CHIANG MAI UNIVERSITY
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I would like to express my sincere gratitude and appreciation to the lecturers and researchers for their scholarship, and to the members of the CMU Abstract Committee, without whose invaluable efforts, the compilation of this publication would not have been possible.

Pongsak Angkasith, Ed.D.
President
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RECOVERY FROM LIPODYSTROPHY IN HUMAN IMMUNODEFICIENCY VIRUS–INFECTED CHILDREN AFTER SUBSTITUTION OF STAVUDINE WITH ZIDOVUDINE IN A NON–NUCLEOSIDE REVERSE TRANSCRIPTASE INHIBITOR–BASED ANTIRETROVIRAL THERAPY

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ABSTRACT

Background: Substitution of stavudine with zidovudine may lead to recovery from lipodystrophy (LD) in human immunodeficiency virus (HIV)-infected children. Methods: We prospectively followed HIV-infected children enrolled in an earlier LD study conducted between 2002 and 2004 at Chiang Mai University Hospital in northern Thailand. In 2006, stavudine was substituted with zidovudine. All children were evaluated by a clinical LD checklist modified from that of the European Pediatric LD study group together with waist/hip measurement at baseline and 24, 48, 72, and 96 weeks after substitution. The waist-to-hip ratios were converted to age- and sex-adjusted z scores based on normal ranges in healthy Thai children. Results: Forty-five lipodystrophic children with 36 episodes of lipohypertrophy and 22 episodes of lipoatrophy were enrolled. By weeks 48 and 96 after substitution, 40% and 47% of lipohypertrophy resolved, whereas 59% and 73% of lipoatrophy resolved, respectively. The rate of resolution of lipoatrophy was higher than that of lipohypertrophy at 48 weeks after substitution and thereafter. Ninety-six weeks after changing to zidovudine therapy, 8 children still had LD (1 with both lipoatrophy and lipohypertrophy, 7 with lipohypertrophy). No clinically significant hematologic adverse event was observed. Conclusion: Substitution of stavudine with zidovudine resulted in decreased severity or resolution of LD among HIV-infected children and adolescents.
SECOND-LINE ANTIRETROVIRAL THERAPY FOR
HIV-INFECTED CHILDREN
IN RESOURCE LIMITED SETTINGS

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ABSTRACT

Pediatric antiretroviral treatment programs have been rolled out in resource limited settings, providing lifesaving treatment to approximately 300,000 HIV-infected children. The standard first-line antiretroviral regimen is a non-nucleoside reverse transcriptase plus 2 nucleoside reverse transcriptase inhibitors (NRTIs). A meta-analysis showed that 70\% of children achieved virologic suppression after 12 months of first line therapy. This article presents the challenges in diagnosis of treatment failure in resource limited settings and reviews the current guidelines for management of HIV-infected children with second-line antiretroviral therapy. The details of antiretroviral drugs recommended for second line regimens are summarized. The current standard second-line regimen is a boosted protease inhibitor-based regimen plus recycling NRTIs. The potential role of new ARV drug classes for second-line regimen is addressed.

A PHANTOM STUDY OF IMPACT FROM DIFFERENT DEGREE OF THE MAIN MAGNETIC FIELD PERTURBATIONS OF MRI SCANNER ON T2* MEASUREMENTS

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ABSTRACT

Objectives: To determine the levels of main magnetic field inhomogeneity that potentially affect to the accuracy of the T2* measurements in phantom. Methods: The magnetic field uniformity of a 1.5 Tesla MRI scanner was measured under normal condition and 7 different levels of perturbations. The change of T2* of a gel phantom incorporated 8 different concentrations of Ferric iron, was monitored along with the levels of main magnetic field inhomogeneity. The correlation between the levels of main magnetic field inhomogeneity and measured T2* was evaluated by 2 way analysis of variance (2 way ANOVA). The range of magnetic field inhomogeneity affected measured T2* was evaluated by pair-Test based on Fisher's least significant different (LSD) analysis at 95% confident interval. The fitting model used to evaluate for T2* values was the simple mono-exponential model running on MATLAB 7.0.1 (Mathworks, Natick, MA, USA). The percent coefficient of variance (%CV) of mean T2* in each concentration of Fe3+ was measured. Results: The two-way ANOVA demonstrated that magnetic field inhomogeneity (ppm) significantly affected to T2* values with 95% confident interval (P=0.000). Fisher's least significant different analysis showed that magnetic field inhomogeneity under 0.90 ppm resulted in significant differences (95% confident interval with p=0.100) of mean T2* measurements. In addition, main magnetic field inhomogeneity showed greater impact to T2* values at upper 20 milliseconds than lower 20 milliseconds with the ranges of percent coefficient of variation (%CV) = 3.15-4.85 and 0.63-3.17 respectively. Conclusion: Magnetic field homogeneity affected the accuracy of T2* measurement. It was shown that when perturbation of main magnetic field was below 0.90 ppm, the accuracy of T2* measurements tended to have no effect. The results also showed that ferric iron concentrations of 1.0-2.0 mg/g wet weight or T2* values was lower than 20 milliseconds, the impact to T2* values due to external magnetic field perturbation tended to be reduced for T2* measurements at the ranged of 10.2-50.7 milliseconds.

KEYWORDS: MRI Quality Control, phantom, T2* measurement, main magnetic field homogeneity

Published in Bulletin of Chiang Mai Associated medical Sciences, 2011, 44(1) 45-52.
A PROPHYLACTIC EFFECT OF PROPRIOEPTIVE 
NEUROMUSCULAR FACILITATION (PNF) STRETCHING ON 
SYMPTOMS OF MUSCLE DAMAGE INDUCED BY 
ECCENTRIC EXERCISE OF THE WRIST EXTENSORS

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ABSTRACT

Stretching with proprioceptive neuromuscular facilitation (PNF) is frequently used before exercise. The prophylactic effect of PNF on symptoms of muscle damage induced by eccentric exercise of the wrist extensors was examined in this study. Twenty-eight healthy males were randomly divided into the PNF group (n = 14) and the control group (n = 14). PNF was used before eccentric exercise induction in the wrist extensors. All subjects were tested to examine muscle damage characteristics including sensory-motor functions at baseline, immediate and from 1st to 8th days after the exercise-induced muscle damage (EIMD). The results demonstrated that the PNF group showed a lesser deficit in some sensory-motor functions (p < 0.05) than the control group. The prior PNF stretching application could be useful for attenuating the signs and symptoms of muscle damage after eccentric exercise.

EFFECTS OF CONTINUOUS AND ACCUMULATED BRISK WALKING ON FUNCTIONAL CAPACITY AND LIPID PROFILE IN SEDENTARY WORKERS

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ABSTRACT

Objective: To determine the effects of continuous and accumulated brisk walking with moderate intensity on functional capacity and lipid profile in sedentary workers. Methods: Sedentary and healthy twenty seven subjects, aged 40-59 years from Pasang hospital, Amphur Pasang, Lumpoon province were recruited. They were assigned into 2 groups either a 30 minutes continuous exercise group (30 mins x 1) or a 30 minutes accumulated exercise group (15 mins x 2). They were directed to walk briskly with moderate intensity, 3 days a week for 8 weeks. The exercise intensity was monitored with the Polar wireless chest strap throughout the study. Measurements of functional capacity determining from 6-MWT, and lipid profiles including total cholesterol, triglyceride, LDL-cholesterol and HDL-cholesterol were taken before and after the program. Results: At the end of study, the functional capacity for both brisk walking groups were significantly improved (P<0.05). However, both groups had significant lower HDL-cholesterol level (P<0.05). Total cholesterol, triglyceride and LDL-cholesterol were not changed statistically for both groups. There were no differences in functional capacity and lipid profiles between groups for changes in functional capacity and lipid profiles from pre- to post-intervention. Conclusion: Both continuous and accumulated of 30-min brisk walking with moderate intensity, 3 days a week for 8 weeks had beneficial to improve functional capacity, but fails to alter cardiovascular disease risk factors in sedentary people aged 40-59 years.

Published in Journal of Medical Technology and Physical Therapy, 2011, 23(2) 177-85.
EFFECTS OF EXECUTIVE FUNCTION AND ATTENTION ON GAIT IN INDIVIDUALS WITH MILD COGNITIVE IMPAIRMENT

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ABSTRACT

Recent evidence indicates that walking involves higher cognitive function. Cognitive declines in individuals with mild cognitive impairment (MCI) are associated with gait deterioration. The role of specific cognitive function on gait performance is, however, not well understood. The aim of the present study was to investigate the effects of executive function and attention on gait performance in individuals with amnestic MCI (aMCI). Subtraction task and backward digit span task were used to assess executive function and attention, respectively. Fifteen individuals with aMCI (mean age 76.40 ± 5.93 years) and 15 healthy age- and gender-matched controls (mean age 76.67 ± 6.75 years) participated in the study. Mean gait parameters (velocity, stride length, swing time) and gait variability (stride length and swing time) were measured under single-task and dual-task conditions. The dual-task conditions were walking while performing: 1) serial 3 subtraction test and 2) backward digit span test. Mixed model repeated measures ANOVA was conducted to address the research questions. A level of significance was set at p < 0.05. The results revealed that participants with aMCI showed significant slower gait velocity, shorter stride length, and higher stride length variability than controls (group effect, p < 0.05). As for the effect of cognitive load, both groups had slower gait velocity, shorter stride length, greater swing time, larger swing time and stride length variability in dual-task compared to single-task conditions (condition effect, p < 0.05). Each cognitive task had similar effects on gait performance of participants with aMCI and controls except for the backward digit span task where participants with aMCI demonstrated markedly increased gait unsteadiness as indicated by increased dual-task cost of swing time variability compared to controls (group X condition interaction; p = 0.028). This finding suggests that individuals with aMCI may have insufficient attentional capacity to divide attention between walking and performing the digit span task. Therefore, early gait deterioration in individuals with aMCI may be detected by using the dual-task paradigm with attentional load being the secondary task.

Published in Thai Journal of Physical Therapy (in press).
EFFICACY OF AN INSOLE SHOE-WEDGE AND AUGMENTED PRESSURE SENSOR FOR GAIT TRAINING IN INDIVIDUALS WITH STROKE

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ABSTRACT

Objective: To determine whether external feedback to promote symmetrical weight distribution during standing and walking would improve gait performance and balance in people with stroke. Design: Randomized, controlled, assessor-blinded trial. Setting: Rehabilitation unit and physical therapy department. Subjects: Thirty five individuals with stroke (mean (SD) age = 53.0 (9.3) years) were randomly assigned to an experimental (n = 17) or control group (n = 18). Time post stroke was less than 6 months for most subjects (n = 27). Interventions: Subjects participated in 15 rehabilitation sessions including 30-minutes of gait re-training per session. During gait re-training, the experimental group used an insole shoe-wedge and sensors (I-ShoWS) while the control group received a conventional program. I-ShoWS consisted of a wedge insole and footswitch for the non-paretic leg and a pressure sensor on the paretic leg. Outcome measures: Gait speed, step length and single support time asymmetry ratio, balance, and amount of load on paretic leg during stance were evaluated twice: one day before and after training. Results: The experimental group demonstrated significant increase in standing and gait symmetry than the control group (p < 0.05). They demonstrated 3 times greater improvement in gait speed than the control group (p = 0.02). Balance improvement was significantly greater for the experimental than the control group (p < 0.05). Conclusion: Gait re-training using I-ShoWS was more effective in restoration of gait speed, standing and walking symmetry and balance than a conventional treatment program. These results indicate the benefit of implementing feedback during gait re-training.

Published in Clinical Rehabilitation, 2011, 25:360-369.
FREE-BREATHING TECHNIQUE FOR MYOCARDIAL T2* MEASUREMENT WITH GRE MULTI-ECHOES PULSE SEQUENCE

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⁴Cardiac Electrophysiology Research and Training Center, Department of Physiology, Faculty of Medicine, Chiang Mai University, Chiang Mai 50200, Thailand.

ABSTRACT

Accuracy, reproducibility and selected curve fitting model for the T2* measurement depend on Signal to Noise Ratio (SNR) and resolution of MR images. Currently, single breath-hold technique for cardiac T2* measurement has been used in most centers. The limitation of this technique is that acquisition time is constrained by the breath-holding capability in each individual resulting in limited SNR and resolution on images. We propose an optimized free-breathing technique to assess myocardial T2* employing a navigator pre-pulse to reduce motion artifact. This technique improved the resolution and SNR by approximately 40% resulting in better inter-study and intra-observer reproducibility, as well as less dependent to the curve fitting algorithms.

IMPROVED FAT SUPPRESSION WITH THE USE OF CHESS AND NATURAL RUBBER PAD

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ABSTRACT

Rapid change of magnetic susceptibility at air/tissue interface such as neck can lead to incorrect chemical shift-selective (CHESS) fat suppression on MR imaging. Applying pad devices with CHESS to shift air/tissue interface away from the skin have been used to improve the incomplete fat suppression. We propose Natural Rubber (NR) for building a neck pad to improve local magnetic field inhomogeneity. The study included testing material, building device, and testing on volunteers. The results showed that using the NR pad with CHESS provided completely fat suppression for neck MR imaging both in T1 and T2 weighted along with invisible device.
INHIBITION OF HUMAN TUMOR XENOGRAFT GROWTH IN NUDE MICE BY A NOVEL MONOCLONAL ANTI-HSPG ISOLATED FROM HUMAN LIVER

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ABSTRACT

Heparan sulfate proteoglycans (HSPGs) were isolated from normal human liver and monoclonal antibody (MAb) was raised against them. Preliminary studies showed that MAb clone 1E4-1C2 was able to react with many cell lines tested, including hematopoietic cells and solid tumors. MAb1E4-1C2 was used to study whether HSPG was involved in growth and proliferation of human liver cancer using hepatocellular carcinoma (HCC) cell line (HepG2) as a model. Inhibition by MAb1E4-1C2 of HepG2 cell proliferation was studied in vitro by MTT assay. For in vivo assay, xenograft induction in athymic mice was performed. The results showed that MAb1E4-1C2 inhibited proliferation of HepG2 cells significantly compared to isotype and medium control. MAb1E4-1C2 also retarded the growth of tumor, resulting in smaller tumor size and weight. The investigation also showed that MAb1E4-1C2 inhibited proliferation and retarded tumor growth through the induction of apoptosis. The results suggest that HSPG might be involved in liver cancer cell proliferation. Therefore, a specific MAb that was raised against liver HSPG might be an alternative therapeutic agent for the treatment of human liver cancer.

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N,N,N-TRIMETHYL CHITOSAN NANOPARTICLES FOR THE DELIVERY OF MONOCLONAL ANTIBODIES AGAINST HEPATOCELLULAR CARCINOMA CELLS

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ABSTRACT

N,N,N-Trimethyl chitosan chloride is capable of forming nanocomplexes with protein through ionotropic gelation. A monoclonal antibody, raised against human liver heparan sulfate proteoglycan and specifically inhibiting hepatocellular carcinoma in vitro, was prepared in nanocomplexes of this modified chitosan. The smallest nanocomplexes (59±17 nm, zeta-potential 16.5±0.5 mV) were obtained at polysaccharide:antibody ratios of 5:0.3. Spherical particles with a smooth surface and compact structure having a mean diameter of ~11.20±0.9 nm were investigated by atomic force microscopy. Cellular uptake of fluorescently labeled nanocomplexes was studied in mouse monocyte models of cancer and normal cells. External and internal fluorescence was analyzed by flow cytometry. The results demonstrate that thenanocomplexes could enter cells and were retained for a longer period of time in cancer cells where they exhibited greater toxicity. These nanocomplexes appear safe and could potentially enhance the half-life of added antibodies.

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PRODUCTION OF AN ANTICANINE GLOBULIN (POLYSPECIFIC) REAGENT FOR LABORATORY INVESTIGATION

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ABSTRACT

Objectives: Canine allo- or autoantibodies are clinically important, but attachment of these immunoglobulin G (IgG) antibodies does not produce observable haemagglutination. Antibody to canine globulins is required to demonstrate sensitisation of red blood cells. Commercial reagents are available, but these often differ in sensitivity and specificity. Rabbit anticanine globulins (polyspecific) were produced for use in canine blood compatibility testing and in the investigation of immune-mediated haemolytic anaemia. Methods: Canine sera was pooled, IgG was purified and subsequently used to immunise rabbits. A rising titre of anticanine IgG was demonstrated by indirect enzyme-linked immunosorbent assay. Rabbit anticanine complement was isolated and investigated by agglutination of complement-coated caninered blood cells. Both antibodies were purified and checked for crossreactivity before being combined to polyspecific anticanine globulins. The obtained reagent was used to indicate sensitised canine red blood cells and free antibodies in three different types of clinical samples, including blood for compatibility testing and that for investigation of immune-mediated haemolytic anaemia and screening for post-transfusion alloantibodies and was also compared to commercial Coombs’ reagent. Results: The product provided results in accordance with those from commercial Coombs’ reagent. The sensitivity for canine crossmatching was 100% and specificity for diagnosing immune-mediated haemolytic anaemia was 87%. Clinical Significance: This product is helpful for canine crossmatching purposes and in the investigation of immune-mediated haemolytic anaemia.

PROPHYLACTIC EFFECT OF HOT PACK ON SYMPTOMS OF ECCENTRIC EXERCISE-INDUCED MUSCLE DAMAGE OF THE WRIST EXTENSORS

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ABSTRACT

This study investigated whether hot pack treatment could provide prophylactic effects on muscle damage induced by eccentric exercise of the wrist extensors. Twenty-eight healthy men (age 21 ± 1 years, weight 65 ± 2 kg, height 171 ± 6 cm) were randomly placed into hot pack (n = 14) and control (n = 14) groups. All participants performed an exercise consisting of 300 maximal eccentric contractions of the wrist extensors of the non-dominant arm using an isokinetic dynamometer. A hot pack was applied for 20 min to the wrist extensors of the exercised arm before the exercise for the hot pack group. The control group received no treatment before the exercise. Measured variables included pain intensity assessed by a visual analogue scale and a modified Likert’s scale, cold thermal pain threshold, pressure pain threshold (PPT), range of motion in active wrist flexion (ROM-AF) and extension (ROM-AE), range of motion in passive wrist flexion (ROM-PF) and extension (ROM-PE), grip strength, and wrist extension strength. Changes in these variables before, immediately after, and 1 to 8 days following the exercise were compared between groups by a two-way repeated measures ANOVA. All outcome measures from both groups (except for the cold thermal pain threshold of the hot pack group) demonstrated a significant change within the first 2-3 days following exercise. Significant differences between groups were only found at a single point in time for PPT, ROM-PF, ROM-PE and ROM-AE, and the changes were smaller for the hot pack group in comparison to the control group. These results suggest that the prophylactic effects of hot pack treatment on eccentric exercise-induced muscle damage of the wrist extensors are limited.

SACROILIAC JOINT AND WEIGHT DISTRIBUTION TO FEET:
AN OPINION TOWARDS CLINICAL AND RESEARCH PRACTICE

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ABSTRACT

We enjoyed reading the published manuscript entitled ‘Immediate and lasting improvements in weight distribution seen in baropodometry following a high-velocity, low-amplitude thrust manipulation of the sacroiliac joint.’ by Grassi et al. (2011). We thought of sharing our views on the published article. The authors took a common clinical concept and related it eloquently to sacroiliac joint dysfunction and after effects of sacroiliac manipulation. We would like to comment on few aspects related to record the weight distribution to the feet. Although, use of baropodometry measures are still considered superior compared to using digital weighing scale, the method adopted in the present study creates much interest and queries. The authors collected baropodometry variables such as peak pressure at feet and contact area of feet in standing. We would like to question why the baropodometry measurement was taken in standing and not during walking. This is because the influence of mobility of the sacroiliac joint may be higher during walking rather than standing. Walking is more functional compared to standing. Furthermore, during walking, the sacroiliac joint may be exposed to single leg stance phase where the load might be more exposed to the involved sacroiliac joint as the other side sacroiliac joint remains in swing phase of gait. One may also question the clinical reasoning behind taking pressure difference between the feet as measurement. It is interesting to raise the query why the authors did not consider taking mean peak pressure of the foot concerned with the involved sacroiliac joint. Instead, the authors considered the difference between the feet before and after sacroiliac joint manipulation. As the authors compared the weight distribution to feet before and after sacroiliac joint manipulation, perhaps, it may be appropriate...
to compare the peak pressure at the foot of the manipulated sacroiliac joint rather than comparing the difference between the feet. We believe that the study will be more interesting if the mean peak pressure or contact area of foot of the involved and uninvolved sacroiliac joint are presented separately. This would provide some reference values for practitioners and enable other researchers to cite such a paper. The validity of the diagnostic criteria used to identify sacroiliac joint restriction and dysfunction patients is another questionable fact. As a battery of clinical tests are suggested to identify patients with sacroiliac dysfunction (Arab et al., 2009), one would query the rationale for choosing only long sitting test and other two complementary screening tests. The reason for choosing paired \( t \) test instead of one way repeated ANOVA is questionable as the measurement were taken at three different situations. Also, rationale for using a non-parametric test (Spearman test) and parametric test (paired \( t \) test) for analyzing the same variable raises queries. Absence of intervention effect size and no \( p \) value for correlation tests makes it difficult for readers to apply the study findings in clinical practice. We appreciate the meticulous work by the authors and thank the editor for publishing such informative articles.
SCREENING OF HLA-B*5701 IN HIV INFECTED/AIDS PATIENTS RECEIVING FIRST LINE ANTIRETROVIRAL THERAPY USING DEVELOPED REAL TIME PCR

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ABSTRACT

There are some recent reports that the screening of HLA-B*5701 has helped predicting the occurrence of hypersensitivity to abacavir in HIV infected/AIDS patients. The researcher, therefore, developed Real time PCR method for screening of HLA-B*5701 in the HIV infected/AIDS patients to prevent hypersensitivity to abacavir by collecting the blood samples collected from 147 HIV infected/AIDS patients and first screened for HLA-B17 (HLA-B57 and HLA-B58) by flow cytometry. The results revealed that 22 samples were positive (15%) and 125 samples were negative (85%) for HLA-B17. Then, all of the positive samples were subjected to screening of HLA-B*5701 by the developed Real time PCR. The results revealed that 2 samples were HLA-B*5701 (1.4%). In addition, 88 blood samples of HIV infected/AIDS patients were collected and subjected to screening of HLA-B*5701 by the developed Real time PCR. The results revealed that all of the samples were negative. From this study, 2 samples out of the collected 235 blood samples were HLA-B*5701 positive (0.85%). It can be concluded that the developed Real time PCR can be used for screening HLA-B*5701 which will be useful for planning to prevent the occurrence of hypersensitivity to abacavir before treatment HIV infected/AIDS patients with abacavir.

KEYWORDS: HLA-B*5701, HIV infected patients, AIDS patients, Antiretrovirus, Real time PCR

SENSITIVITY AND SPECIFICITY OF SEVEN MINUTE SCREEN (7 MS) THAI VERSION IN SCREENING ALZHEIMER’S DISEASE

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ABSTRACT

Background: Diagnosis of Alzheimer’s disease (AD) is often delayed due to lack of a simple and effective screening test in primary care settings. Objective: To determine sensitivity and specificity of the validated 7 Minute Screen (7 MS) Thai version in screening elders with mild to moderate AD. Methods: The original 7 MS was translated and modified to be appropriate for Thai elders. The validity and reliability of the test were obtained. The 7 MS was administered to community-dwelling elders in Chiangmai province. AD was diagnosed by a neurologist based on NINCDS-ADRDA criteria. All AD cases were confirmed by MRI. Results: One hundred and forty nine elders (20 AD; mean age 79.10 ± 5.49 yr and 129 non-AD; mean age 74.17 ± 6.88 yr) participated. The Thai version of 7 MS was valid (IOC = 0.96) and reliable (ICC = 0.99). It had a sensitivity of 100% and specificity of 89.9% in discriminating elders with mild to moderately severe AD from non-AD. Conclusion: The Thai version of 7 MS has a high level of sensitivity and specificity for detecting elders with mild to moderate AD. The test is suitable to use in primary care settings since it is simple, can be rapidly administered by allied health professions with minimal training requirement.

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THE EFFECTS OF PILATES TRAINING ON LUMBO-PELVIC STABILITY AND FLEXIBILITY

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ABSTRACT

This study was performed to assess and compare the effects of Pilates exercise on flexibility and lumbo-pelvic movement control between the Pilates training and control groups. A randomized single-blinded controlled design was utilized in the study. Forty healthy male and female volunteers (mean age 31.65 ± 6.21 years) were randomly divided into Pilates-based training (20 subjects) and the control groups (20 subjects). The Pilates group attended 45-minute training sessions, 2 times per week, for a period of 8 weeks. Flexibility and lumbo-pelvic stability tests were determined as outcome measures using a standard “sit and reach test” and “pressure biofeedback” respectively at 0, 4 and 8 weeks of the study. The results showed that the Pilates training group improved flexibility significantly ($P<0.001$) during time intervals. This effect was also significantly greater than the control group for both 4 weeks and 8 weeks of the training period ($P<0.001$). There were 65% and 85% of the subjects from Pilates group passing the lumbo-pelvic stability test at 4 and 8 weeks of training periods respectively. No subjects from the control group passed the test at any stages. Pilates can be used as an adjunctive exercise program to improve flexibility, enhance control-mobility of trunk and pelvic segments. It may also prevent and attenuate the predisposition to axial musculoskeletal injury.

12-WEEK HIGH FAT DIET CONSUMPTION DETERIORATES NEURONAL INSULIN RECEPTOR FUNCTION IN RATS’ BRAIN

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ABSTRACT

The development of abdominal obesity following chronic consumption of a high-fat diet contributes to peripheral insulin resistance. Although the relationship between peripheral insulin resistance and cognitive impairment has been shown, the effect of high-fat consumption and the neurofunctional insulin sensitivity in CA1 hippocampus is unclear. We tested the hypothesis that high-fat diet consumption can lead to peripheral insulin resistance and impair neuronal responses to insulin by using extracellular recording in CA1 hippocampus and the immunoblot technique to determine the neuronal function of insulin receptors (IRs) in rats. In 12-week high-fat-fed (HF) rats, peripheral insulin resistance was observed, but was not found in 4- or 8-week HF rats. The neuronal IR response demonstrated by insulin-mediated long-term depression (LTD) in CA1 hippocampus was diminished in 12-week HF rats. This reduction of insulin-mediated LTD correlated with various parameters of peripheral insulin resistance (p<0.05). However, the impairment of insulin-mediated LTD in hippocampus did not cause any change in paired-pulse ratio and carbachol-induced LTD between both dietary groups, suggesting that the defect of neuronal insulin receptors should have no effect on the presynaptic transmission and should not interrupt other forms of synaptic plasticity. Furthermore, levels of tyrosine phosphorylation of neuronal IR, neuronal IR substrate 1 (IRS-1) and neuronal Akt/PKB in response to insulin was significantly decreased in 12-week HF rats without any change in the level of protein: IR, IRS-1 and Akt/PKB. These findings suggest that neurofunctional insulin resistance can develop at the same time as peripheral insulin resistance in HF rats. The neuronal insulin resistance may lead to neuronal ageing as shown in the reduction of nNOS-immunoreactive neurons in 12-week HF rats with the impairment of neuronal insulin receptors.

Published in Effects of high-fat diet on insulin receptor function in rat hippocampus and the level of neuronal corticosterone. Life Sci. 2011, 88:619-27.
THE CORRELATION BETWEEN THE EXPRESSION OF THE TTX-RESISTANCE SODIUM CHANNELS AND THE AMOUNT OF INFLAMMATORY REACTION IN THE DENTAL PULP OF HUMAN PRIMARY TEETH

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ABSTRACT

The study aimed to investigate whether there are any changes in the amounts of nerve fibers, Naᵥ1.8 and Naᵥ1.9 expression in inflamed dental pulp of primary teeth compared to normal teeth and to demonstrate the correlation between Naᵥ1.8 and Naᵥ1.9 expression and dental pain intensity. Subjects attending this study were patients with inflamed primary teeth diagnosed with reversible or irreversible pulpitis and required extraction (n = 9-16). Patients with normal primary teeth (n = 5-7) and normal permanent teeth (n = 5-18) served as a negative control group and patients with permanent teeth diagnosed with irreversible pulpitis (n = 5-7) served as a positive control group. After accomplishment of dental pain assessment in each patient, dental pulp from each tooth was harvested. The amounts of Naᵥ1.8 and Naᵥ1.9 expression were quantified using western blot method. The general neuron marker, protein gene product 9.5 (PGP9.5), was used to quantify the neural density and matrix metalloproteinase-9 (MMP-9) was used to indicate relative degrees of pulp inflammation. It was found that only Naᵥ1.8 expression was upregulated in inflamed dental pulp of primary teeth. There was no change in overall neural density between normal and inflamed teeth in primary teeth. No correlation between the expression of both Naᵥ1.8 and Naᵥ1.9 and dental pain intensity was found in primary teeth. These findings suggest that Naᵥ1.8 but not Naᵥ1.9 plays an important role in chronic pulpal inflammation of primary teeth. Therefore, Naᵥ1.8 may be a potential target for the treatment of chronic inflammatory pain in primary teeth.

Published in Na(V) 1.8, but not Na(V) 1.9, is upregulated in the inflamed dental pulp tissue of human primary teeth; Int Endod J. November 16th, 2011. doi: 10.1111/j.1365-2591.2011.01986.x.
THE RESPONSE OF NERVE FIBERS TO PULPAL INFLAMMATION AND PULPAL PAIN IN HUMAN PRIMARY TOOTH PULP

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ABSTRACT

This study aimed to determine the correlation between pulpal inflammation and nerve fibers in human primary tooth pulp and to determine the correlation between pulpal pain and nerve fibers in human primary tooth pulp. Subjects attending this study were patients with inflamed primary teeth diagnosed with reversible or irreversible pulpitis and required extraction (n = 9-16). Patients with normal primary teeth (n = 5-7) and normal permanent teeth (n = 5-18) served as a negative control group and patients with permanent teeth diagnosed with irreversible pulpitis (n = 5-7) served as a positive control group. After accomplishment of dental pain assessment in each patient, dental pulp from each tooth was harvested. The amounts of protein gene product 9.5 (PGP9.5) and matrix metalloproteinase-9 (MMP-9) expression were quantified using western blot method. The general neuron marker, protein gene product 9.5 was used to quantify the neural density and matrix metalloproteinase-9 was used to indicate relative degrees of pulpal inflammation. It was found that no correlation between pulpal inflammation and nerve fibers in human primary tooth pulp and no correlation between pulpal pain and nerve fibers in human primary tooth pulp.

Published in Na(V) 1.8, but not Na(V) 1.9, is upregulated in the inflamed dental pulp tissue of human primary teeth; Int Endod J. November 16th, 2011. doi: 10.1111/j.1365-2591.2011.01986.x.
A HIV-INFECTED ADOLESCENT WITH POLYCYSTIC OVARY SYNDROME RUNNING TITLE: HIV AND POLYCYSTIC OVARY SYNDROME

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ABSTRACT

We report a case of polycystic ovary syndrome in a 15-year-old human immunodeficiency virus-infected female on highly active antiretroviral therapy who developed hypertriglyceridemia, hyperinsulinemia due to insulin resistance, and hyperandrogenism. Ultrasonography showed multiple small follicles at the right ovary and lobulated follicles at the left ovary. Treatment of polycystic ovary syndrome included insulin sensitizing agents (metformin, pioglitazone) and a contraceptive for hyperandrogenism. We also encouraged life style modification including regular exercise and dietary fat restriction. She attained menarche 1 month after initiation of treatment.

A NOVEL INFLUENZA A H1N1 CLINICAL MANIFESTATIONS IN PATIENTS AT CHIANG MAI UNIVERSITY HOSPITAL

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ABSTRACT

Objective: To describe the clinical manifestations of patients affected with a novel influenza A (H1N1 2009) during the pandemic. Material and method: A retrospective study was conducted in patients with influenza-like illness receiving care at Chiang Mai University Hospital between June 1 and September 30, 2009. The inclusion criteria were as follows 1) patients had influenza-like illness that was defined as fever, with cough and/or sore throat, 2) detection of influenza A H1N1 2009 by real-time polymerase chain reaction (RT-PCR) from nasopharyngeal swabs or throat swabs. Results: Among 278 patients, 150 patients (54.0%) were male and the mean age was 21.4 +/- 13.1 years (range 1-74). Eighty-seven patients (31.3%) were in age group 15-19 years. Fifty-eight patients (20.9%) had underlying diseases and asthma was the most common health problem. The presenting symptoms were cough (dry or productive) (248 patients, 89.2%), fever > or = 38.0 degrees C (229 patients, 82.4%), sore throat (195 patients, 70.1%), rhinorrhea (126 patients, 45.3%) and myalgia (113 patients, 40.6%). Five patients had co-infection at admission, three patients had dengue hemorrhagic fever, one patient had mycoplasma infection, and the other one with Acinetobacter Iwoffi bacteremia. One hundred forty four patients (51.8%) received oseltamivir. Two hundred seventy two patients (97.8%) recovered without complications. One pregnant-woman developed severe pre-eclampsia five days after the first symptom, one patient developed Guillain Barre syndrome 10 days after the first symptoms. Four patients died, all had pneumonia. Conclusion: Younger people were more likely to be infected with influenza A H1N1 2009. The clinical manifestations were similar to the seasonal influenza. However, the mortality rate was much higher, particularly in patients who developed pneumonia. In this study, all patients who died had existing underlying medical conditions.

A PHASE II STUDY OF DOCETAXEL AND CARBOPLATIN WITH CONCURRENT RADIATION THERAPY FOR LOCALLY ADVANCED HEAD AND NECK CANCER

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ABSTRACT

Objective: In this study we evaluate the clinical response and safety profile of a regimen of docetaxel+carboplatin concurrent with radiotherapy (RT) in locally advanced squamous cell carcinoma of head and neck (HNSCC). Methods: Between January 2006 and December 2008, we enrolled 38 patients (stage IVA: 29 patients; stage III: 9 patients). Fourteen had oral cavity cancer (tongue 10, buccal mucosa 2, alveolar ridge 1, floor of mouth 1), 10 had oropharyngeal cancer (base of tongue 5, tonsil 5), 13 had laryngeal cancer, and 1 had maxillary sinus cancer. Patients received concurrent docetaxel 15 mg/m² 1-h infusion plus carboplatin AUC of 2, 30-min infusion on days 1, 8, 15, 22, 29, and 36. RT began on day 1 of concurrent chemotherapy with 2 cGy/fraction, 5 fractions/week (total dose: 66-70 cGy). Tumor was assessed by CT scan 3 months post-completion of concurrent chemoradiotherapy. Results: Thirty-five patients were evaluated (2 refused to receive all treatments, 1 had serious adverse event [rash, wheezing] from docetaxel first dose). The primary study endpoint of clinical response was achieved in 26 (74.3%) patients, 6 (17.1%) had stable disease, and 3 (8.6%) had disease progression. The 2-year disease-free survival was 62.9% (CI: 45.85-79.95%). The 2-year overall survival was 64.1% (CI: 43.52-84.68%). The most common Grade 3 toxicities were mucositis, xerostomia and dysphagia (13.9% each) and dermatitis (11%). No Grade 4 toxicities were observed. Conclusion: In conclusion, this study with a limited number of patients, docetaxel+carboplatin concurrent with RT appears to show acceptable activity and is generally well tolerated in patients with locally advanced HNSCC.

A RETROSPECTIVE STUDY COMPARING HYPOFRACTIONATED RADIOTherAPy AND CONVENTIONAL RADIOTherAPy IN POSTMASTECTOMY BREAST CANCER

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ABSTRACT

Background: The conventional radiotherapy (CRT) in postmastectomy breast cancer is 1.8-2.0 Gy daily for 25 fractions, while hypofractionated radiotherapy (HFRT) delivered dose in fewer fractions with larger radiation intensity. The present study compares the efficacy of HFRT and CRT. Material and method: From 2004 to 2006, 215 patients were retrospectively reviewed. Sixty seven patients received CRT and 148 patients received HFRT (2.65 Gy in 16-18 fractions). Five-year locoregional control (LRC), disease free survival (DFS), overall survival (OS) and toxicities were analyzed. Results: Median follow-up was 39 months. Five-year LRC was 86.6% in CRT and 85.8% in HFRT (p = 0.852). Five-year DFS was 62.7% and 69.6% (p = 0.136) in CRTand HFRT respectively. Patients who received HFRT had significant increase in 5-year OS (62.7% and 73.0% (p = 0.048). No difference of toxicities including changes in chest wall appearance, skin fibrosis, brachial plexopathy, arm edema, pulmonary fibrosis, rib fractures and cardiovascular events was found between two groups. Conclusion: HFRT is as effective as CRT in postmastectomy breast cancer.

ACCUMULATION OF CALCIUM AND PHOSPHORUS IN THE CORONARY ARTERIES OF THAI SUBJECTS

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ABSTRACT

To clarify the manner of accumulation of Ca and P in the coronary arteries, the authors divided the coronary arteries into many segments based on arterial ramification and investigated the element contents of the segments by direct chemical analysis. After ordinary dissection at Chiang Mai University was finished, the left coronary (LC) and the right coronary (RC) arteries were removed successively from the hearts of Thai subjects. The Thai subjects consisted of seven men and five women, ranging in age from 42 to 87 years (average age = 73.9 ± 13.5 years). The LC and the RC arteries were divided into 19 segments based on arterial ramification. After incineration with nitric acid and perchloric acid, element contents of the segments were analyzed by inductively coupled plasma-atomic emission spectrometry. In two cases, a significant content of Ca and P was contained only in the left anterior descending (LAD) artery (type I). In four cases, a significant content of Ca and P was contained in both the LAD and the RC arteries (type II). In five cases, a significant content of Ca and P was contained in all the LAD, the RC, and the circumflex (CF) arteries (type III). In the other one case, no significant content of Ca and P was contained in the coronary arteries. The manner of accumulation of Ca and P in the coronary arteries was classified into the three types, I, II, and III. Regarding the average content of elements in 12 cases, the average content of Ca was the highest in the segment of the LAD artery ramifying the first left diagonal artery and was higher in the proximal and distal adjacent segments of the LAD artery ramifying the first left diagonal artery, the proximal segment of the RC artery, and the proximal segment of the CF artery. To examine an effect of arterial ramification on accumulation of Ca and P, the differences in the Ca and P content between artery-ramifying and non-ramified proximal or distal segments of the coronary arteries were analyzed with Student’s t test. It was found that there were no significant differences in the Ca and P content between the artery-ramifying and non-ramified proximal or distal segments of the coronary arteries.

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AGE-RELATED CHANGES OF ELEMENTS AND RELATIONSHIPS AMONG ELEMENTS IN HUMAN HIPPOCAMPUS, DENTATE GYRUS, AND FORNIX

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ABSTRACT

To elucidate compositional changes of the limbic system with aging, the authors investigated age-related changes of elements in the hippocampus, dentate gyrus, and fornix and the relationships among elements by direct chemical analysis. After ordinary dissections at Nara Medical University were finished, the hippocampi, dentate gyri, and fornices were resected from identical cerebra of the subjects which consisted of 23 men and 23 women, ranging in age from 70 to 101 years. After ashing with nitric acid and perchloric acid, element contents were determined by inductively coupled plasma-atomic emission spectrometry. The average contents of P, Zn, and Na were significantly less in both the hippocampi and dentate gyri compared with the fornices. It was found that the Ca and Mg contents increased significantly in the hippocampus with aging; the P content increased significantly in the dentate gyrus with aging, whereas the Na content decreased in the dentate gyrus with aging; and the Mg content increased significantly in the fornix with aging. Regarding the relationships among elements, a significant direct correlation between Ca and Fe contents and an extremely significant inverse correlation between P and Zn contents were found in both the hippocampi and dentate gyri. In addition, a significant direct correlation between P and Mg contents was found in both the hippocampi and fornices. Pearson's correlation was used to examine whether there were elements with significant correlation among the hippocampus, dentate gyrus, fornix, and mammillary body. Significant correlations were found in five elements of Ca, P, Mg, Zn, and Fe except for S and Na among the hippocampus, dentate gyrus, and mammillary body with one exception. Regarding the fornix, significant correlations were found in two elements of P and Fe between the fornix and hippocampus, dentate gyrus, or mammillary body.

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ALIMENTARY CANAL OF THE BLOW FLY CHRYsomya MegACEPhala (F.) (Diptera: CALLiphoridae): AN EMPHASIS ON DISSECTION AND MORPHOMETRY

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ABSTRACT

The alimentary canal is a major organ system that is often involved in the transmission of pathogens to humans from insects that serve as vectors of disease. In this study, we investigated the alimentary canal of the blow fly, Chrysomya megacephala (F.) (Diptera: Calliphoridae), highlighting the description for dissection and morphometric analysis of each organ. Dissection was performed in a phosphate buffer solution (pH=7.4) on 3rd instar larvae (three to four days old) and on both male and female adults (seven days old). Larval dissection was accomplished using two fine forceps to open the specimens from the posterior end and proceed anteriorly toward the cephalic segment. Meticulous dissection of the anterior end was vital for observation of the delicate salivary ducts, crop duct, and esophagus. Overall length of the 3rd instar alimentary canal measured 89.15 mm (range 81.40-99.70 mm). The midgut comprised the longest portion, measuring 46.35 mm (range 40.00-52.00 mm; n = 30) of the entire canal. Adult dissection was also performed from abdomen to head. Morphometric analyses revealed that the alimentary canal of males and females were relatively similar. No statistical differences were found between the entire length of the alimentary canal from mouth to anus (excluding all branches of the salivary glands, crop, and Malpighian tubules) of males and females. The alimentary canals of males measured 36.23 mm (range 32.60-41.20 mm) in length; whereas, those of females measured 37.23 mm (range 32.70-42.15 mm). Two-thirds of the entire canal length was comprised of midgut in each sex.

ALKALINE CITRATE REDUCES STONE RECURRANCE AND REGROWTH AFTER SHOCKWAVE LITHOTRIPSY AND PERCUTANEOUS NEPHROLITHOTOMY

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ABSTRACT

Objective: To evaluate the preventive effects of alkaline citrate on stone recurrence as well as stone growth post-ESWL or PCNL in patients with calcium-containing stones. Materials and methods: A total of 76 patients with calcium calculi who were stone-free or had residual stones less than 4 mm following ESWL and PCNL were enrolled. All patients were independently randomized into two groups. The treated group (N = 39) was given 81 mEq per day of oral potassium-sodium citrate (27 mEq three times a day), and the untreated group (N = 37) serving as controls. Blood, twenty-four hour urine analysis, and plain KUB were measured and compared at the baseline and after 12 months. Results: At baseline, hypocitraturia was found in 20 of 39 patients (46.05%) of Group I and 15 of 37 patients (40.5%) of Group II. At 12 months, hypocitraturia was found in 3 of 39 (7.69%) and 14 of 37 (37.83%) of Group I and Group II, respectively (p = 0.007). At the 12 month follow-up, of the stone-free group, 92.3% of the treated group and 57.7% of the control group were still stone free. Of the residual stone group, 30.8% and 9.1% of treated and control group were stone-free, respectively. The increased stone size found in 7.7%) and 54.5%) of treated and control groups, respectively. Conclusion: Sodium-potassium citrate provides positive effects on stone-forming activities in calcium stone patients suffering from urolithiasis following treatment with ESWL and PCNL procedures at the 12-month follow-up.

ALLERGIC RHINITIS AND IMMUNOGLOBULIN DEFICIENCY IN PRESCHOOL CHILDREN WITH FREQUENT UPPER RESPIRATORY ILLNESS

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ABSTRACT

Background: Frequent upper respiratory illness (URI) is a common problem in preschool children. Allergic rhinitis and immunoglobulin (Ig) deficiency are usually suspected as underlying etiologies. Objective: To determine the prevalence of allergic rhinitis and Ig and IgG subclass deficiency in preschool children with frequent URI. Methods: Two thousand eight hundred and seventy-six questionnaires were distributed to the parents of children aged 3-6 years in 24 kindergartens. Firstly, they determined the frequency of URI in the previous year and secondly the prevalence of rhinitis according to the International Study of Asthma and Allergies in Childhood (ISAAC) questionnaire. The skin prick test (SPT) was performed and serum Ig and IgG subclasses were measured in children with frequent URI (> or = 10 episodes per year). Allergic rhinitis was diagnosed when the child had had rhinitis in the previous 12 months and positive SPT for at least 1 aeroallergen. Results: Two thousand eight hundred and seventy-six questionnaires (80.01%) were returned. Ninety-four out of 219 children with frequent URI participated in the study. The prevalence of allergic rhinitis in the participants was 42.55%. Exclusive breastfeeding for at least 6 months had a protective effect, while paternal history of rhinitis was a risk factor. All participants had normal serum IgG, IgA, IgM and IgG subclass levels for age. Conclusions: The prevalence of allergic rhinitis in preschool children with frequent URI in our study was 42.55%. Allergic rhinitis should be considered if they have a family history of allergic rhinitis. Immunoglobulin deficiency was not found in our study.

ANOPHELES (CELLIA) RAMPAE N. SP., ALIAS
CHROMOSOMAL FORM K OF THE ORIENTAL MACULATUS
GROUP (DIPTERA: CULICIDAE) IN SOUTHEAST ASIA

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ABSTRACT

Chromosomal form K (also known as species K) of the Anopheles maculatus
group of sibling species in the Oriental Region is diagnosed and formally named
An. (Cellia) rampae Harbach & Somboon, n. sp. The male genitalia, pupa and
fourth-instar larva are illustrated and information is provided on the morphology,
systematics, bionomics and distribution of the species.

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ANTIBODY RESPONSES TO HEPATITIS A VIRUS VACCINATION IN THAI HIV-INFECTED CHILDREN WITH IMMUNE RECOVERY AFTER ANTIRETROVIRAL THERAPY

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ABSTRACT

The prevalence of hepatitis A virus (HAV) protective antibody in 98 Thai HIV-infected children who achieved immune recovery after antiretroviral therapy was 12.2%. After a 2-dose HAV vaccination, 98.8% (85 of 86 children) seroconverted. The geometric mean titer was 520.95 mIU/mL. In a multivariate analysis, female gender, age <12 years and higher CD4 lymphocyte count at enrollment were predicting factors for high (≥250 mIU/mL) HAV antibody response.
BIOMECHANICAL COMPARISON OF LESSER TUBEROSITY OSTEOTOMY VERSUS SUBSCAPULARIS TENOTOMY IN TOTAL SHOULDER ARTHROPLASTY

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ABSTRACT

Background: Total shoulder arthroplasty is traditionally performed through an anterior deltopectoral exposure with subscapularis tenotomy. Postoperative subscapularis dysfunction is common and adversely affects clinical outcomes. Consequently, surgeon interest in lesser tuberosity osteotomy has grown in an effort to improve subscapularis repair strength. This study investigated the biomechanical strength of subscapularis tenotomy vs lesser tuberosity osteotomy in the setting of total shoulder arthroplasty. Materials and methods: Uncemented humeral prostheses were placed in 20 paired upper extremities from 10 cadavers. For each respective cadaver, 1 limb underwent lesser tuberosity osteotomy and the contralateral limb underwent subscapularis tenotomy. The cadaveric specimens then underwent cyclic displacement and maximum load to failure testing. Results: The subscapularis tenotomy specimens exhibited significantly less cyclic displacement (0.8 mm) than the osteotomy group (1.8 mm), with a 95% confidence interval (CI) for the difference of 0.5 to 1.5 mm (P ¼ 0.002). The maximum load to failure was 439 _ 96 N for tenotomy and 447 _ 89 N for osteotomy (95% CI for the difference of _58 to 75), which was not significant (P ¼ .78). Conclusion: Lesser tuberosity osteotomy was not significantly stronger than subscapularis tenotomy in maximum load to failure testing, with minimal clinical significance set at 100 N. Subscapularis tenotomy repair showed statistically significant less cyclic displacement than lesser tuberosity osteotomy. Further research is needed to clarify how the biomechanical results immediately after subscapularis tenotomy and lesser tuberosity osteotomy correlate with clinical outcomes.

BIOMECHANICAL COMPARISON OF THREE FIXATION TECHNIQUES USED FOR FOUR-CORNER ARTHRODESIS

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ABSTRACT

Clinical results following four-corner arthrodesis vary and suggest that nonunion may be related to certain fixation techniques. The purpose of our study was to examine the displacement between the lunate and capitate following a simulated four-corner arthrodesis with the hypothesis that three types of fixation (Kirschner wires, dorsal circular plate, and a locked dorsal circular plate) would allow different amounts of displacement during simulated wrist flexion and extension. Cadaver wrists with simulated four-corner arthrodeses were loaded cyclically either to implant failure or until the lunocapitate displacement exceeded 1 mm. The locked dorsal circular plate group was significantly more stable than the dorsal circular plate and K-wire groups (p = 0.018 and p = 0.006). While these locked dorsal circular plates appear to be very stable our results are limited only to the biomechanical behavior of these fixation techniques within a cadaver model.
BONE MINERAL DENSITY: CORRELATION BETWEEN THE LUMBAR SPINE, PROXIMAL FEMUR AND RADIUS IN NORTHERN THAI WOMEN

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ABSTRACT

Objective: To determine the correlation of bone mineral density (BMD) in lumbar spine, proximal femur and 1/3 radius in northern Thai women. Materials and method: The data of this study was collected from the medical records and the BMD results of 885 perimenopausal and postmenopausal women who had the BMD measurement in Division of Nuclear Medicine, Department of Radiology, Faculty of Medicine, Chiang Mai University between January and December 2007. BMD was measured using dual-energy X-ray absorptiometry (Hologic, QDR-4500C). Results: Mean age (± SD) was 58.7 ± 9.9 year. The lowest T-score was found 51.6% at lumbar spine (LS), 29.2% at 1/3 radius, 13.8% at femoral neck (FN), 2.9% at total femur (TF) and 2.5% at trochanter region (TR). We found a significant correlation between age, BMI, duration of menopause, and BMD at the LS, TF, FN, TR and 1/3 radius (p < 0.01). The correlation between the BMD measures at LS and TF, FN, TR and 1/3 radius were 0.708, 0.667, 0.721 and 0.633, respectively (p < 0.01). Women with perimenopausal status had higher height and BMD values at all five observed sites than postmenopausal women (p < 0.01). Conclusion: The present found a good correlation of the BMD from various skeletal sites. Interestingly, the correlation was found highest between the LS vs. TR and TF vs. TR region. Clearly, estrogen-deficient plays important role on the low BMD values in all skeletal sites.

CAROTID ENDARTERECTOMY FOR SYMPTOMATIC CAROTID STENOSIS

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ABSTRACT

Background: Severe narrowing (stenosis) of the carotid artery is an important cause of stroke. Surgical treatment (carotid endarterectomy) may reduce the risk of stroke, but carries a risk of operative complications. Objectives: To determine the balance of benefit versus risk of endarterectomy plus best medical management compared with best medical management alone in patients with a recent symptomatic carotid stenosis (i.e. transient ischaemic attack (TIA) or non-disabling stroke). Search strategy: We searched the Cochrane Stroke Group Trials Register (July 2010), MEDLINE (1966 to March 2010), EMBASE (1990 to March 2010) and three other databases, and handsearched relevant journals and reference lists. Selection criteria: Randomised controlled trials. Data collection and analysis: Two review authors independently selected studies and extracted the data. Main results: We included three trials. As the trials differed in the methods of measurement of carotid stenosis and in the definition of stroke, we did a pooled analysis of individual patient data on 6092 patients (35,000 patient years of follow-up) after reassessment of the carotid angiograms and outcomes from all three trials using the primary electronic data files and redefined outcome events where necessary to achieve comparability. On re-analysis, there were no statistically significant differences between the trials in the risks of any of the main outcomes in either of the treatment groups or in the effects of surgery. Surgery increased the five-year risk of ipsilateral ischaemic stroke in patients with less than 30% stenosis (N = 1746, absolute risk reduction (ARR) -2.2%, P = 0.05), had no significant effect in patients with 30% to 49% stenosis (N = 1429, ARR 3.2%, P = 0.6), was of marginal benefit in patients with 50% to 69% stenosis (N = 1549, ARR 4.6%, P = 0.04), and was highly beneficial in patients with 70% to 99% stenosis without near-occlusion (N = 1095, ARR 16.0%, P < 0.001). However, there was no evidence of benefit (N = 262, ARR -1.7%, P = 0.9) in patients with near-occlusions. Benefit from surgery was greatest in men, patients aged 75 years or over, and patients...
randomised within two weeks after their last ischaemic event and fell rapidly with increasing delay. Authors’ conclusions: Endarterectomy is of some benefit for 50% to 69% symptomatic stenosis and highly beneficial for 70% to 99% stenosis without near-occlusion. Benefit in patients with carotid near-occlusion is marginal in the short-term and uncertain in the long-term. These results are generalisable only to surgically-fit patients operated on by surgeons with low complication rates (less than 7% risk of stroke and death). Benefit from endarterectomy depends not only on the degree of carotid stenosis, but also on several other factors, including the delay to surgery after the presenting event.
CHARACTERISTICS OF THE THREE LIGAMENTS OF HUMAN SPRING LIGAMENT COMPLEX FROM A VIEWPOINT OF ELEMENTS

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ABSTRACT

To elucidate characteristics of the three ligaments constituting the spring ligament complex from a viewpoint of elements, the authors investigated age-related changes of elements, relationships among their elements, relationships among ligaments in the elements, and gender differences in the three ligaments of the spring ligament complex, the superomedial calcaneonavicular (SMCN), inferoplantar longitudinal calcaneonavicular (ICN), and third or medioplantar oblique calcaneonavicular (TCN) ligaments. After ordinary dissection at Nara Medical University was finished, the SMCN, ICN, and TCN ligaments of the spring ligament complex were removed from the subjects. The subjects consisted of 10 men and 12 women, ranging in age from 62 to 99 years (average age = 80.5 ± 9.7 years). After incineration with nitric acid and perchloric acid, the element contents were determined by inductively coupled plasma-atomic emission spectrometry. It was found that although the Ca and P content hardly changed in the SMCN ligament with aging, the Ca and P content in the ICN ligament increased to about three and five times higher in the 80s in comparison with the 60s, respectively, whereas in the TCN ligament, it increased about 40% and 90% higher in the 80s compared with the 60s, respectively. Regarding the relationships among elements, significant direct correlations were found among the contents of Ca, P, and Mg in all the three ligaments of the spring ligament complex. This finding was in agreement with the previous finding obtained with the three ligaments of the anterior cruciate ligament,
posterior longitudinal ligament, and ligamentum capitis femoris. Whether there were significant correlations among the three ligaments of the spring ligament complex with regard to the Ca, P, S, Mg, Zn, and Fe contents was examined using Pearson’s correlation. It was found that there were significant direct correlations between the SMCN and TCN ligaments in all the Ca, P, Mg, and Zn contents and also between the SMCN and ICN ligaments in both the Mg and Fe contents but not between the TCN and ICN ligaments in the six element contents. Regarding the gender difference in elements, a significant gender difference was found only in the Mg content of the SMCN ligament, being significantly higher in men than in women.
CLINICAL CHARACTERISTICS AND OUTCOMES OF DENGUE-INFECTED CHILDREN ADMITTED TO THE CHIANG MAI UNIVERSITY HOSPITAL DURING AN OUTBREAK IN 2008

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ABSTRACT

Objective: To assess clinical characteristics, outcomes, and hospital costs of dengue-infected children, who were admitted to Chiang Mai University (CMU) Hospital during an outbreak in 2008. Methods: All serologically confirmed dengue-infected children, who were admitted to CMU Hospital between January 1 and December 31, 2008 were reviewed retrospectively. Results: A total of 130 children were included in the study. The median age was 12.2 years (interquartile range: 9.7-13.9). Seventy-eight children (60%) were males. Twenty children (15.4%) were classified as having dengue fever, 99 (76.1%) as having dengue hemorrhagic fever (DHF), and 11 (8.5%) as having dengue shock syndrome (DSS). The three most common presenting symptoms were acute fever (98.5%), nausea/vomiting (66.9%), and myalgia (55.4%). Hepatomegaly, hypotension, pleural effusion, and ascites were found more common in children with DDS than in those without it (p < 0.05). Children with DSS stayed significantly longer in hospital than those without it (7.1 vs. 3.3 days, p < 0.01). The mean hospital cost per admission was 10 times higher among children with DDS than those without it (US$ 181.9 vs. US$ 1,873.0, p < 0.001). The overall mortality rate was 1.5%. Conclusion: Children with DDS showed higher clinical severity, longer hospital stay, and poorer outcomes than those without it. Prompt diagnosis and treatment definitely helps reduce morbidity, mortality and hospital costs.
CLINICS IN DIAGNOSTIC IMAGING (134). TESTICULAR LYMPHOMA

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ABSTRACT

A 55-year-old man presented with a painless right scrotal mass for the past three months. Scrotal ultrasonography showed a large circumscribed hypoechoic mass with marked hypervascularity occupying almost the entire right testis. The epididymis and scrotal skin were normal. Right radical orchiectomy was performed. Histopathology revealed lymphoma, diffuse large B-cell type confined within the tunica albuginea. The patient made a good postoperative recovery. No evidence of lymphoma in other organs was demonstrated. We discuss the differential diagnosis of ultrasonographic intratesticular masses and highlight various cases of intratesticular lesions in this article.

ABSTRACT

A 45-year-old man presented with right flank pain and haematuria for one month. Computed tomography showed a large, well-circumscribed exophytic complex cystic mass with enhanced, irregular thickened walls arising from the upper pole of the right kidney, which was associated with bilateral renal stones. Partial right nephrectomy with removal of the right renal stones was performed. Histopathology revealed papillary cell carcinoma confined to the kidney. The patient made good postoperative recovery. The Bosniak classification system of renal cystic lesions and cystic renal cell carcinoma are discussed. Various cases of renal cystic lesions and cystic renal cell carcinoma are shown.
CLOSED FLEXOR TENDON RUPTURES OF THE ULNAR-SIDED FINGERS WITHIN THE HAND: TREATMENT WITH LOOPED PALMARIS LONGUS TENDON GRAFT: REPORT OF 5 CASES

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ABSTRACT

Spontaneous ruptures of the flexor tendons are considered to be uncommon conditions that generally occur after the tendon loses its tensile strength due to preexisting pathologies. The presenting symptoms; pain and weakness of grip strength, are not specific to this condition. The site of tendon rupture also is difficult to identify clinically. We recently treated five patients who had closed rupture of the flexor tendon of the ulnar-sided fingers within the hand and they presented inability to flex the little finger fully. They also experienced pain and discomfort during daily activities. These reported cases involved spontaneous tendon rupture involving the flexor digitorum profundus of the ulnar digits. Three patients had identifiable pathologies: nonunion of the hamate hook, bony spur at the hamate hook and gouty tendinopathy; and the other 2 patients had no identifiable abnormality. All patients were treated with tendon repair using looped palmaris longus tendon graft. All but one showed improved digital motion, and satisfactory hand function was restored. Closed flexor tendon rupture of the hand occurs more often than previously recognized. Surgical reconstruction using tendon graft produced satisfactory results.

COMPARATIVE PHYLOGEOGRAPHY REVEALS A SHARED IMPACT OF PLEISTOCENE ENVIRONMENTAL CHANGE IN SHAPING GENETIC DIVERSITY WITHIN NINE ANOPHELES MOSQUITO SPECIES ACROSS THE INDO–BURMA BIODIVERSITY HOTSPOT

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ABSTRACT

South-East Asia is one of the world’s richest regions in terms of biodiversity. An understanding of the distribution of diversity and the factors shaping it is lacking, yet essential for identifying conservation priorities for the region’s highly threatened biodiversity. Here, we take a large-scale comparative approach, combining data from nine forest associated Anopheles mosquito species and using statistical phylogeographical methods to disentangle the effects of environmental history, species-specific ecology and random coalescent effects. Spatially explicit
modelling of Pleistocene demographic history supports a common influence of environmental events in shaping the genetic diversity of all species examined, despite differences in species’ mtDNA gene trees. Populations were periodically restricted to allopatric northeastern and northwestern refugia, most likely due to Pleistocene forest fragmentation. Subsequent southwards post-glacial recolonization is supported by a north–south gradient of decreasing genetic diversity. Repeated allopatric fragmentation and recolonization have led to the formation of deeply divergent geographical lineages within four species and a suture zone where these intraspecific lineages meet along the Thai–Myanmar border. A common environmental influence for this divergence was further indicated by strong support for simultaneous divergence within the same four species, dating to approximately 900 thousand years ago (kya). Differences in the geographical structuring of genetic diversity between species are probably the result of varying species’ biology. The findings have important implications for conservation planning; if the refugial regions and suture zone identified here are shared by other forest taxa, the unique and high levels of genetic diversity they house will make these areas conservation priorities.
COMPARISON OF SALBUTAMOL EFFICACY IN CHILDREN- VIA THE METERED-DOSE INHALER (MDI) WITH VOLUMATIC® SPACER AND VIA THE DRY POWDER INHALER, EASYHALER®, WITH THE NEBULIZER – IN MILD TO MODERATE ASTHMA EXACERBATION: A MULTICENTER, RANDOMIZED STUDY

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ABSTRACT

Background: Beta (2) agonist administered via a nebulizer is the standard treatment for acute asthma exacerbation. There are some limitations for the use of nebulization. We conducted a study to determine the efficacy of salbutamol administered via the pMDI with Volumatic spacer and the Easyhaler (DPI) compared to nebulization in mild to moderate asthma exacerbations in children.

Methods: A multicenter, randomized, controlled study was conducted in children between 5 and 18 years of age who presented at an emergency or outpatient department. They were randomized to receive either 6 puffs of salbutamol via the pMDI with Volumatic spacer, or via the Easyhaler, or 0.15 mg/kg of salbutamol nebulized via oxygen (or compressed air). The primary outcome was the clinical response which was assessed using the modified Wood’s asthma score. The secondary outcomes were: hospitalization, asthma revisit within 3 days, systemic corticosteroid use and adverse events. The clinical score, oxygen saturation, PR, RR, BP and adverse events were recorded at time 0 (before treatment) and 20, 40 and 60 minutes after drug administration. Results: There were no statistically significant
differences in the clinical response between the three groups at the 1st, 2nd or 3rd dose or for the SpO(2) or the respiratory rate while the children in the Easyhaler group had significantly less tachycardia after the 2nd dose. No significant adverse events were noted among the three groups. Conclusions: Salbutamol administered via pMDI with Volumatic spacer or DPI (Easyhaler) are as effective as salbutamol given via a nebulizer in providing effective relief of mild to moderate severity acute asthma exacerbation in children between 5 and 18 years of age.
CONFIRMATORY FACTOR ANALYSIS OF ROSENBERG SELF ESTEEM SCALE: A STUDY OF THAI STUDENT SAMPLE

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ABSTRACT

Objective: To investigate the structure of the Rosenberg Self-Esteem scale (RSES) by using confirmatory factor analysis. Materials and Methods: A Thai version of RSES was developed, with the translation and cultural adaptation method, and tested in 664 university students in a northern Thai province. The data were factor analysed using both exploratory and confirmatory factor analysis. Possible models were evaluated and compared to find the best model. Results: The scale demonstrated a good internal consistency in this sample (Cronbach’s alpha 0.86). One-factor model with method effect yielded the best fit indices comparing to other models (χ²=95.518, df=25, NFI=0.969, CFI=0.977, TLI=0.958, GFI=0.972, SRMR=0.0329 and RMSEA=0.065) Conclusions: The Thai version of RSES is uni-dimensional, which obtains goodness of fit. However, method effects can be explained by negative items. This Thai version of RSES demonstrated a satisfactory internal consistency. The factorial construct is consistent with earlier reports.

CONTACT INVESTIGATION AMONG CHILDREN WHO HAVE HAD CONTACT WITH TUBERCULOSIS PATIENTS IN UPPER NORTHERN THAILAND

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ABSTRACT

In order to control tuberculosis effectively, it is important to implement tuberculosis contact investigation programs among children who have had contact with tuberculosis patients. Such programs help physicians to work up contact cases to obtain a prompt diagnosis and treatment. In Northern Thailand, such programs have been implemented by hospitals of different levels such as local and provincial hospitals, as well as large medical centers. Most hospitals already have their own guidelines, but some do not. Health care workers reported that they lack understanding why the contact investigation process is important, as well as lack knowledge and skills on how to conduct contact investigations. The Thai Ministry of Health and experts from university hospitals should provide more support in the form workshops and training for health care workers (including tuberculin skin test training) to help them carry out existing contact investigation programs more effectively and successfully.

CURRENT STATUS OF THE RESEARCH ETHICS COMMITTEES IN THAILAND

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ABSTRACT

Many research ethics committees (RECs) have been established to review biomedical research involving human subjects in many research institutes. The purpose is “To protect rights and welfare of human research participants”. It is necessary to determine how many research ethics committees have been established in Thailand and whether they have a high enough standard to protect the rights and welfare of human research subjects.

DELAYED DIAGNOSIS OF KAWASAKI DISEASE: RISK FACTORS AND OUTCOME OF TREATMENT

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ABSTRACT

Background: Kawasaki disease (KD) is associated with a high incidence of coronary artery aneurysms in untreated children. Treatment with intravenous immunoglobulin (IVIG) within the 1st 10 days of illness reduces by approximately fivefold the prevalence of coronary artery abnormalities (CAA). Data regarding delayed diagnosis of KD in Thailand have not been reported in the literature. AIMS: To determine the prevalence, risk factors and outcome of delayed diagnosis of KD in Thai patients. Methods: We retrospectively reviewed the medical records of patients at Chiang Mai University Hospital diagnosed as KD during 2000-2008. Patients were classified into two groups: Group I were diagnosed ≤10 days of fever and Group II were diagnosed >10 days of fever. Results: Of 170 patients, 150 were in Group I [mean (SD) fever 7 (1·45) d] and 20 (11·7%) in Group II [mean (SD) fever 15 (4· d)]. There were no statistical differences between the two groups in age, gender, number of KD clinical manifestations or laboratory results, except that Group II were of lower weight (p = 0·01). Group II were younger (p = 0·09) and had more incomplete criteria (p = 0·09) but the differences were not statistically significant. Group II had a higher incidence of CAA (75% vs 19%) (p<0·001), more severe CAA and more resistant cases (31·2% vs 9·5%) (p = 0·04). Conclusion: Patients with delayed diagnosis of KD have a higher risk of developing CAA and of a more severe outcome for coronary artery disease. Education is needed to make healthcare providers and physicians more aware of KD, especially in small children or those with incomplete KD.

DEPRESSION AMONG VERTICALLY HIV-INFECTED ADOLESCENTS IN NORTHERN THAILAND

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ABSTRACT

Purpose: To compare depression risk among vertically HIV-infected adolescents and matched controls in northern Thailand. Methods: The Thai Children’s Depression Inventory (CDI) was administered among vertically HIV-infected adolescents and matched controls in northern Thailand from 2007 to 2008, as part of a comprehensive quantitative survey that also assessed demographics, substance use, and sexual behavior and knowledge. A total CDI score ≥15 was considered a positive screen for possible depression. Results: A total of 54 cases and 165 controls participated; cases had significantly lower mean CDI scores (P = .003) and fewer screened positive for possible depression (P = .046). Cases who screened positive were more likely to have engaged in sexual intercourse (P = .07). Conclusions: Depressive symptoms and depression risk were reduced among vertically HIV-infected adolescents compared to matched controls in northern Thailand. Further investigation into mental health disorders among vertically HIV-infected adolescents in developing settings is needed.

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DETECTION AND MOLECULAR CHARACTERIZATION OF COSAVIRUS IN ADULTS WITH DIARRHEA, THAILAND

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ABSTRACT

Human cosavirus (HCoSV) is a newly discovered virus in Picornaviridae family. At present it is not clear whether HCoSV is associated with diseases, including gastroenteritis in humans, as epidemiological data is limited. Epidemiological surveillance of HCoSV was conducted on 150 fecal specimens collected from children and 150 samples from adults with diarrhea in Thailand by RT-PCR screening. HCoSV was found in a single adult specimen and not in any of the fecal specimens from children. This represents the first report of HCoSV infection in patients with diarrhea in Thailand. Extensive epidemiological surveillance of novel viruses associated with diarrhea in other populations may provide a better understanding of the distribution, genetic diversity, and association of the viral agents associated with acute gastroenteritis in humans.

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DETERMINATION OF SEX FROM THE METACARPALS IN A THAI POPULATION

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ABSTRACT

Determination of sex using metacarpals was carried out on a sample of 249 skeletons from a Thai population (154 males and 95 females), ranging in age from 19 to 93 years. Six measurements were taken on each metacarpal, namely maximum length, medio-lateral base width, antero-posterior base height, medio-lateral head width, antero-posterior head height and mid-shaft diameter. Binary logistic regression equations were calculated for determining sex from these measurements. All metacarpals from both sides produced at least one equation that correctly allocated the skeletons with 80% or greater accuracy. In a comparative test using only individuals with no missing measurements (n = 196), the most accurate equations for each metacarpal on the right side had pooled allocation accuracies ranging from 85.2% to 89.3%, with the best equation based on three measurements from the 5th metacarpal. On the left side, the most accurate equations for each metacarpal ranged from 83.2% to 89.8% correct allocation, with the best equation based on three measurements of the 2nd metacarpal. When the allocation accuracy for each sex is considered in addition to the pooled accuracy, the best equations involve the same three measurements of the 5th metacarpal on the right side, but shift to three measurements of the first metacarpal on the left side, with a pooled accuracy of 88.3%. The results of this study suggest that metacarpals can be used quite reliably for sexing in forensic contexts in Thailand.
DIAGNOSING DELIRIUM IN ELDERLY THAI PATIENTS: UTILIZATION OF THE CAM ALGORITHM

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ABSTRACT

Background: Delirium is a common illness among elderly hospitalized patients. However, under-recognition of the condition by non-psychiatrically trained personnel is prevalent. This study investigated the performance of family physicians when detecting delirium in elderly hospitalized Thai patients using the Thai version of the Confusion Assessment Method (CAM) algorithm. Methods: A Thai version of the CAM algorithm was developed, and three experienced Thai family physicians were trained in its use. The diagnosis of delirium was also carried out by four fully qualified psychiatrists using DSM-IV TR criteria, which can be considered the gold standard. Sixty-six elderly patients were assessed with MMSE Thai 2002, in order to evaluate whether they had dementia upon admission. Within three days of admission, each patient was interviewed separately by a psychiatrist using DSM-IV TR, and a family physician using the Thai version of the CAM algorithm, with both sets of interviewers diagnosing for delirium. Results: The CAM algorithm tool, as used by family physicians, demonstrated a sensitivity of 91.9% and a specificity of 100.0%, with a PPV of 100.0% and an NPV of 90.6%. Interrater agreement between the family physicians and the psychiatrists was good (Cohen's Kappa = 0.91, p < 0.0001). The mean of the time the family physicians spent using CAM algorithm was significantly briefer than that of the psychiatrists using DSM-IV TR. Conclusions: Family physicians performed well when diagnosing delirium in elderly hospitalized Thai patients using the Thai version of the CAM algorithm, showing that this measurement tool is suitable for use by non-psychiatrically trained personnel, being short, quick, and easy to administer. However, proper training on use of the algorithm is required.

DISTRIBUTION AND PROGRESSION OF CHONDROCYTE DAMAGE IN A WHOLE-ORGAN MODEL OF HUMAN ANKLE INTRA-ARTICULAR FRACTURE

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ABSTRACT

Background: Despite the best current treatments, intra-articular fractures commonly cause posttraumatic osteoarthritis. In this disorder, death and dysfunction of chondrocytes associated with acute cartilage injury presumably plays an important role in triggering the pathomechanical cascade that eventually leads to whole-joint degeneration. Information regarding this cell-level cartilage injury, particularly at the whole-organ level in actual human joints, has been lacking. In this study, the distribution and progression of fracture-associated cell-level cartilage damage were assessed using a novel whole-organ model of human ankle intra-articular fracture. Methods: Seven normal human ankles harvested immediately following amputation were subjected to a transarticular compressive impaction insult that mimicked an injury mechanism typical of tibial plafond fractures. For each ankle, sitespecific, time-dependent changes in chondrocyte viability in the fractured tibial surface were studied by means of live-dead assay, using a confocal laser-scanning microscope. Fractional chondrocyte death was measured at several time points, in the superficial zone of the cartilage in “fracture-edge” regions within 1 mm of the fracture lines, as well as in “nonfracture” regions more than 3 mm centrally away from the fracture lines. Results: All seven experimental fractures morphologically replicated tibial plafond fractures. Immediately post-fracture, superficial-zone chondrocyte death was significantly greater (p = 0.001) in fracture-edge regions (fractional cell death = 7.6%) than in non-fracture regions (1.6%). Progression of cell death over the next forty-eight hours was significantly faster in fracture-edge regions (p = 0.007), with the fractional cell death reaching 25.9%, which was again significantly higher (p < 0.001) than in non-fracture regions (8.6%). Conclusions: Cell-level cartilage damage in human intra-articular fractures was characterized by acute chondrocyte death that predominated along
fracture lines and that spontaneously progressed in the forty-eight hours following injury. Clinical Relevance: Progressive chondrocyte damage along fracture lines appears to be a reasonable target of therapeutic treatment to preserve the whole-joint cartilage metabolism in intra-articular fractures, eventually to mitigate the risk of posttraumatic osteoarthritis.
DO CLIMATIC AND PHYSICAL FACTORS AFFECT POPULATIONS OF THE BLOW FLY CHRYSOMYA MEGACEPHALA AND HOUSE FLY MUSCA DOMESTICA?

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ABSTRACT

The blow fly, Chrysomya megacephala (Fabricius), and house fly, Musca domestica L., are medically and forensically important flies. The population dynamic of these flies is essential for both control and forensic aspects. The aim of this study was to investigate the climatic and physical factors affecting the population trend of both species in Chiang Mai province, northern Thailand, using the Geographic Information System (GIS). Based on systematic random sampling, 18 study sites were selected in three districts (Mueang Chiang Mai, Mae Rim, and Hang Dong). Six land use types were involved in the study sites, i.e., disturbed mixed deciduous, mixed deciduous forest, mixed orchard, lowland village, city, and paddy field. Adult flies were sampled every 2 weeks using an in-house prototype reconstructable funnel trap. Two types of bait were used—one with fresh beef viscera for luring M. domestica and the other with 1-day tainted beef viscera for luring C. megacephala. Collections were conducted from May 2009 to May 2010, and analysis of climatic factors (temperature, relative humidity, and light intensity) was carried out. Correlation bivariate analysis was performed initially to determine the relationship between climatic factors and the number of flies. Consequently, an ordinary co-kriging approach, in ArcGIS 9.2, was performed to predict the spatial distribution of flies with land use and climatic factors as co-variables. A total of 63,158 flies were captured, with C. megacephala being the most common species collected (68.37%), while only 1.3% were M. domestica, thus proving that C. megacephala was the most abundant species in several land use types. A significantly higher
number of females than males was found in both species. Fly populations can be collected throughout most of the year with a peak in late summer, which shows a positive relation to temperature but negative correlation with relative humidity. *C. megacephala* was predicted to be abundant in every land use type, from lowland to forested areas, while the density of house fly was association with altitude and land use types.
EFFECT OF RADIATION THERAPY TO IMMUNOLOGICAL AND VIROLOGICAL STATUS IN HIV/AIDS–CANCER PATIENTS, PRELIMINARY REPORT

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ABSTRACT

Objective: To describe effects of radiation therapy (RT) on immunological status (CD4 cell counts) and disease progression among HIV-positive cancer patients. Material and method: This prospective observational study was conducted among HIV-positive cancer patients who received RT for curative intention of cancer in five selected hospitals in Thailand. All subjects received external beam radiation therapy, according to standard clinical practice guidelines of RT. Blood samples were taken 4 times for complete blood count, CD4 cell count and plasma HIV RNA viral load (HIV-VL) assays before and in the last week of RT, then three and six months after completion of RT. Results: This preliminary study reported immunological status and HIV-VL before and the last week of RT, among 29 HIV-positive female cancer patients enrolled from August 22, 2009 to June 30, 2010. The median age was 38 years (range 30-54). 27 patients (93 percent) had invasive cervical cancer. 26 patients (90 percent) were on antiretroviral treatment (ART). The mean baseline white blood cell (WBC) count, lymphocyte percentage were 6,771.7 cells/microL and 31.7 percent respectively. The mean baseline CD4 cell count and CD4%, 387.8 cells/microL and 17.5 percent respectively. In the last week of RT, 25 subjects (86 percent) had CD4 count less than 200 cells/microL. The last week, mean WBC count, and mean lymphocyte percentage decreased to 3,902.8 cells/microL and 17.5 percent respectively. The mean CD4 count number decreased to 157.7 cells/microL, but the mean CD4 % did not change. Four patients (14 percent) had increased HIV-VL after RT, of these two were not on ART and two were on ART for more than 1 year. Conclusion: The CD4 cell count was not a good surrogate for prediction of immunologic status of HIV-positive cancer patients during RT.
EFFECTS OF *BOESENBERGIA ROTUNDA* JUICE ON SPERM QUALITIES IN MALE RATS

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ABSTRACT

*Boesenbergia rotunda* (L.) Mansf. is one of Thai medicinal plants locally known for its male sexual enhancing effect. However, the study of other impacts of this plant on the male reproductive system is still very rare. To investigate the effects of *B. rotunda* on sperm qualities, the fresh juice of this plant was tested on both pre-mature and mature male rats by oral administration at the doses of 60, 120 and 600 mg/kg.bw for 30 days. The results showed that *B. rotunda* juice significantly progressively increased the motility of sperm at the doses of 60 and 120 mg/kg.bw and enhanced the number of normal sperm at all doses in the mature rats. Additionally, significant prominent stages VII to VIII of seminiferous epithelium was found in treated mature rats at all doses. There was no effect of *B. rotunda* on the pre-mature rats. These findings suggest that the *B. rotunda* juices could enhance fertility by improving the quality of sperm and its effect is age dependable.
EFFECTS OF HUMAN CONTRACEPTIVE ON REPRODUCTION AND OFFSPRING IN CHRYsomYA MEGACEPHALa

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ABSTRACT

Objective: To investigate the effect of human contraceptive (HC) as ability to suppress the reproductive success of blow fly, Chrysomya megacephala (Fabricius) (C. megacephala) and offspring under controlled laboratory conditions. Methods: Adult C. megacephala were fed with low (0.036 mg/mL) and high dose (0.072 mg/mL) HC (Microgest®, Thailand), containing levonorgestrel and ethinyl estradiol, in their drinking water for 7 days. Three experiments were set; experiment I with fed only in parental males, experiment II with fed only in parental females and experiment III with fed in both males and females. All experiments were then maintained for 3 generations after crossing and inbreeding. Results: A lower ovariole production and less fully matured ovarioles were evident in F1, F2 and F3 than control when parent males, females and both had been fed with high dose HC. Cellular changes during spermatogenesis in F1, F2 and F3 testes was confirmed using transmission electron microscopy (TEM), showing the low level of condensed chromatin, necrotic chromatin, irregularities and degenerated nuclear envelope in the nucleus. In the cytoplasm, mitochondrial swelling, rough endoplasmic reticulum swelling as well as vacuolated cytoplasm were noticed. As for the sperm per se, we found the degenerated nuclei and/or incomplete mitochondrial derivative, axoneme and vacuolated flagella. Regarding deformity in F1, F2 and F3 ovariole, ultrastructural alteration observed by scanning electron microscopy (SEM) included malformations involving fragile enveloping peritoneal sheath, cracked ovarioles, peel away chorion, crumbled eggshell and incomplete development; whereas TEM presented malformed and disorganized mass of cells, proteic yolk granules and vacuolated vesicles. Conclusions: Administer of HC to adult C. megacephala caused ovariole reduction, less matured ovariole and affected cellular changes in testes and ovariole of offspring up to F3.

EFFECTS OF LEFT VENTRICULAR FUNCTION ON THE EXERCISE CAPACITY IN PATIENTS WITH REPAIRED TETRALOGY OF FALLOT

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ABSTRACT

Background: Tissue Doppler imaging has been recently used to evaluate ventricular function. Peak oxygen uptake (V•O2peak) has been demonstrated as a predictor for death in adults with repaired tetralogy of Fallot (TOF). The aim of this study was to determine which Doppler parameters correlated with V•O2peak in patients with repaired TOF. Method and results: Doppler echocardiography, tissue Doppler imaging, and exercise test were performed in 30 patients with TOF after surgical repair. In 30 patients with repaired TOF (median age 14 years, range 9-25 years), 11 patients (37%) were female. Seven patients (median age 12 years) had normal left ventricular diastolic function, whereas the rest of the patients were classified as diastolic dysfunction grade II (median age 15 years; n=15) and III and IV (median age 18 years; n=8). The oxygen uptake at anaerobic threshold (V•O2AT) and peak exercise in patients with left ventricular diastolic dysfunction was significantly lower than that in those with normal diastolic function. Also, V•O2AT and V•O2 peak in patients with diastolic dysfunction grade III and IV were significantly lower than that in those with diastolic dysfunction grade II. Left ventricular early diastolic myocardial velocity was most closely correlated to V•O2peak (r=0.51; P=0.005). Peak early ventricular filling velocity to early diastolic myocardial velocity ratio was significantly correlated with V•O2peak (r=-0.50; P=0.006). Conclusion: Left ventricular diastolic dysfunction is correlated with V•O2peak. Left ventricular diastolic function should be a routine echocardiographic assessment in patients with repaired TOF.

EFFECTS OF PHENOLIC COMPOUNDS OF FERMENTED THAI INDIGENOUS PLANTS ON OXIDATIVE STRESS IN STREPTOZOTOCIN–INDUCED DIABETIC RATS

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ABSTRACT

We investigated the effects of antioxidant activity of fermentation product (FP) of five Thai indigenous products on oxidative stress in Wistar rats with streptozotocin (STZ)-induced diabetes type II. The rats were fed with placebo and with the FP (2 and 6 mL/kg body weight/day) for 6 weeks. Rutin, pyrogallol and gallic acid were main compounds found in the FP. Plasma glucose levels in diabetic rats receiving the higher dose of the FP increased less when compared to the diabetic control group as well as the group receiving the lower FP dose (13.1%, 29%, and 21.1%), respectively. A significant dose-dependent decrease in plasma levels of thiobarbituric acid reactive substance (P < .05) was observed. In addition, the doses of 2 and 6 mL FP/kg/day decreased the levels of erythrocyte ROS in diabetic rats during the experiment, but no difference was observed when compared to the untreated diabetic rat group. Results imply that FP decreased the diabetes-associated oxidative stress to a large extent through the inhibition of lipid peroxidation. The FP also improved the abnormal glucose metabolism slightly but the difference was not statistically significant. Thus, FP may be a potential therapeutic agent by reducing injury caused by oxidative stress associated with diabetes.

EFFECTS OF PREEMPTIVE ANALGESIA IN LAPAROSCOPIC CHOLECYSTECTOMY: A DOUBLE-BLIND RANDOMIZED CONTROLLED TRIAL

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ABSTRACT

Background: This study aimed to investigate the effect of preemptive etoricoxib compared with placebo in laparoscopic cholecystectomy. Methods: This randomized, double-blind, placebo-controlled study enrolled 120 patients requiring elective laparoscopic cholecystectomy. The patients were randomized to receive either etoricoxib 120 mg plus diazepam or placebo plus diazepam. Postoperatively, the visual analog score (VAS) for pain, the rescue morphine requirement, and the side effects were recorded. Results: Between February 2006 and September 2007, 120 patients were enrolled in the study. The demographic data between two groups were similar except for mean age. The mean age of the placebo group was younger (p = 0.007). There were no significant differences in bleeding tendency rating scores, duration times between fentanyl and rescue morphine, number of rescue morphine doses, or length of postoperative hospital stay. But the number of oral analgesic drug usages was significantly less in the etoricoxib group (p = 0.006). The postoperative VAS was lower in the etoricoxib group at hours 10 (p = 0.023), 14 (p = 0.045), and 26 (p = 0.011), and the average VAS also was significantly less in the etoricoxib group (p = 0.013). The two groups did not differ significantly in terms of postoperative shoulder pain (p = 0.065). According to the verbal rating scale, the incidence of postoperative nausea and vomiting did not differ significantly between the two groups (p = 0.797), nor did the drug side effects or treatment complications. Conclusion: The authors recommend using etoricoxib as a preemptive analgesia to reduce postoperative pain after laparoscopic cholecystectomy.

ELEMENT DISTRIBUTION IN VISUAL SYSTEM, THE OPTIC CHIASMA, LATERAL GENICULATE BODY, AND SUPERIOR COLLICULUS

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ABSTRACT

To elucidate compositional changes of the visual system with aging, the authors investigated age-related changes of elements in the optic chiasma, lateral geniculate body, and superior colliculus, relationships among their elements, relationships among their brain regions from a viewpoint of elements, and gender differences in their elements by direct chemical analysis. After ordinary dissection at Nara Medical University was finished, the optic chiasmas, lateral geniculate bodies, and superior colliculi were resected from identical cerebra of the subjects. The subjects consisted of 14 men and 10 women, ranging in age from 75 to 96 years (average age = 85.6 ± 5.9 years). After ashing with nitric acid and perchloric acid, element contents were determined by inductively coupled plasma-atomic emission spectrometry. As the result, the average content of P was significantly higher in the optic chiasma and superior colliculus compared with the lateral geniculate body. Regarding age-related changes of elements, no significant changes with aging were found in seven elements of the optic chiasma, lateral geniculate body, and superior colliculus in the subjects more than 75 years of age. The findings that with regard to the relationships among elements, there were extremely significant direct correlations between Ca and Zn contents and significant inverse correlations between Mg and Na contents were obtained in common in all of the optic chiasma, lateral geniculate body, and superior colliculus. It was examined whether there were significant correlations among the optic chiasma, lateral geniculate body, and superior colliculus in the seven elements and the following results were obtained: There were significant direct correlations between the optic chiasma and lateral geniculate body in both the P and Mg contents; there was a significant direct correlation between the optic chiasma and superior colliculus in the Fe content; and a significant direct correlation was found between the lateral geniculate body and superior colliculus in the Mg content. Regarding the gender differences in elements, it was found that both the Ca and Zn contents of the lateral geniculate body were significantly higher in women than in men.

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ENTROPY ANALYSIS OF TRI-AXIAL LEG ACCELERATION SIGNAL WAVEFORMS FOR MEASUREMENT OF DECREASE OF PHYSIOLOGICAL VARIABILITY IN HUMAN GAIT

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ABSTRACT

Disease-related and senescent decrease of physiological variability in biological time-series outputs (e.g., heart rate) has drawn increasing attention as a potential new type of biomarker. In this paradigm, measurement of variability in periodic motion may enable quantitative evaluation of functional limitation in people with musculoskeletal disorders. A novel technique to measure variability of leg motion patterns during level walking was used to study 52 adults with symptomatic knee osteoarthritis (OA), and 57 asymptomatic control subjects over a wide range of age (20–79 years). The hypothesis was that cycle-to-cycle variability in leg motion patterns, indexed by tri-axial acceleration signal entropy, would be lower in those with greater age or with knee symptoms. Leg motions were assessed using portable inertial monitors attached bilaterally just above each ankle. The tri-axial acceleration data were analyzed using a nonlinear variability measurement tool designated as Sample Entropy (SampEn). SampEn data for asymptomatic subjects exhibited a significant negative correlation ($r = -0.287$, $p = 0.0306$) with greater age. OA subjects had significantly lower SampEn values ($p = 0.0002$) than did age-matched asymptomatic subjects who walked at equivalent velocity. This approach holds promise as a basis for valid, inexpensive, and convenient objective evaluation of limitations in human gait function.

ENZYMES-BASED RESISTANT MECHANISM IN PYRETHROID RESISTANT AND SUSCEPTIBLE Aedes aegypti STRAINS FROM NORTHERN THAILAND

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ABSTRACT

Previous studies have shown that permethrin resistance in our selected PMD-R strain of Aedes aegypti from Chiang Mai, Thailand, was associated with a homozygous mutation in the knockdown resistance (kdr) gene and other mechanisms. In this study, we investigated the metabolic mechanism of resistance of this strain compared to the PMD strain which is susceptible to permethrin. The permethrin susceptibility of larvae was determined by a dose–response bioassay. Two synergists, namely piperonyl butoxide (PBO) and bis(4-nitrophenyl)-phosphate (BNPP), were also added to determine if the resistance is conferred by oxidase or esterase enzymes, respectively. The LC₅₀ value for PMD-R (25.42 ppb) was ∼25-fold higher than for PMD (1.02 ppb). The LC was reduced 3.03-fold in PMD-R and 2.27-fold in PMD when the oxidase inhibitor (PBO) 50 was added, but little or no reduction was observed in the presence of BNPP, indicating that oxidative enzymes play an important role in resistance. However, the LC₅₀ previously observed in the heterozygous mutation form was reduced ∼eightfold, indicating that metabolic resistance is inferior to kdr. The levels of cytochrome P450 (P450) extracted from fourth instar larvae were similar in both strains and were about 2.3-fold greater in microsomal fractions than in crude supernatant and cytosol fractions. Microsome oxidase activities were determined by incubation with each of three substrates, i.e., permethrin, phenoxybenzyl alcohol (PBOH), and phenoxybenzaldehyde (PBCOH), in the presence or absence of nicotinamide adenine dinucleotide phosphate (NADPH), nicotinamide adenine dinucleotide (NAD+), PBO, and BNPP. It is known that hydrolysis of permethrin produces PBOH which is further oxidized to PBCOH by alcohol dehydrogenase (ADH) and then to phenoxybenzoic acid (PBCOOH) by aldehyde dehydrogenase (ALDH). When incubated with permethrin, a small amount of PBCOOH was detected.
in both strains (about 1.1–1.2 nmol/min/mg protein), regardless of the addition of NADPH. The addition of PBO resulted in about 70% and 50% reduction of PBCOOH in PMD and PMD-R, respectively. The addition of BNPP reduced PBCOOH about 50% and 35% in PMD and PMD-R, respectively. Using PBOH as substrate increased PBCOOH ~16-fold and ~40-fold in PMD and PMD-R, respectively. Using PBCHO as substrate increased PBCOOH ~26-fold and ~50-fold in PMD and PMD-R, respectively. The addition of NADPH, and particularly NAD+, increased the level of PBCOOH. Together, the results have indicated the presence of a metabolic metabolism involving P450, ADHs, and ALDHs in both PMD and PMD-R strains, with greater enzyme activity in the latter.
EVIDENCE TO SUPPORT KARYOTYPIC VARIATION OF THE MOSQUITO, ANOPHELES PEDITAENIATUS IN THAILAND

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ABSTRACT

Eight isoline colonies of Anopheles peditaeniatus Leicester (Diptera: Culicidae) were established from wild-caught females collected from buffalo-baited traps at 8 localities in Thailand. They showed 2 types of X (X₂, X₃) and 4 types of Y (Y₂, Y₃, Y₄, Y₅) chromosomes based on the number and amount of major block(s) of heterochromatin present in the heterochromatic arm, and were tentatively designated as Forms B (X₂, X₃, Y₂), C (X₃, Y₃), D (X₃, Y₄) and E (X₂, X₃, Y₅). Form B was found in Nan, Ratchaburi, and Chumphon provinces; Form C was obtained in Chon Buri province; Form D was recovered in Kamphaeng Phet province; and Form E was acquired in Chiang Mai, Udon Thani, and Ubon Ratchathani provinces. Crossing studies among the 8 isoline colonies, which were representative of 4 karyotypic forms of An. peditaeniatus, revealed genetic compatibility in providing viable progenies and synaptic salivary gland polytene chromosomes through F₂-generations, thus suggesting the conspecific nature of these karyotypic forms. These results were supported by the very low intraspecific sequence variations (0.0 - 1.1%) of the nucleotide sequences in ribosomal DNA (ITS2) and mitochondrial DNA (COI and COII) of the 4 forms.

GENDER DIFFERENCE IN ACCUMULATION OF CALCIUM AND PHOSPHORUS IN THE LEFT CORONARY ARTERIES OF THAIS

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ABSTRACT

To examine whether there were gender differences in compositional changes of the coronary artery with aging, the authors investigated the gender difference in age-related changes of elements in the left coronary arteries of Thais by direct chemical analysis. After ordinary dissections by students at Chiang Mai University were finished, the left coronary arteries were resected from Thai subjects. The Thai subjects consisted of 69 men and 34 women. The ages of the male subjects ranged from 25 to 87 years (average age = 62.6 ± 11.4 years) and of the female subjects from 24 to 86 years (average age = 59.4 ± 14.6 years). After incinerating the arteries with nitric acid and perchloric acid, the element content was determined by inductively coupled plasma-atomic emission spectrometry. The Ca and P contents tended to increase in the left coronary arteries of men with age, but the increases were not statistically significant. In the left coronary arteries of women, the Ca and P contents increased significantly and progressively with aging. In addition, the Na content increased significantly in the left coronary arteries of both men and women with aging. The differences in the average contents of Ca and P by age group were observed between the left coronary arteries of men and women. With Student's t test, significant gender differences in the average contents of Ca and P were found in both the 40s and the 70s. The Ca and P contents of the left coronary arteries in the 40s were significantly higher in men than in women. In contrast, the Ca and P contents in the 70s were significantly higher in women than in men. These results indicated that the accumulation of Ca and P in the left coronary arteries of Thais occurred at least 10 years earlier in men than in women, but a higher accumulation
of Ca and P in old age occurred in the left coronary arteries of women compared with those of men. The present study revealed that there were significant gender differences in the left coronary arteries with regard to the accumulation of Ca and P with aging. It is reasonable to presume that taking clinical findings into consideration, the gender differences in the left coronary arteries may result from hormonal and/or genetic factors rather than lifestyle factors.
ABSTRACT

To examine whether there were gender differences in the various brain regions, the authors investigated the gender differences in seven element contents of the anterior commissure, mammillary body, and olfactory bulb and tract by direct chemical analysis. After ordinary dissection at Nara Medical University was finished, the anterior commissures, mammillary bodies, and olfactory bulbs and tracts were resected from the cerebra cut at median line. The brain samples were treated with 99.5% ethanol three times to remove lipids. After ashing with nitric acid and perchloric acid, the seven element contents Ca, P, S, Mg, Zn, Fe, and Na were determined by inductively coupled plasma-atomic emission spectrometry. It was found that the Zn content was significantly higher in the anterior commissures of men than in those of women. In the olfactory bulbs and tracts, it was found that the Ca, P, and Zn contents were significantly higher in men than in women. In contrast, no significant difference was found between the mammillary bodies of men and women regarding the seven element contents.
GENDER DIFFERENCES IN THE PHOSPHORUS CONTENT OF THE SINO-ATRIAL NODES AND OTHER CARDIAC REGIONS OF MONKEYS

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ABSTRACT

To examine whether there were gender differences in the sino-atrial node (SAN), the authors investigated the gender difference in the SAN using monkey hearts by direct chemical analysis from a viewpoint of element contents. The used rhesus and Japanese monkeys consisted of 30 males (average age=6.5±7.5 years) and 30 females (average age=12.2±10.3 years), ranging in age from newborn to 30 years. The SAN tissues were removed from the anatomical position of monkey hearts and were confirmed by means of histological observation. After ashing with nitric acid and with perchloric acid, element contents of the SANs, such as Ca, P, S, Mg, Zn, Fe, and Na, were determined by inductively coupled plasma-atomic emission spectrometry. In addition, gender differences in the right atrial walls, left ventricular walls, mitral valves, and left coronary arteries of monkeys were also investigated as controls. It was found that the P content was significantly higher in females than in males in the SANs of monkeys, but the other six element contents, Ca, S, Mg, Zn, Fe, and Na, were not significantly different between males and females in the SANs of monkeys. Regarding the P content, a similar finding was also obtained in both the right atrial walls and the left ventricular walls of monkeys, but it was not obtained in the mitral valves and the left coronary arteries of monkeys. The P content of tissue is mostly determined by the nucleic acid (DNA and RNA) content and the phospholipid content of tissue. Nucleic acids in the cell nucleus and the cytosol, and phospholipids in the cell membrane are all indicators of metabolically active cells. It is reasonable to presume that the P content in the SAN indicates the active cell density, namely, the number of active cells per volume. Therefore, there is a possibility that the active cell density of the SAN is significantly higher in females than in males.

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GENDER DIFFERENCES, ATTACHMENT STYLES, SELF-ESTEEM AND ROMANTIC RELATIONSHIPS IN THAILAND

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ABSTRACT

In this study we explore the association between attachment dimension (anxiety and avoidance), attachment style (secure, preoccupied, fearful and dismissing), self-esteem and romantic relationships, as determined by relationship status, relationship satisfaction and the length of relationships in 398 young Thai people. For the results, males scored higher in terms of both attachment anxiety and avoidance than the females, and this is consistent with other Asian cultures when compared to their western counterparts. It was found that non-romantic attachment as well as self-esteem does not predict the status of a relationship; however, romantic attachment avoidance predicts the level of relationship satisfaction, though with no difference between men and women. The lack of variables associated with the length of a relationship and relationship satisfaction, highlight the fact that other involved factors remain unstudied. The limitations of the study are also discussed.

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HEART RATE VARIABILITY AND EXERCISE CAPACITY OF PATIENTS WITH REPAIRED TETRALOGY OF FALLOT

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ABSTRACT

Heart rate variability (HRV) has been used as a reliable method to detect cardiac autonomic nervous system activity. Peak oxygen uptake (VO\textsubscript{2} peak) has been a predictor of death for adults with repaired tetralogy of Fallot (TOF). This study investigated the correlation between HRV and exercise capacity in 30 patients with TOF after surgery for total correction. The median age of the patients was 14 years (range, 9-25 years), and the median follow-up period was 11.6 months (range, 5.3-20.2 months). Low- and high-frequency-domain HRV significantly correlated with VO\textsubscript{2} peak (r = 0.56, P = 0.001 and r = 0.44, P = 0.02, respectively). After the 1-year follow-up evaluation, VO\textsubscript{2} peak and HRV analysis did not differ from those at entry to the study. However, low- and high-frequency-domain HRV still correlated significantly with VO\textsubscript{2} peak (r = 0.43, P = 0.03 and r = 0.52, P = 0.007, respectively). Left ventricular early diastolic myocardial velocity was most closely correlated with the VO\textsubscript{2} peak (r = 0.51, P = 0.005). Impaired cardiovascular autonomic control and left ventricular diastolic dysfunction may be responsible for exercise intolerance in patients with repaired TOF. Long-term follow-up evaluation with exercise testing and 24-h Holter monitoring are warranted.
HIGH-THROUGHPUT ASSAYS FOR DETECTION OF THE F1534C MUTATION IN THE VOLTAGE-GATED SODIUM CHANNEL GENE IN PERMETHRIN-RESISTANT Aedes aegypti AND THE DISTRIBUTION OF THIS MUTATION THROUGHOUT THAILAND

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ABSTRACT

Objectives: To develop rapid monitoring tools to detect the F1534C permethrin-resistance mutation in domain IIIS6 of the Aedes aegypti voltage-gated sodium channel gene and determine the frequency and distribution of this mutation in Thailand. Methods: A TaqMan SNP genotyping and an allele specific PCR (AS-PCR) assay were developed and validated by comparison with DNA sequencing of homozygous susceptible and homozygous resistant laboratory strains, their reciprocal-cross progenies, and field-caught mosquitoes. To determine the resistance phenotype of wild-caught A. aegypti, mosquitoes were exposed to 0.75% permethrin paper. The AS-PCR assay was used to screen 619 individuals from 20 localities throughout Thailand. Results: Overall, both assays gave results consistent with DNA sequencing for laboratory strains of known genotype and for wild-caught A. aegypti. The only slight discrepancy was for the AS-PCR method, which overestimated the mutant allele frequency by 1.8% in wild-caught samples. AS-PCR assays of permethrin-exposed samples show that the mutant C1534 allele is very closely associated with the resistant phenotype. However, 19 permethrin-resistant individuals were homozygous for the wild type F1534 allele. DNA sequencing revealed all these individuals were homozygous for two other mutations in domain II, V1016G and S989P, which are known to confer resistance (Srisawat et al. 2010). The F1534C mutation is widespread in Thailand with mutant allele frequencies varying among populations from 0.20 to 1.00. Conclusions: These assays can be used for the rapid detection of the F1534C resistance mutation in A. aegypti populations. The F1534C, and other, mutations underlie an extremely high prevalence of pyrethroid resistance in Thailand.
HISTORY OF FOOT ULCERS INCREASES MORTALITY AMONG PATIENTS WITH DIABETES IN NORTHERN THAILAND

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ABSTRACT

Aims: Studies within the Caucasian population with diabetes showed an increased mortality in patients with diabetic foot ulcers. However, there were no such studies based on Asian populations. We therefore designed our study on the association of foot ulcer with mortality within the Asian population. Methods: Ninety-seven Asian individuals with diabetes who had previously participated in the ‘Multidisciplinary Diabetic Foot Protocol’ between 2005 and 2007 at our centre were followed up in 2010 to ascertain their mortality rate. Cox proportional-hazard regression analyses were used to estimate hazard ratios. Results: Forty-seven patients had a history of foot ulcer (group 1), while 50 had none (group 2). The mean follow-up was 43.74 months. Twenty-one patients died during this period (21.65%). The mortality rates in group 1 and group 2 were 15 (31.92%) and six (12.00%), respectively. Patients with a history of foot ulcer had higher mortality rates than those without (hazard ratio 3.51, 95% CI 1.03-11.96, P = 0.04). Conclusions: Our study showed that history of foot ulcer increased mortality. This association appeared to be stronger in younger Asian patients than those in the Caucasian populations.
IDENTIFICATION OF BRUGIA MALAYI IMMUNOGENS BY AN IMMUNOPROTEOMICS APPROACH

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ABSTRACT

Filariasis remains a health problem in tropical countries. Identification of immunogens from its causative organism would lead to development of a better diagnostic test, as well as vaccine discovery to effectively prevent this disease. We applied immunoproteomics to define potential immunogens of adult Brugia malayi that were recognized by IgM, IgG1 and IgG4 in sera of patients with four distinct clinical spectra of filariasis, including endemic asymptomatic, lymphangitis, elephantiasis and microfilaremia (n=5/group). Sera of healthy individuals (n=5) from nonendemic area served as the negative control. Brugian proteins were resolved by 2-DE and subjected to 2-D Western blot analysis probed with these sera. A total of 30 immunoreactive proteins recognized by IgM, IgG1 and IgG4 in sera from all four filarial groups were identified by Q-TOFMS and MS/MS analyses. Interestingly, only three immunogens were recognized by IgM in lymphangitis, elephantiasis and microfilaremia (mostly in microfilaremia), but not in endemic asymptomatic group. IgG1 recognized 20 immunogens in endemic asymptomatic, lymphangitis and microfilaremia (mostly in endemic asymptomatic group), but not in elephantiasis, whereas IgG4 recognized 28 immunogens in all four filarial groups (mostly in microfilaremia). This large data set is an important resource for further development of a new diagnostic test and/or vaccine for filariasis.

IDIOPATHIC HIGH-FLOW PRIAPISM IN A PEDIATRIC PATIENT

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ABSTRACT

High-flow priapism is a very rare condition in children. The most common cause is perineal trauma, which is a major cause of arterio-cavernosal fistula. A few pediatric patients have high-flow priapism without an obvious cause. There are many therapeutic modalities for this condition, depending on the etiology. We report a case of idiopathic high-flow priapism in a 6-year-old boy who underwent repeated superselective embolization.
IMMUNOGENICITY AND SAFETY OF MONOVALENT INFLUENZA A (H1N1) 2009 IN HIV-INFECTED THAI CHILDREN

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ABSTRACT

To evaluate the immunogenicity and safety of the monovalent pandemic influenza A (H1N1) 2009 (pH1N1) vaccine in HIV-infected Thai children, 2 doses, 28 days apart, of non-adjuvant monovalent pH1N1 vaccine (Panenza\(^\star\) by Sanofi Pasteur, 15 µg/dose) provided by the National Health Promotion Program of the Thai Ministry of Public Health were given to HIV-infected children. Immunogenicity was measured by hemagglutination inhibition test (HAI) using two antigens, pH1N1 (A/Thailand/104/09) and seasonal influenza A H1N1 (A/Brisbane/59/07-like), at baseline, and 28 days after each dose. Sero-logic response was defined as four-fold rising of HAI titer or HAI titer \(\geq 1:40\) for those with baseline titer \(\leq 1:10\). Adverse events were recorded for 7 days after each vaccination. Of the 119 HIV-infected children enrolled, 60 (50.4\%) were female with a median (IQR) age of 10.4 (7.2–13.7) years. All but 2 (98.3\%) children were receiving antiretroviral therapy. At baseline, the median CD4 cell count was 782 (570–1149) cells/mm\(^3\), 91 (80.5\%) children had HIV RNA level <40 copies/ml. The baseline HAI titer \(\geq 1:40\) for pH1N1 and seasonal H1N1 were 45.4\%, and 39.5\%, respectively. At 28 days after doses 1 and 2, the serologic response rates for pH1N1 were 54.2\% and 67.8\% with the geometric mean titer of 109.9 and 141.8; and serologic response rate when tested with seasonal H1N1 were 2.5\% and 3.5\%, respectively. The presence of baseline HAI titer for pH1N1 or seasonal H1N1 was found to be associated with serologic response. The vaccine was well tolerated. The results suggested that monovalent pH1N1 vaccine was immunogenic and safe in well controlled HIV-infected children with low level of cross reacting antibody to seasonal H1N1.
IMPACT OF INCOMPLETE PLAN TO TREATMENT RESULTS OF CONCURRENT WEEKLY CISPLATIN AND RADIOTHERAPY IN LOCALLY ADVANCED CERVICAL CANCER

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ABSTRACT

To evaluate the efficacy of incomplete treatment protocols of cisplatin in concurrent chemoradiation for locally advanced cervical carcinoma. This retrospective study was performed in 165 consecutively treated patients with locally advanced cervical cancer who received a weekly cisplatin regimen. The number of weekly cisplatin cycles of each patient was recorded and used to discriminate between patients. Local control, disease free survival, distant metastasis-free survival, and toxicities were calculated using the software package SPSS version 15.0. Ninety-two patients (55%) completed the planned protocol of six cycles of weekly cisplatin. With the median follow-up time of 38.2 months, the 3-year local control rate differed significantly in the two patient groups (95.4% of 6 cycles versus 84.8% of < 6 cycles; p = 0.028). No statistical significance was observed for disease-free survival (74.6% versus 74.5%; p = 0.22) and distant metastasis-free survival (76.5% vs. 75.7%; p = 0.88). In conclusion, the plan completion of concurrent cisplatin with radiotherapy was responsible for better local control. However, differences in disease-free survival and distant metastasis-free survival were not statistical significant.
IMPORTANCE OF ETHNIC BASE STANDARD REFERENCES FOR THE DIAGNOSIS OF OSTEOPOROSIS IN THAI WOMEN

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ABSTRACT

Many studies demonstrated the importance of using ethnic-specific normal database in the diagnosis of osteoporosis (OP). Aims of this study were to assess diagnostic agreement, prevalence of OP, and diagnostic misclassification between Caucasian, Japanese, and Thai normal databases. The cross-sectional study of 3181 Thai women who had bone mineral density (BMD) measurement between January 2008 and December 2010 was performed. BMDs at lumbar spine (LS), femoral neck (FN), and total hip (TH) were derived to T-score by using Caucasian, Japanese, and Thai standard references. Kappa statistic was used to assess diagnostic agreement and misclassification. Diagnostic agreements between Caucasian and Thai reference databases were 0.39 for LS and 0.90 for FN. No statistical agreement was found in TH region (0.01, p value=0.264). Applying the Japanese reference, diagnostic agreements were 0.71 for LS, 0.76 for FN, and 0.94 for TH regions. Prevalence of OP in postmenopausal women was 64.1%, 37.7%, and 41.4% using Caucasian, Japanese, and Thai standard references. Percentage of misclassification was varied by menopausal status and reference database from 11.2% to 48.7%. When applying Japanese databases instead of Caucasian normal databases, overall diagnostic misclassification decreased from 35.1% to 16.1%. Choice of reference database has a significant effect on the diagnosis of low bone mass and OP. Japanese reference database has better diagnostic agreement with previously studied Thai reference database in 1999 than Caucasian reference database.
INHIBITORY EFFECTS OF CAFFEIC ACID ESTER ANALOGUES ON FREE RADICALS AND HUMAN LIVER MICROSONE CYP1A2 ACTIVITIES

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ABSTRACT

Ethyl caffeate (EC), octyl caffeate (OC), benzyl caffeate (BC) and phenethyl caffeate (PC) were synthesized and evaluated for scavenging of superoxide anion, nitric oxide radical and 1,1-diphenyl-1-picrylhydrazyl radical (DPPH). Antioxidant activity was investigated with reducing power method. Pooled human liver microsome was used for investigating the effects on cytochrome P450 1A2 (CYP1A2) catalytic activities by using phenacetin as a substrate. Dixon and Cornish-Bowden plots were used for enzyme kinetic analysis. The EC, OC, BC and PC potentially inhibited superoxide anion, nitric oxide and DPPH radicals. IC(50) values of superoxide anion scavenging of EC, OC, BC and PC were 16.42, 79.83, 123.69 and 123.69 µg/ml, respectively. EC was more potent than OC and BC in terms of nitric oxide radical scavenger: IC(50) values of EC, OC and BC were 24.16, 37.34 and 52.64 µg/ml, respectively. In addition, the IC(50) values of EC, OC, BC and PC on DPPH radical scavenging were 70.00, 184.56, 285.34 and 866.54 µg/ml, respectively. The IC(50) values of EC, OC, BC and PC on phenacetin O-deethylation were 124.98, 111.86, 156.68 and 31.05 µg/ml, respectively. Enzyme kinetics showed that the type of inhibition mechanism was mixed-type. The result of this study shows that caffeic acid ester analogues potentially scavenge free radicals and inhibit catalytic activity of CYP1A2. This may lead to important implications in the prevention of CYP1A2-mediated chemical carcinogenesis.
INTRA-ARTICULAR OSSICLE IN INTERPHALANGEAL JOINT OF THE GREAT TOE AND CLINICAL IMPLICATION

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ABSTRACT

Failure of closed reduction for an interphalangeal joint dislocation of the great toe resulted from an intra-articular ossicle interposed between the articular cartilages of the phalanges. The knowledge concerning the intra-articular ossicle is unclear. A study was thus carried out on 100 fresh great toes to document the appearance, number, size, and location of the intra-articular ossicle found in the interphalangeal joint of the great toe. Roentgenographic studies of the joint revealed 86% of bony mass representing either the sesamoid bone or the intra-articular ossicle. Anatomical studies revealed no sesamoid bone in the flexor hallucis longus tendon. There was 88% of intra-articular ossicle on the dorsal surface of the plantar capsule of the interphalangeal joint. A medial surgical approach to reduce the irreducible dislocation is thus suggested as easier and safer than other approaches.
IPSILATERAL ANTERIOR HIP DISLOCATION AND POSTERIOR KNEE SUBLUXATION: A CASE REPORT

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ABSTRACT

Hip or knee dislocations are two orthopedic emergencies. Concomitant hip and knee dislocations are extremely rare. The authors report a case of ipsilateral anterior hip and posterior knee dislocations. Firstly, closed reduction of the knee and spanning external fixation was performed and then the hip was closely reduced under general anesthesia.
KIDNEY STONES RECURRENCE AND REGROWTH AFTER EXTRACORPOREAL SHOCK WAVE LITHOTRIPSY AND PERCUTANEOUS NEPHROLITHOTOMY

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ABSTRACT

Objective: To estimate and compare the incidence rate of kidney stone recurrence and regrowth after ESWL with PCNL at one, two, and three years.

Material and method: A retrospective cohort study was performed. The study recruited patients aged more than 18 years, diagnosed with kidney stones and treated by ESWL or PCNL between January 2006 and August 2010 at the urological unit of a university hospital located in the northern part of Thailand. Data were retrieved from medical records and analyzed using exact probability test or student’s t-test. Poisson regression was used to compare the recurrence rate and the regrowth rate between ESWL and PCNL.

Results: During three years of follow-up, the overall stones recurrence and regrowth were 15.5% and 25.1% in ESWL group and 12.6% and 16% in PCNL group, respectively. At one, two and three years after treatment, stones recurrence rate in the ESWL group were 13.1, 7.5 and 7.3 per 1,000 patient-months while in the PCNL group were 11.3, 6.1 and 5.4 per 1,000 patient-months. After ESWL stones regrowth rates were 29.1, 12.3 and 11.9 per 1,000 patient-months, whereas after PCNL were 11.3, 6.9 and 6.9 per 1,000 patient-months, respectively. In comparison to PCNL, the relative recurrence rate after ESWL presented as incidence rate ratio (IRR) were 1.1 (95% CI; 0.4-3.2, p = 0.762), 1.2 (95% CI; 0.6-2.6, p = 0.517) and 1.4 (95% CI; 0.8-2.5, p = 0.271) at 1, 2 and 3 years, respectively. For regrowth, the IRRs were 2.6 (95% CI; 1.1-6.5, p = 0.012), 1.8 (95% CI; 0.9-3.4, p = 0.048), and 1.7 (95% CI; 1.1-2.9, p = 0.017) at 1, 2 and 3 years, respectively. Conclusion: Patients after ESWL had a higher trend of recurrent rates and statistically significant higher regrowth rates, in comparison with those after PCNL.
KINKING OF CATHETERS DURING TRANSLARYNGEAL JET VENTILATION: A BENCH MODEL INVESTIGATION OF 8 DEVICES

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ABSTRACT

Objective: To evaluated oxygen flow through several transtracheal devices in native and right angle kinked states. Material and Method: Eight catheter-over-needle, and two oxygen conveyance devices (Enk Flow Modulator 10L/min flow and Manujet III Jet device 15, 30, 50 psi) were examined. Oxygen flow from each of catheter was measure 5 times with 3 insufflation patterns [continuous insufflation, 1 second insufflation/1 second pause (1:1), 1 second insufflation/3 second pause (1:3)] in both native and 90 degree kinked condition. Results: During continuous insufflation all but the 20G catheter delivered flows of more than 7L/min with all conveyance pressures. With a 1:1 insufflation/pause ratio, catheters smaller than 16G were able to deliver 7L/min flow only with driving pressures of 30psi and 50psi. With a 1:3 insufflation ratio, no catheter could deliver adequate flow with 15psi(Manujet) or with the Enk Flow modulator, and only the Cook catheter and 14G Ravussin were capable at 30psi. Only the Cook Transtracheal Jet Ventilation Catheter could deliver adequate flow in kinked position, but only at 50 psi. Conclusion: Needle-catheters designed for vascular access are marginally capable of effective TJV. The Cook Transtracheal Jet Ventilation catheter proved to be the most robust device in the kinked state, but only when combined with a high pressure oxygen conveyance system.
MITOCHONDRIAL DNA VARIATION IN THE MALARIA VECTOR ANOPHELES MINIMUS ACROSS CHINA, THAILAND AND VIETNAM: EVOLUTIONARY HYPOTHESIS, POPULATION STRUCTURE AND POPULATION HISTORY

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ABSTRACT

The effects of Pleistocene environmental fluctuations on the distribution and diversity of organisms in Southeast Asia are much less well known than in Europe and North America. In these regions, the combination of palaeoenvironmental reconstruction and inferences about population history from genetic data has been very powerful. In Southeast Asia, mosquitoes are good candidates for the genetic approach, with the added benefit that understanding the relative contributions of historical and current processes to population structure can inform management of vector species. Genetic variation among populations of Anopheles minimus was examined using 144 mtDNA COII sequences from 23 sites in China, Thailand and Vietnam. Haplotype diversity was high, with two distinct lineages that have a sequence divergence of over 2% and exhibit different geographical distributions. We compare alternative hypotheses concerning the origin of this pattern. The observed data deviate from the expectations based on a single panmictic population with or without growth, or a stable but spatially structured population. However, they can be readily accommodated by a model of past fragmentation into eastern and western refugia, followed by growth and range expansion. This is consistent with the palaeoenvironmental reconstructions currently available for the region.
MOLECULAR IDENTIFICATION OF *TRICHINELLA PAPUA* FROM A THAI PATIENT WITH IMPORTED TRICHINELLOSIS

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ABSTRACT

Previously, we reported the presence of imported trichinellosis in a Thai worker returning from Malaysia, who presented with progressive generalized muscle hypertrophy and weakness after eating wild boar meat. This work analyzed a partial small subunit of a mitochondrial ribosomal RNA gene of *Trichinella* larvae isolated from the patient. The results showed complete identity with a mitochondrial RNA gene of *Trichinella papuae* (GenBank accession no. EF517130). This is the first report of imported trichinellosis in Thailand caused by *T. papuae*. It is possible that *T. papuae* is widely distributed in the wildlife of Southeast Asia.
MORPHOLOGICAL DESCRIPTIONS FOR THE IDENTIFICATION OF HYPOPYYIOPSIS TUMRASVINI KURASHI (DIPTERA: CALLIPHORIDAE)

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ABSTRACT

This article presents morphological descriptions of larvae and adults of Hypopygiopsis tumrasvini Kurahashi (Diptera: Calliphoridae), a blow fly species that may be of forensic importance. Both second and third instar larvae are illustrated, with emphasis placed on important characteristic features used for larval identification, such as the cephalopharyngeal skeleton, anterior and posterior spiracles, and dorsal spines between the prothorax and mesothorax. Eight to 11 papillae were found on each anterior spiracle arranged in a single row. The dorsal spines between the prothorax and mesothorax were arranged in sets of posteriorly projecting acuminate spines with darkly pigmented tips. The posterior spiracles each bear three prominent and separated long, slender spiracular slits encircled by a dark, thick peritreme that is complete ventromedially around a button. Prominent inner projection of peritreme is seen between the middle and lower spiracular slits. A previously published key for differentiating third instar larvae of flies of possible forensic importance in Thailand is updated to include this additional species. Some characteristic features of males and females of the species are also provided.
MUSCULOSKELETAL INFECTION IN ACQUIRED IMMUNODEFICIENCY SYNDROME

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ABSTRACT

Musculoskeletal infection is one of the common manifestations of patients infected with human immunodeficiency virus and acquired immunodeficiency syndrome. With immune deficiency, patients are susceptible to a variety of nonopportunistic and opportunistic infections that can result in significant morbidity and mortality. Infection can involve any anatomical compartments resulting in infectious arthritis, osteomyelitis, pyomyositis, and soft tissue and skin infection. Imaging plays an important role in the early diagnosis and treatment planning for these patients. This article reviews the clinical manifestations of musculoskeletal infection together with reported causative organisms. We discuss the role of imaging and present radiological examples.
MUSCULOSKELETAL MELIOIDOSIS

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ABSTRACT

Melioidosis is an infectious disease caused by Burkholderia pseudomallei, mostly affecting patients in Southeast Asia and northern Australia. The disease has been increasingly recognized around the world due to the increased levels of travel and population movement. Clinical manifestations of melioidosis range from fulminant septicemic illness to an indolent local infection. The disease often involves multiple organs, including the lung, spleen, liver, and other visceral organs. Musculoskeletal infection is usually seen as a part of multiorgan involvement, but localized musculoskeletal involvement may occur. The most common manifestation of musculoskeletal melioidosis is septic arthritis, followed by osteomyelitis, pyomyositis, and soft tissue abscesses. The clinical and radiological manifestations of musculoskeletal melioidosis are nonspecific, and the diagnosis needs a high level of suspicion. Associated infection of lungs and visceral organs is suggestive of melioidosis. The disease requires special laboratory facilities and treatment. Inappropriate or inadequate treatment leads to high mortality rate or long-term relapse of the disease. The causative organism of melioidosis, clinical manifestations, and imaging features of musculoskeletal melioidosis are reviewed.
NEW CLERODANE DITERPENOID FROM THE BULBILS OF DIOSCOREA BULBIFERA

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ABSTRACT

A new clerodane diterpenoid has been isolated from the acetone extract of bulbils of Dioscorea bulbifera. The structure of compound 1 was established as 15,16-epoxy-6alpha-O-acetyl-8beta-hydroxy-9-nor-clero-13(16),14-diene 17,12; 18,2-diolide on the basis of comprehensive spectroscopic techniques.
OUTCOME OF MEDULLOBLASTOMA IN CHILDREN TREATED WITH REDUCED-DOSE RADIATION THERAPY PLUS ADJUVANT CHEMOTHERAPY

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ABSTRACT

Medulloblastoma is the most common malignant brain tumor in children. Post-surgical craniospinal irradiation (CSI; 30-36 Gy) plus local boost radiation therapy (RT; 54-56 Gy) is a standard treatment for children with medulloblastoma who are over 3 years old, resulting in a 5-year overall survival (OS) rate of 46% to 65% in average-risk patients and 50% in high-risk patients. The addition of chemotherapy has the benefit of reducing complications from radiation and improving the OS rate. Using this approach, the estimated 5-year OS rates for patients with average- and high-risk medulloblastomas treated with different protocols are 65% to 85% and 16% to 70%, respectively. In this study, we determined the outcome of patients with average- and high-risk medulloblastomas treated with reduced dosage CSI and chemotherapy with an oral etoposide-based regimen. The study included 49 patients, with a mean age of 7.7 ± 3.4 years. Twenty-six patients...
(53%) were classified as average-risk and 23 patients (47%) as high-risk. In the average-risk group, the 5-year progression free survival (PFS) rate was 62.9% ± 10% and the 5-year OS rate was 70.4% ± 9.5%. In the high-risk group the 5-year PFS rate was 48.9% ± 13% and the 5-year OS rate was 49.7% ± 13%. In the average-risk group, patients who received CSI of either 24 Gy (n=20) or 36 Gy (n=9) showed no difference in their 5-year PFS and OS rates. We found that patients who were ≤ 10 years old and patients who were female had a significantly better 5-year PFS rate.
PAGET'S DISEASE OF THE BREAST: CLINICAL, IMAGING AND PATHOLOGIC FINDINGS: A REVIEW OF 16 PATIENTS

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ABSTRACT

Objectives: To determine the clinical, imaging and pathological findings of Paget’s disease of the breast. Materials and methods: Approval by Institutional Review Board was granted and informed consent was waived. Retrospective review of the pathological diagnosis of 2,361 women with breast carcinoma between January 2004 and April 2010 revealed 27 patients with Paget’s disease of the breast. The clinical, mammographic and ultrasonographic images were retrospectively reviewed. Results: The prevalence of Paget’s disease of the breast was 1.14% of all breast carcinoma at this institution. Of the 27 patients with Paget’s disease, only 16 had imaging studies and this group constituted the basis of this study. All 16 patients were women, with ages ranging from 36–68 years (mean age 50.31 years). Eleven patients presented with clinical findings suggestive of Paget’s disease of the breast. Seven of these 11 patients also had associated palpable mass(es). Four patients presented with a palpable mass alone and one presented with bloody nipple discharge alone. Mammography was performed in all 16 patients and ultrasonography (US) in 15 patients. Of the 16 mammographic studies, two were negative. Of the 15 US studies, three were negative. Of these three negative US studies, two also had negative mammography and one had pleomorphic microcalcifications on mammogram. US was helpful in detecting multifocality in two patients. Mammography was 100% positive in patients who presented with palpable breast mass(es) and bloody nipple discharge, but 50% positive in patients who had clinically suggestive Paget’s disease alone. Almost all patients (15/16) had underlying breast malignancies. Seven patients had multifocality or multicentricity. Modified radical mastectomy was performed in 13 patients, simple mastectomy in two, and wide local excision in one patient. Pathological findings were ductal carcinoma in situ (DCIS) (n = 3), invasive ductal carcinoma (IDC) (n = 10), metaplastic carcinoma (n = 1), invasive lobular carcinoma (ILC) (n = 1), and only Paget’s disease of the nipple without underlying breast carcinoma (n
Conclusion: Patients with Paget’s disease of the breast have a high incidence of an underlying breast carcinoma. Most of the patients in this study presented late and were more likely to have positive mammograms. Mammography should be performed to identify the underlying breast carcinoma. Those who have only nipple areolar changes and no palpable mass have less positive mammography and less invasive carcinoma. © 2011 Biomedical Imaging and Intervention Journal. All rights reserved.

**KEYWORDS:** CORONARY ARTERY DISEASE, SINGLE PHOTON EMISSION COMPUTED TOMOGRAPHY, POSITRON EMISSION TOMOGRAPHY, COMPUTED TOMOGRAPHY, DIAGNOSTIC VALUE
PERCUTANEOUS CERCLAGE WIRING FOR REDUCTION OF PERIPROSTHETIC AND DIFFICULT FEMORAL FRACTURES
A TECHNICAL NOTE

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ABSTRACT

Background: Combining closed reduction techniques with minimally invasive plate osteosynthesis (MIPO) or intramedullary nailing is a technically challenging procedure, especially when dealing with complex femoral fractures such as periprosthetic fractures. Cerclage wiring is a well known adjunct for fracture reduction and fixation. However, it is usually performed by open reduction, requiring wide surgical exposures, that results in soft tissue stripping. Objectives: To present how a novel cerclage wiring technique, employing a new percutaneous cerclage system, helped reduce a periprosthetic femoral fracture, fixed with MIPO, and a difficult proximal femoral fracture, stabilized with an intramedullary nail. Conclusion: Percutaneous wiring is an alternative reduction technique to facilitate the reduction and maintenance of difficult femoral fractures, which reduces the radiation exposure to the surgeon.
PERINATAL TREATMENT OF REFRACTORY ATRIAL FLUTTER WITH HYDROPS FETALIS: A CASE REPORT

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ABSTRACT

Objective: Highlight the management of a critically ill premature hydropic baby with refractory atrial flutter (AF) and successful outcome without neurologic sequel at 1 year of follow-up. Case: A 23-year-old pregnant woman, G1PO, presented with fetal tachycardia at 32 weeks. Results: Ultrasound revealed a hydropic fetus with fetal atrial rate (FHR) of 440 bpm and A:V block of 2:1. Transplacental therapy resulted in a temporary response with the combination of digoxin and flecainide, and subsequently digoxin plus sotalol. Termination of pregnancy at 34 weeks was performed for postnatal treatment, giving birth to a premature hydropic baby, weighing 3320 grams. At birth flecainide failed to control the AF Therefore, intravenous adenosine was started and successful conversion to normal sinus rhythm was temporally achieved. Finally, conversion to normal sinus rhythm with amiodarone plus digoxin was satisfactorily achieved and then long-term control with only oral flecainide. The hydropic signs gradually disappeared without any significant sequelae. The baby was healthy at one year of follow-up without any neurological sequelae. Conclusion: This case may be evidence that combined therapy with amiodarone and digoxin is probably effective in treatment of refractory AF with hydropic changes, at least in some cases.
PRELIMINARY RESULTS OF CONFORMAL COMPUTED TOMOGRAPHY (CT)-BASED INTRACAVITARY BRACHYTHERAPY (ICBT) FOR LOCALLY ADVANCED CERVICAL CANCER: A SINGLE INSTITUTION’S EXPERIENCE

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ABSTRACT

Intracavitary brachytherapy using tandem and ovoids is an important component of definitive treatment for cervical cancer. In the present study, we analyzed the dose-volume histograms (DVHs) of the tumor volume and organs at risk including the sigmoid colon by CT-based treatment planning for high dose rate (HDR) intracavitary brachytherapy (ICBT) in cervical cancer. Seventeen patients with carcinoma of the cervix uteri were treated with external beam radiotherapy plus concurrent chemotherapy. For brachytherapy, the planning procedure started by performing a conventional plan which prescribed a dose of 6.5-7 Gy per fraction to point A, then optimized the dose based on CT imaging. Volumes and DVHs were calculated for the HR-CTV, bladder, rectum and sigmoid colon. The mean BED(2Gy) total doses of post-optimized plans of HR-CTV, bladder, rectum and sigmoid colon were: 89.6, 94.1, 74.0 and 69.8 Gy, respectively. For conventional plans, the calculated mean BED(2Gy) total doses of HR-CTV, bladder, rectum and sigmoid colon were 92.2, 120.1, 75.7 and 78.3 Gy, respectively. This study showed statistical significant higher BED(2Gy) total doses for bladder and sigmoid colon (p < 0.001) using conventional plans versus post-optimized, CT-based plans, while no difference between HR-CTV and rectum BED(2Gy) total doses could be detected. After a median follow-up of nineteen months, all seventeen patients had a clinical complete response. Two patients developed distant metastasis. Compared with conventional treatment, CT based brachytherapy planning was very effective in reducing doses to OARs, especially bladder and sigmoid colon whilst maintaining a high therapeutic dose for tumor target volumes in the treatment of cervical carcinoma.
Preliminary Vivax Malaria Vector Competence for Three Members of the Anopheles Hyrcanus Group in the Republic of Korea

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ABSTRACT

In a study on the comparative susceptibility of Anopheles kleini, An. lesteri, and An. sinensis to Plasmodium vivax, we examined the feeding of laboratory-reared mosquitoes on blood of a patient carrying gametocytes from the Republic of Korea. Sporozoites in salivary glands from day 14 postfeeding were detected in An. kleini and An. lesteri with numbers high enough to initiate infection, while no sporozoites were detected in the salivary glands of An. sinensis. This result suggests that An. kleini and An. lesteri could be vivax malaria vectors in the Republic of Korea.
PRELIMINARY STUDY ON HEMOLYTIC ACTIVITIES OF AIRBORNE ASPERGILLUS AND PENICILLIUM AND THEIR SYNERGISTIC HEMOLYTIC REACTIONS WITH STAPHYLOCOCCUS AUREUS

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ABSTRACT

Objectives To investigate whether certain airborne Aspergillus and Penicillium could lysis erythrocytes on solid media and whether cooperative (CAMP-like) hemolytic reactions may be triggered by some Aspergillus or Penicillium with some common bacteria in respiratory tract. Methods Aspergillus species and Penicillium species isolated from indoor air were counted and identified by morphology and/or DNA sequences. They were inoculated on Tryptic soy agar (TSA) plates supplemented with 5% human blood, incubated at 25°C for 3 days and then transferred to 37°C for 10 days. Hemolytic activity was demonstrated as hemolytic index. Cooperative hemolytic reactions were performed using species of Aspergillus and Penicillium and bacteria including Staphylococcus aureus, S. epidermidis, Streptococcus pneumoniae and S. pyogenes, incubated on TSA supplemented with erythrocytes from human or sheep at 25°C. Results Aspergillus species and Penicillium species were found in small amount but frequently in indoor air. One half of the Aspergillus isolates and one third of Penicillium isolates were found hemolytic activity positive with human blood, including A. wentii, A. westerdijkiae and P. citrinum. No CAMP-like reactions could be detected in all species tested with human erythrocytes. With sheep erythrocytes, CAMP-like reactions were identified in most of the isolates of these three species with S. aureus but the results were varied when tested with S. pneumoniae. No reaction could be detected using S. epidermidis and S. pyogenes. Conclusions Hemolytic activity could be detected in some species of Aspergillus and Penicillium with human blood in variation between isolates, including A. wentii, A. westerdijkiae and P. citrinum. Most isolates of these three species had synergistic hemolytic reactions with S. aureus.
PREGNATAL DIAGNOSIS OF HOMOZYGOUS ALPHA-THALASSEMIA-1 BY CELL-FREE FETAL DNA IN MATERNAL PLASMA

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ABSTRACT

Objective: To investigate the use of cell-free fetal DNA (cff-DNA) to determine the fetal status in pregnant women who are at risk for Hb Bart's. Methods: Plasma DNA was extracted from 10 mL of maternal blood from couples who both were alpha-thalassemia-1 carriers (SEA deletion). Real-time quantitative PCR was performed using fluorescence-labeled probes to monitor wild type (wt) and SEA alleles. The quantity of each allele was determined by the cycle threshold (Ct). ΔCt (Ct of wt - Ct of SEA) was calculated from each sample. Prenatal diagnosis was performed to determine fetal status. Result: There were 62 Hb Bart's, 62 alpha-trait, and 34 normal fetuses in this study. Mean ΔCt was 1.04±0.38, 0.21±0.37, and 0.14±0.55 in Hb Bart's, alpha-trait and normal fetuses, respectively. On the basis of the receiver operating characteristic curve, the best cut-off of ΔCt for predicting Hb Bart's was 0.51, giving a 98.4% sensitivity and 20.8% false-positive rate. All but one Hb Bart's (98.4%) had ΔCt above 0.51, whereas 74.2% of alpha-trait and 88.2% of normal fetuses had ΔCt below 0.51. Conclusion: There is a positive trend to use cff-DNA in maternal plasma for prenatal diagnosis of homozygous alpha-thalassemia-1. With this technique, invasive prenatal testing and complications can be avoided in 79.2% of unaffected fetuses.
PREVALENCE OF FOOD ALLERGY AMONG PRESCHOOL CHILDREN IN NORTHERN THAILAND

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ABSTRACT

Background: The epidemiology and clinical spectrum of food allergies (FA) confirmed by oral food challenge tests (OFC) in the Southeast Asian countries are limited. We examined the prevalence and characteristics of food allergies among preschool children in northern Thailand. Methods: Five hundred and forty-six children aged 3-7 years living in Chiang Mai, Thailand participated in this study. A cross-sectional parent-responded questionnaire survey was conducted. Families with children reporting FA were invited to undergo further investigations with skin prick testing, serum specific IgE, and OFC. Results: A total of 452 out of 546 questionnaires (82.8%) were returned. Forty-two children (9.3%) were reported to have FA. The five leading allergic foods reported were shrimp, cow’s milk, fish, chicken eggs, and ant eggs. The most commonly reported symptom was a skin rash (78.0%), followed by abdominal pain and vomiting (31.1%). Anaphylaxis was found in 2 children (3.4%), from ant eggs allergy. Eighteen children underwent OFC; 5 of them demonstrated positive results to shrimp, fish, and crab. Either a skin prick test or a serum specific IgE was positive in these children. Factors associated with parent reported FA included personal and family history of atopic dermatitis. Conclusions: This study found at least 1.11% (95%CI 0.41-2.98%) prevalence of IgE-mediated FA confirmed by OFC. The most commonly causative food was shrimp. Ant eggs were a unique food allergen causing severe reactions in our preschool children.
PREVALENCE OF PROTECTIVE LEVEL OF HEPATITIS B ANTIBODY 3 YEARS AFTER REVACCINATION IN HIV-INFECTED CHILDREN ON ANTIRETROVIRAL THERAPY

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ABSTRACT

After responding to highly active antiretroviral therapy (HAART), HIV-infected children had a good response to hepatitis B immunization. However, there are limited data on the durability of antibody to hepatitis B surface antigen (anti-HBs) in these children. The primary objective of this study is to determine the prevalence of protective anti-HBs level 3 years after a 3-dose HBV revaccination among HIV-infected children with immune recovery (CD4 cell ≥ 15%) while on HAART. The secondary objective is to assess immunologic memory among children who had waning of anti-HBs. An anti-HBs level of ≥ 10 mIU/mL was defined as a protective antibody level. Sixty-nine HIV-infected children who had history of a 3-dose HBV revaccination while receiving HAART were enrolled. The mean (SD) of CD4 cell and duration of HAART at time of revaccination was 27.2% (6.7) and 5.9 years (0.4), respectively. The proportion of children with protective anti-HBs level 3 years after the revaccination was 71.0% [95% CI, 58.8-81.3]. The geometric mean titer was 114(SD 5)IU/mL. By multivariate logistic analysis, the predictors for protective anti-HBs level 3 years after revaccination were CD4 cell count ≥ 500 cells/mm³ at the time of vaccination (p = 0.04) and anti-HBs level ≥ 100 IU/mL at 1 month after completion of the 3-dose vaccination (p < 0.001). Anamnestic response after one booster dose was demonstrated among 14 of 17 children who had waning protective anti-HBs level (82.4% [95% CI, 62.2-102.6]). Our findings support the recommendation of giving a 3-dose HBV vaccination to HIV-infected children with immune recovery while receiving HAART.
PROGNOSTIC FACTORS FOR SUCCESS IN TREATING KIDNEY STONES BY EXTRACORPOREAL SHOCK WAVE LITHOTRIPSY

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ABSTRACT

Background: Extracorporeal shock wave lithotripsy (ESWL) is widely used worldwide to treat kidney stone because it is without invasive and can be done on an outpatient basis. However, not all patients are treated successfully. The success of kidney stone treatment by ESWL depends on several factors. Objective: To investigate prognostic factors for the successful treatment of kidney stones by ESWL. Material and method: A prospective cohort study was made of 394 patients with kidney stone who underwent ESWL using Storz SLX-20 Lithotripter at Chiang Mai University Hospital between June 2008 and October 2009. All patients were followed up for three months after treatment to evaluate treatment success. Success was defined as the presence of clinically insignificant residual fragments less than or equal to 4 mm or complete clearance of the stones. Data were analyzed using exponential risk regression to determine the prognostic factors of ESWL treatment success. Results: The ESWL treatment success rate was 81.2%. The stone free (SF) rate was 56.4%. The clinically insignificant residual fragment (CIRF) rate was 24.8%. The median number of ESWL treatment sessions was two (IQR = 2-4). Multivariable exponential risk regression analysis demonstrated that the statistically significant prognostic factors for ESWL treatment were stone size < 15 mm (IRR = 1.52, 95% CI = 1.13-2.05, p = 0.005), stone location (renal pelvis had a higher success rate than lower calyx; IRR = 1.32, 95% CI = 1.01-1.72, p = 0.028) and a single stone (IRR = 1.35, 95% CI = 1.02-1.79, p = 0.035). Conclusion: Stone size, stone location, and stone number were prognostic factors in determining the success of ESWL treatment.
PULSE CYCLOPHOSPHAMIDE INDUCTION TREATMENT IN THAI CHILDREN WITH DIFFUSE PROLIFERATIVE LUPUS NEPHRITIS

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ABSTRACT

Aim: To report the effectiveness of pulse cyclophosphamide induction therapy and to identify predictors for unresponsiveness to treatment in Thai children. Methods: Children with biopsy-proven diffuse proliferative lupus nephritis admitted to Chiang Mai University hospital between 2001 and 2006 were retrospectively studied. Patients received a test dose of 750 mg/m(2) at the first month followed by six cycles of monthly cyclophosphamide (IVCY) at the dose of 1 g/m(2) (maximum 1 g) as induction therapy. Responsiveness to treatment, defined as urinary protein to creatinine ratio of less than 0.3 with normalization of C3 level and clinical remission, was assessed at the end of the induction period. Gender, age at onset, duration of disease before treatment, hypertension, clinical nephrotic syndrome, amount of proteinuria, serum creatinine, creatinine clearance, serum C3 level and crescentic formation were compared between responsive and nonresponsive groups. Maintenance therapy with quarterly pulse IVCY or Azathioprine or Mycophenolate mofitil was given for 18-24 months after remission. Results: 29 patients with the mean age of 10.3 ± 2.6 years were studied. Hypertension, microscopic hematuria and nephrotic-range proteinuria were seen in 66%, 86% and 60% of the patients respectively. Forty-one percent of biopsies showed cellular or fibrocellular crescents. Twenty patients (69%) achieved remission at the end of induction therapy. There were no significant differences in all parameters studied between responsive and nonresponsive groups. The relapse rate after maintenance therapy was 58.8%. Conclusion: Our results show that pulse cyclophosphamide is an effective regimen for induction therapy in children with diffuse proliferative glomerulonephritis. No definite predictor for unresponsiveness was detected in this study.
RECURRENT TIBIAL INTRA-CORTICAL OSTEOSARCOMA: A CASE REPORT AND REVIEW OF THE LITERATURE

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ABSTRACT

Introduction: Intra-cortical osteosarcoma is the rarest subtype of osseous-producing tumor. Most reported cases present a low-grade histology with slow progression and good oncological control after adequate treatment. In this report, we describe a case and review the literature to propose adequate treatment. Case presentation: We present the case of a 21-year-old Thai woman who was thought to have an intra-cortical osteosarcoma of the right tibia. We performed a wide resection and reconstruction with bone transportation using an Ilizarov external fixator. The tumor recurred five years later at the same site with a similar histology. We performed a new resection and reconstruction by ankle arthrodesis with adjuvant chemotherapy. At the last follow-up, she had remained active and free from disease for seven years. Conclusion: This case report of recurrent intra-cortical osteosarcoma describes an atypical presentation. The low-grade histology, adequate surgical margin and adjuvant chemotherapy of the recurrent lesion were favorable factors, and our patient has remained free of any tumor recurrence.
RELATIONSHIP OF CELL BEARING EBER AND P24 ANTIGENS IN BIOPSY-PROVEN LYMPHOCYTIC INTERSTITIAL PNEUMONIA IN HIV-1 SUBTYPE E INFECTED CHILDREN

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ABSTRACT

Lymphocytic interstitial pneumonia (LIP) is an uncommon histopathologic entity characterized by infiltration of the interstitium and alveolar spaces of the lung by lymphocytes and other lymphoid elements. An increased incidence of LIP has been seen in the pediatric population, especially in children with acquired immune deficiency syndrome. Our previous study supports the notion that Langerhans cells (LCs) are reservoirs for Epstein-Barr virus (EBV) in lungs of human immunodeficiency virus (HIV) subtype E-infected pediatric LIP. To further understand the pathogenesis of LIP, we studied the relationship between EBV, the suggested causative agent of LIP and HIV-1 capsid protein p24, which play an important role in the interaction with host proteins during HIV-1 adsorption, membrane fusion, and entry in surgical lung biopsy-proven LIP from 9 vertically HIV subtype E-infected pediatric patients. The dominant microscopic feature of LIP demonstrated widespread widening of alveolar septum by mononuclear inflammatory cell infiltrate, mainly composed of mature lymphocytes and plasma cells surrounding airways and expanding to the lung interstitium. EBV-encoded RNA (EBER) in situ hybridization (ISH) and p24 immunohistochemistry, performed on formalin-fixed, paraffin-embedded tissue from open lung biopsy specimens, revealed positive intranuclear EBER signals and intracytoplasmic immunostains for p24 core protein in all 9 LIP cases. By combining ISH and immunohistochemistry, these results suggest that (i) EBV/p24-carrying cells are likely involved in the development of LIP, either directly or indirectly; (ii) LCs and related dendritic cells are the main reservoir of both EBV and HIV subtype E in
pediatric LIP and possibly LCs may play an important role in the recruitment of inflammatory cell infiltrates, especially T cells into these tissues; (iii) coexpression of EBV/p24 in bronchioalveolar epithelium supports the hypothesis that these cells serve as a reactivation source for both viruses to achieve greater quantities in alveolar septum and interstitium around bronchioles. These results indicate a strong association between the presence of HIV core protein p24 and expression of EBV RNA transcripts (EBER). Interactions between LCs and related dendritic cells together with T cells are important for effective HIV and EBV replications. The coexpression of both viruses could be related to the evolution of pediatric LIP in HIV subtype E infection.

RELATIONSHIPS AMONG THE HIPPOCAMPUS, DENTATE GYRUS, MAMMILLARY BODY, FORNIX, AND ANTERIOR COMMISSURE FROM A VIEWPOINT OF ELEMENTS

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ABSTRACT

To elucidate the relationships among the brain regions belonging to the limbic system, the authors investigated the relationships among the hippocampus, dentate gyrus, mammillary body, and fornix, using the anterior commissure as a control, from a viewpoint of elements. After ordinary dissections at Nara Medical University were finished, the hippocampi, dentate gyri, mammillary bodies, fornices, and anterior commissures were resected from identical cerebra of the subjects. The subjects consisted of 23 men and 23 women, ranging in age from 70 to 101 years (average age = 83.5 ± 7.5 years). After ashing with nitric acid and perchloric acid, element contents were determined by inductively coupled plasma-atomic emission spectrometry. With regard to seven elements of Ca, P, S, Mg, Zn, Fe, and Na, it was examined whether there were significant correlations among the hippocampus, dentate gyrus, mammillary body, fornix, and anterior commissure. It was found that there were extremely or very significant direct correlations among all of the five brain regions of the hippocampus, dentate gyrus, mammillary body, fornix, and anterior commissure in the P content. Likewise, with regard to the Fe content, there were significant direct correlations among the four brain regions belonging to the limbic system, except for the anterior commissure. In both the Ca and Zn contents, there were extremely or very significant direct correlations among the hippocampus, dentate gyrus, and mammillary body of the gray matter.
RELATIONSHIPS BETWEEN SERUM BIOMARKER LEVELS AND CLINICAL PRESENTATION OF HUMAN OSTEOSARCOMAS

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ABSTRACT

Background: Currently, serum biomarkers play an important role as sensitive tools for monitoring the cancer development and progression. Each biomarker represents a specific pathogenesis and has different predictive capability. In order to identify their characteristics in human osteosarcoma, multiple potential biomarkers were analyzed simultaneously with clinical presentations. Materials and Methods: Blood samples were collected from 28 osteosarcoma patients and 30 healthy matched controls. Specific clinical presentations were recorded, including: tumor volume, estimated based on three-dimensional MRI volumetric measurement; metastasis status; and histological cell types. Serum biomarkers analyzed by ELISA-based assays were bone-specific alkaline phosphatase (BALP), vascular endothelial growth factor (VEGF), hyaluronic acid (HA) and chondroitin sulfate WF6 (WF6). Serum lactate dehydrogenase (LDH) was analyzed by a photometric-based system. Results: Serum BALP, LDH and WF6 levels of osteosarcoma patients were significantly higher than those of healthy controls, whereas HA and VEGF levels were not significantly different between the two groups. Serum BALP and LDH were positively correlated with tumor volume, (correlation coefficients 0.5 and 0.4, respectively). Serum BALP from metastasis and osteoblastic subtype group had a significantly higher level than that found in non-metastasis and non-osteoblastic subtypes group, respectively. Upon multivariate analysis, tumor volume was the only factor which correlated with BALP levels. Conclusion: Of the biomarkers analyzed in this study, serum BALP was the most reliable and sensitive for estimating tumor volume. A high level of serum WF6 reflects alteration of the extracellular matrix component of tumors. Both serum biomarkers can be expected to be further explored for use in specific clinical monitoring.

RELIABILITY AND VALIDITY OF THE MULTIDIMENSIONAL SCALE OF PERCEIVED SOCIAL SUPPORT (MSPSS): THAI VERSION

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ABSTRACT

This study examines the Thai version of the Multidimensional Scale of Perceived Social Support (MSPSS) for its psychometric properties. Methods: In total 462 participants were recruited - 310 medical students from Chiang Mai University and 152 psychiatric patients, and they completed the Thai version of the MSPSS, the State Trait Anxiety Inventory (STAI), the Rosenberg Self-Esteem Scale (RSES) and the Thai Depression Inventory (TDI). Test-retest reliability was conducted over a four week period. Results: Factor analysis produced three-factor solutions for both patient (PG) and student groups (SG), and overall the model demonstrated adequate fit indices. The mean total score and the sub-scale score for the SG were statistically higher than those in the PG, except for ‘Significant Others’. The internal consistency of the scale was good, with a Cronbach’s alpha of 0.91 for the SG and 0.87 for the PG. After a four week retest for reliability exercise, the intra-class correlation coefficient (ICC) was found to be 0.84. The Thai-MSPSS was found to have a negative correlation with the STAI and the TDI, but was positively correlated with the RSES. Conclusion: The Thai MSPSS is a reliable and valid instrument to use.
ROLE OF PREOPERATIVE AND INTRAOPERATIVE FACTORS IN MEDIATING INFECTION COMPLICATION FOLLOWING PERCUTANEOUS NEPHROLITHOTOMY

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ABSTRACT

Objective: To identify the pre- and intraoperative factors that affect the development of postoperative systemic inflammatory response syndrome (SIRS) following percutaneous nephrolithotomy (PCNL). Patients and methods: A total of 200 patients were treated with PCNL, 56 of which developed postoperative SIRS (group I) and 144 did not (group II). For these 2 groups, the patient factor, operative factor, preoperative urine culture, pelvic urine culture, and stone culture were compared. Results: Average age, stone size, operative time, success rate, and number of tubeless PCNL were not significantly different between the 2 groups. However, preoperative urine culture, pelvic urine culture, and stone culture, respectively, were positive in 66.1, 46.4 and 48.2% of the patients in group I, but only 10.4, 3.5 and 3.5% for the corresponding specimens in group II. In addition, 5 patients in group I developed clinical septic shock, 4 of which were positive for all cultures and 1 positive only for stone culture. Conclusion: Infection following PCNL is common, but only a few cases progress to septic shock. Positive preoperative urine, intraoperative pelvic urine and stone cultures are important factors indicating the development of postoperative SIRS. Intraoperative cultures are important for decision-making about the treatment of postoperative infection complications.

SEMINAR REVIEW: SOCIOCULTURAL PRACTICES AND EPIDEMIOLOGY OF DIABETIC FOOT PROBLEM: LESSONS FROM A STUDY IN CHIANG MAI UNIVERSITY HOSPITAL, THAILAND

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ABSTRACT

The data on sociocultural practices and epidemiology of diabetic foot problems are scarce in Thailand. This report used data found in a database with patients involved in multidisciplinary foot care. Of the 511 patients with diabetes, 475 (93.0%) patients had type 2 diabetes. The prevalence of foot ulcers in diabetic patients was 12.5% and the amputation rate was 1.4%. A total of 32.7% of patients suffered from neuropathic problems. Barefoot walking inside the house was found 55.4% of the time, and this seemed to link closely with Thai sociocultural practices. Improvement in foot care was a direct result of foot care education.
STATURE ESTIMATION FROM LONG BONE LENGTHS IN A THAI POPULATION

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ABSTRACT

The estimation of stature is a very important step in developing a biological profile for forensic identification. However, little previous work has been done on stature estimation among modern Thai people, despite a growing number of forensic cases in Thailand in recent years. The current study was carried out on a sample of 200 skeletons from a northern Thai population (132 males and 68 females), ranging in age from 19 to 94 years. The maximum lengths of six long bones (humerus, radius, ulna, femur, tibia and fibula) were measured and stature reconstruction formulae generated using linear regression. These equations were then tested on a holdout sample of 15 females and 15 males. Results reveal that the three lower limb bones are the most accurate estimators of stature among the males, with the fibula equation producing the lowest standard error of the estimate (SE = 4.89 cm), followed by the femur (SE = 5.06 cm). Results for females were mixed. The femur produced the lowest standard error among the females (SE = 5.21 cm), followed by the radius (SE = 5.63 cm). However, when tested against the holdout sample (n = 30), the femur equations were considerably more accurate, with a mean absolute error of 3.5 cm and a median absolute error of 2.4 cm. Females exhibited a higher standard error of the estimate than reported in many previous studies. This higher error may be the result of a recent secular trend in stature affecting the females of our sample somewhat more than the males.
SUCCESSFUL TREATMENT OF A CHILD WITH VASCULAR PYTHIOSIS

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ABSTRACT

Background: Human pythiosis is an emerging and life-threatening infectious disease caused by Pythium insidiosum. It occurs primarily in tropical, subtropical and temperate areas of the world, including Thailand. The aim of this report is to present the first pediatric case of typical vascular pythiosis. Case Presentation: A 10-year-old boy with underlying β-thalassemia presented with gangrenous ulcers and claudication of the right leg which were unresponsive to antibiotic therapy for 6 weeks. Computerized tomography angiography indicated chronic arterial occlusion involving the right distal external iliac artery and its branches. High-above-knee amputation was urgently done to remove infected arteries and tissues, and to stop disease progression. Antibody to P. insidiosum was detected in a serum sample by the immunoblot and the immunochromatography tests. Fungal culture followed by nucleic sequence analysis was positive for P. insidiosum in the resected iliac arterial tissue. Immunotherapeutic vaccine and antifungal agents were administered. The patient remained well and was discharged after 2 months hospitalization without recurrence of the disease. At the time of this communication he has been symptom-free for 2 years. Conclusions: The child presented with the classical manifestations of vascular pythiosis as seen in adult cases. However, because pediatricians were unfamiliar with the disease, diagnosis and surgical treatment were delayed. Both early diagnosis and appropriate surgical and medical treatments are crucial for good prognosis.

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SURVEILLANCE OF ANTIMICROBIAL RESISTANCE AMONG BACTERIAL PATHOGENS ISOLATED FROM HOSPITALIZED PATIENTS AT CHIANG MAI UNIVERSITY HOSPITAL, 2006–2009

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ABSTRACT

Background: Conducting surveillance of multidrug-resistant organisms leads to identifying changes in the pathogens causing healthcare-associated infections (HAIs) of specific sites, and the antimicrobial susceptibility patterns. This surveillance study aimed to characterize the pattern of nosocomial multidrug-resistant pathogens. Methods: Clinical laboratory reports from Chiang Mai University hospital were reviewed from 2006 to 2009. Results: During the 4-year period, gram-negative bacteria were the majority of clinical isolates. *A. baumannii* was the most common pathogen isolated from sputum. *E. coli* was the most common pathogen isolated from blood and urine. Carbapenem resistance among *A. baumannii* isolates was 67.1%, 74.2%, 68.9%, and 74.2% in 2006, 2007, 2008, and 2009, respectively. Carbapenem resistance among *P. aeruginosa* was 35.0%, 33.8%, 27.0%, and 26.8% in 2006, 2007, 2008, and 2009, respectively. Extended-spectrum β-lactamase producing strains accounted for 35.2% and 49.2% among *E. coli* and *K. pneumoniae*, respectively in 2006 and 2007 and 2008 and 2009, respectively. Extended-spectrum β-lactamase producing strains accounted for 35.2% and 49.2% among *E. coli* and *K. pneumoniae*, respectively in 2006 and 2007 and 2008 and 2009, respectively. Extended-spectrum β-lactamase producing strains accounted for 35.2% and 49.2% among *E. coli* and *K. pneumoniae*, respectively in 2006 and 2007 and 2008 and 2009, respectively. Extended-spectrum β-lactamase producing strains accounted for 35.2% and 49.2% among *E. coli* and *K. pneumoniae*, respectively in 2006 and 2007 and 2008 and 2009, respectively. Gram-positive bacteria accounted for 25% of all isolates for all 4 years. *S. aureus* and Enterococci were the most common gram-positive pathogens. Among *S. aureus*, 35% and 44% were methicillin-resistant strains in 2006 and 2009, respectively. Conclusions: The surveillance data showed that gram-negative bacteria are the major problems in our hospital. Multidrug-resistant *Acinetobacter baumannii* is a particularly important problem. Continued.
SUSCEPTIBILITY OF ANOPHELES CAMPESTRIS-LIKE AND ANOPHELES BARBIROSTRIS SPECIES COMPLEXES TO PLASMODIUM FALCIPARUM AND PLASMODIUM VIVAX IN THAILAND

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ABSTRACT

Nine colonies of five sibling species members of Anopheles barbirostris complexes were experimentally infected with Plasmodium falciparum and Plasmodium vivax. They were then dissected eight and 14 days after feeding for oocyst and sporozoite rates, respectively, and compared with Anopheles cracens. The results revealed that Anopheles campestris-like Forms E (Chiang Mai) and F (Udon Thani) as well as An. barbirostris species A3 and A4 were non-potential vectors for P. falciparum because 0% oocyst rates were obtained, in comparison to the 86.67-100% oocyst rates recovered from An. cracens. Likewise, An. campestris-like Forms E (Sa Kaeo) and F (Ayuttaya), as well as An. barbirostris species A4, were non-potential vectors for P. vivax because 0% sporozoite rates were obtained, in comparison to the 85.71-92.31% sporozoite rates recovered from An. cracens. An. barbirostris species A1, A2 and A3 were low potential vectors for P. vivax because 9.09%, 6.67% and 11.76% sporozoite rates were obtained, respectively, in comparison to the 85.71-92.31% sporozoite rates recovered from An. cracens. An. barbirostris-like Forms B and E (Chiang Mai) were high potential vectors for P. vivax because 66.67% and 64.29% sporozoite rates were obtained, respectively, in comparison to 90% sporozoite rates recovered from An. cracens.
SYMPTOM CHECKLIST-90 (SCL-90) IN A THAI SAMPLE

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ABSTRACT

Background: Symptom Checklist-90 (SCL-90) has been used on both normal and clinical samples in Thailand over a long period. However, its validity and reliability have not yet been systemically reported. Objective: Survey the validity and reliability of SCL-90 in a more extensive way, using a normal sample of people throughout Thailand, and investigate the psychometric properties of the Thai version of SCL-90. Material and Method: Four hundred forty eight subjects participated in the present study of which 50.4% were male and with ages ranging from eighteen to 90 years, by providing demographic data and completing the Thai version of SCL-90 and the 16-Personality Factor (16-PF) Questionnaire. The demographic data was analyzed using descriptive statistics, and Cronbach’s alpha was used to determine its internal consistency. Factor and confirmatory factor analysis were performed to construct the validity, and convergent and discriminant validities were calculated to generate Pearson’s correlation coefficients using the 16-PF subscales. Results: The mean of the global symptoms index was found to be 0.70 ± 0.46, with the means of the symptoms ranging from 0.53 for Psychoticism to 0.98 for Obsessive-compulsive disorder. We found to be a significant difference in sub-scales across genders, age groups, geographic regions, educational levels, occupations, and incomes, but the symptom dimension patterns revealed were similar to those of previous studies. Depression and anxiety were the key components to show variance between the normal and clinical samples. The measurements demonstrated good internal consistency with Cronbach’s alpha, at 0.97, but did not yield relevant correlations between some of the 16-PF sub-scales, as was expected. Moreover, factor analysis revealed that SCL-90 has a uni-dimensional construct. Conclusion: The Thai version of SCL-90 showed a good internal consistency, but poor discriminant validity with most items occurring for the depression, anxiety and interpersonal sensitivity dimensions. It is recommended that some of the items be revised for clinical studies.
SYSTEMATIC REVIEW OF RANDOMIZED CONTROLLED TRIALS OF PATCH ANGIOPLASTY VERSUS PRIMARY CLOSURE AND DIFFERENT TYPES OF PATCH MATERIALS DURING CAROTID ENDARTERECTOMY

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ABSTRACT

Objective: Patch angioplasty during carotid endarterectomy (CEA) can reduce the risk of perioperative stroke or late carotid artery recurrent stenosis and subsequent ischaemic stroke. We aimed to update our previous systematic review of randomized controlled trials (RCTs) of routine or selective carotid patch angioplasty compared with CEA with primary closure, and of different materials used for carotid patch angioplasty. Methods: We identified new RCTs published during 2002-2010 by searching Medline, Embase and the Cochrane Stroke Group Trials Register. We also hand-searched six relevant journals. Pooled estimates of treatment effects combined with our previous review (1966-2001) were calculated on the basis of a weighted estimate of the odds ratio (OR) with the Peto method. Results: Twenty-three eligible RCTs were identified in both periods. Ten RCTs involving 2,157 operations compared primary closure with routine patch closure. Patch closure significantly reduced the combined risk of perioperative stroke and later stroke during long-term follow-up [OR = 0.49, 95% confidence interval (CI) = 0.27-0.90, p = 0.001; 7 RCTs]. Patching also reduced the risks of perioperative arterial occlusion (OR = 0.18, 95% CI = 0.08-0.41, p < 0.0001; 7 RCTs) and recurrent stenosis during long-term followup (OR = 0.24, 95% CI = 0.17-0.34, p < 0.001; 8 RCTs). Conclusion: Meta-analysis of relatively small RCTs suggests that carotid patch angioplasty reduces the combined perioperative and long-term risk of stroke and the risk of restenosis. More data are needed.
THE EFFECT OF TELEPHONE-BASED INTERVENTION (TBI)
IN ALCOHOL ABUSERS: A PILOT STUDY

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ABSTRACT

Objective: The present study was to examine the efficacy of Telephone-based intervention (TBI) with alcohol abusers. Material and Method: Sixty individuals suffering from alcohol abuse were randomly assigned to either the intervention group (n = 30) (in which the TBI was modified based on the combination of motivational interviewing and supportive techniques), or the control group (n = 30) (in which the participants received mail concerning health promotion). Each participant in the intervention group received individual weekly therapy sessions of 20 to 30 minutes via telephone for six weeks. Simultaneously, the participants in the control group received weekly mails for six weeks. Assessment was done at weeks 0, 6, and 18. The primary outcome was defined as a change in the amount of alcohol consumed and the number of days spent drinking. Anxiety, depression, and self-esteem were also compared between the two groups. All were analyzed by intention-to-treat. Results: After 18 weeks, 54 out of the original 60 participants had complete data sets. The mean amount and frequency of alcohol consumption was significantly lower in the intervention group than in the control group (4.1 days + 2.0 vs. 2.8 days + 2.0, p < 0.01). At the end of week six, 37.3% of participants in the experiment group (compared with 11.8% of the control) had successfully decreased their alcohol consumption ($\chi^2 = 16.49, df = 1, p < 0.001$, with an NNT = 1.69). The frequency of drinking, as determined by the number of drinking days per week, was significantly lower in the experiment group from baseline than in the control group at week 6 ($\chi^2 = 18.20, df = 1, p < 0.001$, with an NNT = 1.8). There was no difference between week 6 and the end of week 18 regarding amount and frequency of drinking in both groups. There was no difference in depressive, anxiety and self-esteem scores between the two groups over time and these factors were found to have no effect on alcohol consumption in either group. A common problem reported in the telephone group was connection failures. Conclusion: Telephone motivational interviews showed promise in being effective in reducing the frequency and amount of drinking for non-treatment-seeking primary care patients who abuse alcohol. Moreover, the effect of the intervention lasted for at least three months. Limitations of the present study are discussed.

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THE EFFECTS OF GUIDED IMAGERY ON AFFECT, COGNITION, AND PAIN IN OLDER ADULTS IN RESIDENTIAL CARE: A RANDOMIZED CONTROLLED STUDY FROM THAILAND

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ABSTRACT

Few studies have examined the effects of guided imagery on older adults in residential care. This study aimed to evaluate the outcome of group-delivered guided imagery over a 16-day period with a sample of Thai older adults in residential care (N = 31). Residents were randomly allocated to the guided imagery treatment group or usual care control group. No significant differences were found between the two groups regarding affective states, cognitive functioning, or pain. The results are discussed in relation to a ceiling effect and other methodological factors that may have contributed to the lack of positive outcomes. As the evidence base remains inconclusive, it is hoped that future studies will seek to establish the effects of using guided imagery with older adults in residential care.
THE EFFICACY AND SAFETY OF ORAL TAMSULOSIN CONTROLLED ABSORPTION SYSTEM (OCAS) FOR THE TREATMENT OF LOWER URINARY TRACT SYMPTOMS DUE TO BLADDER OUTLET OBSTRUCTION ASSOCIATED WITH BENIGN PROSTATIC HYPERPLASIA: AN OPEN-LABEL PRELIMINARY STUDY.

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ABSTRACT

Aims: Tamsulosin, a superselective subtype alpha 1a and 1d blocker, is used for the treatment of male lower urinary tract symptoms (LUTS) commonly caused by benign prostatic hyperplasia (BPH). This prospective study evaluated the efficacy and safety of a new formulation, Tamsulosin OCAS® (Oral Controlled Absorption System), for LUTS associated with BPH in Thai patients. Materials and methods: Fifty one patients over 40 years old with complaints of LUTS associated with BPH were recruited. Patients received an 8 week course of once daily 0.4 mg tamsulosin OCAS®, and were followed up at 2 (visit 3), 4 (visit 4) and 8 (visit 5) weeks post-treatment. At each visit, patients were assessed using the International Prostate Symptom Score (IPSS), Nocturia Quality of Life (N-QoL) Questionnaire, QoL Assessment Index (IPSS-QoL), and International Index of Erectile Function (IIEF). The primary outcome was efficacy of Tamsulosin. The secondary outcomes included change in the mean number of nocturia episodes, hours of undisturbed sleep (HUS) and uroflowmetry measurements. Results: Total IPSS significantly decreased at week 8 from baseline (from 19.52 to 6.08; p < 0.001). Similarly, the voiding and storage subscores of IPSS also continued to improve significantly starting from the second and third visits, respectively (p < 0.001 versus baseline). The IPSS-QoL and N-QoL scores significantly improved at visit 3 through end of study. In addition, we observed significant nocturia and HUS improvement in their last clinic visit. Uroflowmetry parameters, Qmax and Qave, improved significantly at 3rd clinic visit. Three patients experienced mild dizziness. Conclusion: Tamsulosin OCAS® treatment led to significant improvements in LUTS, HUS and QoL in Thai patients with bladder outlet obstruction from BPH with few side effects.

THE IMPACT OF A NATIONAL PROGRAM TO ELIMINATE LYMPHATIC FILARIASIS IN SELECTED MYANMAR IMMIGRANT COMMUNITIES IN BANGKOK AND RANONG PROVINCE, THAILAND

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ABSTRACT

Some immigrants from Myanmar to Thailand have brought *Wuchereria bancrofti* infections with them, causing a community health problem for Thai citizens. The seroprevalence of bancroftian filariasis was detected in 438 and 512 Myanmar immigrants residing in Bangkok and Ranong Provinces, respectively, along with 81 Thai citizens living in Bangkok. The immunochromatography card test was positive in 5 Myanmar immigrants living in Bangkok and 1 living in Ranong for a prevalence of 0.63%. Antifilarial IgG4 antibodies were found in 21 Myanmar immigrants living in Bangkok and 14 living in Ranong for a prevalence of 3.68%. None of the samples from Thai citizens were positive with either test. These prevalence rates are lower than those observed between 2001 and 2005. The Thai mass drug administration program to eliminate lymphatic filariasis among Myanmar immigrants appears to be a successful public health strategy.
THE PRESCRIPTION OF ANTICHOLINERGIC AGENTS IN ALZHEIMER’S DISEASE PATIENTS

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ABSTRACT

Objectives: To determine the prevalence of anticholinergic prescription among elderly Thai patients suffering from Alzheimer’s disease (AD), as well as any adverse effects experienced in the central nervous system (CNS). Methods: A retrospective drug review, based on the outpatient medical records of AD patients aged 60 years and over, was carried out in a university hospital in northern Thailand during the period 2006 to 2009, using the descriptive statistics method to analyze the demographic data, comorbidity, prescription records, MMSE scores, and any adverse CNS events in the last year. The anticholinergic risks of the prescribed medicines were evaluated, and the association between the prescription and any side effects within the CNS including changes in MMSE scores were investigated. Results: A total of 121 medical records were obtained for the study (including 69 women: mean age 77 years, SD 7.5), consisting of 17 mild dementia (17.9%), 51 moderate dementia (53.7%) and 27 severe dementia (28.7%) patients. The three most common co-morbidity found were hypertension (61.9%), dyslipidemia (55.3%) and vascular dementia (47.9%). The use of cholinesterase inhibitors (ChEIs) was found in 52.1% of the cases. Anticholinergic prescriptions were found in 64.5% of cases, with 80.8% of these having a moderate anticholinergic risk, 23.1% having a severe risk and 26.9% having a most severe risk. The anticholinergic prescription was found to be associated with confusion (p < 0.05), but not with changes in the MMSE score. Conclusions: Anticholinergic prescriptions were found in two-thirds of the studied dementia cases, with onethird of these having moderate to severe symptoms. Confusion was found to be related to the anticholinergic prescription. Further studies using a larger population should be carried out in order to establish the proportion of patients prescribed with anticholinergic agents and the association with CNS adverse effects.
THE ROLE OF THE *Aedes aegypti* EPSILON GLUTATHIONE TRANSFERASES IN CONFERRING RESISTANCE TO DDT AND PYRETHROID INSECTICIDES

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**ABSTRACT**

The Epsilon glutathione transferase (GST) class in the dengue vector *Aedes aegypti* consists of eight sequentially arranged genes spanning 53,645 bp on super contig 1.291, which maps to chromosome 2. One Epsilon GST, GSTE2, has previously been implicated in conferring resistance to DDT. The amino acid sequence of GSTE2 in an insecticide susceptible and a DDT resistant strain differs at five residues two of which occur in the putative DDT binding site. Characterization of the respective recombinant enzymes revealed that both variants have comparable DDT dehydrochlorinase activity although the isoform from the resistant strain has higher affinity for the insecticide. GSTe2 and two additional Epsilon GST genes, GSTe5 and GSTe7, are expressed at elevated levels in the resistant population and the recombinant homodimer GSTE5-5 also exhibits low levels of DDT dehydrochlorinase activity. Partial silencing of either GSTe7 or GSTe2 by RNA interference resulted in an increased susceptibility to the pyrethroid, deltamethrin suggesting that these GST enzymes may also play a role in resistance to pyrethroid insecticides.

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ABSTRACT

Background: The measurements of body mass index (BMI) and percentage of body fat are used in many clinical situations. However, special tools are required to measure body fat. Many formulas are proposed for estimation but these use constant coefficients of age. Age spectrum might affect the predicted value of the body composition due to body component alterations, and the coefficient of age for body fat prediction might produce inconsistent results. The objective of this study was to identify variations of BMI and body fat across the age spectrum as well as compare results between BMI predicted body fat and bioelectrical impedance results on age. Methods: Healthy volunteers were recruited for this study. Body fat was measured by bioelectrical impedance. The age spectrum was divided into three groups (younger: 18-39.9; middle: 40-59.9; and older: ≥60 years). Comparison of body composition covariates including fat mass (FM), fat free mass (FFM), percentage FM (PFM), percentage FFM (PFFM), FM index (FMI) and FFM index (FFMI) in each weight status and age spectrum were analyzed. Multivariable linear regression coefficients were calculated. Coefficient alterations among age groups were tested to confirm the effect of the age spectrum on body composition covariates. Measured PFM and calculated PFM from previous formulas were compared in each quarter of the age spectrum. Results: A total of 2324 volunteers were included...
in this study. The overall body composition and weight status, average body weight, height, BMI, FM, FFM, and its derivatives were significantly different among age groups. The coefficient of age altered the PFM differently between younger, middle, and older groups (0.07; P = 0.02 vs 0.13; P < 0.01 vs 0.26; P < 0.01; respectively). All coefficients of age alterations in all FM- and FFM-derived variables between each age spectrum were tested, demonstrating a significant difference between the younger (<60 years) and older (≥60 years) age groups, except the PFFM to BMI ratio (difference of PFM and FMI [95% confidence interval]: 17.8 [12.8-22.8], P < 0.01; and 4.58 [3.4-5.8], P < 0.01; respectively). The comparison between measured PFM and calculated PFM demonstrated a significant difference with increments of age. CONCLUSION: The relationship between body FM and BMI varies on the age spectrum. A calculated formula in older people might be distorted with the utilization of constant coefficients.
TREATMENT OF APERT SYNDROME: A LONG-TERM FOLLOW-UP STUDY

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ABSTRACT

Background: Patients with Apert syndrome have severe malformations of the skull and face requiring multiple complex reconstructive procedures. The authors present a long-term follow-up study reporting both surgical results and psychosocial status of patients with Apert syndrome. Methods: A retrospective study was performed identifying patients with Apert syndrome treated between 1975 and 2009. All surgical procedures were recorded and a review of psychosocial and educational status was obtained when patients reached adulthood. Results: A total of 31 patients with Apert syndrome were identified; nine with long-term follow-up had complete records for evaluation. The average patient age was 30.4 years. Primary procedures performed included strip craniectomy and fronto-orbital advancement. Monobloc osteotomy and facial bipartition were performed in eight patients, and all underwent surgical orthognathic correction. Multiple auxiliary procedures were also performed to achieve better facial symmetry. Mean follow-up after frontofacial advancement was 22.5 years. Psychosocial evaluation demonstrated good integration of patients into mainstream life. Conclusions: This report presents one of the longest available follow-up studies for surgical correction of patients with Apert syndrome. Although multiple reconstructive procedures were necessary, they play an important role in enhancing the psychosocial condition of the patients, helping them integrate into mainstream life. (Plast. Reconstr. Surg. 127: 1601, 2011.)
TUBERCULOSIS ARTHRITIS AND TENOSYNOVITIS

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ABSTRACT

The incidence of extrapulmonary tuberculosis (TB) has been rising due to the increasing number of immunosuppressed patients. Musculoskeletal system accounts for 25% of extrapulmonary TB. Most of the musculoskeletal TB involves the spine. TB of peripheral joints and tendons occur infrequently, but if untreated, it can cause serious joint and tendon destruction as well as spread of the infection to the surrounding bursa, muscle, and other soft tissues. The diagnosis of TB of joints and tendons is difficult due to the nonspecific clinical manifestations and imaging features. Concurrent active pulmonary TB is present in <50% of the patients. A positive chest radiographic finding or a positive tuberculin test supports the diagnosis, but negative results do not exclude diagnosis. Although imaging features of TB of joints and tendons are nonspecific, certain findings such as relatively preserved joint space, juxta-articular osteoporosis, cold abscesses, para-articular soft tissue calcification, and rice bodies are suggestive of TB infection. Familiarity with these imaging features can help in making an early diagnosis and facilitating proper management.
VALIDITY AND RELIABILITY OF THE THAI VERSION OF THE EXPERIENCES OF CLOSE RELATIONSHIPS-REVISED QUESTIONNAIRE

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ABSTRACT

Introduction: This study aimed to investigate the psychometric properties of the Thai version of the Experiences of Close Relationships-Revised (Thai ECR-R) questionnaire. Methods: 400 students from a university in northern Thailand were randomly selected to complete the Thai ECR-R, the extraversion scale for 16 personality factors, the self-esteem scale and the trait anxiety scale. A retest of the Thai ECR-R was conducted at four-week intervals. Exploratory and confirmatory factor analyses were performed to test the validity of the construct. Results: The Thai ECR-R showed good internal consistency and satisfactory test-retest reliability. The avoidance and anxiety subscales demonstrated a convergent validity with the extraversion, self-esteem and trait anxiety scales. An exploratory analysis yielded a two-factor structure. Confirmatory factor analysis also provided general support for the hypothesised two-factor model, although there was a slight lack-of-fit. Conclusion: The overall psychometric properties of the Thai ECR-R were acceptable. In order to render it more congruent with Thai culture, a revision of some items was considered. Further research on other age groups should be conducted in future.
CASE REPORT: DIARRHEA IN BABY ASIAN ELEPHANT (ELEPHAS MAXIMUS)

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ABSTRACT

A 5 - year – 10 month male, Asian elephant was admitted to FAE elephant hospital with abnormal gastrointestinal problem, pain, weakness, watery stool, yellowish urine. The fecal sample was found parasitic eggs, protozoa, and Clostridium perfringens type A. The hematological was icteris serum. After supportive treatment with antibiotic, parenteral fluid therapy, vitamin and mineral supplement. The elephant clinical signs were recovered and had normal defecation, consequence treatment the phlebitis at the ear. One month later, the elephant showed recurrent pain, restlessness, decreased amount of feeding and brought back to hospital again, after 5 days of treatment found the elephant died after midnight. The necropsy result reveal yellowish at subcutaneous area, spleenomegaly, hemorrhage at myocardium, endocarditis, edema at caecum and colon. Histopathological diagnosis from heart liver lung spleen stomach and intestine found necrotizing and hemorrhage at myocardium, lung, liver. Colon found fibrinopururent at submucosa area. Laboratory diagnosis and histopathological lesion could be concluded that Clostrisium perfringens Type A caused sever diarrhea in baby elephant and outcome to death.

KEYWORDS: DIARRHEA, CLOSTRIDIUM PERFRINGENS, ENTERITIS, BABY ELEPHANT

CASE REPORT: TWO TYPES OF EEHV IN ASIAN ELEPHANT
(ELEPHAS MAXIMUS) IN THAILAND

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ABSTRACT

Elephant Endotheliotropic Herpesvirus or EEHV is a newly recognized subgroup of herpesvirus that causes the fatal disease in mainly Asian elephant. EEHV was first reported from North America Zoo, leading to many cases throughout the world, as well as in Thailand. EEHV is extremely virulent, causing the dead of young Asian elephant (Elephas maximus) within 24-48 hours. Currently, there are seven type of EEHV have been reported which has genetically different to each other. This report illustrated two cases of Asian elephant that had been infected with different type of EEHV confirming by molecular evidence. Moreover, this case is also first report of EEHV3b that had been identified in Thailand. The results from these findings could contribute to develop the new diagnostic method for detecting newly recognized subtype of EEHV.

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CURRENT STATUS OF WILDLIFE ASSISTED REPRODUCTIVE TECHNOLOGIES IN THAILAND

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ABSTRACT

Assisted reproductive technologies (ARTs) have been recognized as potential tool aiding infertile human and animals to achieve pregnancy by artificial or partial artificial means. Much appreciable of ARTs in wildlife, has not only been used for aiding animals which are diagnosed infertile or inability to mate naturally caused by aggression and behavior problems, but also been considered as valuable tool for conserving genetic resources and maintain genetic diversity. The ARTs comprising of several biotechniques such as hormone monitoring, artificial insemination (AI), in vitro fertilization (IVF), nuclear transfer (NT) and embryo transfer (ET). In addition, cryopreservation of gametes and embryos for preserving in genome resource bank (GRB) would help as insurance to have founder genetics in the future for distributing valuable gene to the next generation. Furthermore, preserved gametes and embryos could reduce the risk of animal transportation between zoos and it is possible to exchange genetic between captive breeding areas (ex situ) and the wilds (in situ). However, there are still some limitations of applying ARTs in wildlife such as lack of knowledge about reproduction, risk of anesthesia and stress during the processes. Accordingly, it needs more study conducted for efficiency improving of ARTs in wildlife to conserve endangered species.

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ELEPHANT REPRODUCTION AND BREEDING MANAGEMENT IN THAILAND

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ABSTRACT

The efficiency of reproduction of the Asian elephant in captivity has become a major concern over the past decades. The low birth rate and high mortality cause the captive population to decline rapidly. Knowledge on breeding elephants is lacking, however, and research in this area could be of high significance to overcome this problem. The study of reproduction in elephants is restricted, due to ethical considerations and hampered by the large body size, the length of the reproductive cycle, and concerns of safety when handling animals. If we want to breed more elephants, our understanding of elephant reproductive biology needs to be improved.

Breeding management of Thai elephants

In the past, after a 9-month period of work, both male and female timber elephants had a resting period from March to May, the so-called “Pang Ram”. Then foraging in the forest allowed sexual contacts and the production of calves. However, since the logging industry was banned in 1989, this breeding technique is not practised anymore and elephants are now working the year around, particularly in the tourist industry. Designing elephant breeding program based on genetic and pedigree analysis. Efforts are being made within Thailand to develop a breeding program that ensures maintenance of genetic diversity. The eventual aim is to create a ‘studbook’ for Thai elephants: initially, elephants will be categorized by age, sex, health status and known pedigree. Later, the pedigree information will be improved by analyzing blood samples for the DNA markers. The revised studbook will be used to plan future mating which, depending on the proximity of the elephants and practicalities in the field, will by natural mating or AI. If it is successful for domestic elephants, the genetic approach will be used to help promote genetic diversity within the wild elephant population. To maintain the genetic diversity of captive elephant populations, DNA analysis is required. Fortunately, the diversity appears still to be high in Thai captive populations, and will remain so for a period of time.
Thus, an intensive breeding management in order to maintain the biodiversity is not of high importance; on the other hand, still pairing of related individuals should be prevented. If cows are allowed to mate wild bulls near the camps, paternity testing of calves would be useful in order to determine how many different bulls contribute to the next generation. However, inbreeding can easily occur when mating solely within this population, particularly when only one breeding bull is available. Hence, also in captive elephants, breeding close relatives, or closely genetic related individuals should be avoided. Breeding individuals with a genetic relatedness less than 0.125 is recommended. Feto-maternal blood incompatibility caused hematological defects affecting abortion and neonatal anemia that might be the risk of elephant calves loss. Additionally, personal clinical experience presented two elephant calves aborted at 17 months of pregnancy without any evidence of infectious disease or poor management. Therefore, detection of blood compatibility in Asian elephant using indirect antiglobulin technique was performed in order to use as a tool for breeding program and to reduce the risk of elephant fetal loss. The results would be benefit for breeding plan to avoid mating the reactive blood of the couples.

**Female reproductive endocrinology and behavior: a monitoring tool for breeding program**

Monitoring of reproductive hormones is an excellent way to identify the estrous period. However, when an endocrine laboratory is not available, a reliable and economical method of estrus detection from behaviors is proper for zoos as well as elephant camps and facilities. Specific reproductive behaviors of bull elephants i.e. increased interest for the uro-genital area (genital inspection test) or urinary pheromones (urine test) of cows were scored, and related to endocrine data of each female. The number of each behavior was recorded per bull per cow or urine sample, and multiplied with the score of each behavior. When the accumulative score of the test was higher than the threshold level, the cow was considered to be in estrus. Moreover, some factors i.e. teaser bull and cow criteria can obscure the accuracy of estrus detection; therefore, the estrus detection procedure should be carefully performed. However, more morphological characteristics and female behaviors specific for estrus, as well as the interaction between bull and cow during estrus should be further investigated to identify the true estrous period. The length of the follicular and luteal phase varies among individuals and across seasons. It appears that many factors influence the ovarian cycle, which implies that each breeding female should be monitored and evaluated for her reproductive
status. The follicular phase proved to be shorter in the second half of the winter (mid December-mid February) and the summer (mid February-mid May), when the anLH surge occurred sooner after the progesterone decline than in the remaining part of the year. Further investigation revealed that the interval between “progestagens declining to baseline” and the first LH surge (anLH surge) in a cycle, varied among seasons in Thailand, which indicated that the environment influences the reproductive physiology in this species. By contrast, the interval between the anLH and the second LH surge (ovLH) is not affected by ecological factors. These observations instigated the investigation of GnRH challenge during the specific period of the interval between progestagens declining to baseline and the anLH surge which resulted in the ovLH surge 3 weeks later. A constant 3-week interval between the two LH surges from 2 studies resulted in the hypothesis that timing of the ovLH surge is controlled by the anLH.

Reproductive biotechnology: a research for future conservation

Artificial insemination trial was performed in Thailand, which is the alternative method from natural mating. Our success in producing elephant calf with chilled semen and establishment of pregnancy with frozen-thawed semen confirmed that AI could be used as an alternative approach for breeding management and conservation of this endangered species. Another reproductive technique in elephant was also performed in Thailand. Thai researchers attempted to fuse fibroblast cells from Asian elephant ear skin to enucleated rabbit ooplasm. The result showed that the rabbit oocytes can serve as recipient oocytes to support the development of elephant cloned embryos up to the blastocyst stage. In conclusion, reproduction and breeding management in Thailand has been much further studied over this decade, and is going on very well. The co-operation among institutes is very important with not just only in Thailand, but also across countries and continents to conserve this endangered species.
EMBRYO PRODUCTION POTENTIAL IN TROPICAL HOLSTEIN CROSSBREDS: EXPERIENCE IN THAILAND

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ABSTRACT

Embryo transfer has been used in Thailand for rapid expansion of selected superior Holstein Friesian (HF) crossbred dairy cattle. This study aims to evaluate the embryo producing ability of the Tropical Holstein (TH) cows raised under the tropical conditions. Forty-eight donor cows were repeatedly superovulated 2-6 times with 57 to 206-day interval. A total dose of 260-280 mg of FSH were given twice daily within 4 days in a decreasing fashion, starting on day 9 after CIDR-B insertion. On the third day of the treatment, 500 μg of cloprostenol was given in the morning and evening. All animals were inseminated artificially at 12, 24 and 36 hours after standing estrus. Embryos were collected 7 days after the first insemination. The response to superovulation was determined by the number of palpable corpora lutea (CL), ova/embryos collected (OVA) and transferable embryos (TE) per flush. The mean ± SEM of the number of CL, OVA, and TE were 12.87 ± 0.58, 8.64 ± 0.64 and 3.87 ± 0.39 respectively. The results indicated that TH cows, under the management and harsh environment conditions in Thailand, have the ability to produce embryos in a similar manner as HF cattle in temperate countries. Embryo transfer technology can be used to provide a sustainable system for production of a superior genetic pool to the industry.

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NEONATAL DISEASES AND ORPHAN ELEPHANT (ELEPHAS MAXIMUS) MANAGEMENT

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ABSTRACT

Nowadays, Asian elephant (Elephas maximus) population in Thailand is dramatically decreasing from the past. One of the major problems causing population declining is the low number of survival baby elephants. The elephant calves can face various problems leading to death, including; disease, congenital abnormality, disease and abnormality due to poor management. Therefore, understanding neonatal diseases is essential for prevention plan as well as a proper management which could decrease the management-related problems. This article demonstrated the common neonatal diseases and abnormalities and baby elephant management especially for an orphan elephant. This article, hopefully, could be used as a guide to improve baby elephant rearing in captivity for elephant conservation in the nearly future.

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ANTIOXIDANT PROPERTIES AND BIOACTIVE CONSTITUENTS OF SOME RARE EXOTIC THAI FRUITS AND COMPARISON WITH CONVENTIONAL FRUITS IN VITRO AND IN VIVO STUDIES

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ABSTRACT

The aim of this research was to investigate the bioactivity of durian, snake fruit and mangosteen, rare exotic Thai fruits. These fruits were compared among them and with conventional fruits: durian with mango and avocado, and snake fruit with mangosteen and kiwifruit in order to find the preferable diet for human consumption. The contents of polyphenols, flavonoids, flavanols, tannins, anthocyanins, ascorbic acid and carotenoids, and the level of antioxidant potential by ABTS, DPPH, FRAP and CUPRAC in different extracts (methanol, water, acetone, and hexane) were determined. The presence of polyphenols (flavonoids and phenolic acids) in the investigated samples was characterized by Fourier transform infrared (FT-IR) spectroscopy and three-dimensional fluorimetry (3D-FL). The in vivo studies were carried out on 25 male Wistar rats, divided into 5 diet groups, each of 5. During 30 days of the experiment the rats of all 5 groups
were fed basal diet (BD), which included wheat starch, casein, soybean oil, vitamin and mineral mixtures. The rats of the Control group were fed only the BD. The BD of the other 4 groups was supplemented with 1% of nonoxidized cholesterol (NOC) (Chol group), 1% of NOC in each group and 5% of lyophilized fruits: durian (Chol/Durian), snake fruit (Chol/Snake), mangosteen (Chol/Mangosteen). After the experiment diets supplemented with exotic fruits significantly hindered the rise in plasma lipids and hindered the decrease in the plasma antioxidant activity. In conclusion, the contents of bioactive compounds and the antioxidant potential are relatively high in the studied fruits and varied among them depending on the extraction procedure. FT-IR and 3D-FL can be used as additional tools for identification and comparison of bioactive compounds. Supplementation of diets with exotic fruits positively affects plasma lipid profile and antioxidant activity in rats fed cholesterol-containing diets.
APPLICATION OF RADIO FREQUENCY HEAT TREATMENT FORM ELECTROMAGNETIC FIELD COMBINE WITH CONVENTIONAL HOT AIR OVEN METHOD FOR MAIZE SEED DRYING

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ABSTRACT

The application of radio frequency (RF) 27.12 MHz heat treatment from electromagnetic field combine with conventional hot air oven to reduce moisture content was conducted. Maize seed Cho Kun 90 were harvested with the initial moisture at 29\% wet weigh basis. The sample was subjected to 6 methods of drying: hot air oven, RF heat treatment and combination hot air oven with RF heat treatment. There were 2 temperature levels of 38\(^\circ\)C and 40\(^\circ\)C. The target moisture content of seed was 14\% wet basis. The results showed that using RF heat treatment at 40\(^\circ\)C took the least time used of 7 hours 40 minute. Besides that using combining drying method took 10 hours whereas the timing from hot air oven drying method took the longest hours of 13 respectively. After drying the viability of seed by tretrazolium test and standard germination test were determined. It was found that all treatments showed no significant difference in seed quality. Nevertheless, after dry with hot air oven at 40\(^\circ\)C, 37\% of seed germination percentages were decreased compare to control treatment. Therefore, RF heat treatment at 40\(^\circ\)C was the treatment that took the least time of drying with maintains their good maize seed qualities.

APPLICATIONS OF RADIO FREQUENCY HEAT TREATMENTS FOR CONTROLLING FUNGI CONTAMINATION IN HERB POWDER

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ABSTRACT

The experiment was aimed to investigate the effect of radio frequency heat treatments in controlling fungi in herb powder. Three herb powder including turmeric, chilli, and pepper with the initial moisture content of 9.66, 5.66, and 8.6\%, respectively were used as dry samples. The fungi contamination were assayed by total plate count. It was found that the fungi contamination in turmeric, chilli, and pepper were 16.89, 2.73, and 39.64 CFU/ml (x10\textsuperscript{5}), respectively. The samples were fumigated with water vapor from water bath treatment for 15 minutes in order to increase their moisture contents as wet samples. The moisture content were increased to 16.55, 11.45, and 12.57\%, respectively. The moisted samples were assayed for the number of fungi contamination which were 22.3, 3.16, and 54.05 CFU/ml (x10\textsuperscript{5}), respectively. All samples were then treated with radio frequency heat treatment at 27.12 MHz with 65, 75, and 85\°C for 3 minutes. The treatments with the temperature incubation of 85\°C resulted best in decreasing fungi contamination. The fungi contamination in dry samples remained in turmeric, chilli, and pepper were 2.53, 2.06, and 4.05 CFU/ml (x10\textsuperscript{5}), respectively. The results from the wet samples showed their remaining fungi contamination of 2.12, 1.21, and 1.43 CFU/ml (x10\textsuperscript{5}), respectively. It was also observed that when the temperature of treatments increased, their moisture contents and water activities were decreased. However, radio frequency heat treatment has a very best potential for decreasing fungi contamination in herb powder, both in dry and wet samples.
ABSTRACT

Mango (Mangifera indica L.) fruit cv. Nam Dok Mai Seethong harvested on 100 - 110 days after full bloom (DAFB) were obtained from a farmer orchard in Phrao district, Chiang Mai province. Fruit were kept at 15, 25 and 35°C and 70-80% RH for 30 days. Random samples were analyzed every 3 days for sugar (fructose, glucose and sucrose) and ascorbic acid content using a high-performance liquid chromatograph (HPLC). It was found that the fructose and glucose content of mango fruit from all treatments decreased whereas the sucrose content increased depending on the storage period. In addition, the glucose content was lower than the fructose content. Mango fruit stored at 15°C had lower total sugars content compared to fruit stored at 25 or 35°C. The ascorbic acid content of mango fruit from all treatments continuously decreased until the end of the storage.
CHANGES OF SOME PROPERTIES OF NON-COATED AND
COATED TANGERINE FRUIT FRUITS CV. SAI NAM PUNG
IN QUALITY ASSESSMENT BY NIR SPECTROSCOPY

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ABSTRACT

To develop an effective calibration equation of near infrared (NIR) spectroscopy for quality assessment of tangerine fruit cv. Sai Nam Pung on the shelf, the correlation data of NIR spectrum and fruit properties need to be acquired. Non-coated and coated fruits (diameter 6.4 - 7.0 cm.) with a commercial wax ‘ZIVDAR’ were packed in card board boxes and put on the shelf at ambient temperature (25±2\textdegree C) and relative humidity 62±3 % for 12 days. Samples were recorded on weight changes, spectral data by NIRSystem 6500 and were analyzed for total soluble solid (TSS), titratable acidity (TA), ratio of TSS/TA and ethanol content every four days. Result showed that the absorbance at 980 nm (corresponded to water band) of non-coated and coated fruits decreased after 12 days storage as well as the fruit weight. TA of both the non-coated and the coated samples slightly decreased, which were 0.51\% and 0.38\%, respectively. TSS and TSS/TA ratio slightly increased, which were 12.52 \%, 12.46 \% and 25.15, 33.79, respectively. Moreover, ethanol content increased to 302.97 ppm and 1,537.13 ppm, respectively. The changes in chemical properties of tangerine fruit conformed with the spectral readings data. Therefore, the NIR spectroscopy technique could be used to assess the quality of non-coated and coated tangerine fruits.

CHEMICAL TREATMENTS TO EXTENDING THE VASE LIFE OF CUT Plumeria obtuse FLOWERS

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ABSTRACT

Plumeria obtusa flowers harvested at floral bud stage (S1) and unscrewed bud stage (S2) were able to open after held in distillated water. Plumeria flowers harvested at these stages had longer vase life than those of the flowers harvested at opened flower stage (S3). The vase life of S1, S2 and S3 were 4, 3 and 2 days, respectively. However, S1 and S2 failed to fully open and had less diameter than those of S3 flowers. Although pulsing treatments with 2, 4 or 10% sucrose solutions for 3, 6 or 10 hours increased S1 flower opening but the treatments with 10% sucrose reduced their vase life. Pulsing S3 flowers with 2 mM silver thiosulfate (STS) solution for 30 minutes, 1 or 2 hours increased their vase life. It was found that 30 minutes and 1 hour STS pulsed S3 flowers could last 1 and 2 days longer compared to those of untreated S3. As a result the S3 could last as long as the S1 flowers with better visual appearance.

COMBINED EFFECTS OF ACIDS AND CHITOSAN ON PERICARP COLOR OF LYCHEE FRUIT CV. JUCKAPAT

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ABSTRACT

Acid dipping is normally used to maintain red pericarp color of lychee fruit (Litchi chinensis Sonn.). For this study, lychee fruit cv. Juckapat was dipped for 30 seconds in 2.0% citric acid solution, 0.5% or 0.8% peroxycitric acid solutions (PCA) with and without 0.5% chitosan. Undipped and dipped lychee fruit in distilled water were used as the controls. Ten fruits for each treatment were stored in low density polyethylene (LDPE) bags (Fresh & Fresh Model 3: FF3, size 5 × 7.5 inch) at 5±1°C and 90-95% relative humidity (RH) for 30 days. The physicochemical properties of lychee pericarp were analyzed every 5 days. The results indicated that all the treatments had no effect on the pH of the pericarps. Furthermore, acid dipping could delay the pericarp from browning in comparison to controls during 20 days of storage. Treated lychee fruit with 2% citric acid solution was found to be the most effective in delaying lychee pericarp browning during storage.

DIELECTRIC PROPERTIES OF RICE AND MAIZE SEED

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ABSTRACT

The dielectric property of rice and maize seeds with an accumulation of electric energy storage (Dielectric constant) and the release of energy (Loss factor) were evaluated. The precision impedance analyzer in frequency range 0-50 MHz was used. The air, rice and maize seeds with initial moisture content of 25 and 29 percent on a wet weight basis (wb) were determined. Then, the seed samples were dried by radio frequency (RF) waves at 27.12 MHz at the temperature of 38°C to 14% (wb) were determined the dielectric property again. The results showed that dielectric constant of rice and maize seeds with moisture content of 25 and 29 percent (wb) were 1.87-3.16±0.03 and 2.59-8.41±0.12 and the loss factor were 1.22-5.58±0.17 and 2.82-10.51±0.32. After drying the seeds to moisture content of 14 percent (wb), the dielectric constant of rice and maize seeds were 1.43-1.89±9.28E-03 and 1.91-2.70±0.01, respectively, and the loss factor were 0.44-3.15±0.10 and 0.64-5.28±0.18, respectively. Therefore, maize seed showed higher ability to accumulate and release the electric energy than rice seed.

EFFECT OF HEAT FROM RADIO FREQUENCY ON MAIZE WEEVIL (SITOPHILUS ZEAMAIS)

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ABSTRACT

Maize weevil (Sitophilus zeamais Motschulsky) is one of the most important insect pests of maize and other cereals during storages. The immature stages develop inside kernels and cause weight loss and deterioration directly on grain. The objective of this experiment was to determine the effects of heat from radio frequency (RF) at 27.12 MHz against maize weevil. In experiment 1, adults of maize weevils and infested grain with each stage of maize weevil; egg, larval and pupal stages, were packed with 1,000 g maize at 12.5% moisture content in polyethylene bag and then were exposed to the RF at the power of 670 watts for 120 seconds. The result showed that adult stage was the most tolerant stage to RF treatment. The mortality of eggs, larvae, pupae and adults were 76.13, 66.59, 70.27 and 49.93% respectively. Comparing to the untreated maize, the RF treated on egg, larval, pupal and adult stage is able to reduce maize weevil damage as 15.81, 12.81, 7.06 and 9.08% by number of grains. Moreover, the RF treated survivals could be able to lay eggs and develop their progeny significantly less than in untreated control.

In experiment 2, the most tolerant stage to RF treatment (adult stage) was exposed to combination of RF treatment at 4 different levels of RF power (700, 730, 750 and 780 watts) and for 60, 120 and 180 seconds. The result showed that mortality of insect increased with increasing power and exposure time. Insect mortality was 80.25% at combination of 780 watts power and 180 second exposure.
EFFECT OF NITROGEN FERTILIZER ON TOTAL LIPID AND FREE FATTY ACID CONTENT AND ANTIOXIDANT ACTIVITY OF *Perilla frutescens* L. BRITTON. SEED

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ABSTRACT

The aim of the study was to evaluate the effect of nitrogen (NH4+) and organic fertilizer on total lipid, free fatty acid content and antioxidant activity of *Perilla frutescens* L. seed after harvested at 157 days after planting (DAP). The experimental was designed in RCBD with 5 replications. Nitrogen (NH4+) treatment comprised 5 different rate of; 0 (control; T1), 5 (T2), 30 (T3), 50 (T4), 100 (T5) kg N/rai whereas organic fertilizer were contributed to; 500 (T6) and 1,000 (T7) kg/rai. The experiment found that nitrogen fertilizer had no significantly effect (P<0.05) on the changes in total lipid content and total antioxidant activity as well as free fatty acid content of α-linolenic acid, linoleic acid, palmitic acid and stearic acid content. However, the application of organic fertilizer at the rate of 500 kg/rai significantly (P<0.05) increased omega-9 (oleic acid) content in the seed.

EFFECT OF SEED COATING MIXTURES OF UREA AND POLYETHYLENE GLYCOL ON THE QUALITY OF SWEET CORN SEEDLING

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ABSTRACT

The aim of this experiment was to study the effects of seed coating with mixtures of urea and polyethylene glycol (PEG) on the sweet corn seedling establishment. Three treatments comprised of uncoated seed, seed coated with urea at 0.4 gN and seed coated with urea 0.4 gN and 3\% PEG 6000. Germination percentage, germination index, seedling growth rates, shoot and root growth rates and seedling vigor classification were determined. The result showed that seeds coated with urea 0.4 gN and 3\% (w/v) PEG 6000 significantly increased seedling performances in terms of speed of germination and seedling growth rates comparing to those from the uncoated seed. The coated seeds with urea and PEG 6000 showed better germination index, seedling growth rates, shoot and root growth rates and the percentage of healthy seedlings than other treatments. In addition, the percentage of total nitrogen in the coated sweet corn seed and seedlings were higher than those in the uncoated seed and seedlings.

EFFECTS OF DIELECTRIC HEATING ON QUANTITY AND PHYSICAL PROPERTIES OF OIL FROM *Perilla frutescens* SEEDS

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ABSTRACT

The comparison study of two drying methods, hot air oven drying (HA) and dielectric heating using microwave oven drying (MW) on *Perilla frutescens* seeds was investigated through the different drying product temperatures (40, 50 and 60°C). The result revealed that the MW at 60°C (MW 60) provided the highest percentage of oil volume following by HA 60, MW 50, MW 40, HA 50 and HA 40 with amount of oil 24.3, 23.7, 23.6, 22.5, 21.6 and 21.1% respectively. The color changed value of dried seeds (∆E) was influenced by drying temperature. The MW at 60°C provided less changed than other treatments. The HA at 50°C was found the most color changed. The oil color changed (∆E) was found that the HA 50°C showed lass changed than other treatments. The highest viscosity, 58 cP, was found at using HA 40°C and MW 40°C provided low viscosity than the other. The result of specific gravity of MW 50°C was the highest and MW 60°C was lowest than the other treatments. In addition the data from drying curve was found that MW 60°C tended to decreases the drying time and HA 40°C required the most drying time. The final moisture content and water activity was non significance in all treatments.

EFFICACY OF OZONATED WATER AT VARIOUS TEMPERATURES IN PESTICIDE (ETHION) REDUCTION

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ABSTRACT

The reduction of pesticide (ethion), an important pesticide used in tangerine production, using ozone gas with flow rate 25 ml min\textsuperscript{-1} at various temperatures (5, 15 and 25°C) was investigated. It was found that iodine liberation was directly measured of oxidation by ozone effect and the iodine production of all treatments increased with reaction times. At 60 min, ozonation at 15°C had the highest level of iodine production. When ethion standard solution with initial concentration 1 mg L\textsuperscript{-1} was treated with ozone at different temperatures and analyzed the concentration by gas chromatography (GC-FPD), the lower temperature (5°C) ozonation was the most effective in ethion removal (55.1%) within the first 15 min and then dramatically decreasing until 15.81%. However, applying ozone at 15°C enhanced the efficiency in pesticide removal. The maximal degradation was detected within 45 min (80.56%). Therefore, application of ozone at optimum condition of temperature could be considered as a useful method for washing tangerine fruit to reduce the residual ethion.

EFFICACY OF SOME FUNGICIDES ON THE SPECIES OF ANTHRACNOSE FUNGI ISOLATED FROM ‘NAM DOK MAI SI THONG’ MANGO CULTIVATED AT PRAO MANGO ORCHARDS, CHIANG MAI IN POSTHARVEST STAGE

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ABSTRACT

Two species of *Colletotrichum* spp. (*C. acutatum* and *C. gloeosporioides*) identified as the major pathogen causing anthracnose disease were isolated from naturally infected leaf and fruit samples of ‘Nam Dok Mai Si Thong’ mango collected from mango orchards at Prao district, Chiang Mai Province. The fungi were pathogenic on mango fruits, which exhibited dark brown spot symptoms with spore masses within 7 days of inoculation. The effects of three systemic (carbendazim, prochloraz and azoxystrobin) and two contact fungicides (copper oxychloride and mancozeb) were evaluated against the pathogens *in vitro* using the poison food technique and fungicidal dipping fruits. Among the five fungicides studied *in vitro* only two systemic fungicides namely, prochloraz and azoxystrobin were proven to be effective against *C. acutatum* and *C. gloeosporioides* at concentrations of 50 and 100 ppm, respectively when prochloraz showed 100% growth inhibition and nil *C. acutatum* and *C. gloeosporioides* mycelia growth. The two systemic fungicides: prochloraz and azoxystrobin combined with hot water treatments combinations were evaluated for their effects on mango fruit by dip treatments, which were stored for 21 days (at 25 ± 2°C, 95% RH) after inoculation with *C. acutatum* and *C. gloeosporioides*. The results revealed that the combination treatments helped reducing incidence of anthracnose disease. Thus, the present study recommends the use of prochloraz and azoxystrobin at minimal concentrations of 50 and 100 ppm resulting maximum inhibition of *C. acutatum* and *C. gloeosporioides*, respectively.

ENHANCEMENT THE EFFICACY OF CLOVE ESSENTIAL OIL TO CONTROL SEED BORN PATHOGEN IN MAIZE SEED

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ABSTRACT

The aim of this experiment was to enhance the efficiency of the coating mixture of clove essential oil (CL) and polyacrylamide (PAM) in controlling maize seed borne fungi. The maize seeds were coated by the mixer of clove essential oils at 0.2, 0.4 and 0.6% (w/v) combine with 5% (w/v) polyacrylamide (PAM) preparing temperature of 40, 60 and 80°C. The coated seed were kept for 2 months in ambient storage condition for further investigation. The result showed that coated seed with 0.2 % CL with 5% (w/v) PAM at 40 and 60 °C showed their percentage of germination and vigor from seedlings vigor classification were equivalent to uncoated seeds. Beside that seed borne diseases as *A. flavus*, *A. niger* and *Penicillium* sp. was controlled at the level of 67-100%. Therefore, PAM with CL could enhanced the efficiency of coating seed for 2 months of storage.

IDENTIFICATION OF PESTICIDE RESIDUES BY NIR SPECTROSCOPY

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ABSTRACT

This research was studied on the identification of pesticide residue by non-destructive technique, NIR spectroscopy. Two commercial grade of pesticides, chlorpyrifos and cypermethrin, were used in this study. The pesticides solution at various concentrations of 0, 50, 100 and 200 ppm were prepared in acetonitrile. Each solution was dropped on the glass fiber filter paper or Dry Extract Spectroscopy by infrared Reflection (DESIR) technique. The samples were dried in a hot air oven at 35°C for 1 hour. Then, the NIR reflectance spectrum of samples was measured by NIRS System 6500 with the wavelength range between 400 - 2500 nm. Prior to the measurement, the calibration equation was developed by a partial least square regression (PLSR) and analyzed by principle component analysis (PCA). It was found that the PLSR calibration result of both pesticides in long wavelength (1100 – 2500 nm) was high accuracy. The correlation of determination ($R^2$), standard error of calibration (SEC), standard error of prediction of chlorpyrifos calibration equation were 0.89, 24.28 ppm and 24.41 ppm and 0.95, 17.30 ppm and 22.54 ppm, respectively. Furthermore, PCA technique could distinguish the spectra of different kinds of substances at 200 ppm. However, these could not use to separate the pesticide spectrum at the different concentrations. NIR spectroscopy was alternative technique for pesticide identification.

IN VITRO STUDIES TO PRODUCE DOUBLE HAPLOID IN INDICA HYBRID RICE

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ABSTRACT

The aim of this investigation was to improve in vitro the technique of production of double haploid in Indica hybrid rice by combining anther culture, hormone shock and doubling chromosome. It was discussed how to avoid somaclonal variation during culturing and to reduce the time of this process. The anthers of KDML 105 × SPR 1 (Indica × Indica) were cultured in Linsmaier and Skoog (LS) medium, which contained nutrients, growth regulators [(2,4-dichlorophenoxy acetic acid (2,4-D) and naphthalene acetic acid (NAA)] and organic compounds, and then subcultured by inducing embryo-like structure (ELS) LS media. During 4 weeks used LS media supplemented with 10 μM KNO₃ + 2 mg/L 2,4-D + 2 mg/L NAA + 20% coconut water + 1 mg/L of activated charcoal had induced high embryogenic frequent callus with length of 4–5 mm. The supplementation of 0.2 g/L colchicine and 100 μM 2,4-D was the most efficient in LS media. Over 70% of viable double haploid ELS were produced in 8 weeks and subcultured only twice compared with conventional anther which takes more than 12 weeks. This new technique can therefore be applied to rice in order in shorten time to produce higher number of double haploid plantlets.

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INHIBITION OF GREEN MOLD BY VOLATILE COMPOUNDS
FROM AN ENDOPHYTIC FUNGUS, *Muscodor albus* CMU–Cib 462

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ABSTRACT

Injuries sustained by citrus fruit during harvest allow the entry of wound pathogens, including *Penicillium digitatum* Sacc (green mold). These pathogens occur in almost all regions of the world where citrus is grown, and cause serious postharvest losses annually (Obawa and Korsten, 2003). Sodium ortho-phenylphenate (SOPP), thiabendazole (TBZ), and imazalil (IMZ) are fungicides commonly used in packing houses. These compound have different mode of action, they are used alone, combined in mixtures, or applied separately in sequence. Chemicals have been the primary method used to control citrus fruit decay during storage and marketing for more than 25 years (Ismail and Zhang, 2004). However, postharvest use of fungicides has been increasingly curtailed by the development of pathogen resistance to many key fungicides, lack of replacement fungicides, and public perception that pesticides are harmful to human health and the environment (Janisiewicz and Chen, 2002). An interesting candidate for biological control is *Muscodor* species, an endophytic fungus isolated from plants (Strobel et al., 2001). Therefore, the aim of current research is to use the fungus itself as a biological fumigant. Several reports have shown the potential of biofumigation with *Muscodor* spp. in controlling soil borne diseases (Mercier and Manker, 2005) and postharvest decay of fruit (Mercier and Jiménez, 2004). The purpose of this research is to investigate *in vitro* and *in vivo* effects of *M. albus* CMU–Cib462 in control of green mold (*P. digitatum*).
INHIBITORY EFFECT OF TITANIUM DIOXIDE (TiO2) PHOTOCATALYSIS ON CONTROLLING ANTHRACNOSE DISEASE OF MANGO FRUIT (Mangifera indica L.)

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ABSTRACT

The effect of TiO₂ photocatalysis on growth inhibition of Colletotrichum gloeosporioides causing anthracnose disease of mango fruit was studied. The 2.6x10⁶ spores/ml spore suspension of C. gloeosporioides was mixed with 1, 5 and 10 mg/ml of TiO₂ powder. Then, 0.1 ml of the mixture suspension were spread out on a PDA plate under ultraviolet (UV) illumination (20 W) for 15, 30 and 60 min. After that, the samples were analyzed for fungal development after incubation for 3 days at 25°C. The results showed that the concentrations of titanium dioxide had no effect on fungal inhibition while the longer UV illumination time was the better inhibition of the fungal development. For the second experiment, mango fruit with artificial inoculation were immersed in 1 mg/ml of titanium dioxide photocatalysis-containing water for 30, 60, 120 and 240 min and stored at 13°C for 1 month. The results showed that TiO₂ photocatalysis had effect on the reduction of anthracnose disease of mango fruit, when compared with the control (distilled water).
LOSS ASSESSMENT IN POSTHARVEST HANDLING OF MANDARIN FRUITS CV. SAI NUM PUNG

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ABSTRACT

Loss assessment of mandarin fruit cv. Sai Num Pung was studied during postharvest chain. Assessment was done immediately after harvest, after packing in the packing house and after transportation to Talad Thai market. Mandarin was packed in 3 different packing methods; cardboard with cell pack, cardboard with volume fill and volume fill in plastic basket. Assessment of losses was done in each step and identified the cause of loss such as sharp stem, without stem, over mature, defect from disease and insect, other physical damage. It was found that losses of mandarin fruit cv. Sai Num Pung right harvesting was the highest which equal to 43.70\%, while the percentage of losses at packing house and transportation were 17.30\% and 19.32\%, respectively. The cause of losses in each step was identified and the results showed that major loss of harvesting was defect from insect (31.60\%). Percentage of major losses at the packing house was bruised and soft fruit which equal to 5.56\%. During transportation with different packing methods it was found that percentage of losses of mandarin in volume fill plastic basket was the highest which equal to 24.50\% while cardboard with cell pack and cardboard with volume fill equal to 5.76\% and 7.42\%, respectively. The major causes of loss were bruised and soft fruit.

ABSTRACT

Aim of the study: Diets containing high cholesterol levels led to atherosclerosis damage in the livers and hearts of rats. The aim of this study was to investigate the possible positive effects of durian fruit against high-cholesterol diets. Materials and methods: Durians at various stages of ripening (young, mature, ripe and overripe) were chosen for in vitro and in vivo studies. In the in vivo study 36 male Wistar rats were divided into 6 groups and supplemented with cholesterol and durians. The bioactivity in vitro, plasma lipids, antioxidant activity, liver enzymes and histopathology of the aorta and liver were analyzed. Results: Polyphenols and flavonoids were significantly higher in the overripe durian, while quercetin, ascorbic acid and anthocyanins were more abundant in the ripe fruit and tannins – in mature samples ($P < 0.05$). The highest antioxidant potential was in overripe fruit and only the value of FRAP – in ripe durian samples ($P < 0.05$). The interaction between polyphenol extracts of ripe durian and BSA had a strong
ability comparable to that of quercetin – to quench the intrinsic fluorescence of BSA by forming complexes. The main histopathological changes were detected in the liver and aorta of rats fed a high-cholesterol diet without fruit supplementation. These changes were minor in rats of Chol/DRipe ($P < 0.05$). Conclusion: Durian at different stages of ripening, especially ripe durian, constitute an excellent source of effective natural compounds with antioxidant and health-protective activity in general and liver and heart-protective effect in cholesterol fed rats in particular.

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SUNLIGHT-STIMULATED PHENYLALANINE AMMONIA-LYNASE (PAL) ACTIVITY AND ANTHOCYANIN ACCUMULATION IN EXOCARP OF ‘MAHAJANAKA’ MANGO

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ABSTRACT

The activity of phenylalanine ammonia-lyase (PAL) required for anthocyanin synthesis was stimulated by sunlight exposure resulting in the development of red colour in ‘Mahajanaka’ mango exocarp, which occurred only on the sunlight-exposed side of the fruit. The accumulation of anthocyanin was concurrent with the increase in PAL activity in the mature stage of the fruit. The exposed side of the fruit had higher PAL activity, endogenous sugar content, and anthocyanin accumulation than the unexposed side. It is concluded that sunlight increases red colour development of the mango exocarp by inducing PAL activity. Exposure to sunlight also enhances endogenous sugar accumulation in mango fruit.
THE MULTIPLE NUTRITION PROPERTIES OF SOME EXOTIC FRUITS: BIOLOGICAL ACTIVITY AND ACTIVE METABOLITE

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ABSTRACT

The main objective of this review was to describe the physicochemical and nutritional characteristics of twenty selected exotic fruits and the influence of their physiologically active compounds on human health, through scientifically proven information. The review presents the biologically active metabolites derived from exotic fruits (polyphenols, flavonoids, flavanols, tannins, ascorbic acid, anthocyanins, volatile compounds, minerals, and organic acids) and various analytical methods for their detection (elemental analysis, electrophoretic separation by SDS-polyacrylamide gel electrophoresis, and fast protein liquid and ion-exchange chromatography; GC–MS, HPLC/diode array detection (DAD), circular dichroism (CD), differential scanning calorimetry (DSC), Fourier transform infrared (FT-IR), ultraviolet spectroscopy, two- and three-dimensional fluorimetry (2D-FL) and (3D-FL), and antioxidant radical scavenging assays (DPPH, FRAP, CUPRAC, ABTS, and ORAC). The correlation between the polyphenols and other bioactive compounds, and their antioxidant activities was reported for different fruit extracts. During the last two decades our international scientific group investigated in vitro the physicochemical and nutritional characteristics of avocado, dragon fruit, durian, kiwifruit, mango, mangosteen, persimmon and snake fruit, and in vivo their influence on laboratory animals and humans. Supplementation of diets with exotic fruits positively affects plasma lipid profile, antioxidant activity and histological examination of aorta in rats fed cholesterol-containing diets.
The interaction between drugs and serum albumin plays an important role in the distribution and metabolism of drugs. The properties of polyphenol methanol extracts of exotic fruits showed the ability to quench serum albumin by forming the complexes similar with the ones between proteins and pure flavonoids. Our experimental data and a wide range of other investigations are included in this review. In conclusion, it is necessary to promote a consumption of exotic fruits (a rich source of natural antioxidants) as a supplement to everyday human diet.
THE PREVENTION OF PERICARP BROWNING AND THE MAINTENANCE OF POST-HARVEST QUALITY IN VIETNAMESE LONGAN CV. LONG USING SODIUM METABISULFITE TREATMENT

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ABSTRACT

The impact of sodium metabisulfite (Na₂S₂O₅) treatment on the prevention of pericarp browning and the maintenance of the postharvest quality of Vietnamese longan cv. Long during storage was studied by soaking bunches of the fruit in 2.5 or 5 or 7.5% of sodium metabisulfite solution for 5 and 10 min at room temperature and then storing them at 5±1 C for 28 days. The visual appearance expressed as pericarp and flesh color; the lightness of fruit pericarp (L* value); the yellowness of fruit pericarp (b* value); polyphenols oxidase (PPO) activity; the percentage of fruit decay and fruit drop; total soluble solids (TSS) content were studied. The results show that the 10 min soaking treatment in 7.5 % sodium metabisulfite solution maintained L* and b* value and low PPO activity, with the fruit showing no signs of severe pericarp browning or fruit decay throughout the 21 days in storage. Moreover, the postharvest quality of the longan fruit reveal no difference over time; plus the percentage of fruit drop was only 5.2%, when compared with the control was 5.8 % and other treatment range from 5.5 to 5.9%.

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TYPE OF PACKAGING ON THE QUALITY OF CUT SIAM TULIP FLOWERS CV. CHIANG MAI PINK

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ABSTRACT

The effect of three types of packaging film on the quality of Siam tulip flowers cv. Chiang Mai Pink during storage was studied. Cut Siam tulip flowers were wrapped in polypropylene (PP), low density polyethylene (LDPE) and polyvinyl chloride plastic (PVC) films before being packed into corrugated boxes. They were kept in dry or wet conditions at 7°C for 0, 2 and 4 days. The results showed that the flowers wrapped in PP film and stored in wet condition for 4 days had the longest vase life of 11.6 days, followed by the flowers wrapped in LDPE and stored in wet conditions for 4 days which lasted for 8.4 days. The non-wrapped flowers in dry storage could be kept at 7°C for 2 days and the shelf-life was only 2 days. The senescence of Siam tulip flower were due to chilling injury in coma bracts and fungal infection in both dry and wet storage conditions. The percentage of water uptake and transpiration rates of dry-stored and wet-stored flowers did not differ significantly.

USING OF POLYMER COMPOSITE PACKAGING FILM TO EXTEND STORAGE LIFE OF 'MAHAJANAKA’ MANGO FRUIT AT 13°C

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ABSTRACT

Extending storage life of ’Mahajanaka' mango fruit at 13°C by using polymer composite packaging films was studied. The fruit were packed in 4 kinds of polymer composite film bag; FF3 FF5 CF1 and LDPE and compared with control, fruit without package and stored at 13°C. Fruit were sampled weekly and separated into 2 portions. One was immediately checked for quality and another was checked for quality after transferred to become ripe at ambient temperature and without package. It was found that, fruit packed in all kinds of film could not ripen when stored for 42 days. While, the control fruit showed normal ripening at day 14 of storage. If fruit were transformed for ripening at ambient temperature and without package after storage, FF5 was the best packaging film, for 35 days storage.

VACUUM COOLING OF HEADED CHINESE CABBAGE

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ABSTRACT

The aim of this research was to study the optimum process parameters during vacuum cooling of headed Chinese cabbage precooled from initial core temperature of 16-19°C to the final core temperature of 4±1°C. In the experiment, the final pressures for vacuum-cooled headed Chinese cabbage were set at three different levels; 5.5, 6.0 and 6.5 millibar. The pressures were again experimented with three levels of preserving time; 20, 25 and 30 minutes. The study results illustrated that the optimum operating process parameters for precooling headed Chinese cabbage to 4±1°C with initial core temperature of 16-19°C were at the final pressure of 6.0 mbar and the reserving time of 30 minutes. The total cycle time was 44 minutes and the energy consumption was 0.22 kwh per 538 kilograms of Chinese cabbage. The electricity cost was 0.035 baht per kilogram of fresh weight. The weight loss during precooled Chinese cabbage with the previous optimum parameters was 2.29%.
VACUUM COOLING TECHNOLOGY USED FOR THE ROYAL PROJECT VEGETABLES AND HERBS

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ABSTRACT

Precooling vegetables and herbs of the Royal Project Foundation using vacuum cooling technology has been conducted. The research was aimed at investigating the optimum process parameters for vacuum cooling system of organic vegetables, namely pointed cabbage, chayote shoot, baby pak choi, baby carrot and Thai herbs, namely coriander, holy basil, sweet basil, kaffir lime leave. Experiments on vacuum-cooling of organic vegetables and herbs using different vacuum pressures and reserving times were conducted by trimming and putting produce harvested at commercially mature stage into ready-to-sell packages, then placed in the holed plastic baskets to be ready to be precooled in full capacity using the vacuum system. The optimum vacuum process parameters were determined by varying final pressures and reserving times (holding time) until the desired produce temperatures and minimizing fresh weight loss of the produces attained. The optimum conditions for vacuum cooling process of chayote shoot, pointed cabbage, baby pak choi and baby carrot were attributed to the final pressures of 10 and 11, 6 and 6.5, 6 and 6, 6 and 6.5 mbar with reserving times of 3 and 5, 15 and 20, 25 and 15, 20 and 10 minutes, respectively. The results also showed that the optimum conditions for vacuum cooling process of holy basil, sweet basil, coriander, kaffir lime leave were at the final pressures of 14 and 13, 13 and 2, 6 and 6, 6 and 6.5 mbar with reserving times of 2 and 1, 5 and 3, 1 and 3, 5 and 5 minutes, respectively. Organics vegetables and Thai herbs precooled using above conditions did not suffer high weight loss and the produce was still fresh and the optimum temperatures of each produce were attained.

VISUAL APPEARANCE AND ANATOMICAL STRUCTURES OF CHILLING INJURED MANDARIN ORANGE CV. SAI NAM PEUNG PEEL

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ABSTRACT

Mandarin oranges cv. Sai nam peung at a commercial stage were packed in cardboard boxes and stored at either 0°C or 3°C for one month. One box of samples was taken out weekly and kept at 25±2°C for 12 days. Three fruits were evaluated every three days for the visual appearances and anatomical structure changes of the peel. It was found that chilling injury symptoms occurred on the peel from fruits stored at both temperatures over two weeks. The severity increased after holding at room temperature more than three days. The chilling injury symptoms on the peel included changing peel color, expanding oil gland, and the surface pitting. In some area on the peel, brown spots occurred and became brown sunken area later. Mold infection was also found on the chilling injured peel. The anatomical studies of chilling injured peel showed that the epidermal cells of flavedo and parenchyma cells of albedo were damaged as a result, the surrounding tissue collapsed. Parenchyma cells around the oil glands disintegrated causing oleocellosis symptom and the damage cells of surrounding area turned brown. The changes of visual appearance and anatomical structures of chilling injured peel were also associated with increasing of electrolyte leakage of the peel.

A STUDY OF ANCIENT CITY PLANNING : CASE STUDY
LUANG PRABANG, LAOS PDR.

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ABSTRACT

To study Luang Prabang city plan and compare with ancient city Plans in Northern of Thailand. For finding the basic knowledge of conceptual design in ancient city Plans in Northern Mekong sub region is similar or difference. In conclusion Luang Prabang city plan is not similar at all. Because The city has been developed based on the context and political factors. But some concept is the same idea. Such as It has stupa on the city center. And found some traces of important religious place that located like Chiang Mai city.
ARCHITECTURE BUILDING FACILITIES MANAGEMENT

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ABSTRACT

The principal objective of building management is to control facilities planning and facilities operations and maintenance, that effective criteria in strategic planning about preventive maintenance and predictive maintenance. The key of success in manage the building and facilities is all about collecting and interpreting data on diverse facets of property use. Computer databases are the ideal vehicles in which to log, store and manipulate data; almost unlimited information can be measured and entered en masse. The strength of such information storage is its capacity for expansion and the diversity of subject; it becomes large and requires greater and greater operator familiarity with its structure in order to interrogate successfully. The ultimate solution is to computer – base the entire operation, by using the three-dimensional building modeling to control the operation. This solution will simulate building in virtual environment and the building system data (Architectural part and Engineering part) will collect in digital data type. The digital data will classification and made three - dimensional database relations. This research focus in three section of the operation as three - dimensional database relationship, topological simulation and smart system, that applied to generate the prototype building management application “Architecture Building Facilities Management: ABFM”.

FROM EPISTEMOLOGY TO METHODOLOGY:
PHENOMENOLOGY IN ARCHITECTURE

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ABSTRACT

Within the multi-disciplinary approach, “Phenomenology” has been brought to the architectural discipline, such as for capturing the experience in space, for conducting a research fieldwork related to history and memory of the people and in the particular site, and somehow those information has also been used as a part of design materials. Yet, such knowledge has not been discussed that much or used without knowing the vital conditions. This research aims to investigate how “Phenomenology” has influenced on architecture both in the theoretical and in the practical level, and also to clarify what the conditions do we need when we use “Phenomenology” in a research methodology as well as in a design process. This research is based heavily on the selected primarily literature of three Thai researchers: Asst. Prof. Tipsuda Patumanon’s book series, which I call “Phenomenology of Architecture’s Series” (from 1996 – 2006); Piyalada Devakula, “A Tradition Rediscovered: Toward an Understanding of Experiential Characteristics and Meanings of the Traditional Thai House”; and Wimonrart Isarathammanoon, “A Study for the Preservation and Renewal Program of Sam Prang District” The structure of this research has divided into 6 chapters. From the analysis and synthesis process, this research found that the vital important condition that “Phenomenology” has influenced on architecture is through the notion of “connectivity”. There are three levels of connectivity: 1) between the Self and the World, 2) between The Object and The Thing, and 3) between Being and Place through experience. Moreover, there are six conditions for those who aims to use “Phenomenology” as a research methodology need to be aware of: 1) we must have a clear position before we experience the site or the event, 2) we must realize the status of the people, the thing or the place we aim to experience, 3) we must be aware of historical layers in the site or of the event through the experienced, memory or meaning in order to explore the phenomenon, 4) we must identify what the research units are, 5) we must learn the technique and the concept of interpretation, 6) we must understand the result and the meaning deriving from the experience, in particular should be regarding as a way of understanding the self. This research is able to show “Phenomenology” is not totally abstraction or only a
subjective experience which hardly be proof or arguable; at the same time it is not something that can be measure objectively. It is about the connectivity and that can be explored methodologically. There are various jargons in this epistemology, such as “Being/being”, “the Self”, “Horizontal”, “Understanding”, “Place/Space”, “the Spirit of Place”, “Collective Memory” etc. It is important to unpack these words in order to get into the phenomenon. Importantly, the notion of “Authenticity” and “Root” should be understood as a way of returning to oneself, not a way of claiming the origin over the other.
GUIDELINES FOR CREATING SUITABLE LIVING ENVIRONMENT AND DWELLING FOR ELDERLY IN MAEHONGSON MUNICIPALITY AREA

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ABSTRACT

This research aims to study the living condition of the elderly in Maehongson Municipality area in both physical and socio-economic aspects. The requirements about factors for good living standards of the elderly are also investigated in order to build the GIS database. This database will be used as criteria for planning and building projects for improving the elderly’s living environment of Maehongson City in comprehensive level. The research raises a pilot project for improving and creating suitable living environment and dwelling for elderly in Maehongson municipality area by selecting an elderly’s house from each type of dwellings which are general house, indigenous house and Tai house. Simultaneously, the research also proposes plan and projects for improving suitable urban facilities and creating proper infrastructures in Maehongson city for the elderly who is expected that the number will be raised dramatically in the near future.

MODELLING OF FACTORS IMPACTING ADOPTION OF PRECAST CONCRETE SYSTEMS

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ABSTRACT

Construction technology utilizing prefabricated concrete elements is known as a 'precast concrete system'. In Western countries, this system has been widely used in constructing bridges, office buildings and residential buildings. A precast concrete construction system provides the advantages of construction effectiveness, high levels of quality control, saving of construction time, minimisation of skilled labour, reduced manpower requirements on site, and saving in formwork requirements when compared with the traditional construction method (cast-in-place concrete). In Thailand, cast-in-place is the traditional construction system that has been mostly used to this point. Precast concrete floor slabs are the only prefabricated elements used widely in Thailand. Only a few parties in the Thai construction market have adopted fully precast concrete systems. However, many factors have an impact on the adoption of precast concrete system. This paper presents and analyses a conceptual model that accommodates the numerous factors impacting the effectiveness of the adoption process. The results of a survey of 160 construction industry professionals in Thailand are presented and the significant factors which impact the adoption of precast concrete systems are determined through statistical analysis. The paper concludes with an analysis of the significant factors in the adoption of precast concrete elements and system.

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NATURAL VENTILATED AND INSULATED ENVELOPE DEMONSTRATION HOUSE PROJECT

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ABSTRACT

The typical medium level of 2-story single house of Thailand presently are loosing of its traditional characteristic, architectural elements, and not energy efficient. The Natural Ventilated and Insulated Envelope Demonstration house project is the research project intended to develop the prototype house that design for sufficient functions and energy efficient consume by implementing shading device and opening design in its building envelope with traditional Lanna characteristic. The methodology of the research based on three major steps. First, reviewing design criterion of houses in the same category, middle Level, to establish building program, construction costs, and vernacular characteristic design. Second, designing the prototype and energy consumption simulation based on thermal transfer and natural ventilation theories. The design will be the house that functional reasonable, cost, using local standard materials and energy saving. Third, comparing the prototype with the other design to validate the assumptions then build the prototype as a demonstration house.
PARADIGM SHIFT IN LANNA ARCHITECTURE

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ABSTRACT

The research analyzes the transformation of Lanna Architecture from the traditional way of design to the modern built form by the contemporary architects. Contemporary Lanna architecture in Chiang Mai city are surveyed to inspect their physical features and evaluate architectural elements which architects use as tools for rendition their modern view of Lanna characteristics.
PERFORMANCE OF CHIMNEY TECHNIQUES:
CASE OF CHIANG MAI HOUSE

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ABSTRACT

Design using natural ventilation techniques is one choice that helps people feel comfortable more than. From the influence of wind speed accelerate the evaporation sweat and rancid moisture. But some area can't get natural ventilation because around the building is near the traffic, air pollution and heat or that has Building density. Then it has a little space and distance sufficient to result from the flow of wind. The objectives of this research are study the potential design of chimney for Thailand in case of Chiang Mai house. And provide guidelines for chimney design for one storey, two storeys and more than two storeys of the house. Those are study for chimney technique that not considers the influence of wind outside the building. This study used weather data of Thailand and used bio climatic chart to compared and evaluated human comfort. This study analyzed data by math model. Consideration compared real condition from operating building for test the possibility. The results showed that height mass building is the best case and low mass building is the worst case for get human comfort compare with outside climate building. Because height mass building affect very different temperatures forward low mass building. When chimney is higher affect speed of wind or ventilation rate is increasing in rate decreased follow from Chimney height. Height mass building has clearly Differences more than low mass building. Ventilation rate in building is 7 times of volume inside enough when design height mass and low mass building. And mass of building affects to decreases heat from outside building (Not hot or cold) so feeling to human comfort more than outside climate. So considered effective of chimney must to has two relative parameters are height and mass of building. Other parameter is area of opening affects to increases ventilation rate follow from area and ratio of inlet and outlet opening. And the best design building in rural area of Chiang Mai is height mass building for every height distance of chimney then felling comfort.

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ASSESSMENT OF FOOD SECURITY LINE AND POVERTY LINE OF THE RURAL HOUSEHOLDS IN CHIANG MAI PROVINCE

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ABSTRACT

Although Thailand is a country where food production is adequate for the needs of the population, and can export the excess produce and food products to the world markets; nevertheless some rural households are still facing food and/or nutritional inadequacy. This study aims at assessing the household food security of rural households in Chiang Mai province. 164 sampled households from three different ecosystems: lowland, upland and highland, were interviewed to find out the type and amount of food consumed in the household during a one-week period. The food consumption quantity was converted into per capita calorie intake per day and compared to the standard food security line to assess the proportion of sampled households with insufficient food. The consumption amount that met the food security line was converted to consumption expenditure and compared to the existing official poverty line of each area for consistency check. The study proposes an analytical framework to correlate the standard consumption expenditure to the relevant household expenditures attained from existing national database to enable the assessment of household food security on a larger scale.

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EXTENSION INNOVATION FOR ENHANCING SUSTAINABLE AGRICULTURE

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ABSTRACT

Agricultural extension is both art and science of communication and innovation learning which lead to behavioral change in technological adoption. This paper reviews agricultural extension pathways since Thai agriculture adopted Green Revolution approach in the 70s till sustainable agriculture movement under sufficiency economy at present time. The agricultural extension systems have been transformed from top-down technology push, to bottom-up farmer-driven innovation, and collective learning among multi-stakeholders. This paper presents extension system for enhancing sustainable agriculture by stressing the importance of interdependence, and social learning processes for innovation creation. It concludes that the state agricultural extension systems and education need to adapt to new challenges under increasing complexity for benefiting smallholder farmers.

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FARMERS’ ADAPTABILITY IN BUILDING FARM RESILIENCE: THE PROSPECTS AND CHALLENGES OF SUSTAINABLE AGRICULTURE IN CHIANG MAI PROVINCE

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\textbf{ABSTRACT}

Resilience thinking offers a framework for understanding socio-ecological systems that enable farmers to cope with changes and uncertainties, and thus resilience theory can be a useful framework for analyzing farm sustainability. In this paper we conceptualize the farming system as a complex adaptive system, and to achieve farm sustainability, farmers need to create new options by integrating diversity through experimentation and implementation. We explore the nature of change and strategies that farmers manage to navigate an adaptive cycle. We then assess farm sustainability through adaptability, and capacity to undergo change and still retain structure and function.

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OPTIMIZATION OF ENZYMATIC PRODUCTION OF FRUCTOOLIGOSACCHARIDES FROM LONGAN SYRUP

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ABSTRACT

Fructooligosaccharides (FOS) are a nutritive and low calorie sweetener. They have been attracted and attributed to the expansion of healthy-sugar market due to prebiotic function. Longan is one of the traditional and economic fruits in the Northern of Thailand. In addition to its typical taste and floral flavor, it is a good source of sugars. In some years, over supply of longan is reported, consequently the extra produce was discarded. This research aimed to produce FOS from longan syrup and to optimize the yield of FOS using two enzymes of Pectinex Ultra SP-L and glucose oxidase from sixty degrees brix of the syrup. The sugar contents of the syrup consisted of sucrose (222.2±3.6 g/L), glucose (120.3±0.8 g/L) and fructose (104.7±1.7 g/L), respectively. Response surface methodology using central composite design was applied to optimize three parameters of FOS production, including pectinase (2.7-7.2 U/g sucrose), glucose oxidase (1022-4022 U/g sucrose) and reaction time (7-25 h). Results showed that Pectinex Ultra SP-L concentration had a significant effect (P<0.05) on nystose and 1-kestose contents. Optimal values of Pectinex Ultra SP-L, glucose oxidase and reaction time were 3.3 U/g sucrose, 1022 U/g sucrose and 8 h 41 min, respectively, which resulted in the highest amount of nystose (30.27 g/L) and 1-kestose (123.36 g/L).

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PASTING BEHAVIOUR, TEXTURAL PROPERTIES AND FREEZE–THAW STABILITY OF WHEAT FLOUR–CRUDE MALVA NUT (*Scaphium scaphigerum*) GUM SYSTEM

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ABSTRACT

The effect of replacement of crude malva nut gum (CMG) at 0, 2.5, 5, 7.5 and 10% w/w on pasting behaviour, textural properties and freeze-thaw stability of wheat flour was investigated. Replacement of wheat flour by CMG significantly elevated (p<0.05) the peak viscosity (128-669 RVU), hot paste viscosity (77-363 RVU), breakdown (51-306 RVU) and final viscosity (157-557 RVU) of wheat flour pastes. Pasting temperature (59-85°C) of the flour decreased with increasing CMG content. The textural parameters including hardness, springiness, cohesiveness, gumminess and chewiness of the mix gels decreased with higher level of CMG. Freeze–thaw stability measurement revealed that wheat gel mixtures containing higher level (7.5 and 10%) of CMG decreased syneresis more than 80% after 3 freeze-thaw cycles, when compared to non-CMG sample. The rate of syneresis depended on CMG concentration and number of freeze-thaw cycles. The results demonstrated that higher viscosity, softer texture and lower syneresis of wheat gel could be attained using CMG.

WEIGHT LOSS OF FROZEN BREAD DOUGH UNDER ISOTHERMAL AND FLUCTUATING TEMPERATURE STORAGE CONDITIONS

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ABSTRACT

Evaporative weight loss from food leads to both loss of saleable weight and quality deterioration so it need to be minimized. The effect of isothermal and fluctuating conditions on frozen dough weight loss was measured and compared with kinetic, physical and artificial neural network (ANN) models. Frozen dough samples were regularly weighed during storage for up to 112 days in loose-fitting plastic bags. The storage temperatures were in the range of -8°C to -25°C with fluctuations of ±0.1°C (isothermal), ±1°C, ±3°C or ±5°C about the mean. For each combination of temperature and fluctuation amplitude, the rate of dough weight loss was constant. The rate of weight loss at constant temperature was nearly proportional to water vapour pressure consistent with standard theories for evaporative weight loss from packaged foods but was also accurately fitted by Arrhenius kinetics. Weight loss increased with amplitude of temperature fluctuations. The increase could not be fully explained by either the physic model based on water vapour pressure differences or the kinetic model alone. An ANN model with six neurons in the input layer, six neurons in hidden layers and one neuron in the output layer, achieved a good fit between experimental and predicted data for all trials. However, the ANN model may not be accurate for product, packaging and storage systems different to that studied.

ACTIVITY CLASSIFICATION USING A SINGLE WRIST-WORN ACCELEROMETER

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ABSTRACT

Automatic identification of human activity has led to a possibility of providing personalised services in different domains i.e. healthcare, security and sport etc. With advancement in sensor technology, automatic activity recognition can be done in an unobtrusive and non-intrusive way. The placement of the sensor and wearability are ones of vital keys in the successful activity recognition of free space livings. Experiments were carried out to investigate the use of a single wrist-worn accelerometer for automatic activity classification. The performances of two classification algorithms namely Decision Tree C4.5 and Artificial Neural Network were compared using four different sets of features to classify five daily living activities. The result revealed that Decision Tree C4.5 has outperformed Neural Network regardless of the different sets of features used. The best classification result was achieved using the set containing the most popular and accurate features i.e. mean, minimum, energy and sample differences etc. The best accuracy of 94.13\% was achieved using only wrist-worn accelerometer showing a possibility of automatic activity classification with no movement constrain, discomfort and stigmatisation caused by the sensor.

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AN ANALYSIS OF GAME DESIGN USING GRAPH-BASED SUBSTRUCTURE MINING TECHNIQUE

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ABSTRACT

To analyze and extract design of existing games is an interesting game research area but they are subjective due to different personal opinions. This paper presents method for finding central among personal vision of analyses by using graph-based representation of game design which allows the common to be found by the use of graph mining technique. The experimental result shows common graph which is compressed from diversity of game design graphs.
CREATING ONTOLOGIES FOR KNOWLEDGE MANAGEMENT: THE CHAIPATTANA AERATOR PROJECT

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ABSTRACT

The Royal Projects create valuable knowledge and there is a requirement to structure, store, share and reuse this knowledge effectively. This research aims to analyze, synthesize, and formulate structural knowledge of one Royal Project using CommonKADS and ontological-based knowledge management. The paper proposes three broad ontological categories, which deal with the principle, essence, and practice concepts of the Chaipattana Aerator Project. The requirement that knowledge gained from this project should be gathered, stored, maintained and reused effectively means there is a need to share and reuse ontology when building or modifying the Chaipattana Aerator. In turn, this requires an effective and suitable knowledge package. The ontology developed in this research provides such a support system and may be used by students in remote areas of Thailand to effectively navigate and utilize the knowledge of the Chaipattana Aerator Project to enhance their communities. In addition, research findings suggest that the Internet could be used to share and generate data, information and knowledge at which scales within the Royal Project domain. This study concludes by emphasizing the benefits of ontologies in supporting knowledge for students. Ultimately, the ontologies provide a methodology for knowledge acquisition and modeling which will facilitate more effective use of the Chaipattana Aerator across Thailand.
ENHANCING EXPERT CONTRIBUTION IN UNIVERSITY BUSINESS INCUBATION: CASE STUDY OF COLLEGE OF ARTS, MEDIA AND TECHNOLOGY NEW PRODUCT DEVELOPMENT PROJECT

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ABSTRACT

In the last decade, business incubation has been an important strategy for promoting business and entrepreneurship development, both in developing countries and the EU. According to the United Nations Creative Economy Report 2010, there are a number of features indicating that in 2008-2009, the world economy faced its most severe recession in 70 years, which largely undermined growth, employment and quality of life. In this context, while traditional businesses and manufacturing were seriously hit, the knowledge-based creative sectors were more resistant to this world crisis. This paper addresses the issue of experts’ motivation and contributions to university New Product Development (NPD) projects through a specific methodology. A case study developed at the College of Arts, Media and Technology (CAMT), Chiang Mai University (CMU) is provided to validate the proposed methodology. An individual case study was employed to analyze the results and outcomes of the project. Findings reveal that to ensure long-term success of the university NPD project and University Business Incubation (UBI) center, a spiral of knowledge (SECI model) is essential to reach higher levels of knowledge. This spiral of knowledge can be achieved by raising experts’ motivation and contribution towards the university by continuous contribution from experts and/or an expansion of the expert network.
IMPLEMENTATION OF OVERALL EQUIPMENT EFFECTIVENESS IN WIRE MESH MANUFACTURING

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ABSTRACT

This study presents the implementation of overall equipment effectiveness (OEE) at a small enterprise manufacturing wire mesh in the developing country of Thailand. This company had never established any performance measurement before. Therefore, an appropriate indicator was elaborately selected for the case study, and OEE was chosen. OEE is employed as a simple indicator, but it is still an effective method for analyzing the efficiency of a single machine and an integrated machinery system. The case study of OEE was carried out from set-up stage to full implementation. Several processes were carried out to establish the OEE indicator. OEE helped the company identify the primary problems concerning the availability rate and performance efficiency. The management made the decisions by relying on OEE results and its details, and mandated the elimination of the root causes of breakdown losses and speed losses. Finally, after six months of full implementation, OEE performances improved by over 60 percentages, since availability rate and performance efficiency were improved over 75 percentages, and quality rate was maintained at the same level.
THE COLLABORATE COOPERATIVE EDUCATION PROGRAM BETWEEN THAI AND EU IN THE FIELD OF INDUSTRIAL INFORMATION TECHNOLOGY

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ABSTRACT

This paper presents a cooperative education model in the field of Industrial Information Technology of Modern Management and Information Technology (MMIT), College of Arts, Media and Technology (CAMT), Chiang Mai University (CMU), Chiang Mai, Thailand. The model was with the collaboration of Institut Universitaire de Technology Lumière (IUT Lumière), University Lumière, Lyon 2, France and Duale Hochschule Baden – Wurttemberg (DH-BW or BA) Vellingen – Schwenningen, Germany through the Euro THai Implementation of Cooperative Study - For Economic Development (ETHICS-FED) project. The aim is to enable the French and Germany to give some technical assistance to Chiang Mai University Staff in order to create a framework and adapt a new technical education program (Bachelor degree) for training mid-level managers in production management. The project has 6 work packages; Project management, Adaptation of the curriculum to the economic context, Cooperative education structure and adaptation, Integration of new teaching modules, Implementing a followup system of the MMIT graduates’ career paths, and Dissemination. Since the initiation of the project, the past 18 months have led to many discoveries and advantages for the Thai educational system. These include perspectives based on the culture, economics, educational systems, and company partners.

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THE LOGISTICS SYSTEM REVIEW: GMS INTEGRATION

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ABSTRACT

The review aims at benchmarking the logistics system of the Greater Mekong Subregion (GMS) countries, ie, China, Thailand, Myanmar, Lao PDR, Vietnam and Cambodia. As the regional supply chain is as strong as the weakest link, the weakness in each perspective must be identified and therefore the improvement strategies can be deployed accordingly. The review is based on secondary information, however internationally recognized, ie, the World Bank's The Logistics Performance Index and Its Indicators, the World Bank's Doing Business 2011, World Economic Forum's The Global Competitiveness Report 2010-2011, and US Government Central Intelligence Agency’s World Factbook. The result shows strong indications suggest several improvements in these countries in various perspectives.

KEYWORDS: LOGISTICS SYSTEM, THE LOGISTICS PERFORMANCE INDEX AND ITS INDICATORS, DOING BUSINESS, THE GLOBAL COMPETITIVENESS REPORT, WORLD FACTBOOK

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USING CONSTRAINT PROGRAMMING FOR SPLIT DELIVERY SCHEDULING IN SCARCE RESOURCE ENVIRONMENT

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ABSTRACT

The research proposes a novel generic fleet scheduling for a split delivery with scarce resource problem. The research presents the problem in Constraint Satisfaction Problem (CSP) and further tackling it using Constraint Programming. The prototype system has been developed to evaluate the proposed method using problem statement case study from one of the large agricultural product supplier in the north of Thailand. The developed system deals with practical constraints including hard constraints e.g. vehicle capacity, time window, vehicle usage restriction and fleet constraints, and soft constraint which is a minimising of using subcontractor. The results showed a primary success of the proposed method in providing efficiency decision for agricultural transport planning.

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USING ONTOLOGIES FOR KNOWLEDGE MANAGEMENT:
THE CHAIPATTANA AERATOR PROJECT

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ABSTRACT

There are over 4,000 Royal Initiative Projects, reflecting His Majesty King Bhumibol of Thailand’s concern over the well-being of his people. The Royal Projects create valuable knowledge and there is a requirement to structure, store, share and reuse this knowledge effectively. This research aims to analyze, synthesize, and formulate structural knowledge of one Royal Project using CommonKADS and ontological-based knowledge management. The paper proposes three broad ontological categories, which deal with the principle, essence, and practice concepts of the Chaipattana Aerator Project. The Chaipattana Aerator is a patented invention known worldwide for its effectiveness in increasing oxygenation to reduce water pollution and is particularly useful in rural areas. This study constructs a knowledge representation of the Chaipattana Aerator Project by extracting key concepts from the King of Thailand’s principle, essence and practice concepts. Ontological development was based on information from the Royal Project repository, which was translated from freely available text into a formal representation using CommonKADS. The requirement that knowledge gained from the project should be gathered, stored, maintained and reused effectively means there is a need to share and reuse ontology when building or modifying the Chaipattana Aerator. In turn, this requires an effective and suitable knowledge support system. The ontology developed in this research provides such a support system and may be used by students in remote areas of Thailand to effectively navigate and utilize the knowledge of the Chaipattana Aerator Project. In addition, the research findings suggest that the Internet could be used to share and generate data, information and knowledge in the Royal Initiative Project domain. This study concludes by emphasizing the benefits of ontologies in supporting knowledge for students. Ultimately, the ontologies provide a methodology for knowledge acquisition and modeling which will facilitate more effective use of the Chaipattana Aerator.
A P2P-BASED INCREMENTAL WEB RANKING ALGORITHM

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ABSTRACT

In this paper, we propose an incremental algorithm for web ranking in the Peer-to-Peer (P2P) environments. Not the same as the non-incremental algorithm, the proposed algorithm can partition the web link graphs, the graphs represented the connectivity structure among the web pages, into the changed subgraphs, and the unchanged subgraphs. Subsequently, the algorithm processes only the necessary data in order to compute the ranking. The experiments have been conducted to evaluate the efficiency of the algorithm, comparing with the non-incremental algorithm in various P2P environments. We report the efficiency in terms of both computational and communication costs. It has been found that in terms of communication cost, the proposed algorithm can outperform the traditional one in all configurations. For the computational cost, the proposed algorithm can outperform the traditional one in all P2P network sizes but it has slightly higher computational cost when the web link graph size is large.

ACHIEVING K-ANONYMITY FOR ASSOCIATIVE CLASSIFICATION IN INCREMENTAL-DATA SCENARIOS

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ABSTRACT

When a data mining model is to be developed, one of the most important issues is preserving the privacy of the input data. In this paper, we address the problem of data transformation to preserve the privacy with regard to a data mining technique, associative classification, in an incremental-data scenario. We propose an incremental polynomial time algorithm to transform the data to meet a privacy standard, i.e. k-Anonymity. While the transformation can still preserve the quality to build the associative classification model. The computational complexity of the proposed incremental algorithm ranges from $O(n \log n)$ to $O(\Delta n)$ depending on the increment data. The experiments have been conducted to evaluate the proposed work comparing with a non-incremental algorithm. From the experiment result, the proposed incremental algorithm.

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AN EFFICIENT APPROACH FOR DATA-DUPLICATION DETECTION BASED ON RDBMS

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ABSTRACT

Data-duplication is one of the most important issues in the context of information system management. Instead of storing a single real-world object as an entity in an information system, the duplication, storing more than one entity representing a single object, can be occurred. This problem can decrease the quality of service of information systems. In this paper, we propose an efficient approach to detect the duplication based on the RDBMS foundation. Our approach is based on the assumption that the data to be processed have been stored in the RDBMS at the first place. Thus, the proposed approach does not require the data to be imported/exported from the storage. Also, such approach will benefit from the query optimizer of the RDBMS. The experiment results on the TPC-H dataset have been presented to validate such proposed work.

AN OVERVIEW OF UNIPOLAR CHARGER DEVELOPMENTS FOR NANOPARTICLE CHARGING

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ABSTRACT

Charging of nanoparticles is an important process in aerosol sizing. A unipolar charger is one of the most important upstream components in aerosol particle sizing and measurement systems by electrical mobility analysis. The aim of particle charging for an electrical mobility analyzer is to impose a known net charge distribution on the aerosol particles for each size. Charger performance depends on the extrinsic charging efficiency and stable operation. A well-designed unipolar charger should provide high extrinsic charging efficiency and stability that can be accurately determined for any given operating conditions. Depending on the mechanisms used to generate the ionized gas, the chargers can be classified as: (i) a corona discharge chargers, (ii) a radioactive chargers, and (iii) a photoelectric chargers. In this article, a brief overview on the development of existing unipolar aerosol chargers for nanoparticles is presented. Descriptions of the operating principles as well as detailed physical characteristics of these chargers, including the corona discharge, ionizing radiation, and photoelectron emission, are given.
ANALYSIS OF MICROPARTICLE RESUSPENSION IN TURBULENT FLOWS WITH HORIZONTALLY VIBRATING SURFACE

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ABSTRACT

Removal of deposited particles is a key issue in particulate contamination control in hard disk assembly. Successful resuspension predictions require a good knowledge of forces for microparticles deposited on rough surfaces. This work is about removal of particles in turbulent air flow with external excitation. A well known, kinetic detachment model was modified and applied to the resuspension of particles. The modified model was derived from the energy accumulation approach with combined aerodynamic drag and in-plane vibration to separate particles from a surface. Moments of adhesion, aerodynamic drag, and vibration acting on microparticles deposited to the surface were evaluated. An expression was obtained for the resuspension rate from surfaces where a spread of adhesive forces due to surface roughness was taken into consideration. The prediction results showed similar qualitative and quantitative trends to the experimental results from the literature. Frequency of particle-surface interaction was found to significantly influence the removal rate of microparticles from the surface.

ANALYTICAL PREDICTION OF FINE PARTICLE DETACHMENT FROM A FLAT SURFACE BY TURBULENT AIR FLOWS

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ABSTRACT

Detachment of deposited particles in turbulent air flows has been theoretically investigated, based on a quasi-static, critical moment model. Micrometer and submicrometer particles were considered in this study. Forces, i.e. adhesion, gravitation, aerodynamic lift and drag, and moments of these forces acting on particles deposited to a surface were considered and calculated as a function of particle size, and particle/surface system. Critical velocities of air flows for particle detachment were determined, and compared with experimental results from literature. The analytical prediction and experimental data were found to be in reasonable agreement. Trends between the two were similar. The analytical solutions predicted that the effect of aerodynamic drag played an important role in removal of fine particles from the surface. Critical velocity was found to increase with a decrease in particle size.

ASSOCIATIVE CLASSIFICATION RULES HIDING FOR PRIVACY PRESERVATION

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ABSTRACT

Sensitive patterns could be discovered from the given data when the data are shared between business partners. Such patterns should not be disclosed to the other parties. However, the shared data should be credible and trustworthy for their ‘quality’. In this paper, we address a problem of sensitive classification rule hiding by a data reduction approach. We focus on an important type of classification rules, i.e., associative classification rule. In our context, the impact on data quality generated by data reduction processes is represented by the number of false-dropped rules and ghost rules. To address the problem, we propose a few observations on the reduction approach. Subsequently, we propose a greedy algorithm for the problem based on the observations. Also, we apply two-bitmap indexes to improve the efficiency of the proposed algorithm. Experiment results are presented to show the effectiveness and the efficiency of the proposed algorithm.
AUTOMATIC NEVIRAPINE CONCENTRATION INTERPRETATION SYSTEM USING SUPPORT VECTOR REGRESSION

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ABSTRACT

Follow-up of human immunodeficiency virus (HIV) patients treated with Nevirapine (NVP) is a necessary process to evaluate the drug resistance and the HIV mutation. It is also usually tested by immunochromatographic (IC) strip test. However, it is difficult to estimate the amount of drug the patient gets by visually inspection of color. In this paper, we propose an automatic interpretation system using a commercialized optical scanner. Several IC strips can be placed at any direction as long as they are on the scanner plate. There are three steps in the system, i.e., light intensity normalization, image segmentation and NVP concentration interpretation. We utilized the Support Vector Regression to interpret the NVP concentration. From the results, we found out the performance of the system is promising and better than that of the linear and nonlinear regression.

KEYWORDS: IMMUNOCHROMATOGRAPHIC (IC) STRIP, TEST, IMAGE SEGMENTATION, SUPPORT VECTOR REGRESSION, NEVIRAPINE

AUTOMATIC SEGMENTATION AND DEGREE IDENTIFICATION IN BURN COLOR IMAGES

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ABSTRACT

When burn injury occurs, the most important step is to provide treatment to the injury immediately by identifying degree of the burn which can only be diagnosed by specialists. However, specialists for burn trauma are still inadequate for some local hospitals. Hence, the invention of an automatic system that is able to help evaluating the burn would be extremely beneficial to those hospitals. The aim of this work is to develop an automatic system with the ability of providing the first assessment to burn injury from burn color images. The method used in this work can be divided into 2 parts, i.e., burn image segmentation and degree of burn identification. Burn image segmentation employs the Cr-transformation, Luv-transformation and fuzzy c-means clustering technique to separate the burn wound area from healthy skin and then mathematical morphology is applied to reduce segmentation errors. The segmentation algorithm performance is evaluated by the positive predictive value (PPV) and the sensitivity (S). Burn degree identification uses h-transformation and texture analysis to extract feature vectors and the support vector machine (SVM) is applied to identify the degree of burn. The classification results are compared with that of Bayes and K-nearest neighbor classifiers. The experimental results show that our proposed segmentation algorithm yields good results for the burn color images. The PPV and S are about 0.92 and 0.84, respectively. Degree of burn identification experiments show that SVM yields the best results of 89.29 % correct classification on the validation sets of the 4-fold cross validation. SVM also yields 75.33 % correct classification on the blind test experiment.

KEYWORDS: BURN IMAGE SEGMENTATION, DEGREE IDENTIFICATION, SUPPORT VECTOR MACHINE, FUZZY C-MEANS CLUSTERING, MATHEMATICAL MORPHOLOGY

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Bone Age Assessment in Young Children Using Automatic Carpal Bone Feature Extraction and Support Vector Regression

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Abstract

Boundary extraction of carpal bone images is a critical operation of the automatic bone age assessment system, since the contrast between the bony structure and soft tissue are very poor. In this paper, we present an edge following technique for boundary extraction in carpal bone images and apply it to assess bone age in young children. Our proposed technique can detect the boundaries of carpal bones in X-ray images by using the information from the vector image model and the edge map. Feature analysis of the carpal bones can reveal the important information for bone age assessment. Five features for bone age assessment are calculated from the boundary extraction result of each carpal bone. All features are taken as input into the support vector regression (SVR) that assesses the bone age. We compare the SVR with the neural network regression (NNR). We use 180 images of carpal bone from a digital hand atlas to assess the bone age of young children from 0 to 6 years old. Leave-one-out cross validation is used for testing the efficiency of the techniques. The opinions of the skilled radiologists provided in the atlas are used as the ground truth in bone age assessment. The SVR is able to provide more accurate bone age assessment results than the NNR. The experimental results from SVR are very close to the bone age assessment by skilled radiologists.

Keywords: Boundary Extraction, Bone Age, Carpal Bones, Edge Following, Support Vector Machine
BOUNDARY DETECTION IN MEDICAL IMAGES USING EDGE FOLLOWING ALGORITHM BASED ON INTENSITY GRADIENT AND TEXTURE GRADIENT FEATURES

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ABSTRACT

Finding the correct boundary in noisy images is still a difficult task. This paper introduces a new edge following technique for boundary detection in noisy images. Utilization of the proposed technique is exhibited via its application to various types of medical images. Our proposed technique can detect the boundaries of objects in noisy images using the information from the intensity gradient via the vector image model and the texture gradient via the edge map. The performance and robustness of the technique have been tested to segment objects in synthetic noisy images and medical images including prostates in ultrasound images, left ventricles in cardiac magnetic resonance (MR) images, aortas in cardiovascular MR images, and knee joints in computerized tomography images. We compare the proposed segmentation technique with the active contour models (ACM), geodesic active contour models, active contours without edges, gradient vector flow snake models, and ACMs based on vector field convolution, by using the skilled doctors’ opinions as the ground truths. The results show that our technique performs very well and yields better performance than the classical contour models. The proposed method is robust and applicable on various kinds of noisy images without prior knowledge of noise properties.

KEYWORDS: BOUNDARY EXTRACTION, EDGE DETECTION, EDGE FOLLOWING, IMAGE SEGMENTATION, VECTOR FIELD MODEL

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CHARACTERIZATION OF BIOCHAR FROM HYDROTHERMAL CARBONIZATION OF BAMBOO

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ABSTRACT

This paper presents a preliminary investigation on producing biochar from bamboo using a technique of hydrothermal carbonization. Laboratory scale experimentation to produce carbonaceous materials was carried out. The suspended biomass samples in water were subjected to hydrothermal carbonization at 220°C, 2.2 MPa in a closed vessel for six hours. The resulting products were in solid and liquid phase. The coal-like biochar was found to have rough surface and porous structure. The aqueous solution was found to contain a high concentration of nutrients, especially nitrogen, phosphorus, and potassium. The study shows that bamboo is an interesting and adequate biomass for the production of biochar with several applications including carbon sequestration.

COIL DEFECT INSPECTION IN PIVOT ARM ASSEMBLY

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ABSTRACT

A pivot arm is one of the important parts of a hard disk drive. The two most common defects in the coil attached to a pivot arm are the so-called coil dent and coil scratch. This paper proposes an automatic method to classify the good area and defective area in the coils. We create a coil image data set consisting of 300 images from the good areas and the other 300 images from the defective areas. Two features based on the HSV color space and the discrete wavelet transform are also proposed. The results show that the proposed features can effectively be used in the coil defect inspection. The Bayes classifiers achieve the classification rate of 95.67 % using the 10-fold cross validation.

KEYWORDS: HARD DISK DRIVE, PIVOT ARM, COIL DEFECT INSPECTION, COIL DENT, COIL SCRATCH

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CONSTRUCTED WETLAND SYSTEM FOR TREATING WASTEWATER OF SCATTERED SMALL INDUSTRIES: A CASE STUDY OF FERMENTED FISH PRODUCTION INDUSTRY IN PHAYAO CITY, THAILAND

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ABSTRACT

In the absence of centralized treatment systems and collection networks, wastewater discharged by small industries often end up in surface water bodies. When those industries are scattered in a wider area, decentralized systems are also not effective in solving the problem. This paper presents the results of a community-based project that was implemented to demonstrate how wastewater problem of scattered small industries can be addressed. The paper presents the application of Constructed Wetland technology to treat wastewater discharged by home-based industries specialized in fermented fish production. It shows that Constructed Wetland technology can efficiently resolve the wastewater problem of fermented fish production industry. However, stakeholder participation and logistical arrangements are found to be key issues that determine the effectiveness of CW technology to address the wastewater problem of scattered industrial units.

KEYWORDS: CONSTRUCTED WETLAND, SCATTERED INDUSTRIES, WASTEWATER POLLUTION, FERMENTED FISH PRODUCTION

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CONTENT-BASED VIDEO SEARCH ON PEER-TO-PEER NETWORKS

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ABSTRACT

In this paper, we address the efficiency issue of the content-based video indexing over peer-to-peer (P2P) networks. The traditional video index is improved to suit with the P2P computational model. The algorithms to perform the video query based on the content similarity in the P2P environment are proposed. Also, the algorithms to handle the node joining, departure, index entry insertion are proposed. Furthermore, the load balancing approach based on the proposed algorithms is proposed. From the experiment results, our proposed approach outperforms a naive approach, which directly applies the P2P model with full replication, when a number of P2P nodes to be joined, as well as a number of videos to be inserted, is increased. Meanwhile, the efficiency of our approach in terms of the query answering is bounded by linear complexity. Moreover, our proposed load balancing approach is much more efficient than the naive approach in all experiments.
CULTURALLY INFLUENCED RISK EXPOSURE: A NEW APPROACH TO TACKLE RISKS IN OFFSHORE OUTSOURCING

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ABSTRACT

Culture is arguably perceived as the most influential risk factor in offshore outsourcing of software projects. Yet, due to its intangible characteristics, quantifying and systematizing this factor seems to be impracticable. This paper proposes a new approach to enhance risk assessment process by involving culture in the calculation. The results from this new approach suggest a better evaluation of risk which leads to more appropriate planning and mitigation.
DEVELOPMENT OF A FAST RESPONSE, HIGH RESOLUTION ELECTRICAL MOBILITY SPECTROMETER

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ABSTRACT

A short electrical mobility spectrometer (EMS) for measuring aerosol size distribution has been developed and presented [Intra and Tippayawong, Korean J. Chem. Eng., 26, 1770, 2009]. In this work, further improvement of the short EMS into a fast-response, and high resolution instrument was presented. This was done by (i) improvement in particle charging, (ii) utilization of faster flow rate, and (iii) adoption of higher number of electrode rings. The so called “long” EMS consists of three main parts: a particle charger, a long multi-channel size classifier column, and a multi-channel electrometer. Performance of the long EMS was preliminary tested using polydisperse, carbonaceous aerosol particles generated by a diffusion flame. Preliminary test results showed that the long EMS performed comparatively well, and gave faster response and higher resolution than the short EMS. It was a valuable aerosol instrument available for measuring size distribution of aerosol particles.

DEVELOPMENT OF A LABORATORY SCALE REACTOR WITH CONTROLLED HIGH PRESSURE SAMPLING FOR SUBCRITICAL METHANOLYSIS OF BIODIESEL

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ABSTRACT

The objective of this work was to develop a laboratory scale reactor for biodiesel production from subcritical methanol transesterification. The design was based on utilizing a high pressure system from diesel engine to regulate near critical condition and sample the converted product. The reactor consisted of a 400 ml autoclave, a 2-kW electrical heating furnace, and a product sampling system. The pressure system was adapted from a diesel fuel injector. High pressure and temperature inside the reactor was built up by means of external heat source. Rapid heat transfer was provided to the reactor, accompanied with simultaneous rise in pressure so that near critical conditions (temperatures between 180-200 °C and pressure around 140-190 atm) were attained for methanol. Synthesis product can be collected real time via injection. Limited product samples from preliminary tests with palm oil and methanol at molar ratio of 46:1 were collected and analyzed by gas chromatography – mass spectrometry. Analysis results showed high percentage conversion of vegetable oil to methyl esters. Yields of over 93% biodiesel were obtained. The reactor proved to be successful for producing biodiesel.

DOMESTIC WASTEWATER TREATMENT BY A CONSTRUCTED WETLAND SYSTEM PLANTED WITH RICE

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ABSTRACT

The experiments were conducted in four concrete laboratory scale free water surface constructed wetland units with 1 m wide, 1.5 m long and 0.8 m deep. Paddy field soil was added to a depth of 0.4 m and rice seedlings (Oryza sativa L.) were transplanted into the units at a density of 25 plants/m². Domestic wastewater collected from Chiang Mai University was applied into each unit via two different modes to evaluate suitable conditions for wastewater treatment and rice yield. In the first experiment, the wastewater was fed intermittently (7 hours/day) with a hydraulic loading rate of 2, 4, 6 and 8 cm/day. The maximum removal efficiencies for chemical oxygen demand, biological oxygen demand, total kjedahl nitrogen and suspended solids were only 49.1, 58.7, 64.0 and 59.4%, respectively, due to the short hydraulic retention time for the biodegradation of organic substances. In the second experiment, the wastewater in each unit was inundated to a depth of 15 cm for 10, 15, 20 and 25 days in each unit and then drained and re-flooded. Removal efficiencies of chemical oxygen demand, biological oxygen demand, total kjedahl nitrogen and suspended solids were greater than in the first experiment especially at the 25 day retention time and except for suspended solids met the Thai national effluent standard. The study revealed that apart from wastewater treatment, wastewater can be replaced natural water to grow rice in the dry season or throughout the year. Moreover, nutrients in wastewater can be a substitute for chemical fertilizers. Rice grain production was 4,700 Kg/ha and only 6% less than the production from the conventional paddy field.

KEYWORDS: CONSTRUCTED WETLANDS; DOMESTIC WASTEWATER; ORGANIC FERTILIZER; TREATMENT; RICE

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EVALUATING THE A-DOMINANCE OPERATOR IN
MULTIOBJECTIVE OPTIMIZATION FOR THE
PROBABILISTIC TRAVELING SALESMAN
PROBLEM WITH PROFITS

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ABSTRACT

This chapter formulates a new multiobjective optimization problem (MOP), the Probabilistic Traveling Salesman Problem with Profits (pTSPP), which contains inherent noise in its objective functions. As a variant of TSP, many real-world noisy MOPs can be reduced to pTSPP. In order to solve pTSPP, this chapter proposes an evolutionary multiobjective optimization algorithm (EMOA) that leverages a novel noise-aware dominance operator, called the α-dominance operator. The operator takes objective value samples of given two individuals (or solution candidates), estimates the impacts of noise on the samples and determines whether it is statistically confident enough to judge which individual is superior/inferior to the other. Unlike existing noise-aware dominance operators, the α-dominance operator assumes no noise distributions a priori; it is well applicable to various real-world noisy MOPs, including pTSPP, whose objective functions follow unknown noise distributions. Experimental results demonstrate that the α-dominance operator allows the proposed EMOA to effectively obtain quality solutions to pTSPP and it outperforms existing noise-aware dominance operators.

EYE-GAZE DISTANCE ESTIMATION BASED ON GRAY-LEVEL INTENSITY OF IMAGE PATCH

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ABSTRACT

This paper proposes an eye-gaze distance estimation technique based on the gray-level intensity of a single image patch from a single camera. The proposed measuring system is easy to estimate the distance between a user's eye and a computer screen. For eye gaze distance estimation, the eye gaze image is reflected by two infrared light emitting diodes attached on the vertical center of the left and right frame of a computer screen. The images are captured using a camera with a lens with focal length of 25 mm. The proposed method is tested on five users. The results are 95.64 % accuracy using linear least squares method and 96.54 % accuracy using least squares second order polynomial. The absolute errors for distance estimation are 2.97 cm and 2.47 cm using the linear least square and the least squares polynomial, respectively. The comparison shows the proposed method performs better than the pixel counts method and the two-eye distance based method.

KEYWORDS: EYE-GAZE, DISTANCE ESTIMATION, GRAY-LEVEL INTENSITY, IMAGE PATCH, LINEAR REGRESSION

ABSTRACT

A novel neural associative memory-based structural control method, coined as AMOLCO, is proposed in this study. AMOLCO is an open-loop control system that autonomously and incrementally learns to suppress the structural vibration caused by dynamic loads such as wind excitations and earthquakes to stabilize high-rise buildings. First, AMOLCO incrementally learns the associative pair of input excitation from either winds or earthquakes and the corresponding output control response generated by standard optimal control only under a single simple condition (i.e., low wind conditions). After learning for a short period of time, i.e., 15 min, AMOLCO becomes capable of efficiently suppressing more intense structural vibrations such as those caused by very strong winds or even earthquakes. In this study, evaluation of the AMOLCO method is performed by using the physical simulation data. The results show that the control signal generated by AMOLCO is similar to that generated by the state-of-the-art control system used in a building. In addition, the resulting control signal is tested on a realistic simulation to affirm that the signal can control the structures. These results show that for the first time, AMOLCO offers another approach of structural control, which is inexpensive and stable similar to a standard open-loop system and also adaptive against disturbances and dynamic changes similar to a closed-loop system.

GASIFICATION OF CASHEW NUT SHELLS FOR THERMAL APPLICATION IN LOCAL FOOD PROCESSING FACTORY

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ABSTRACT

Cashew nut shells are high energy content residues from cashew nut processing. It can potentially replace fuelwood for thermal application in a factory. However, direct combustion of cashew nut shells was troublesome due to low efficiency and high smoke emission. Alternative thermal conversion of cashew nut shells should be used instead. In this work, a gasifier system was designed, built, and installed at a local cashew nut processing factory. Cashew nut shells were converted to producer gas in the downdraft fixed-bed gasifier. The gaseous fuel was then fed to a burner to supply hot water for the factory. From the results obtained, cashew nut shells were successfully used as feedstock in a gasifier. Satisfactory operation was obtained. Gasification of cashew nut shells could provide required thermal input, with clean fuel to the local food processing factory. Preliminary economic analysis showed that the factory can save around $150 a month, with simple period to positive cash flow of less than a year.

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INCREMENTAL WEB RANKING ON P2P NETWORKS

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ABSTRACT

Web ranking is one of the most important components of web search services which becomes an important activity these days. In order to compute the web ranking, the web-link graph structure is to be processed to analyze the importance of the linkage. The time and space complexity for web ranking can be enormous as the number of web grows rapidly. Peer-to-peer (P2P) network computational models are an important approach to process such task efficiently. However, as mentioned that number of webs is increased continuously, a web ranking algorithm that considers the web-link graph as a static set of data may not be appropriated. When a snapshot of the web-link graph is being processed, the new change can occur. Thus, the ranking result can be inaccurate. In this paper, we proposed an efficient approach to incrementally compute web rankings on a P2P network. The proposed approach processes almost only the changed part of the web-link graph in the distributed manner, thus it performs the web ranking efficiently. Our experiment results show that the proposed approach can significantly reduce the computational cost as well as the communication cost.

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INVESTIGATION OF A SMALL BIOMASS GASIFIER - ENGINE SYSTEM OPERATION AND ITS APPLICATION TO WATER PUMPING IN RURAL THAILAND

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ABSTRACT

This paper reports experimental and developmental studies on a producer gas/diesel dual fuel operation of a small engine for irrigation water pumping. In this work, a biomass gasifier - engine system was designed, built and tested. Waste woods from furniture making industry and charcoal were used as feedstock to produce fuel gas in the downdraft, throat-type, fixed-bed gasifier. The engine performance was evaluated over a fixed load and variable speeds between 1000 – 2000 rpm. Results showed that dual operation was able to produce slightly higher power output than normal diesel operation, with similar thermal efficiency. Producer gas substitution or diesel replacement of about 60 – 70% by mass was achieved. The producer gas powered water pumpset was later installed at a farm in rural Thailand. Start-up was straight forwards and continuous operation was achieved with water yield at 60% of nominal value. It was successfully demonstrated that biomass gasification could provide clean fuel to a small engine and this renewable energy technology could be a sustainable option for water pumping in rural areas.
INVESTIGATION ON THE ELECTRICAL DISCHARGE CHARACTERISTICS OF A UNIPOLAR CORONA-WIRE AEROSOL CHARGER

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ABSTRACT

In the present study, a simple corona-wire charger for unipolar diffusion charging of aerosol particles is designed, constructed, and characterized. Experimental characterizations of the electrostatic discharge in terms of current-voltage relationships of positive and negative coronas of the corona-wire charger are also presented and discussed. The charging current and ion concentration in the charging zone increased monotonically with corona voltage. The negative corona showed higher current than the positive corona. At the same corona voltages, the current in the discharge zone is about 600 times larger than the charging current. The ion number concentrations ranged within approximately $5.0 \times 10^{10}$ to $1.24 \times 10^{16}$ ions/$m^3$ and $4.5 \times 10^{12}$ to $2 \times 10^{16}$ ions/$m^3$ in the discharge and charging zones, respectively. A numerical model is used to predict the behavior of the electric potential lines. Numerical results of ion penetration through the inner electrode are in good agreement with the experimental results.

KEYWORDS: AEROSOL; CHARGER; UNIPOLAR CHARGING;
MODEL-DRIVEN PERFORMANCE ENGINEERING FOR WIRELESS SENSOR NETWORKS WITH FEATURE MODELING AND EVENT CALCULUS

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ABSTRACT

This paper proposes and evaluates a model-driven performance engineering framework for wireless sensor networks (WSNs). The proposed framework, called Moppet, is designed for application developers to rapidly implement WSN applications and estimate their performance. It leverages the notion of feature modeling so that it allows developers to graphically and intuitively specify features (e.g., functionalities and configuration policies) in their applications. It also validates a set of constraints among features and generates application code. Moppet also uses event calculus in order to estimate a WSN application’s performance without generating its code nor running it on simulators and real networks. Currently, it can estimate power consumption and lifetime of each sensor node. Experimental results show that, in a small-scale WSN of 16 iMote nodes, Moppet’s average performance estimation error is 8%. In a large-scale simulated WSN of 400 nodes, its average estimation error is 2%. Moppet scales well to the network size with respect to estimation accuracy. Moppet generates lightweight nesC code that can be deployed with TinyOS on resource-limited nodes. The current experimental results show that Moppet is well-applicable to implement biologically-inspired routing protocols such as pheromone-based gradient routing protocols and estimate their performance.

MODIFICATION GELATIN SCAFFOLD WITH CARBOXYMETHYLCELLULOSE FOR DERMAL SKIN

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ABSTRACT

Effects of carboxymethylcellulose (CMC), a derivative of cellulose, blended with biopolymer gelatin scaffolds were studied. The CMC solution was mixed with gelatin solution in various ratios and fabricated to porous structure via freeze drying process. Thermal and chemical crosslinking techniques were used to induce conjugation of free amide and carboxyl groups in protein structures of the different types of scaffold. Physical and mechanical properties of different gelatin/CMC scaffolds were characterized via Scanning Electron Microscope (SEM) which observe of a scaffold cross section. The compressive modulus of the scaffolds were evaluated via Universal Testing Machine (UTM). The morphology of the gelatin/CMC scaffolds seemed to mainly depend upon the mixing ratios of gelatin and CMC solutions. Adding of CMC to the scaffolds decreased in pore sizes and seemed to have more porous than pure gelatin scaffolds, especially when used the 1-ethyl-3-3-dimethylaminopropyl carbodiimide hydrochloride (EDC) and N-hydroxysuccinimide (NHS) in 50 mM MES buffer in 40% ethanol for crosslinking the scaffolds. The mechanical analysis demonstrated that adding CMC effected the compressive modulus of the EDC/NHS crosslinked scaffolds. The compressive modulus dramatically decreased when increased of CMC in some ratio in the scaffolds. These results suggested that using CMC as an additive and crosslinking techniques improved physical properties of the scaffolds. However, the compressive modulus of the scaffolds decreased in some ratio both thermal and chemical crosslinking techniques. This results suggested that the additive of CMC had tendency to display some interesting properties for applying in tissue engineering applications.

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NAVIGATION SYSTEM OF MOBILE ROBOT IN AN UNCERTAIN ENVIRONMENT USING TYPE-2 FUZZY MODELLING

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ABSTRACT

A navigation system of a mobile robot in an uncertain environment is one of a popular research area. There are both static and dynamic obstacles in an uncertain environment. If a robot finds a static obstacle, it can select a safe path very easily. However, a dynamic obstacle can move very randomly in the global map. Hence, in this paper, we propose a navigation system in an uncertain environment focusing on dynamic obstacles for a mobile robot. The future position of a dynamic obstacle is modeled using a fuzzy vector. The dangerous region of that obstacle is then computed. Then the free road candidates are computed based on those dangerous regions found. Then the best free road is selected. Finally, the interval type-2 fuzzy logic system is utilized to compute the velocity and angular velocity of a mobile robot. The experiment results show that our navigation system worked in an uncertain environment, i.e., an environment with an obstacle with stable velocity and angular velocity, an environment with an obstacle with random velocity, and an environment with several obstacles with both condition.

KEYWORDS: INTERVAL TYPE-2 FUZZY LOGIC, UNCERTAIN ENVIRONMENT, FUZZY COLLISION REGION, COLLISION PREDICTION, OBSTACLE AVOIDANCE

PERFORMANCE EVALUATION OF AN ELECTROMETER SYSTEM FOR ION AND AEROSOL CHARGE MEASUREMENTS

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ABSTRACT

In this study, an aerosol electrometer system for measuring ion and aerosol charge using electrostatic detection technique was developed and presented. It consists of a size selective inlet, a particle charger, an ion trap, a Faraday cup, an electrometer, and a data acquisition and processing system. In this system, an aerosol sample first passes through the size selective inlet to remove particles outside the measurement size range based on their aerodynamic diameter, and then pass through the unipolar corona charger that sets a charge on the particles and enter the ion trap to remove the free ions. After the ion trap, the charged particles then enter the Faraday cup electrometer for measuring ultra low current about 1 pA induced by ion and aerosol charge collected on the filter in Faraday cup corresponding to the number concentration of ion and aerosol. Signal current is then recorded and processed by a data acquisition system. A detailed description of the operating principle of the system as well as main components was presented. Performance of the prototype aerosol electrometer circuit used in this work was evaluated and compared with a commercial electrometer, Keithley model 6517A. Good agreement was found from the comparison. Finally, experimental testing results of ion and aerosol charge measurements were shown and discussed.

PERFORMANCE EVALUATION OF CURVED BLADES VERTICAL AXIS WIND TURBINE

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ABSTRACT

Wind is a natural resource and it can be used as an alternative energy. Many sites in Thailand have satisfactory potential of wind energy such as the average wind energy of Chiang Mai was 128.95 W/m² and many locations in Northern part of Thailand are suitable to setup the electrical generation system from wind. The present work studied the effect of the operating conditions (tip speed ratio) to the starting rotation, rev up rotation, power and torque coefficients of Curved Blades Vertical Axis Wind Turbine (CB-VAWT). CB-VAWT was tested in the laboratory scale in wind tunnel with setting velocities of 1.5, 2.0, 3.0, 4.0 and 5.0 m/s. Four identical blades of semi-cylindrical hollowed drum shape were the main essential parts of CB-VAWT. Of which each blade was attached to a horizontal radius arm at 90° apart, to a single vertical axis shaft. Studies were consisted of starting behavior, starting sequence behavior, constant rotational behavior and torque coefficients. Blades of turbine were hollowed cylinder of closed ends, with 15 cm length and 30 cm height. The swept diameter of turbine was set at 300 mm². The analysis of the experimental results showed that when the rotational speeds of CB-VAWT become is zero (shaft locked) with increasing caused maximum tangential force at the torque-pulley. Cut in wind speed increase corresponding to the increasing of tangential force ratio. The rev up rotation period depends on wind speed and tangential force ratio. The more time of rotor was required in order to accelerate from starting up to reach the rated rotational speed, in accordance with increasing of tangential force ratio and/or decreasing of wind speed. The optimal tip speed ratio to create the higher power coefficient, for the designed experimental configuration, was within the range of tip speed ratio of 1.5 - 2.5. The power coefficient of CB-VAWT reaches value of about 5 - 7.5%. However at a constant wind speed, torque coefficient diminished with an increasing of the tip speed ratio. ©EuroJournals Publishing, Inc. 2011.
PHONEME AND TONAL ACCENT RECOGNITION FOR THAI SPEECH

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ABSTRACT

In this paper, we investigate the application of a phoneme recognition system with a soft phoneme segmentation procedure for Thai speech. In addition, we propose a new method to classify the tonal accent of a syllable. The recognition system classifies Thai phonemes, including the 21-class initial consonants, the 18-class vowels, and the 9-class final consonants, using discrete hidden Markov models. Two features, i.e., the Mel frequency with perceptual linear prediction and the Mel frequency cepstrum coefficients, are compared to investigate their utilities in phoneme recognition. Neural networks are applied to classify the 5-class tonal accents by using the temporal variation of pitch frequencies across syllables as features. Speaker-dependent and speaker-independent data sets recorded from 30 speakers are used to test our recognition system. The experimental results show promising recognition performances for the phonemes and tonal accents in both data sets.

KEYWORDS: THAI PHONEME SEGMENTATION, THAI PHONEME RECOGNITION, HIDDEN MARKOV MODELS, SPEECH RECOGNITION, MEL FREQUENCY CEPSTRUM

PIBEA: PROSPECT INDICATOR BASED EVOLUTIONARY ALGORITHM FOR MULTIOBJECTIVE OPTIMIZATION PROBLEMS

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ABSTRACT

This paper proposes and evaluates an evolutionary multiobjective optimization algorithm (EMOA) that uses a new quality indicator, called the prospect indicator, for parent selection and environmental selection operators. The prospect indicator measures the potential of each individual to reproduce offspring that dominate itself and spread out in the objective space. The prospect indicator allows the proposed EMOA, PIBEA (Prospect Indicator Based Evolutionary Algorithm), to (1) maintain sufficient selection pressure, even in high dimensional MOPs, thereby improving convergence velocity toward the Pareto front, and (2) diversify individuals, even in high dimensional MOPs, thereby distributing individuals uniformly in the objective space. Experimental results show that PIBEA effectively performs its operators in high dimensional problems and outperforms three existing well-known EMOAs, NSGA-II, SPEA2 and AbYSS, in terms of convergence velocity, diversity of individuals, coverage of the Pareto front and performance stability.

PRIVACY PRESERVATION FOR ASSOCIATIVE CLASSIFICATION: AN APPROXIMATION ALGORITHM

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ABSTRACT

Privacy is one of the most important issues when dealing with the individual data. Typically, given a data set and a data-processing target, the privacy can be guaranteed based on the pre-specified standard by applying privacy data-transformation algorithms. Also, the utility of the data set must be considered while the transformation takes place. However, the data-transformation problem such that a privacy standard must be satisfied and the impact on the data utility must be minimised is an NP-hard problem. In this paper, we propose an approximation algorithm for the data transformation problem. The focused data processing addressed in this paper is classification using association rule, or associative classification. The proposed algorithm can transform the given data sets with $O(k \log k)$-approximation factor with regard to the data utility comparing with the optimal solutions. The experiment results show that the algorithm is both effective and efficient comparing with the optimal algorithm and the other two heuristic algorithms.

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ABSTRACT

In general, query optimizers rely on a cost model to choose an appropriate query execution plan for the given queries. An important key parameter of the cost estimation is the cardinality of sub-expressions of the queries. Traditionally, the optimizers may use the estimation cardinality techniques, which can lead to the estimation errors, and hence the poor execution plans. The exact cardinality approach can be applied to resolve such problem, though its computational expense can be costly. A possible way to improve the efficiency is the query transformation since it can provide the alternation to the optimizers. In this paper, we focus on investigation at the effects of the query transformation to the exact cardinality computing processes. The query transformation techniques to be considered in our work are the traditional but widely applied techniques, i.e. subquery unnesting, group-by view merging, join factorization, and join predicate pushdown. The experiment results on the real-life datasets have been presented to validate such proposed work.
SMSP-EMOA: AUGMENTING SMS-EMOA WITH THE PROSPECT INDICATOR FOR MULTIOBJECTIVE OPTIMIZATION

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ABSTRACT

This paper studies a new evolutionary multiobjective optimization algorithm (EMOA) that leverages quality indicators in parent selection and environmental selection operators. The proposed indicator-based EMOA, called SMSP-EMOA, is designed as an extension to SMS-EMOA, which is one of the most successfully and widely used indicator-based EMOAs. SMSP-EMOA uses the prospect indicator in its parent selection and the hypervolume indicator in its environmental selection. The prospect indicator measures the potential (or prospect) of each individual to reproduce offspring that dominate itself and spread out in the objective space. It allows the parent selection operator to (1) maintain sufficient selection pressure, even in high dimensional MOPs, thereby improving convergence velocity toward the Pareto-optimal front, and (2) diversify individuals, even in high dimensional MOPs, thereby spreading out individuals in the objective space. Experimental results show that SMSP-EMOA’s parent selection operator complement its environmental selection operator. SMSP-EMOA outperforms SMS-EMOA and well-known traditional EMOAs in optimality and convergence velocity without sacrificing the diversity of individuals.
SOLVING THE PROBABILISTIC TRAVELING SALESPERSON PROBLEM WITH PROFITS (PTSPP) WITH A NOISE-AWARE EVOLUTIONARY MULTIOBJECTIVE OPTIMIZATION ALGORITHM

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ABSTRACT

This paper studies an evolutionary algorithm to solve a new multiobjective optimization problem (MOP), the Probabilistic Traveling Salesperson Problem with Profits (pT-SPP), which has noisy objective functions. As a variant of TSP, many real-world noisy MOPs can be reduced to pTSP. The proposed algorithm leverages a novel noise-aware dominance operator, called the α-dominance operator. The operator statistically estimates the impacts of noise on objective functions and judges which solution candidates are superior/inferior to the others. Unlike existing noise-aware dominance operators, the α-dominance operator assumes no noise distributions. Thus, it is well applicable to various real-world noisy MOPs that follow unknown noise distributions. Experimental results show that the α-dominance operator effectively reveals the dominance relationships among solution candidates, aids to obtain quality solutions to pTSP and outperforms existing noise-aware dominance operators.

THE EXPERIMENTAL STUDY ON PYROLYSIS OF CASSAVA RHIZOME UTILIZING FLUE GAS

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ABSTRACT

The characteristics during pyrolysis of cassava rhizome utilizing flue gas in a metal kiln have been studied experimentally. The pyrolysis parameters being studied include sample size, pyrolysis temperature and moisture content of the sample. The pyrolysis experiment include the dry and fresh cassava rhizome cylinders with 36, 40 and 44 mm in diameter and the pyrolysis temperature varied from 400 to 500°C. The experimental result showed that the temperature distribution is caused by heat transfer from the surface to the inner cassava rhizome on both the radial and axial directions. The effect of the wood diameter and pyrolysis temperature affected the mass loss rate and the pyrolysis time. The large wood diameter caused lower mass loss rate and the pyrolysis time was longer. The higher temperature caused higher mass loss rate and shorter pyrolysis time. Fresh material need to be dried before pyrolysis can begin and more time is needed for the process. It was found that higher moisture in the fresh material yield more charcoal than that dry ones. In comparison between the experimental and the thermal gravimetric analysis (TGA) both mass loss during the process starting time are different. The mass loss of the pyrolysis by flue gas are more rapid when compared to the pyrolysis by TGA due to the effect on flue gas. In the experiment, the charcoal yield for the dry material varied from 26 to 35% depending on the pyrolysis temperature. It was found that the higher temperature caused lower the charcoal yield.

TOWARDS A COMPLETE PROJECT ORIENTED RISK MANAGEMENT MODEL: A REFINEMENT OF PRORISK

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ABSTRACT

PRORISK is a conceptual model which was developed to simultaneously address importance of project management and risk management in software projects. This paper further refines this model by incorporating insights from experienced Thai software engineers, resulting in a more complete and practical project oriented risk management model which can be further applied in standard software projects.
VACCINE STORAGE TEMPERATURE MONITORING AND ALERT SYSTEM

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ABSTRACT

This paper describes the development of a low cost vaccine storage temperature monitoring and alert system. The system has to be cheap and can alert assigned personnel in the case of power failure or malfunctions especially during the off-hours. The first prototype of the vaccine storage temperature monitoring and alert system was built from off-the-shelf components to prove that the system concept can work successfully. The prototype consists of a digital thermostat for a sensor which is connected to a microcontroller board that sends a short telephone massage to responsible personnel via a general packet radio service (GPRS) module when the storage temperature is out of safe range. The system is powered by an uninterruptible power supply (UPS) and plugged in to the power grid. The first prototype is too expensive for remote hospitals (12,000 Thai Baht or 400 US dollar) but proves that the concept can work. The final system uses high-precision digital thermometer integrated circuit (Dallas Semiconductor DS18S20) as the temperature probe and then weather proofed with plastic tubing and acetic silicone sealant. The probe is read by an 8-bit microcontroller that can use wide tolerance power supply (Atmel AT89LP4052) and the microcontroller is used to drive four small relays (Fujitsu FTR-C1CA003G-01) through darlington drivers (Toshiba ULN2803AP-G). The relay contacts are then wired directly to the keyboard contact of a low cost cellular telephone (Nokia 1208). The power supply of the whole system is a telephone battery plugged in to a wall charger. The system can send a SMS to a telephone when the storage temperature is getting out of safe range, when the power grid fails or when the temperature probe did not response to the controller read command. The firmware for the controller is written in assembly language for compactness and is 1,047 byte long. In this configuration, the user needs to store the destination phone number and the massage in the telephone before operation. The system cost including assembly is 2,500 Thai Baht or less than 100 US dollar. With appropriate sensors and firmware programs, this type of system can be used to monitor many kinds of mechanical systems or processes at a very low cost.

KEYWORDS: VACCINES, TEMPERATURE, MICROCONTROLLER, CELLULAR TELEPHONE

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VISUAL CLUSTERING METHOD USING GENETIC ALGORITHM AND IMAGE MANIPULATION

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ABSTRACT

Clustering method has been applied in many fields, including data mining, machine learning, information retrieval, and image analysis. In this paper, we propose a visual clustering method based on the genetic algorithm (GA) and image manipulation. The proposed method automatically determines the number of clusters in a binary image without using distance measures. There are three processes of the proposed method, i.e., creating the object table, mapping the object table into a binary image, and clustering objects in the binary image by using the GA and image manipulation. The effectiveness of the proposed method is tested on both synthetic data sets and a real data set. The experimental results show that the proposed method can effectively construct the clusters in both synthetic and real data sets.

KEYWORDS: CLUSTERING METHOD, VISUAL CLUSTERING, DATA CLUSTERING, GENETIC ALGORITHM
ABSTRACT

3-Methoxy-2-methyl-carbazole-1,4-quinone (1) together with carbazomycins D (2) and F (3) were isolated from the crude extract of Streptomyces CMU-JT005, an actinomycete with nematicidal activity. 3-Methoxy-2-methyl-carbazole-1,4-quinone is reported here for the first time from nature. In this paper, we describe the isolation and structure elucidation of the compounds together with the characterization of the Streptomyces strain CMU-JT005.

KEYWORDS: PERFORMANCE LIQUID-CHROMATOGRAPHY; TRANSITION-METAL-COMPLEXES; THIN-LAYER CHROMATOGRAPHY; BACTERIAL-CELL-WALLS; ROOT-KNOT NEMATODES; CARBAZOLE ALKALOIDS; ORGANIC-SYNTHEIS; ACID; MELOIDOGYNIDAE; SUBSTANCES
A FIXED POINT THEOREM FOR POINTWISE EVENTUALLY NONEXPANSIVE MAPPINGS IN NEARLY UNIFORMLY CONVEX BANACH SPACES

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ABSTRACT

The purpose of this paper is to prove the existence of a fixed point for a pointwise eventually nonexpansive mapping in a nearly uniformly convex Banach space. This provides an affirmative answer to a question given by Kirk and Xu [W.A. Kirk, Hong-Kun Xu, Asymptotic pointwise contraction, Nonlinear Anal. 69 (2008), 4706-4712]. (C) 2010 Elsevier Ltd. All rights reserved.

KEYWORDS: CONTRACTIONS
A GENERALIZATION OF SUZUKI’S LEMMA

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ABSTRACT

Let \{z(n)\}, \{w(n)\}, and \{v(n)\} be bounded sequences in a metric space of hyperbolic type \((X, d)\), and let \{an\} be a sequence in \([0, 1]\) with \(0 < \lim \inf(n) \alpha(n) \leq \lim \sup(n) \alpha(n) < 1\). If \(z(n+1) = \alpha(n)w(n) \oplus (1 - \alpha(n))v(n)\) for all \(n \in \mathbb{N}\), \(\lim(n)d(z(n), v(n)) = 0\), and \(\lim \sup(n)(d(w(n+1), w(n)) - d(z(n+1), z(n))) \leq 0\), then \(\lim(n)d(w(n), z(n)) = 0\). This is a generalization of Lemma 2.2 in (T. Suzuki, 2005). As a consequence, we obtain strong convergence theorems for the modified Halpern iterations of nonexpansive mappings in CAT (0) spaces.

KEYWORDS: CAT(0) SPACES; STRONG-CONVERGENCE; NONEXPANSIVE-MAPPINGS; BANACH-SPACES; THEOREMS
A NEW DEPSIDONE FROM THE TWIGS OF GARCINIA COWA

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ABSTRACT

A new depsidone, cowadepsidone (7), along with six known xanthones (1-6) were isolated from the twigs of Garcinia cowa. Their structures were determined on the basis of spectroscopic methods. The cytotoxicity against KB, MCF-7 and NCI-H187 cancer cell lines of compounds 2-7 were also reported.

KEYWORDS: CRATOXYLUM-COCHINCHINENSE; PRENYLATED XANTHONES; PARVIFOLIA

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A NEW FLUORESCENT SENSOR BEARING THREE DANSYL FLUOROPHORES FOR HIGHLY SENSITIVE AND SELECTIVE DETECTION OF MERCURY(II) IONS

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ABSTRACT

A novel fluorometric sensor bearing three dansyl moieties based on tris[2-(2-aminoethyethylthio)ethyl]amine was prepared by a simple approach using a conventional two-step synthesis. The sensor exhibits highly Hg(2+)-selective ON-OFF fluorescence quenching behavior in aqueous acetonitrile solutions and is shown to discriminate various competing metal ions, particularly Cu(2+), Ag(+), and Pb(2+) as well as Ca(2+), Cd(2+), Co(2+), Fe(3+), Mn(2+), Na(+), Ni(2+), and Zn(2+), with a detection limit of 1.15 x 10(-7) M or 23 ppb. (C) 2011 Elsevier Ltd. All rights reserved.

KEYWORDS: PHOTOPHYSICAL PROPERTIES; CATION-BINDING; CHEMOSENSOR; FLUOROIONOPHORE; HG2+; CROWN; FISH; 8-HYDROXYQUINOLINE; CHROMOIONOPHORE; BEHAVIORS

A NEW HYBRID ALGORITHM FOR A COUNTABLE FAMILY OF QUASI-NONEXPANSIVE MAPPINGS AND EQUILIBRIUM PROBLEMS

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ABSTRACT

In this paper, we introduce and study a new hybrid algorithm for finding common elements of the set of common fixed points of a countable family of quasi-nonexpansive mappings, the set of solutions of variational inequality and the set of solutions of generalized equilibrium problem. We prove a strong convergence theorem of the purposed algorithm under some control conditions and the NST-condition. We also show that the sequences of W-mappings and K-mappings of families of quasi-nonexpansive mappings satisfy the NST-condition.

KEYWORDS: STRONG-CONVERGENCE THEOREMS; FIXED-POINT PROBLEMS; VARIATIONAL INEQUALITY PROBLEMS; VISCOSITY APPROXIMATION METHODS; HILBERT-SPACES; ITERATIVE SCHEME; BANACH-SPACES; CQ METHOD; WEAK
A SNP IN *GmBADH2* GENE ASSOCIATES WITH FRAGRANCE IN VEGETABLE SOYBEAN VARIETY “Kaori” AND SNAP MARKER DEVELOPMENT FOR THE FRAGRANCE

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ABSTRACT

Fragrance in soybean is due to the presence of 2-acetyl-1-pyrroline (2AP). *BADH2* gene coding for betaine aldehyde dehydrogenase has been identified as the candidate gene responsible for fragrance in rice (*Oryza sativa* L.). In this study, using the RIL population derived from fragrant soybean cultivar “Kaori” and non-fragrant soybean cultivar “Chiang Mai 60” (CM60), STS markers designed from *BADH2* homolog were found associating with 2AP production. Genetic mapping demonstrated that QTL position of fragrance and 2AP production coincides with the position of *GmBADH2* (*Glycine max* betaine aldehyde dehydrogenase 2). Sequence comparison of *GmBADH2* between Kaori and non-fragrant soybeans revealed non-synonymous single-nucleotide polymorphism (SNP) in exon 10. Nucleotide substitution of G to A in the exon results in an amino acid change of glycine (GGC; G) to aspartic acid (GAC; D) in Kaori. The amino acid substitution changes the conserved EGCRLGPVIS motif of *GmBADH2*, which is essential for functional activity of *GmBADH2* protein, to EGCRLDPIVS motif, suggesting that the SNP in *GmBADH2* is responsible for the fragrance in Kaori. Five single nucleotide-amplified polymorphism (SNAP) markers which are PCR-based allele specific SNP markers were developed for fragrance based on the SNP in *GmBADH2*. Two markers specific to A allele produced a band in only Kaori, while three markers specific to G alleles produced a band in only CM60. The simple PCR-based allele specific SNAP markers developed in the present study are useful in marker-assisted breeding of fragrant soybean.

KEYWORDS: ORYZA-SATIVA L.; QUANTITATIVE TRAIT; RAPID METHOD; RICE; 2-ACETYL-1-PYRROLINE; AROMA; MECHANISM
A STUDY ON THE DYEING CHARACTERISTICS AND ELECTROCHEMICAL BEHAVIOUR OF LAWSONE-INDIGO MIXTURES

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ABSTRACT

The dyeing characteristics of lawsone-indigo mixtures on wool and their electrochemical properties were studied as a model for natural dyeing. To determine the optimum conditions for dyeing, experiments with different levels of pH in the oxidising and reducing states were performed. The dyeing characteristics on wool were studied using basic colour measurement. The colour depth of the dyeings was strongly dependent on the pH of the solution. Dyeing of lawsone in oxidising and reducing states at pH 4-6 showed the highest colour depth. For lawsone-indigo mixtures, the pH of the maximum colour strength shifted to pH 6-7. The dyeing properties of henna showed similar behaviour to the lawsone dyeing. The electrochemical properties of the lawsone-indigo mixtures were studied using cyclic voltammetry. The cathodic peak current increased with the increasing lawsone concentration. Furthermore, the cathodic peak current of the lawsone-indigo mixtures, which was less than the cathodic peak current of pure lawsone, indicates the sorption of lawsone molecules on the surface of dispersed indigo.

KEYWORDS: NATURAL DYE; HENNA; REDUCTION; COTTON
ACCELERATORS AND RELATED R & D ACTIVITIES IN THAILAND

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ABSTRACT

The production and the utilization of four fundamental probes, namely, electron, ion, neutron and photon probes, have played a vital role in the research and development in modern science and technology. These probes are generated by various types of particle accelerators. In Thailand, beams of charged particles are accelerated to energies ranging from keV to GeV. Low-energy (<200 keV) heavy-ion implanters are applied to research in material surface modification, biology and nanotechnology whereas the MeV tandem accelerator is employed in material surface analysis and lithography. Relativistic femtosecond electron beams are used to produce transition radiation with wavelengths in the tera-Hertz (THz) region. Synchrotron radiation is generated from a 1.2-GeV electron synchrotron coupled to a storage ring. The details of present and future accelerator R & D activities are presented and discussed.

KEYWORDS: CHIANG-MAI-UNIVERSITY; PROXIMITY APERTURE LITHOGRAPHY; FEMTOSECOND ELECTRON BUNCHES; N-ION-IMPLANTATION; SIAM PHOTON SOURCE; CRYSTALLINE QUALITY; BEAM SYNTHESIS; SILICON; MUTATION; FACILITY
ACETYLENE SENSOR BASED ON Pt/ZnO THICK FILMS AS PREPARED BY FLAME SPRAY PYROLYSIS

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ABSTRACT

ZnO nanoparticles loaded with 0.2-2.0 at.% Pt have been successfully produced in a single step by flame spray pyrolysis (FSP) technique using zinc naphthenate and platinum(II) acetylacetonate, as precursors dissolved in xylene and their acetylene sensing characteristics have been investigated. The particle properties were analyzed by XRD, BET, TEM, SEM and EDS. Under the 5/5 (precursor/oxygen) flame condition. ZnO nanoparticles and nanorods were observed. The crystallite sizes of ZnO spherical and hexagonal particles were found to be ranging from 5 to 20 nm while ZnO nanorods were seen to be 5-20 nm in width and 20-40 nm in length. In addition, very fine Pt nanoparticles with diameter of similar to 1 nm were uniformly deposited on the surface of ZnO particles. From gas-sensing characterization, acetylene sensing characteristics of ZnO nanoparticles is significantly improved as Pt content increased from 0 to 2 at.%. The 2 at.% Pt loaded ZnO sensing film showed an optimum C(2)H(2) response of similar to 836 at 1% acetylene concentration and 300 degrees C operating temperature. A low detection limit of 50 ppm was obtained at 300 degrees C operating temperature. In addition, Pt loaded ZnO sensing films exhibited good selectivity towards hydrogen, methane and carbon monoxide. (C) 2010 Elsevier B.V. All rights reserved.

KEYWORDS: GAS-SENSING PROPERTIES; ZNO NANOPARTICLES; ETHANOL VAPOR; TEMPERATURE; MORPHOLOGY; POWDERS; SURFACE; H-2; CO
ACTINOBACTERIAL COMMUNITY AND DIVERSITY IN RHIZOSPHERE SOILS OF AQUILARIA CRASSNA PIERRE EX LEC ASSESSED BY RT-PCR AND PCR-DGGE

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ABSTRACT

The actinobacterial community in rhizospheres of eaglewood (Aquilaria crassna Pierre ex Lec) was analyzed using culture-independent methods of RT-PCR and PCR DGGE of 16S rRNA gene. We conducted the experiments to investigate the difference in diversity and community structure of actinobacteria with respect to sampling sites and seasons and to determine effect of plant species on selection of rhizosphere community from different sampling sites. Total genomic DNA and RNA were extracted from rhizosphere soils collected from two plantations in Phetchabun province and one plantation in each Nakhonnayok province, Rayong province and Chiang Mai province of Thailand during dry and rainy seasons. The UPGMA dendrogram generated from DGGE fingerprints showed that the actinobacterial community was separated corresponding to sampling sites, suggesting sampling sites effect. The shift in community and diversity between two seasons was detected in all sampling sites. RNA-based analyses showed that several actinobacterial groups appeared to be ubiquitous but different in metabolic activity in different environments. Species diversity ($S$) and simple indexes ($I$) indicate the increase in species diversity of actinobacteria from all sampling sites in rainy season. Cloning and sequencing of 16S rRNA gene fragments obtained from DGGE bands revealed that 14 of 40 dominant species of actinobacteria in the rhizospheres of this plant belonged to uncultured actinobacteria. Besides the uncultured actinobacteria, Nocardioides sp., Streptomyces sp., Mycobacterium sp., Rhodococcus sp. and Actinoplanes sp. were indentified and frequently found more than other genera. (C) 2011 Elsevier Ltd. All rights reserved.

KEYWORDS: GRADIENT GEL-ELECTROPHORESIS; 16S RIBOSOMAL-RNA; BACTERIAL COMMUNITIES; MICROBIAL COMMUNITIES; GENETIC DIVERSITY; POPULATIONS; SOFTWARE; ECOLOGY; IMPACT; BULK
**ABSTRACT**

A Gram-reaction-positive aerobic actinomycete, designated strain IM17-1(T), was isolated from a honey bee (Apis mellifera) hive in Chiang Mai Province, Thailand. The strain formed a branched substrate mycelium and mature aerial mycelium bore short chains of arthrospores with warty surfaces. The cell wall contained meso-2,6-diaminopimelic acid (cell-wall type III) and the whole cell sugars were fucose, galactose, glucose, madurose, mannose and ribose. The major isoprenoid quinone was hexahydrogenated menaquinone with nine isoprene units and the predominant cellular fatty acids were C(16:0) (33.8%), C(18:1)ω9c (32.7%), summed feature 3 (C(16:1)ω7c and/or iso-C(15:0)2-OH) (8.7%) and 10-methyl C(18:0) (8.2%). The phospholipids were diphosphatidylglycerol, phosphatidylinositol and phosphatidylinositol mannosides. These morphological and chemotaxonomic characteristics were consistent with the classification of IM17-1(T) within the genus Actinomadura. Based on 16S rRNA gene sequence analysis, strain IM17-1(T) was closely related to the type strains of Actinomadura cremea subsp. cremea (98.1%) and Actinomadura cremea subsp. rifamycini (98.6%); however, it represented a distinct phylogenetic lineage from the other species within this genus. The unique genetic characteristics were reaffirmed by low levels of DNA DNA relatedness between strain IM17-1(T) and the two most closely related type strains, A. cremea subsp. cremea JCM 3308(T) (56.5 +/- 4.9%) and A. cremea subsp. rifamycini JCM 3309(T) (31.0 +/- 22.6%), and further supported the proposal of IM17-1(T) as a novel species. Strain IM17-1(T) (=JCM 16576(T) =TISTR 1980(T)) thus represents a novel species of the genus Actinomadura, for which the name Actinomadura apis sp. nov. is proposed. In addition, the genotypic and phenotypic data suggested the reclassification of Actinomadura cremea subsp. rifamycini Gauze et al. 1987 as a separate species, Actinomadura rifamycini sp. nov., comb. nov.

**KEYWORDS:** PERFORMANCE LIQUID-CHROMATOGRAPHY; GENUS; ACTINOBACTERIA; PROPOSAL; MEDIA; SOIL
AMYCOLATOPSIS SAMANEAE SP. NOV., ISOLATED FROM ROOTS OF SAMANEA SAMAN (JACQ.) MERR.

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ABSTRACT

A novel actinomycete, designated strain RM287(T), was isolated from surface-sterilized roots of Samanea saman (Jacq.) Merr., collected from Bangkok, Thailand. The status of the novel strain was determined using a polyphasic taxonomic approach. Phylogenetic analyses based on 16S rRNA gene sequences showed that the organism formed a distinct phyletic line within the radiation of the genus Amycolatopsis. The 16S rRNA gene sequence similarity indicated that strain RM287(T) was most closely related to Amycolatopsis mediterranei IMSNU 20056(T) (97.4%), A. rifamycinica DSM 46095(T) (97.2%), A. kentuckyensis NRRL B-24129(T) (97.2%), A. pretoriensis DSM 44654(T) (97%) and A. australiensis DSM 44671(T) (97%). The novel organism was found to have chemical properties typical of members of the genus Amycolatopsis such as meso-diaminopimelic acid as the diagnostic diamino acid in the cell-wall peptidoglycan and arabino and galactose as the diagnostic sugar. The major menaquinone was MK-9(H(4)). The major fatty acids were iso-C(16:0) iso-C(15:0), iso 2-OH-C(16:0) and iso-C(17:0). The DNA G+C content was 71.7 mol%. Phenotypic data clearly distinguished the novel isolate from its closest relatives. The combined genotypic and phenotypic data indicated that strain RM287(T) represented a novel species of the genus Amycolatopsis. The proposed name for this organism is Amycolatopsis samaneae sp. nov., with the type strain RM287(T) (=TISTR 1919(T)=BCC 35842(T)=NBRC 106095(T)).

KEYWORDS: ACTINOMYCETE; NOCARDIA; SOIL; STRAINS; GENERA
AMYCOLATOPSIS THAILANDENSIS SP. NOV., A POLY (L-LACTIC ACID)-DEGRADING ACTINOMYCETE, ISOLATED FROM SOIL

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ABSTRACT

A novel actinomycete that was capable of degrading poly(L-lactic acid), strain CMU-PLA07(T), was isolated from soil in northern Thailand. Strain CMU-PLA07(T) had biochemical, chemotaxonomic, morphological and physiological properties that were consistent with its classification in the genus Amycolatopsis. 16S rRNA gene sequence analysis showed that the isolate formed a phyletic line within the genus Amycolatopsis. Strain CMU-PLA07(T) was most similar to Amycolatopsis coloradensis IMSNU 22096(T) (99.5% 16S rRNA gene sequence similarity) and Amycolatopsis alba DSM 44262(T) (99.4%). However, strain CMU-PLA07(T) was distinguishable from the type strains of species of the genus Amycolatopsis on the basis of DNA-DNA relatedness and phenotypic data. Therefore, strain CMU-PLA07(T) is considered to represent a novel species of the genus Amycolatopsis, for which the name Amycolatopsis thailandensis sp. nov. is proposed. The type strain is CMU-PLA07(T) (=JCM 16380(T) =BCC 38279(T)).

KEYWORDS: PERFORMANCE LIQUID-CHROMATOGRAPHY; THIN-LAYER CHROMATOGRAPHY; BACTERIAL-CELL-WALLS; DEOXYRIBONUCLEIC-ACID; GENUS AMYCOLATOPSIS; PSEUDONOCARDIA; STRAIN; GENERA; DNA
AN LMI APPROACH TO STABILITY FOR LINEAR TIME–VARYING SYSTEM WITH NONLINEAR PERTURBATION ON TIME SCALES

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ABSTRACT

We consider Lyapunov stability theory of linear time-varying system and derive sufficient conditions for uniform stability, uniform exponential stability, psi-uniform stability, and h-stability for linear time-varying system with nonlinear perturbation on time scales. We construct appropriate Lyapunov functions and derive several stability conditions. Numerical examples are presented to illustrate the effectiveness of the theoretical results.
ANALYSIS OF CHORISMATE MUTASE CATALYSIS BY QM/MM MODELLING OF ENZYME-CATALYSED AND UNCATALYSED REACTIONS

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ABSTRACT

Chorismate mutase is at the centre of current controversy about fundamental features of biological catalysts. Some recent studies have proposed that catalysis in this enzyme does not involve transition state (TS) stabilization but instead is due largely to the formation of a reactive conformation of the substrate. To understand the origins of catalysis, it is necessary to compare equivalent reactions in different environments. The pericyclic conversion of chorismate to prephenate catalysed by chorismate mutase also occurs (much more slowly) in aqueous solution. In this study we analyse the origins of catalysis by comparison of multiple quantum mechanics/molecular mechanics (QM/MM) reaction pathways at a reliable, well tested level of theory (B3LYP/6-31G(d)/CHARMM27) for the reaction (i) in Bacillus subtilis chorismate mutase (BsCM) and (ii) in aqueous solvent. The average calculated reaction (potential energy) barriers are 11.3 kcal mol(-1) in the enzyme and 17.4 kcal mol(-1) in water, both of which are in good agreement with experiment. Comparison of the two sets of reaction pathways shows that the reaction follows a slightly different reaction pathway in the enzyme than in it does in solution, because of a destabilization, or strain, of the substrate in the enzyme. The substrate strain energy within the enzyme remains constant throughout the reaction. There is no unique reactive conformation of the substrate common to both environments, and the transition state structures are also different in the enzyme and in water. Analysis of the barrier heights in each environment shows a clear correlation between TS stabilization and the barrier height. The average differential

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TS stabilization is 7.3 kcal mol$^{-1}$ in the enzyme. This is significantly higher than the small amount of TS stabilization in water (on average only 1.0 kcal mol$^{-1}$ relative to the substrate). The TS is stabilized mainly by electrostatic interactions with active site residues in the enzyme, with Arg90, Arg7 and Glu78 generally the most important. Conformational effects (e.g. strain of the substrate in the enzyme) do not contribute significantly to the lower barrier observed in the enzyme. The results show that catalysis is mainly due to better TS stabilization by the enzyme.

**KEYWORDS:** TRANSITION-STATE STABILIZATION; BACILLUS-SUBTILIS; CONFORMATIONAL EQUILIBRIUM; CLAISEN REARRANGEMENT; REACTION-MECHANISMS; REACTION BARRIERS; ACTIVE-SITE; PREPHENATE; ENERGY; SIMULATIONS
ANTICANCER ACTIVITY OF ETHYL ACETATE AND N-BUTANOL EXTRACTS FROM RHIZOMES OF AGAPETES MEGACARPA WW SMITH

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ABSTRACT

Agapetes megacarpa W.W. Smith, also known as Pratat Doi, is one of the commonly used medicinal herbs in northern Thailand. The water extract of the herb has been used for lactation and body shape-up by gestation women. Toxicity and antitumor activities of this herb have never been reported. The objective of this study was to examine the cytotoxic and antitumor activities of ethyl acetate and n-butanol partitioned extracts prepared from the rhizomes of this herb. The breast cancer cell lines, MCF7 and MDA-MB231 and the lung cancer cell line NCI-H1299 were used. The cells were exposed to serial concentrations of the extracts in dimethylsulfoxide and dissolved in cell culture medium. Cytotoxic and antiproliferative assays were used employing the Sulforhodamine B method. The experiments showed that, none of the extracts expressed acute cytotoxicity to the cancer cells within 24 h. Antiproliferative effect was exhibited with time-and concentration-dependent manner after 5 days of exposure. Apoptotic induction on the cancer cell lines was analyzed by flow cytometry using Annexin-V-FITC/propidium iodide staining. Significant differences of apoptotic percentages were found from the exposed cells to both of the extract partitions when compared with the unexposed control cells. The results implied bioactive apoptotic induction by constituents contained in the more polar solvent partition.

KEYWORDS: BETA-SITOSTEROL; NATURAL-PRODUCTS; CANCER CELLS; APOPTOSIS; PHARMACOKINETICS; DRUGS

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ANTI-HERPES SIMPLEX VIRUS ACTIVITY OF EXTRACTS FROM THE CULINARY HERBS OCIMUM SANCTUM L., OCIMUM BASILICUM L. AND OCIMUM AMERICANUM L.

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ABSTRACT

This study demonstrates anti-herpes simplex virus activity of dichloromethane and methanol extracts of Ocimum sanctum L., Ocimum basilicum L. and Ocimum americanum L. Green monkey kidney cells were protected from HSV-2 infection by the dichloromethane extract of O. americanum L. and the methanol extract of O. sanctum, with therapeutic indexes (TI) of 1.865 and 1.644, respectively, when the cells were treated before viral infection. Herpes simplex virus-2 (HSV-2) infection was inhibited during viral adsorption when the cells were treated with methanol extracts of O. americanum L., O. sanctum L. and O. basilicum L. with TI of 2.345, 2.473 and 1.563, respectively, whereas dichloromethane extracts of O. americanum L. and O. basilicum L. resulted in TI of 2.623 and 1.835, respectively. The methanol extract of O. americanum L. and the dichloromethane extract of O. basilicum L. inhibited HSV-1F with TI of 1.63 and 2.215, respectively, after viral adsorption. The inhibitory effects of extracts on HSV-2G, after viral adsorption, were quite high, for the dichloromethane extract of O. sanctum L. and the methanol extract of O. sanctum L. with TI of 10.003 and 29.395, respectively. The inhibitory effect of the O. americanum L. extract on HSV-1F and HSV-2 yield, after viral replication, was highest 30 h after treatment. The reduction of viral titers by 8.0 and 10.8 folds was observed when cells were treated with dichloromethane and methanol extracts of O. americanum L. Moreover, time-dependent virucidal effects of the extract on viral particles were demonstrated, since direct inhibition of both HSV-1F and HSV-2G was shown by a reduction in the amount of plaques by 100%, after treatment with the dichloromethane and methanol extracts of O. americanum L. Therefore, dichloromethane and methanol extracts of O. sanctum L., O. basilicum L. and O. americanum L. showed anti-HSV activities at various steps of the viral multiplication cycle.

KEYWORDS: ANTIVIRAL DRUGS; ESSENTIAL OILS; RESISTANCE; ACYCLOVIR; TYPE-2
ANTI-HERPES SIMPLEX VIRUS TYPE 2 OF DRYMARIA DIANDRA BLUME MEDICINAL PLANT

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ABSTRACT

Anti-herpes simplex virus type 2 of dichloromethane and methanol extracts of Thai medicinal plant, Drymaria diandra Blume was investigated on Green Monkey Kidney cells. Cytotoxicity tests performed by the MTT assay revealed that 50% cytotoxicity dose of dichloromethane and methanol extracts were 90 +/- 2 and 631 +/- 32 μg/ml respectively. In all experiments, non-toxic concentrations of the plant extracts were used to test the inhibitory effect on various steps of herpes simplex virus type 2 (HSV-2) multiplication cycle. HSV-2 particles were directly inactivated by the extracts since 1 hour of treatment. HSV-2 infection was inhibited by the methanol extract with the 50% effective dose of 166.6 +/- 23.1 μg/ml. Moreover, both extracts inhibited HSV-2 attachment and penetration. The extracts also showed potent inhibitory activities against viral deoxyribonucleic acid synthesis as determined by real time polymerase chain reaction. Western blot analysis showed that HSV-2 proteins, particularly those at approximately 45 kDa were inhibited by the extracts after detection by horseradish peroxidase-conjugated immunoglobulin G against HSV. Therefore, this study demonstrated the inhibitory efficacy of Drymaria diandra Blume extracts against herpes simplex virus infection as a potential anti-HSV agent.

KEYWORDS: RECOMBINANT BACULOVIRUSES; HEPARAN-SULFATE; PROTEINS; CELLS; REPLICATION; BINDING; CAPSIDS; ENTRY
ANTIMALARIAL, ANTICANCER, ANTIMICROBIAL ACTIVITIES AND CHEMICAL CONSTITUENTS OF ESSENTIAL OIL FROM THE AERIAL PARTS OF CYPERUS KYLLINGIA ENDL

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ABSTRACT

The chemical constituents of the essential oil from Cyperus kyllingia Endl. were analyzed by a GC, GC-MS. Twenty-three compounds were identified, accounting for 93.75% of the total oil that consisted mainly of oxygenated sesquiterpenes (53.52%), particularly sesquiterpene hydrocarbons (38.97%), and carboxylic acid (1.26%). The most representative compounds were alpha-cadinol (19.32%), caryophyllene oxide (12.17%), alpha-muurolol (11.58%), alpha-humulene (9.85%), and alpha-atlantone (6.07%). The oil showed significant activities against Plasmodium falcipalum (K1, multi drug resistant strain) and NCI-H187 (Small Cell Lung Cancer) with the IC(50) values of 7.52 and 7.72 μg/mL, respectively. The oil exhibited highly active against Staphylococcus aureus ATCC25923 and moderately active against Escherichia coli ATCC25922, Pseudomonas aeruginosa ATCC27553, Aspergillus flavus and Candida albicans.
ANTIMICROBIAL AND ANTI-INFLAMMATORY PROPERTIES OF VARIOUS SEAWEEDS FROM THE GULF OF THAILAND

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ABSTRACT

Aqueous (AE) and ethanolic extracts (EE) from four species of seaweed: Sargassum binderi Sonder, Amphiroa sp., Turbinaria conoides (J. Agardh) Kuzting and Halimeda macroloba Decaisne from the east cost of the Gulf of Thailand were screened for antibacterial and antifungal activities. The test organisms were Staphylococcus aureus, S. epidermidis, Propionibacterium acnes, Proteus mirabilis and Candida albicans. Extracts of all the species were found to have antimicrobial activities. AE of T. conoides, however demonstrated the maximum efficacy. Therefore, AE of T. conoides was also evaluated for its anti-inflammatory effect using EPP-induced ear edema and carrageenin-induced hind paw edema tests. Results revealed anti-inflammatory activity of AE of T. conoides comparable to that phenylebutazol and acetylsalicylic acid used as standard controls. Irritation test indicated that AE of T. conoides is also safe to be used in cosmeceutical or pharmaceutical products for skin as an antibacterial and antifungal agent against the organisms considered in this study. (C) 2011 Friends Science Publishers

KEYWORDS: SULFATED POLYSACCHARIDE; ANTIBACTERIAL ACTIVITY; MARINE-ALGAE; INFLAMMATION; DRUGS; EDEMA; MODULATION; FRACTIONS; MECHANISM; INFECTION

ANTIOXIDANT ACTIVITY OF SOME SEAWEED FROM THE GULF OF THAILAND

Boonchum Walailuck, Peerapornpisal Yuwadee, Kanjanapothi Duangta, Pekkoh Jeereporn, Pumas Chayakorn, Jamjai Utan, Amornlerdpison Donupporn, Noiraksar Thidarat and Vacharapiyasophon Panmuk

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ABSTRACT

Four species of seaweed, Sat-gasman binderi Sonder, Amphiroa sp., Turbinaria conoides (J. Agardh) Kuzting and Halimeda macroloba Decaisne, were collected from the Gulf of Thailand. Seaweeds were extracted with water or ethanol and examined for phenolic compounds and antioxidant activities by measuring the scavenging activity of both ABTS and DPPH radicals. In general, the aqueous extracts (AE) showed higher antioxidant activities and phenolic contents than ethanolic extracts (EE). Therefore, AE were chosen for three additional assays: superoxide anion scavenging assay, anti-lipid peroxidation in liver homogenate and reducing power. T. conoides extract showed the highest antioxidation activity in all assays. Therefore, the dried 7: conoides had a potential to antioxidative agent in nutraceutical products. (C) 2011 Friends Science Publishers

KEYWORDS: BROWN SEAWEEDS; HUMAN-DISEASE; IN-VITRO; PHENOLICS; RADICALS; EXTRACTS; STRESS; ASSAYS; PLANT; ABTS

ANTIPROLIFERATIVE ACTIVITY OF BERBERINE FROM COSCINUM FENESTRATUM ON NCI-H838 CELL LINE

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ABSTRACT

Berberine is the main cytotoxic compound in Coscinium fenestratum. Although, cytotoxic activity of berberine on many cancer cell lines have been studied but effect of berberine on NCI-H838 cell line is still not reported. In the present study, antiproliferative activity and mechanism of berberine isolated from C. fenestratum against NCI-H838 were investigated. NCI-H838 cells were treated with various concentrations of berberine and the cytotoxic activity was evaluated by MTT method. Berberine exhibited cytotoxicity by dose and time dependent manner with the IC(50) values at 24, 48 and 72 h were 111.9 +/- 7.0 mu M, 92.4 +/- 1.2 mu M and 68.4 +/- 7.9 mu M, respectively. Additionally, apoptotic in berberine treated cell was detected by DAPI staining. The associated proteins for apoptosis were examined by western blotting and it was found that berberine downregulated Bcl-2, procaspase 3, 6, 7 and 8 but upregulated caspase 7 by dose dependent manner. Moreover, berberine induced G2/M arrest was determined by the flow cytometric method. Taken together indicated that the potential of antiperiferal activity of berberine mediated through the Bcl-2/caspase-dependent pathway and G2/M cell cycle arrest.

KEYWORDS: APOPTOSIS; CYCLE; STEM; EXTRACTS; RATS
In this paper, we introduce and study two new iterative procedures with errors for two quasi-nonexpansive multi-valued maps in Banach spaces. Strong convergence theorems of the proposed iterations to a common fixed point of two quasi-nonexpansive multi-valued maps in uniformly convex Banach spaces are established. (C) 2010 Elsevier Ltd. All rights reserved.

KEYWORDS: STRONG-CONVERGENCE; MAPPINGS; ERRORS; WEAK; MANN
AQUATIC-INSECT-BASED BIOTIC INDICES TO ASSESS WATER QUALITY IN KLONG PAE, RAJJAPRABHA DAM, SURAT THANI PROVINCE 2008-2009

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ABSTRACT

This study was conducted between September 2008 and June 2009 to investigate the aquatic insect diversity and its use as biotic indices for evaluating water quality in Klong Pae, the upstream of Rajjaprabha Dam, Surat Thani Province, Southern Thailand. Shannon Wiener index, Thai Biological Monitoring Working Party (BMWP(Thai)) score, Average Score per Taxon (ASPT), Ephemeroptera, Plecoptera and Trichoptera (EPT) index, EPT ratio and Percentage of Diptera were calculated to compare the water quality. Ninety-four taxa from 96 families belonging to 20 orders in three phyla of macroinvertebrates were collected and identified. Seventy-five taxa from 57 families belonging to 9 orders of Phylum Arthropoda were aquatic insects. The results showed that the Baetidae (Order Ephemeroptera) was the most abundant family of the aquatic insects found every month during the studied period. Comparison of the water quality by using aquatic insects and entire macroinvertebrate groups indicated that the ASPT value of the macroinvertebrates was two times higher than that of the aquatic insects. Other biological indices were not correlated with water quality parameters. It was found that different water quality parameters vary with the climatic seasons. The physical and chemical properties of water of Klong Pae, compared with the standard water quality of Thailand, were acceptable.


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ASSAY OF CHONDROITIN SULFATE USING TIME-BASED DETECTION IN A SIMPLE LAB-ON-CHIP

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ABSTRACT

Amount of chondroitin sulfate in supplementary tablets is determined using the reaction with methylene blue in a proposed simple lab-on-chip platform. An easy approach of detection by timing the migration of the reaction zone, which depends upon concentration of chondroitin sulfate, is described. This simple assay system does not require any complicated or expensive instrumentation and has a potential of further development for on-site analysis.

KEYWORDS: BLUE; GLYCOSAMINOGLYCANS
ABSTRACT

The porosity and microstructure of a Portland cement-multi-walled carbon nanotube composite were investigated. Multi-walled carbon nanotubes (CNTs), up to 1 wt.% of cement, synthesized by infusion chemical vapor deposition, and Portland cement type I (PC) were used to produce pastes with a water to cement ratio of 0.5. Mercury intrusion porosimetry (MIP) and scanning electron microscopy (SEM) were used to characterize Portland cement-CNTs systems. MIP analysis of the results indicates that total porosity of the mixes with CNTs was found to decrease with increasing CNTs content. Moreover, an important effect of additional CNTs was a reduction in the number of mesopores, while SEM technique showed dispersion of CNTs between the hydration phases of Portland cement pastes. (C) 2010 Elsevier B.V. All rights reserved.

KEYWORDS: MECHANICAL-PROPERTIES; COMPOSITES; SURFACE; PASTES; TOUGHNESS; ADDITIVES; STRENGTH; MWNTS
BIOTRANSFORMATION OF NATURAL COMPOUNDS.
OXIDO-REDUCTION OF SCH-642305 BY ASPERGILLUS OCHRACEUS ATCC 1009

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ABSTRACT

Sch-642305 is the major compound produced by the endophytic fungi Phomopsis sp. CMU-LMA. Incubation of Sch-642305 with Aspergillus ochraceus ATCC 1009 resting cells leads to three new derivatives through an oxido-reduction of the six-membered ring of the molecule. Reduction of the double bound leads to compound (1), which subsequently undergoes carbonyl reduction to (2) and ring hydroxylation to (3). According to the previously solved crystal structure of Sch-642305 coupled with (1)H NMR NOE correlation and the crystal structure of compound 1, the absolute configurations of the new derivatives were established. In contrast to the parent compound Sch-642305, compound (1) exhibits antimicrobial activity against Gram-negative bacteria. Furthermore, while all derivatives exhibit cytotoxic activity against various cancer cell lines, compound (2) achieved an IC(50) of 4 nM against human myelogenous leukemia K 562, compared to 20 nM for the parent Sch-642305. (C) 2011 Elsevier Ltd. All rights reserved.

KEYWORDS: DISCOVERY; HYDROXYLATION; DERIVATIVES;CHEMISTRY; PRODUCTS
CHARACTERIZATION AND ANTIMICROBIAL PROPERTIES OF FLUORINE-RICH CARBON FILMS DEPOSITED ON POLY(LACTIC ACID)

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ABSTRACT

This study describes the effect of fluorine contents on the properties of carbon films deposited on poly(lactic acid) (PLA) substrate using plasma enhanced chemical vapor deposition (PECVD) technique. A mixture of acetylene (C(2)H(2)) and carbon tetrafluoride (CF(4)) gas was utilized for film deposition. The thickness of the deposited carbon film was in the range of 150-350 nm. The film's deposition rate was found to increase with the decreasing CF(4) concentration in the gas mixture. Fourier transform spectroscopy revealed the presence of C-F bonds, and X-ray photoelectron spectroscopy showed that the C-C bonds of the carbon film were replaced by the C-CF(x) bonds. This affirms that the films have a polymer-like structure. High concentration of fluorine (up to 25 at.%) could be obtained when 50% of CF(4), was used. PLA coated with F-rich carbon film showed hydrophobic character due to the formation of -CF(x) bonds. The film with a high concentration of fluorine showed excellent performance on reduction of Escherichia coli (E. coli) growth. (C) 2011 Elsevier B.V. All rights reserved.

KEYWORDS: IMMERSION ION-IMPLANTATION; POLYESTERS; BLENDS
CHARACTERIZATION AND PHOTOLUMINESCENCE OF PbS NANOCUBES SYNTHESIZED BY A SOLVOTHERMAL METHOD

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ABSTRACT

PbS nanocubes were synthesized by a solvothermal method using PbCl(2) and NH(2)CSNH(2) as a starting agents in 1,2-propadiol as a solvent at 100-200 degrees C for 10-30 h. The PbS nanocubes were analyzed using an X-ray diffraction, a Raman spectroscopy, a transmission electron microscopy and a photoluminescence spectrometry. The photoluminescence property was influenced by the reaction temperatures and times.

KEYWORDS: CRYSTALS
CHARACTERIZATION AND PROPERTIES OF BaTiO(3)/MgO NANOCOMPOSITE CERAMICS

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ABSTRACT

In this research, BaTiO(3)/xMgO nanocomposite ceramics, where x = 0, 0.3, 0.5, 0.7 and 1.0 vol%, were prepared by a mixed-oxide method. The effect of MgO additions on the phase formation, microstructure and dielectric properties of this system was investigated via X-ray diffraction (XRD), scanning electron microscopy (SEM) and dielectric spectroscopy, respectively. From the results, XRD analysis showed that there is no unwanted phase except BaTiO(3) and MgO observed in these ceramics. Abnormal grain growth was found in pure BaTiO(3) ceramic with a 75.32 μm average grain size. After adding MgO nanoparticles into the system, the grain size significantly decreased to 0.55 μm and continuously decreased with increasing MgO content. For the dielectric properties, the pure BT ceramic exhibits a sharp and high dielectric peak whereas a low and broad peak is found in BT/MgO nanocomposite ceramics, which can be explained by the composite structure.

KEYWORDS: DIELECTRIC-PROPERTIES; MICROSTRUCTURE; MGO; DY
CHARACTERIZATION OF NANOstructured CdTe SYNTHESIZED BY SOLID STATE MICROWAVE–PLASMA PROCESS

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ABSTRACT

Purified cubic CdTe nanocrystals were synthesized from 1:1 molar ratio of Cd:Te using 900 W microwave plasma. The phase was detected using X-ray diffraction (XRD), which are in accordance with those of the simulation, and selected area electron diffraction (SAED). Raman spectroscopic, scanning electron microscopic (SEM) and focused ion beam (FIB) techniques showed that the products were nanocrystals with fundamental transverse optical (1TO) and longitudinal optical (1LO) vibrations at 140 cm⁻¹ and 169 cm⁻¹, respectively. Its direct energy gap (E(g)) was determined to be 1.6 eV.

KEYWORDS: THIN-FILMS; OPTICAL-PROPERTIES; NANOCRYSTALS; TEMPERATURE; DEPOSITION; GROWTH

CHARACTERIZATION OF SrWO(4)-PVA AND SrWO(4) SPIDERS’ WEBS SYNTHESIZED BY ELECTROSPINNING

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ABSTRACT

Mixtures of strontium acetate, ammonium metatungstate hydrate, and different contents of poly (vinyl alcohol) (PVA, 125,000 MW) were electrospun by a +15 kV direct voltage to synthesize SrWO(4)-PVA spiders’ webs. The spider’s web, synthesized from the solution containing 1.3 g PVA, was further calcined in air at 300-600 degrees C for 3 h. The SrWO(4) PVA spider’s web was analyzed by thermogravimetric analyzer (TGA) to specify the evaporation and decomposition of PVA and volatile components. In addition, the SrWO(4) PVA and SrWO(4) spiders’ webs were characterized by X-ray diffractometer (XRD), selected area electron diffraction (SAED), scanning and transmission electron microscopes (SEM, TEM), and ultraviolet (UV) visible and photoluminescence (PL) spectrometers, including the vibration modes by Fourier transform infrared (FTIR) and Raman spectrometers. A possible formation mechanism of SrWO(4) PVA and SrWO(4) spiders’ webs was also proposed according to the experimental results. (C) 2011 Elsevier Ltd and Techna Group S.r.l. All rights reserved.

KEYWORDS: OPTICAL-PROPERTIES; RAMAN; PHOTOLUMINESCENCE; TUNGSTATE; MOLYBDATE; CRYSTALS; SPECTRA; TEMPERATURE; IRRADIATION; NANOFIBERS
CHEMICAL CHANGES OF PNN CERAMICS INDUCED BY ION BOMBARDMENT AND CHARACTERIZED BY X-RAY PHOTOELECTRON SPECTROSCOPY

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ABSTRACT

In this work, the surface composition and chemistry of perovskite PNN ceramics obtained from a columbite precursor were investigated using X-ray photoelectron spectroscopy. The PNN ceramics were bombarded with argon ions, after which the chemical state and composition were determined. The results show that the sputtering technique caused substantial changes in the chemical states of Pb and Nb, but no detectable change in the chemical state of Ni. Notably, ion bombardment led to the removal of absorbed oxygen species. Furthermore, the chemical composition of the PNN ceramics was altered by the sputtering process, where decreases in the atomic percentages of Pb and oxygen were observed, while increases in the atomic percentages of Ni and Nb were observed. (C) 2011 Elsevier B.V. All rights reserved.

KEYWORDS: PB(ZR0.52TI0.48)O-3 THIN-FILMS; LEAD-ZIRCONATE-TITANATE; PHASE-FORMATION; FERROELECTRIC CERAMICS; SURFACE; PRECURSOR; STATES; XPS

CHEMICAL INVESTIGATION OF NOVEL ASCOMYCETES USING PCR BASED SCREENING APPROACHES

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ABSTRACT

Fungi are well known for a wealth of pharmacologically important activities and agrochemical properties. Polyketides that are widely found in fungi, are a large group of secondary metabolites which exhibit diversity in their function and structure. Here we described an investigation of three fungal strains which were prospected for production of polyketides. The aim of this work was to employ the diversity of reducing type I polyketide synthase genes in these fungi using a molecular and bioinformatics approaches as a mini tool. A degenerate primer pair for highly reduced PKSs was newly designed and used together with ketosynthase primers for amplification. One hundred and thirty-eight clones were sequenced. Ten KS domain sequences were isolated, using two primer pairs specific for highly reduced type PKSs. This study revealed four sequences from Emarcea castanopsidicola, four ketosynthase sequences from Gaeumannomyces amomi and two sequences from Leiosphaerella amomi, respectively. Bioinformatic techniques were employed to identify a group of these KS domain sequences. Based on these sequences suggested that rapid screening provided the potential to explore significant PKS structural diversity. Hence chemical investigation had been conducted and exhibited nine compounds. The endophytic fungus L. amomi was cultivated and elucidated linoleic acid, ergosterol and an unidentified sterol in the extracts. Linoleic acid, sitosterol, and p-hydroxybenzoic acid were isolated from the saprobic fungus E. castanopsidicola. We first isolated a new polyketide, stemphol 1-O-beta-D-galactopyranoside together with four known metabolites; stemphol, kojic acid, ergosterol, indole-3-carboxylic acid from an ethyl acetate extract of the cultures of G. amomi. Stemphol was classified as a phenolic lipid or resorcinolic lipid, which have biopharmacological, biomedical, and biotechnological importance. However, recent researches have revealed that these molecule types are synthesized by 2’-oxoalkylresorcinolic acid synthase. The prospective KS domain sequences from this study will be used as probes to isolate putative PKS genes. A gene cluster responsible for PK biosynthesis should be confirmed by determination of PK products generated by these enzymes.

KEYWORDS: POLYKETIDE SYNTHASE GENES; DOMAIN; IDENTIFICATION; PROBES

CHEMOPREVENTIVE PROPERTIES OF THE BRAN EXTRACTED FROM A NEWLY-DEVELOPED THAI RICE: THE RICEBERRY

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ABSTRACT

The potential anti-cancer activity of compounds extracted from Riceberry bran was evaluated in human cancer cell lines (Caco-2, MCF-7 and HL-60). Anti-proliferation and BrdU incorporation assays indicated a time-dose dependent effect of dichloromethane (DCM) and methanol (MeOH) extracts, and that HL-60 was the most sensitive cell. DNA fragmentation assay revealed that both extracts could induce different degrees of apoptosis. The apoptotic induction pathway of each extract determined by flow cytometry and immunoblotting assays revealed various phases of cell cycle arrest with alteration of pro-apoptotic p53, caspase-3, and cyclin proteins. The bioactive compounds in each extract were chemically analysed by GC-MS and LC-ESI-MS/MS. Results revealed the presence of two major anthocyanins, cyanidin-3-glucoside and peonidin-3-glucoside, in the MeOH extract, while the DCM extract contained higher content of plant sterols. The latter constituents are considered the major contributors to apoptotic mechanism in the sensitive cell. These bran products are worth developing into medicinal supplements. (C) 2010 Elsevier Ltd. All rights reserved.

KEYWORDS: BREAST-CANCER CELLS; INOSITOL HEXAPHOSPHATE IP6; TANDEM MASS-SPECTROMETRY; BETA-SITOSTEROL; LIQUID-CHROMATOGRAPHY; CONSTITUENT TRICIN; MEDIATED APOPTOSIS; DOWN-REGULATION; FERULIC ACID; CYCLE

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CHITOSAN AS AN OCULAR DRUG DELIVERY VEHICLE FOR VANCOMYCIN

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ABSTRACT

The main objective of this research has been to study the efficiency of chitosan as an ocular drug delivery vehicle for topically applied vancomycin in rabbit eyes. Vancomycin 50 mg/mL was reconstituted in four preparations, namely: in TeAgricultural Research Service Naturale II (TM), in 0.9% w/v aqueous sodium chloride, and in 0.1% and 0.3% w/v chitosan solutions in 1% aqueous L(+)-lactic acid. Twenty-five microliters of vancomycin (50 mg/mL) were applied into the lower conjunctival eye sac in rabbit eyes. Tear samples were then collected after 0, 30, 60, 90, and 120 min to evaluate the pharmacokinetics of the topically applied vancomycin. Comparison of the results obtained showed that vancomycin 50 mg/mL eye drops in the 0.3% w/v chitosan solution were similar to TeAgricultural Research Service Naturale II (TM) in terms of bioavailability. The main conclusion to be drawn from this study is that the 0.3% w/v chitosan solution appeAgricultural Research Service to be a highly promising, cost effective candidate for biomedical use as a vehicle for vancomycin ocular drug delivery. (C) 2011 Wiley Periodicals, Inc. J Appl Polym Sci 122: 3160-3167, 2011

KEYWORDS: EYE DROPS; POLYMERS; PHACOEMULSIFICATION; PHARMACOKINETICS; POLYSACCHARIDE; ANTIBIOTICS; GENTAMICIN
CLAUSENAWALLINES A AND B, TWO NEW DIMERIC CARBAZOLE ALKALOIDS FROM THE ROOTS OF CLAUSENA WALLICHII

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ABSTRACT

Two new dimeric carbazole alkaloids, clausenawallines A and B, were isolated from the roots of Clausena wallichii. Their structures were elucidated by spectroscopic methods. Clausenawalline A was evaluated for its biological activities [anti-malaria (IC(50) 2.46 μg/mL), anti-TB (MIC 12.50 μg/mL)] and cytotoxicity against three human cancer cell lines [KB (IC(50) 7.87 μg/mL), MCF7 (IC(50) 25.43 μg/mL), and NCI-H187 (IC(50) 10.97 μg/mL)]. (C) 2011 Elsevier Ltd. All rights reserved.

KEYWORDS: STRUCTURAL ELUCIDATION; CONSTITUENTS
COAL FACIES IN A CENOZOIC PARALIC LIGNITE BED, KRABI BASIN, SOUTHERN THAILAND: CHANGING PEAT-FORMING CONDITIONS RELATED TO RELATIVE SEA-LEVEL CONTROLLED WATERTABLE VARIATIONS

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ABSTRACT

The Cenozoic Krabi Basin in the southern part of peninsular Thailand contains about 112 million tons proven coal reserves. At present, coal is only produced from the Bang Mark mine located in the southern part of the basin, where the main lignite bed is 7-20 m thick. The lignite bed occurs in an overall paralic succession. The present paper investigates the depositional conditions of an approximately 8 m thick lignite bed (main seam) in the Bang Mark mine using organic petrography, including maceral ratios, and geochemistry. The results are further interpreted in a sequence stratigraphic context. The lignite is of low rank and is completely dominated by huminite indicating generally oxygen-deficient conditions in the precursor mire. Very low inertinite contents suggest rare occurrences of wildfires. The lower part of the lignite bed represents a topogenous fresh water peat mire with open water areas that in few cases may have experienced influx of saline water. The peat mire was subjected to periodic inundations and deposition of silicilastics. Tissue preservation was relatively poor. The upper part of the lignite bed represents a slightly domed fresh water ombrogenous peat mire with a stable watertable and a balance between peat accumulation and accommodation space creation that favoured preservation of plant tissues. In general, the mire vegetation changed from less woody in the topogenous mire to more arborescent in the ombrogenous mire, where plants with suberinised wood cell walls also were more frequent. Decompacted, the lignite bed corresponds to a minimum similar to 11 m thick peat deposit that records from similar to 22,000 to 55,000 years of peat accumulation. Watertable rise in the peat mire was controlled overall by relative sea-level rise. In a sequence stratigraphic context, the lignite bed overlies a terrestrialisation surface (TeS; sensu Diessel,
and the lowermost part records peat formation during a falling watertable and a decreasing accommodation/peat accumulation ratio (terrestrialisation). An accommodation reversal surface (AGRICULTURAL RESEARCH SERVICE; sensu Diessel, 2007) indicates a change to paludification style of peat formation characterised by rising watertable and a high accommodation/peat accumulation ratio. Another AGRICULTURAL RESEARCH SERVICE marks a gradual change to a situation with a balanced accommodation/peat accumulation ratio. The overall watertable rise throughout peat formation, but at a gradually slower rate from base to top, suggests that the lignite bed could be located in the late transgressive systems tract (TST). (C) 2011 Elsevier B.V. All rights reserved.

KEYWORDS: SEQUENCE-STRATIGRAPHIC ANALYSIS; MAE-SOT-BASIN; NORTHERN THAILAND; SOURCE ROCKS; OIL WINDOW; FLUORESCENCE SPECTROMETRY; THERMAL MATURITY; RIFT-BASINS; LI BASIN; DEPOSITION
COMBINED EFFECTS OF BORON, SODIUM AND STRONTIUM ON GRAIN REFINEMENT OF STERLING SILVER GRADE 950

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ABSTRACT

Combined effects of B, Na and Sr on grain refinement of sterling silver grade 950 were investigated. The silver alloys with different composition of B, Na and Sr were prepared in three steps including pre-alloy preparation, master alloy preparation and finally sterling silver casting. Characterization was performed by inductively coupled plasma optical emission spectroscopy for determining chemical composition, and light microscopy, scanning electron microscopy and electron probe microanalysis for investigating microstructure. The tensile properties of the alloys were determined following the ASTM E 8M-96. The results revealed that micro-scale addition of B, Na and Sr plays a significant role in grain refinement. Effective grain refinement with bright surface appearance, no hot tearing crack and almost no micro-shrinkage can be achieved. The mechanism of grain refinement by combined effects of B, Na and Sr is yet to be understood, but it cannot be related to the distribution of micro-scale second phase. The highest ultimate tensile strength of the alloy achieved was about 178 MPa, nearly twice of that of the typical sterling silver alloy (about 90 MPa). This confirms advantages of the grain-refined alloy on jewelry application.
COMBINED QUANTUM-MECHANICS/MOLECULAR-MECHANICS DYNAMICS SIMULATION OF A–DNA DOUBLE STRANDS IRRADIATED BY ULTRA–LOW–ENERGY CARBON IONS

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ABSTRACT

In order to promote understanding of the fundamentals of ultra-low-energy ion interaction with DNA, molecular dynamics simulations using combined quantum-mechanics/molecular-mechanics of poly-AT and poly-GC A-DNA double strands irradiated by <200 eV carbon ions were performed to investigate the molecular implications of mutation bias. The simulations were focused on the responses of the DNA backbones and nitrogenous bases to irradiation. Analyses of the root mean square displacements of the backbones and non-hydrogen atoms of base rings of the simulated DNA structure after irradiation revealed a potential preference of DNA double strand separation, dependent on the irradiating energy. The results show that for the backbones, the large difference in the displacement between poly-GC and poly-AT in the initial time period could be the reason for the backbone breakage; for the nitrogenous base pairs, A-T is 30% more sensitive or vulnerable to ion irradiation than G-C, demonstrating a preferential, instead of random, effect of irradiation-induced mutation. (C) 2010 Elsevier B.V. All rights reserved.

KEYWORDS: CHARGE LEVEL; RADIATION; CELLS
COMMON FIXED POINTS FOR SOME GENERALIZED MULTIVALUED NONEXPANSIVE MAPPINGS IN UNIFORMLY CONVEX METRIC SPACES

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ABSTRACT

Abkar and Eslamian (Nonlinear Anal. TMA, 74, 1835-1840, 2011) prove that if $K$ is a nonempty bounded closed convex subset of a complete CAT(0) space $X$, $t : K \to K$ is a single-valued quasi-nonexpansive mapping and $T : K \to KC(K)$ is a multivalued mapping satisfying conditions (E) and (C($\lambda$)) for some $\lambda \in (0, 1)$ such that $t$ and $T$ commute weakly, then there exists a point $z \in K$ such that $z = t(z)$ is an element of $T(z)$. In this paper, we extend this result to the general setting of uniformly convex metric spaces. Nevertheless, condition (E) of $T$ can be weakened to the strongly demiclosedness of $I - T$.

KEYWORDS: CAT(0) SPACES; THEOREMS; CONVERGENCE
COMPARISON OF IN-HOUSE HIV-1 GENOTYPIC DRUG RESISTANT TEST WITH COMMERCIAL HIV-1 GENOTYPIC TEST KIT

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ABSTRACT

Background: The use of combination antiretroviral therapy (cART) has become a standard of care in the treatment of HIV infection. However, antiretroviral drug resistance occurs in a substantial number of patients. In resource-limited settings, genotypic resistance assay using a commercial kit is costly. Objective: Focus on the validation of an in-house HIV-1 specific genotypic drug resistance assay in Thai patients failing cART. Materials and methods: Results of HIV-1 genotypic drug resistance assay was evaluated by comparing an in-house method to a commercial test. The TRUGENE HIV-1 genotyping kit was used in 79 plasma specimens (49 from HIV patients failing cART therapy and 30 from proficiency testing panels). Results: The results from the in-house assay were comparable to those obtained from the TRUGENE HIV-1 genotyping kit with > 99.0% codon-to-codon agreement. The lower limit of detection by the in-house assay was approximately 100 copies/mL of HIV-1 RNA. In addition, this in-house assay would allow testing of samples from patients infected with HIV-1 subtype other than B. Conclusion: The in-house HIV-1 genotypic drug resistance assay may be used as an alternative to commercial kits, particularly in resource limited settings.

KEYWORDS: IMMUNODEFICIENCY-VIRUS TYPE-1; SEQUENCE-BASED ANALYSIS; SUBTYPE-B; PERFORMANCE-CHARACTERISTICS; MUTATIONS; SYSTEM; RECOMMENDATIONS; SURVEILLANCE; INFECTION; PATTERNS

Published in ASIAN BIOMEDICINE Volume: 5 Issue: 2 Pages: 249-255 April, 2011. DOI: 10.5372/1905-7415.0502.032.
COMPOSITE ITERATIVE SCHEMES FOR MAXIMAL MONOTONE OPERATORS IN REFLEXIVE BANACH SPACES

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ABSTRACT

In this article, we introduce composite iterative schemes for finding a zero point of a finite family of maximal monotone operators in a reflexive Banach space. Then, we prove strong convergence theorems by using a shrinking projection method. Moreover, we also apply our results to a system of convex minimization problems in reflexive Banach spaces. Accession Number: WOS:000295010200001

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Language: English
Author Keywords: Maximal monotone operator; Shrinking projection method; Proximal point algorithm; Bregman projection; Totally convex function; Legendre function.

KEYWORDS: PROXIMAL POINT ALGORITHM; STRONG-CONVERGENCE THEOREMS; HILBERT-SPACE; MAPPINGS
CONVERGENCE ANALYSIS FOR A SYSTEM OF GENERALIZED EQUILIBRIUM PROBLEMS AND A COUNTABLE FAMILY OF STRICT PSEUDOCONTRACTIONS

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ABSTRACT

We introduce a new iterative algorithm for a system of generalized equilibrium problems and a countable family of strict pseudocontractions in Hilbert spaces. We then prove that the sequence generated by the proposed algorithm converges strongly to a common element in the solutions set of a system of generalized equilibrium problems and the common fixed points set of an infinitely countable family of strict pseudocontractions.

KEYWORDS: SMOOTH BANACH-SPACES; COMMON FIXED-POINTS; NONEXPANSIVE-MAPPINGS; PSEUDO-CONTRACTIONS; HILBERT-SPACES; ITERATIVE ALGORITHMS; NONLINEAR OPERATORS; THEOREMS; WEAK; CONSTRUCTION
CRYSTAL GROWTH AND CHARACTERISATION OF A UNIQUE TRINUCLEAR V(IV)/V(V) COMPLEX

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ABSTRACT

Single crystals of a mixed-valence trinuclear cluster of formula $\text{[V}_2\text{V(IV)O}_5\text{C}_12\text{H}_8\text{N}_2\text{)(SO}_4\text{)(H}_2\text{O}_3\text{]} \cdot 6\text{H}_2\text{O}$ were grown by layer diffusion technique and characterised by single-crystal X-ray diffraction; $P2(1)/c$, $a = 20.5448(11)$ angstrom, $b = 11.7647(9)$ angstrom, $c = 18.1871(9)$ angstrom, $\beta = 92.64(0)$ degrees, $V = 4391.22 (93)$ angstrom$^3$, $R = 0.0941$ and $R(\text{w}) = 0.1345$. A distinct characteristic of the structure is the existence of the rare linear mono-mu-oxo $\text{[V}_2\text{V(IV)O}_5\text{]}^{4+}$ building units and the presence of a large number of hydrogen bonds and pi-pi interactions. The study on the mixed valence state of vanadium by valence bond sum calculations, manganometric titration and cyclic voltammetry, and the presence of pi-pi interactions by calculation of the harmonic oscillator model of aromaticity indices are presented. The thermogravimetric and differential scanning calorimetric analysis is also reported. The results of UV-Vis spectroscopic study and band gap energy calculation are included.

KEYWORDS: AROMATICITY; CORE; DNA
CTAB-ASSISTED HYDROTHERMAL SYNTHESIS OF TUNGSTEN OXIDE MICROFLOWERS

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ABSTRACT

Orthorhombic tungsten oxide (o-WO(3)) was synthesized by 200 degrees C, 24h hydrothermal reactions of ammonium metatungstate hydrate solutions containing different volumes of 1 M HCl and cetyltrimethylammonium bromide (CTAB) cationic surfactant. The as-synthesized products were characterized by X-ray powder diffraction (XRD), Fourier transform infrared (FTIR) and Raman spectroscopy, and scanning and transmission electron microscopy (SEM, TEM), including UV-visible and photoluminescent (PL) spectroscopy. These analyses showed that their phases and morphologies were controlled by the acidity of the solutions. In 7.50 ml 1 M HCl-added solution, the product was o-WO(3) microflowers, with microsquare layers growing out of their cores. FTIR and Raman vibrations of W=O, O-W-O, and W-O-W stretching modes were detected, and showed typical crystalline WO(3). Their optical properties showed a maximum absorption at 275 nm in the UV region and a maximum emission peak at 375 nm. The possible formation mechanism of o-WO(3) microflowers was also proposed according the experimental results. (C) 2010 Elsevier B.V. All rights reserved.

KEYWORDS: SENSING PROPERTIES; VAPOR-DEPOSITION; ROOM-TEMPERATURE; WO3; NANORODS; PHOTOLUMINESCENCE; NANOPARTICLES; FILMS
CURRENT MOLECULAR EPIDEMIOLOGY AND RECOMBINATION OF HIV TYPE 1 SUBTYPES IN NORTHERN THAILAND

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ABSTRACT

HIV subtype characterization is an important tool to monitor the genetic variation of the HIV epidemic. This study investigated the current HIV subtype distribution and recombination among the northern Thai population. An in-house genotypic assay of HIV protease and reverse transcriptase genes was performed on 420 plasma specimens from HIV-infected patients residing in several northern Thai provinces. HIV subtyping was determined by phylogenetic analysis. Three hundred and ninety-eight sequences (94.8%) were identified as CRF01_AE with the genetic distance of 1.848 +/- 0.957% and 12 (2.9%) as subtype B with the genetic distance of 4.186 +/- 0.849%. In addition, two sequences (0.5%) of HIV subtype C were found, suggesting that these patients were either immigrants from another country or were infected through heterosexual contact with HIV-infected subjects from another country. Bootscan analysis showed that there were eight (1.9%) unique recombinant forms (URFs) consisting of a recombinant of CRF01_AE with subtype B or subtype C. The information from this study is useful for prevention programs to halt the onward transmission of a particular HIV outbreak. However, characterization of the full genome of these CRF01_AE/B and CRF01_AE/C intersubtype recombinants, and also subtype C, is required for confirmation and elucidation.

KEYWORDS: IMMUNODEFICIENCY-VIRUS TYPE-I; DRUG-RESISTANCE; GENETIC DIVERSITY; GENOTYPING SYSTEM; STRAINS; PERFORMANCE; MUTATIONS; IMPACT; JAPAN; ASIA
CYCLIC MICROWAVE-ASSISTED SYNTHESIS OF Cu(3) BiS(3) DENDRITES USING L-cysteine AS A SULFUR SOURCE AND COMPLEXING AGENT

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ABSTRACT

Nanostructured Cu(3)BiS(3) dendrites were successfully synthesized from CuCl, BiCl(3) and L-cysteine in ethylene glycol (EG), using cyclic microwave radiation (CMR). The phase was detected by X-ray diffraction (XRD) and selected area electron diffraction (SAED), and was in accordance with that obtained by the simulation. Scanning and transmission electron microscopic (SEM and TEM) techniques revealed the gradual transformation of nanoparticles to nanostructured dendrites, due to the increase of microwave power. Photoluminiscence of Cu(3) BiS(3) dendrites was a blue emission centered at 367 nm. (C) 2010 Elsevier B.V. All rights reserved.
DEFFICIENCY IN THE AMINO ALDEHYDE DEHYDROGENASE ENCODED BY GmAMADH2, THE HOMOLOGUE OF RICE Os2AP, ENHANCES 2-ACETYL-1-PYRROLINE BIOSYNTHESIS IN SOYBEANS (GLYCINE MAX L.)

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ABSTRACT

2-Acetyl-1-pyrroline (2AP), the volatile compound that provides the 'popcorn-like' aroma in a large variety of cereal and food products, is widely found in nature. Deficiency in amino aldehyde dehydrogenase (AMADH) was previously shown to be the likely cause of 2AP biosynthesis in rice (Oryza sativa L.). In this study, the validity of this mechanism was investigated in soybeans (Glycine max L.). An assay of AMADH activity in soybeans revealed that the aromatic soybean, which contains 2AP, also lacked AMADH enzyme activity. Two genes, GmAMADH1 and GmAMADH2, which are homologous to the rice Os2AP gene that encodes AMADH, were characterized. The transcription level of GmAMADH2 was lower in aromatic varieties than in nonaromatic varieties, whereas the expression of GmAMADH1 did not differ. A double nucleotide (TT) deletion was found in exon 10 of GmAMADH2 in all aromatic varieties. This variation caused a frame-shift mutation and a premature stop codon. Suppression of GmAMADH2 by introduction of a GmAMADH2-RNAi construct into the calli of the two nonaromatic wild-type varieties inhibited the synthesis of AMADH and induced the biosynthesis of 2AP. These results suggest that deficiency in the GmAMADH2 product, AMADH, plays a similar role in soybean as in rice, which is to promote 2AP biosynthesis. This phenomenon might be a conserved mechanism among plant species.

KEYWORDS: AMINOALDEHYDE DEHYDROGENASE; QUANTITATIVE-ANALYSIS; FLAVOR COMPOUNDS; AROMATIC RICE; AVENA-SATIVA; RAPID METHOD; FRAGRANCE; COMPOUND; CULTURES; IDENTIFICATION
DELAY-DEPENDENT EXPONENTIAL STABILIZATION FOR UNCERTAIN LINEAR SYSTEMS WITH INTERVAL NON-DIFFERENTIABLE TIME-VARYING DELAYS

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ABSTRACT

In this paper, the problem of exponential stabilization for a class of linear systems with time-varying delay is studied. The time delay is a continuous function belonging to a given interval, which means that the lower and upper bounds for the time-varying delay are available, but the delay function is not necessary to be differentiable. Based on the construction of improved Lyapunov-Krasovskii functionals combined with Leibniz-Newton’s formula, new delay-dependent sufficient conditions for the exponential stabilization of the systems are first established in terms of LMIs. Numerical examples are given to demonstrate that the derived conditions are much less conservative than those given in the literature. (C) 2011 Elsevier Inc. All rights reserved.

KEYWORDS: STABILITY-CRITERIA; DYNAMIC-SYSTEMS; NONLINEAR-SYSTEMS; ROBUST STABILITY; NEURAL-NETWORKS; STATE; PERTURBATIONS

**ABSTRACT**

Lead-free bismuth sodium zirconate (BNZ) ceramics with formula Na(0.5)Bi(0.5)ZrO(3)/xBi(2)O(3) with x = 0, 2, 3, 4, and 6 wt% were prepared by liquid-phase sintering method. The specimens were sintered at 850 and 900 degrees C. Phase identification was investigated using X-ray diffraction technique. BNZ/4 wt% Bi(2)O(3) and BNZ/6 wt% Bi(2)O(3) ceramics sintered at 900 degrees C showed impurity phase of Bi(7.38)Zr(0.62)O(12.31) compound due to excess additive reacted with zirconium in system. Scanning electron microscopy and energy-dispersive X-ray spectroscopy were employed to study microstructure and measure chemical composition of ceramics, respectively. The results revealed creation of bismuth oxide liquid phase at BNZ grain boundaries inhibited grain growth and decreased pore size. This caused the relative densities of the modified samples to increase.

**KEYWORDS:** BI2O3 CONTENT; EXCESS BI2O3; MICROSTRUCTURE; GROWTH
DETERMINATION OF POTASSIUM, SODIUM, AND TOTAL ALKALIES IN PORTLAND CEMENT, FLY ASH, ADMIXTURES, AND WATER OF CONCRETE BY A SIMPLE FLOW INJECTION FLAME PHOTOMETRIC SYSTEM

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ABSTRACT

A simple flow injection with flame photometric detection has been developed for determination of sodium, potassium, and total alkalies in portland cement, fly ash, admixtures, and water of concrete. A liquid sample or a digest of solid sample was injected into a water carrier stream which flowed to a flame photometer. A change in emission intensity at a selected wavelength was recorded as a peak. An amplifier circuit was fabricated, which helped improve sensitivity of the flame photometer. Calibration graphs in the range of 0.05-1.0 mg L(-1) and 1.0-20.0 mg L(-1) were obtained with a detection limit of 0.02 mg L(-1), for both potassium and sodium determination. Relative standard deviations for 11 replicates of injecting of 10 mg L(-1) potassium and sodium solutions were 1.69 and 1.79%, respectively. Sample throughput of 120 h(-1) was achieved. The proposed method was successfully applied to portland cement, fly ash, admixtures, and water samples validated by the ASTM standard method and certified reference materials of portland cement.

KEYWORDS: ATOMIC SPECTROMETRIC DETERMINATION; EMISSION-SPECTROMETRY; ABSORPTION-SPECTROMETRY; BLOOD-SERUM; MAGNESIUM; CALCIUM; IRON; VEGETABLES; DILUTION

Published in JOURNAL OF AUTOMATED METHODS & MANAGEMENT IN CHEMISTRY Article Number: 742656 2011. DOI: 10.1155/2011/742656.
DEVELOPMENT OF HAT-RAPD MARKER FOR DETECTION OF STELLANTCHASMUS FALCATUS INFECTION

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ABSTRACT

The trematode, Stellantchasmus falcatus, is one of the members in the Family Heterophyidae, which is reported to be an endemic fluke in northern region of Thailand. A sensitive and specific detection of this parasite is required to determine the epidemiology at larval stages. Specific primers to determine the presence of S. falcatus were investigated using high annealing temperature random amplified polymorphic DNA (HAT-RAPD) PCR, with 10 arbitrary primers to generate different polymorphic DNA profiles. Eleven parasite species were used for comparison. A 380 bp HAT-RAPD S. falcatus-specific marker was found, and was cloned and sequenced, allowing a pair of primers (St-F 5'-GGCCAACGCAATCGTCATCC-3’ and St-R 5’-GCGTCGGGTTTCAGACATGG-3’) to be designed to produce a 320 bp amplicon specific for S. falcatus. It revealed no cross-reaction with any of the other tested parasite species. The S. falcatus-specific primers can be used for epidemiological monitoring and for detection in snail intermediate hosts, which serve as usefulness tools in management and epidemiological control programs.

KEYWORDS: POLYMERASE-CHAIN-REACTION; SCHISTOSOMA-MANSONI; OPISTHORCHIS-VIVERRINI; REACTION ASSAY; MULTIPLEX-PCR; COPRODIAGNOSIS; IDENTIFICATION; HAEMATOBIUM; WATER; HOST
DIAGNOSING DELIRIUM IN ELDERLY THAI PATIENTS:
UTILIZATION OF THE CAM ALGORITHM

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ABSTRACT

Background: Delirium is a common illness among elderly hospitalized patients. However, under-recognition of the condition by non-psychiatrically trained personnel is prevalent. This study investigated the performance of family physicians when detecting delirium in elderly hospitalized Thai patients using the Thai version of the Confusion Assessment Method (CAM) algorithm. Methods: A Thai version of the CAM algorithm was developed, and three experienced Thai family physicians were trained in its use. The diagnosis of delirium was also carried out by four fully qualified psychiatrists using DSM-IV TR criteria, which can be considered the gold standard. Sixty-six elderly patients were assessed with MMSE Thai 2002, in order to evaluate whether they had dementia upon admission. Within three days of admission, each patient was interviewed separately by a psychiatrist using DSM-IV TR, and a family physician using the Thai version of the CAM algorithm, with both sets of interviewers diagnosing for delirium. Results: The CAM algorithm tool, as used by family physicians, demonstrated a sensitivity of 91.9% and a specificity of 100.0%, with a PPV of 100.0% and an NPV of 90.6%. Interrater agreement between the family physicians and the psychiatrists was good (Cohen's Kappa = 0.91, p < 0.0001). The mean of the time the family physicians spent using CAM algorithm was significantly briefer than that of the psychiatrists using DSM-IV TR. Conclusions: Family physicians performed well when diagnosing delirium in elderly hospitalized Thai patients using the Thai version of the CAM algorithm, showing that this measurement tool is suitable for use by non-psychiatrically trained personnel, being short, quick, and easy to administer. However, proper training on use of the algorithm is required.

KEYWORDS: CONFUSION ASSESSMENT METHOD; HOSPITAL PATIENTS; MEDICAL PATIENTS; PROGNOSIS; DEPRESSION

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DIELECTRIC AGING BEHAVIOR IN A-SITE HYBRID-DOPED BaTiO(3) CERAMICS

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ABSTRACT

Hybrid-doped ferroelectric ceramics have recently been of great interest. Their electrical properties; however, remained mysterious, particularly the aging behavior. Therefore, the dielectric aging characteristics of the A-site hybrid-doped Na(1+)/Sm(3+) BaTiO(3) perovskite ceramics were investigated in this study. With the concentration of acceptor dopant (Na(1+)) fixed at 1 mol%, while that of the donor dopant (Sm(3+)) varied from 0.0 to 1.5 mol%, the hybrid-doped BaTiO(3) ceramics were prepared successfully by a conventional mixed-oxide method via vibro-milling technique. The results showed that the dielectric properties of all de-aged samples decreased noticeably with time. In all the samples with 0.5, 1.0 and 1.5 mol% Sm(3+) obviously the aging of dielectric constant and dielectric loss did not follow the conventional logarithmic law. The stretched exponential decay was found to suitably represent the aging behavior of these A-site hybrid-doped BaTiO(3) ceramics. A possibly cause of such behavior lies in the nature of relaxor-like behavior of these ceramics induced from a disruption of dipole ordering from Na(1+)/Sm(3+) substitution. (C) 2011 Elsevier B.V. All rights reserved.

KEYWORDS: LEAD MAGNESIUM NIOBATE; RELAXOR FERROELECTRIC CERAMICS; BARIUM-TITANATE; MECHANOCHEMICAL SYNTHESIS; X7R CHARACTERISTICS; MICROSTRUCTURE; CAPACITORS
ABSTRACT

In the current work, the dielectric and ferroelectric properties of 1-3 barium titanate (BT)-Portland cement (PC) composites have been studied as potential lead-free piezoelectric-cement-based composites. The 1-3 BT-PC composites were fabricated by a dice-and-fill technique with BT:PC ratios of 50:50, 60:40 and 70:30 by volume. The results indicate that the dielectric constant (epsilon(r)) of the composite materials increases as the barium titanate volume fraction increases; this follows the parallel model. The room temperature epsilon(r) at 1 kHz of 70% barium titanate composite was found to have values higher than 750. The loss tangent (tan delta) results were found to decrease with increasing barium titanate volume fraction. On the other hand, the ferroelectric hysteresis loops of composite materials indicate that the “instantaneous” remnant polarization (P(ir)) increases as the barium titanate volume fraction increases. The P(ir) at 15 kV/cm (90 Hz) of 70% barium titanate composite was found to have a value of approximate to 3 mu C/cm(2). (C) 2011 Elsevier B.V. All rights reserved.

KEYWORDS: PIEZOELECTRIC PROPERTIES; CERAMICS; BATIO3
DIELECTRIC AND FERROELECTRIC PROPERTIES OF ANNEALED B(2)O(3) DOPED Ba(Ti(0.9)Sn(0.1))O(3) CERAMICS

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ABSTRACT

In the present work, the posted sintered annealing method was applied for B(2)O(3) doped Ba(Ti(0.9)Sn(0.1))O(3) ceramics. The ceramics were fabricated via a solid state reaction method: sintered at 1350 degrees C for 24 h followed by annealing at 1100 degrees C for 4-32 h. Many electrical properties of the ceramics annealed at various annealing times were investigated with a variety of methods. Annealing for 4 h produced a sharper phase transition with high dielectric constant. The high dielectric constant of 27,000 was recorded at ferroelectric to paraelectric phase transition temperature of 38 degrees C. This sample also showed a high dielectric tunability of 70%. Ferroelectric performance of the sample was also improved. The improvements in electrical properties were related to the chemical homogeneity of the sample after annealing.

KEYWORDS: ELECTRICAL-PROPERTIES; SOLID-SOLUTIONS; TRANSITION
DIELECTRIC CHARACTERISTICS AND TUNABILITY OF BARIUM ZIRCONIUM TITANATE CERAMICS PREPARED BY TWO-STEP SINTERING METHOD

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ABSTRACT

Barium zirconium titanate ceramics with a composition of BaZr (0.07)Ti (0.93)O(3) were synthesized using a modified two step sintering process and the dielectric and mechanical properties of the ceramics were investigated. The modified sintering helped to improve the sinterability of the samples resulting in a high ceramic density. Improvements in the dielectric constant, dielectric tunability and hardness values were also observed. The enhancements in dielectric and mechanical properties were directly related to the improvement in densification of the samples.

KEYWORDS: NANOCRYSTALLINE BATIO3; GRAIN-SIZE; BA(ZRXTI1-X) O-3; BEHAVIOR
DIELECTRIC PROPERTIES OF COMPLEX PEROVSKITE PZBT–PMNT CERAMIC UNDER COMPRESSIVE STRESS

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ABSTRACT

Effects of compressive stress on the dielectric properties of complex perovskite PZBT-PMNT ceramic were investigated. The dielectric properties measured under stress-free condition showed a composite nature with two distinct temperatures of dielectric maximum associated with PZBT and PMNT end members. The dielectric properties under the compressive stress were observed at stress levels up to 230 MPa using a home-built compressometer. The results clearly showed that the compression load significantly reduced both the dielectric constant and the dielectric loss tangent in every measuring frequency. The change of the dielectric constant with stress was attributed to competing influences of the intrinsic contribution of non-polar matrix and the extrinsic contributions of repolarization and growth of micro-polar regions, while the clamping of the domain walls contributed to the stress-dependent changes of the dielectric loss tangent. Finally, a large drop of the dielectric constant after a stress cycle was likely caused by the stress induced decrease in switchable part of spontaneous polarization.

KEYWORDS: UNIAXIAL-STRESS; ELECTROMECHANICAL PROPERTIES; FERROELECTRIC CERAMICS; TITANATE CERAMICS; SOLID-SOLUTIONS; FIELD; ELECTROCERAMICS; DEPENDENCE; SYSTEM
DIELECTRIC PROPERTIES OF LEAD-FREE COMPOSITES FROM 0-3 BARIUM ZIRCONATE TITANATE–PORTLAND CEMENT COMPOSITES

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**ABSTRACT**

The dielectric properties of lead-free composites from 0-3 barium zirconate titanate-Portland cement composites were investigated. 0-3 BZT-PC composites were produced using BZT content at 30-70% by volume. The dielectric properties at various frequencies with difference BZT content were investigated. Parallel, cube and series models were also compared to the dielectric measurement results. The results showed that the dielectric constant of BZT-PC composites increased with increasing BZT content where epsilon r values at 1 kHz are 225 and 549 for composites with 30 and 70% by volume respectively. The dielectric properties of BZT-PC composites were also found to depend on the frequency tested.

**KEYWORDS:** BEHAVIOR; CERAMICS; ACTUATORS
DIELECTRIC PROPERTIES OF PbTiO(3)/ZnO CERAMIC NANOCOMPOSITES OBTAINED BY SOLID-STATE REACTION METHOD

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ABSTRACT

In this paper, we report on the dielectric properties of PbTiO(3)/ZnO ceramic nanocomposites prepared by a conventional solid-state reaction method with improvement in densification by the addition of ZnO nanowhiskers. Phase formation, densification, microstructure and dielectric properties of the composites were investigated as a function of the content of ZnO nanowhiskers. Densification behavior of the ceramic nanocomposites was significantly enhanced, as compared to pure PbTiO(3) ceramics. Moreover, the dielectric constant of the composites was higher than that of the pure PbTiO(3) ceramics. (c) 2010 Elsevier B.V. All rights reserved.

KEYWORDS: LEAD TITANATE CERAMICS; MECHANICAL-PROPERTIES; ELECTRICAL-PROPERTIES; COMPOSITES; MICROSTRUCTURE; FABRICATION; POWDERS; SINTERABILITY; BEHAVIOR

DIELECTRIC, FERROELECTRIC AND PIEZOELECTRIC PROPERTIES OF 0–3 BARIUM TITANATE–PORTLAND CEMENT COMPOSITES

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ABSTRACT

In this work, barium titanate (BT) and cement composites of 0-3 connectivity were produced with BT concentrations of 30%, 50% and 70% by volume using the mixing and pressing method. The dielectric constant (epsilon (r) ) and the dielectric loss (tan delta) at room temperature and at various frequencies (0.1-20 kHz) of the ferroelectric BT-Portland cement composites with different BT concentrations were investigated. The results show that the dielectric constant of BT-PC composites was found to increase as BT concentration increases, and that the highest value for epsilon (r) of 436 was obtained for a BT concentration of 70%. In addition, the dielectric loss tangent decreased with increasing BT concentration. Moreover, several mathematical models were used; the experimental values of the dielectric constants are closest to those calculated from the cube model. The 0-3 cement-based piezoelectric composites show typical ferroelectric hysteresis loops at room temperature. The instantaneous remnant polarization (P (ir) ), at an applied external electrical field (E (0)) of 20 kV/cm (90 Hz) of 70% barium titanate composite, was found to have a value a parts per thousand 3.42 mu C/cm(2). Furthermore, the piezoelectric coefficient (d (33)) was also found to increase as BT concentration increases, as expected. The highest value for d (33) was 16 pC/N for 70% BT composite.

KEYWORDS: PZT PARTICLE-SIZE; SMART MATERIALS; BATIO3-BASED CERAMICS; HYSTERESIS BEHAVIOR; ELECTRIC-FIELD; ACTUATORS; SENSORS; POWDERS; FILMS
DIRECT ENERGY GAP OF Sb(2)Te(3) SYNTHESISED BY SOLID-STATE MICROWAVE PLASMA

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ABSTRACT

The usefulness of microwave heating and microwave generation of plasma for solid-state synthesis of Sb(2)Te(3) crystals is reported. Lengths of time and molar ratios of Sb:Te were varied to achieve pure products heated by a 900 W microwave-irradiated plasma. In the present research, the products were Sb(2)Te(3) with a rhombohedral crystal system using 2: 2, 2: 1.75 and 2: 1.5 molar ratios of Sb:Te, and lengths of time of 10 and 20 min. Their different crystallographic planes were also detected, including four Raman shifts at 93.9, 102.6, 139.2 and 263.7 cm⁻¹, and direct energy gaps (E(g)) in a range of 0.340-0.515 eV.

KEYWORDS: NANOFILMS; GROWTH; ROUTE; FILMS
DIVERSITY OF BENTHIC DIATOMS IN SIX MAIN RIVERS OF THAILAND

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ABSTRACT

The diversity of benthic diatoms in six main rivers of Thailand during three seasons, were investigated in the months of March 2008, August 2008 and January 2009. Samples were collected from 6 regions in Thailand: Ping River (northern regions), Tha Chin River (central regions), Chi River (northeast regions), Chanthaburi River (eastern regions), Kwai River (western regions) and Tapee River (southern regions). Samples were taken from the upper, middle and lower parts of each river. A total of 214 of benthic diatoms were found and classified into 3 classes, 6 subclasses, 13 orders, 28 families and 50 genera. Of these, 41 taxa were recorded for the first time in Thailand. The most abundant species found in the main rivers of Thailand were Achnanthidium minutissimum, Cyclotella pseudostelligera, Gomphonema lagenula, Navicula cryptocephala, N. symmetrica and Nitzschia palea. (C) 2011 Friends Science Publishers

KEYWORDS: WATER-QUALITY; COMMUNITY; INDIA; FEED
DIVERSITY OF CYANOBACTERIA IN MAN-MADE SOLAR SALTERN, PETCHABURI PROVINCE, THAILAND – A PILOT STUDY

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ABSTRACT

Solar salterns can be found in many tropical and subtropical regions throughout the world, however, nothing is known from these habitats in Southeast Asia. The Petchaburi solar salterns are located in Petchaburi Province, middle part of Thailand. These areas can be defined as hypersaline biotopes where, in salt-producing times, salinity increases by more than 10 times that of seawater. The annual salinity gradient of these areas ranges from 0 - 35 ppt. in the non salt-producing period and gradually elevates from more than 35 ppt. up to saturation in the salt producing period, when salt crystals are formed. The cyanobacterial samples were collected from four ponds of the Petchaburi saltern during the salt producing period (November - December 2009), when the range of salinity was from 90 - 250 ppt. pH values of soil samples ranged from 7.9 - 8.1 and conductivity from 164 - 350 ds/m. Other physico-chemical parameters were analyzed in the soil samples as well. Cyanobacterial mats and their filaments predominated among the diatoms. Sixteen species of cyanobacteria were found. Dominant species were Spirulina subsalsa, Coleofasciculus cf. chthonoplastes and Oscillatoria lloydiana. Most of the species found in this study have not yet been reported in Thailand. Species, which did not correspond to any described taxa in scientific literature (new species or unknown modifications) are designated by “cf.” or “sp”.

KEYWORDS: SP-NOV; LAKE; MATS

EFFECT OF ALUMINUM AND INDIUM CO-DOPING ON ZINC OXIDE FILMS PREPARED BY DC MAGNETRON SPUTTERING

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ABSTRACT

Aluminum and indium co-doped zinc oxide (AIZO) thin films were prepared by direct current (dc) magnetron sputtering on glass substrate in pure argon atmosphere. Three inches of zinc oxide ceramic with 0.5 wt.% of aluminum and indium doping was used as a target in static mode. The influence of sputtering conditions i.e. substrate-target distance, pressure and power on AIZO films was studied. The electrical resistivity and microstructure of thin films were investigated by the four point probe technique and the scanning electron microscope, respectively. The optical transmittance of AIZO films was measured by UV visible spectrophotometer in the wavelength of 300-1100 nm. Depending on the deposited conditions, highly transparent films up to 80% with low resistivities in the range of 2.6-7.9x10(-4) Ω cm were achieved at room temperature. Possible mechanism in the processing which, ultimately, determines the physical properties of AIZO films will be discussed. (C) 2011 Elsevier B.V. All rights reserved.

KEYWORDS: ZNO THIN-FILMS; SOLAR-CELLS; OPTICAL-PROPERTIES; SUBSTRATE
EFFECT OF CARBON ADDITION ON THE FERROELECTRIC HYSTERESIS PROPERTIES OF LEAD ZIRCONATE–TITANATE CERAMIC–CEMENT COMPOSITES

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ABSTRACT

Piezoelectric composites made from lead zirconate titanate ceramic and cement have recently been developed as sensors in smart concrete structures due to their compatibility with the host concrete structure. However there is difficulty in poling the composite due to the insulating nature of the cement phase. In this work, carbon powder was used as a conducting phase in the composites at up to 2.0% by volume. The ferroelectric properties of the composites were investigated. For the same electric field, composites with added carbon were found to have higher polarization values. Therefore, this suggests that carbon could be added as a conducting phase to lead zirconate-titanate ceramic–cement composites in order to improve their polarization. (C) 2011 Elsevier Ltd and Techna Group S.r.l. All rights reserved.

KEYWORDS: PZT PARTICLE-SIZE; PIEZOELECTRIC PROPERTIES; MICROSTRUCTURE; POLARIZATION; BEHAVIOR

EFFECT OF CARBOXYMETHYL CELLULOSE CONCENTRATION ON PHYSICAL PROPERTIES OF BIODEGRADABLE CASSAVA STARCH-BASED FILMS

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ABSTRACT

Background: Cassava starch, the economically important agricultural commodity in Thailand, can readily be cast into films. However, the cassava starch film is brittle and weak, leading to inadequate mechanical properties. The properties of starch film can be improved by adding plasticizers and blending with the other biopolymers. Results: Cassava starch (5% w/v) based films plasticized with glycerol (30 g/100 g starch) were characterized with respect to the effect of carboxymethyl cellulose (CMC) concentrations (0, 10, 20, 30 and 40% w/w total solid) and relative humidity (34 and 54% RH) on the mechanical properties of the films. Additionally, intermolecular interactions were determined by Fourier transform infrared spectroscopy (FT-IR), melting temperature by differential scanning calorimetry (DSC), and morphology by scanning electron microscopy (SEM). Water solubility of the films was also determined. Increasing concentration of CMC increased tensile strength, reduced elongation at break, and decreased water solubility of the blended films. FT-IR spectra indicated intermolecular interactions between cassava starch and CMC in blended films by shifting of carboxyl (C = O) and OH groups. DSC thermograms and SEM micrographs confirmed homogeneity of cassava starch-CMC films. Conclusion: The addition of CMC to the cassava starch
films increased tensile strength and reduced elongation at break of the blended films. This was ascribed to the good interaction between cassava starch and CMC. Cassava starch-CMC composite films have the potential to replace conventional packaging, and the films developed in this work are suggested to be suitable for low moisture food and pharmaceutical products.

**KEYWORDS:** POLYACRYLAMIDE GRAFT COPOLYMER; EDIBLE FILMS; STARCH/CARBOXYMETHYL CELLULOSE; GLASS-TRANSITION; METHYL CELLULOSE; CHITOSAN-STARCH; PROTEIN ISOLATE; BLEND FILMS; PLASTICIZER; ALGINATE
EFFECT OF COMPRESSIVE STRESS ON THE FERROELECTRIC HYSTERESIS BEHAVIOR IN 0-3 PMN-PT/CEMENT COMPOSITES

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ABSTRACT

Lead magnesium niobate titanate (PMN-PT) Portland cement (PC) composites were produced. PMN-PT amount used in this work were 30, 50, and 70% by volume. The effects of PMN-PT content (using 30%, 50%, 70% PMN-PT) and stress on the ferroelectric polarization-electric field (P-E) hysteresis of the composites are reported in this present work. From the results, it was found that there was an increase in the instantaneous remnant polarization (Pir) when PMN-PT amount increased while Pir was found to decrease when the stress was increased from 0 to 57 MPa.

KEYWORDS: PORTLAND-CEMENT COMPOSITES; MORPHOTROPIC PHASE-BOUNDARY; PIEZOELECTRIC PROPERTIES; DIELECTRIC-PROPERTIES; PARTICLE-SIZE; SYSTEMS
EFFECT OF HIGH ROUGHNESS ON A LONG AGING TIME OF SUPERHYDROPHILIC TiO(2) NANOPARTICLE THIN FILMS

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ABSTRACT

TiO(2) nanoparticle thin films with a high roughness were successfully deposited on quartz substrates by a sparking process. To obtain a uniform film thickness, the substrate was moved raster-like across an area of 1 x 1 cm(2) by the x-y scanning stage. Effects of annealing temperatures on surface morphology, chemical structure, photocatalytic and wetting properties were examined by scanning and transmission electron microscopy, atomic force microscopy, Raman spectroscopy, UV-vis spectroscopy and contact angle measurement, respectively. The sample annealed at the optimum temperature of 500 degrees C shows the highest RMS roughness, photocatalytic activity and also the lowest water contact angle. An optimum anatase/rutile ratio and maximum RMS roughness were believed to be the reason for the above results. In contrast with most previous reports, the films prepared by this process remain highly super-hydrophilic after 5 weeks without UV exposure. (C) 2011 Elsevier B.V. All rights reserved.

KEYWORDS: RUTILE PHASE-TRANSITION; PHOTOCATALYTIC ACTIVITY; OPTICAL-PROPERTIES; METHYLENE BLUE; WASTE-WATER; ANATASE; DISINFECTION; DEPOSITION; IRRADIATION; COATINGS
ABSTRACT

Effect of NaOH concentration on the sorption isotherm of carboxymethyl rice starch (CMSr) films was investigated. Sorption isotherms are important for predicting moisture sorption properties of the films via moisture sorption empirical models. The moisture sorptions isotherm of CMSr films synthesized with different NaOH concentrations (0, 10, 20, 30, 40 and 50% w/v) were studied at various relative humidity (16, 35, 55 and 76% RH), at 25 +/- 1 degrees C. The equilibrium moisture content of the films increased dramatically above a(w) = 0.6. Guggenheim-Anderson-de Boer (GAB), Brunauer-Emmett-Teller (BET) and Oswin sorption models were fitted to the experimental data. The results showed that the increase in NaOH concentration caused a decrease in the monolayer water content (M(0)) of the films. The GAB model was found to be the best-fit model for CMSr films at a(w) 0.1-0.76, 25 +/- 1 degrees C.
EFFECT OF OZONE TREATMENT ON THE REDUCTION OF CHLORPYRIFOS RESIDUES IN FRESH LYCHEE FRUITS

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ABSTRACT

The effect of ozone on the reduction of chlorpyrifos residue in lychee cv. Chakapat (Litchi chinensis Sonn.) was studied. Lychee fruits were dipped in the solution of chlorpyrifos at a concentration of 10 mg L-1 for 10 min. Then, they were exposed to ozone gas (O3) at concentrations of 80, 160, 200, 240 mg L-1 and dipped in ozone-containing water, at concentrations of 2.2, 2.4, 3.4 and 3.2 mg L-1 for 10, 20, 30 and 60 min, respectively. Both ozone gas and ozone-containing water reduced pesticide residue in lychee, but exposure to ozone gas for 60 min was most effective. When lychee fruits were stored at 25 degrees C for 6 days, both processes did not show significant differences in weight loss, total soluble solids (TSS) and titratable acidity (TA). However, ozone-containing water decreased the eating quality of lychees after storage, compared with the ozone-fumigated groups.

KEYWORDS: DEGRADATION; PESTICIDES; DECOMPOSITION; PHOSPHORUS
EFFECT OF SOLUTION ON GROWTH OF ZINC OXIDE TETRAPOD BY THERMAL OXIDATION TECHNIQUE

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ABSTRACT

In this work, the effects of solution on the growth of zinc oxide tetrapod (T-ZnO) were investigated. T-ZnO nanostructures were prepared by the thermal oxidation technique of metal zinc powder mixed with different solutions such as methanol (CH(3)OH), ethanol (C(2)H(5)OH) and hydrogen per oxide (H(2)O(2)). The mixtures were heated at the temperature of 1,000 degrees C in normal atmosphere. A detailed field emission scanning electron microscopy (FE-SEM) showed that T-ZnO prepared by heating zinc and H(2)O(2) gave the best tetrapod-like nanostructures. The length and diameter at the leg tip of T-ZnO is about 8.17 +/- 1.17 and 47.8 nm, respectively. With this condition the highest percent yield of T-ZnO was about 4.82% by weight. Moreover, as determined by the energy dispersive spectroscopy (EDS), the atomic ratio of Zn and O was about 1:1. In addition, this study reveal that H(2)O(2) acts as a strong oxidizing properties and has a role as a strong oxidizer to supply more reactive oxygen species to zinc in order to form T-ZnO.

KEYWORDS: ZNO NANOSTRUCTURES; NANOWIRES; WHISKERS

EFFECT OF VIBRO-MILLING ON DIELECTRIC PROPERTIES OF BARIUM ZIRCONIUM TITANATE CERAMICS

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ABSTRACT

Barium zirconium titanate powders were prepared by conventional ball milling and vibro-milling methods. Barium zirconium titanate ceramics were fabricated from the obtained powders. Properties of the ceramics were investigated. The vibro-milling ceramics showed a better dielectric constant and relative tunability. It is proposed that the better densification and degree of crystallinity for the vibro-milling ceramics are responsible for better ceramics properties.

KEYWORDS: MORPHOTROPIC PHASE-BOUNDARY; ELECTRICAL-PROPERTIES; GRAIN-SIZE

EFFECTS BNT COMPOUND INCORPORATED ON STRUCTURE AND ELECTRICAL PROPERTIES OF PZT CERAMIC

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ABSTRACT

Ferroelectric ceramics with formula Pb(Zr(0.52)Ti(0.48))O(3)/x(Bi(0.5)Na(0.5))TiO(3) (when x = 0, 0.1, 0.5, 1.0 and 3.0 wt%) were prepared by a solid-state mixed-oxide method and sintered at the temperature between 1050 and 1200 degrees C for 2 h to obtain dense ceramics. It was found that the optimum sintering temperature was 1200 degrees C at which all the samples had relative density at least 96% of their theoretical values. Phase analysis using X-ray diffraction showed tetragonal and rhombohedral perovskite structure of PZT with no BNT peak detected, indicating that completed solid solutions occurred for all compositions. Scanning electron micrographs of fractured PZT/BNT ceramics showed equiaxed grain shape with mixed-mode of transgranular and intergranular fractures. Addition of BNT significantly decreased grain size of the PZT ceramic. Measurement of room temperature dielectric constant indicated a gradual increase with increasing BNT content. Results of ferroelectric characterization showed a slight decrease of remanent polarization and coercive field for BNT-added samples, suggesting ceramics which could be easily poled. Good piezoelectric coefficient (d(33)) could be maintained and comparable to that of pure PZT ceramic for the sample with 1.0 wt% BNT addition. (C) 2011 Elsevier B.V. All rights reserved.

KEYWORDS: FREE PIEZOELECTRIC CERAMICS; MIXED-OXIDE METHOD; FERROELECTRIC PROPERTIES; LEAD; NA

EFFECTS OF ANNEALING TIME ON FERROELECTRIC AND PIEZOELECTRIC PROPERTIES OF B(2)O(3) DOPED BA(Zr(0.07)Ti(0.93))O(3) CERAMICS

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ABSTRACT

The method of thermal annealing was applied to B(2)O(3) doped BaZr(0.07)Ti(0.93)O(3) ceramics. The modified ceramics were prepared via a solid state reaction method. The samples were sintered at 1250 degrees C for 2 h, and then followed by the thermal annealing at 1000 degrees C for 4-16 h to improve their electrical properties. The ferroelectric properties were slightly decreased. However, an enhancement of piezoelectric properties was observed after annealing, especially for 8 h annealing. The results were discussed in term of composition variation after annealing.

KEYWORDS: DIELECTRIC-PROPERTIES; TITANATE CERAMICS; BA(TI0.7ZR0.3)O-3 CERAMICS; BEHAVIOR; SYSTEM
EFFECTS OF BOESENBERGIA ROTUNDA JUICE ON SPERM QUALITIES IN MALE RATS

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ABSTRACT

Boesenbergia rotunda (L.) Mansf. is one of Thai medicinal plants locally known for its male sexual enhancing effect. However, the study of other impacts of this plant on the male reproductive system is still very rare. To investigate the effects of B. rotunda on sperm qualities, the fresh juice of this plant was tested on both pre-mature and mature male rats by oral administration at the doses of 60, 120 and 600 mg/kg.bw for 30 days. The results showed that B. rotunda juice significantly progressively increased the motility of sperm at the doses of 60 and 120 mg/kg.bw and enhanced the number of normal sperm at all doses in the mature rats. Additionally, significant prominent stages VII to VIII of seminiferous epithelium was found in treated mature rats at all doses. There was no effect of B. rotunda on the pre-mature rats. These findings suggest that the B. rotunda juices could enhance fertility by improving the quality of sperm and its effect is age dependable.

KEYWORDS: ELEMENT MODULATOR CREM; SPERMATOGENESIS; L.
EFFECTS OF B-SITE DOPING ON PIEZOELECTRIC AND FERROELECTRIC PROPERTIES OF Pb(0.88)Sr(0.12)(Zr(0.54) Ti(0.44)Sb(0.02))((1−y))−(Zn(1/3)Nb(2/3))(y)O(3) CERAMICS

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ABSTRACT

Pb(0.88)Sr(0.12)(Zr(0.54)Ti(0.44)Sb(0.02))((1−y))−(Zn(1/3)Nb(2/3))(y)O(3) ceramics where y = 0.00−0.10 were prepared by a solid state reaction method. Doping of Zn and Nb (co-doped) at B-site produced a phase transformation from tetragonal to rhombohedral phase. Highest piezoelectric coefficient d(33) of 632 pC/N was recorded for the y = 0.04 sample. The piezoelectric result was correlated with the phase formation and the ferroelectric properties. Dielectric constant and loss tangent slightly increased with increasing the codoped content. However, loss tangent values were less than 0.06 for all samples. These results indicated that the piezoelectric and dielectric properties of the ceramics could be improved by the co-doping.

KEYWORDS: PHASE-TRANSITIONS; PZT CERAMICS; NB
EFFECTS OF CHARCOAL ON PHYSICAL AND MECHANICAL PROPERTIES OF FIRED TEST BRIQUETTES

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ABSTRACT

Organic combustible additives are frequently used to generate porosity in fired clay bricks. This study aims to investigate the effects of charcoal addition to fired test briquettes on their compressive strength, water absorption, apparent porosity, bulk density, and apparent density. The test results indicate that the amount of charcoal additive and the firing temperature are the key factors determining properties of the test fired briquettes. The study shows that low-density, porous, and lightweight briquettes can be made from Hang Dong clay mixed with charcoal additive.
EFFECTS OF MYCORRHIZAL FUNGI ON SYMBIOTIC SEED GERMINATION OF PECTEILIS SUSANNAE (L.) RAFIN (ORCHIDACEAE), A TERRESTRIAL ORCHID IN THAILAND

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ABSTRACT

Symbiotic seed germination of Pecteilis susannae (L.) Rafin was investigated using 11 fungal isolates recovered from roots of four Thai terrestrial orchids (P. susannae, Eulophia spectabilis, Paphiopedilum bellatulum and Spathoglottis affinis). Seed germination and protocorm development were evaluated up to 133 days after sowing. Protocorm development was most advanced, up to stage 5 (elongation of the first leaf), when seeds were cultured with 4 Epulorhiza isolates obtained from roots of P. susannae (CMU-Aug 028, 4.3%, CMU-Aug 007, 4.2%, and CMU-Aug 013, 2.2%) and E. spectabilis (CMU-STE 014, 3.9%). Moreover, stage 4 protocorm development (emergence of the first leaf) occurred with fungal isolates CMU-STE 011, 5.7%, (Epulorhiza sp.) and CMU-AU 212, 4.3%, (Tulasnella sp.) obtained from roots of E. spectabilis and S. affinis respectively. When seed was incubated without fungi (control), development was limited to stage 3 of protocorm development (appearance of promeristem). This is the first report of protocorm stage 5 development in P. susannae using compatible fungal symbionts. Optimization of seed germination and seedling fitness will assist the conservation and propagation of this orchid species and other terrestrial orchids in Thailand.

KEYWORDS: PLATANTHERA; PROPAGATION; DIVERSITY; MACROCERATITIS; IDENTIFICATION; SPECIFICITY; CULTURE; FLORIDA
EFFECTS OF TEMPERING TIME ON PHASE FORMATION AND MICROSTRUCTURAL EVOLUTION OF ZIRCONIA MODIFIED–DENTAL PORCELAIN CERAMICS

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ABSTRACT

Dental porcelain ceramics reinforced with leucite nanocrystallines were successfully fabricated by using the two-step sintering technique together with some ZrO(2) additive. Influence of firing conditions on leucite formation, densification and microstructural development of the sintered samples was investigated. It has been found that the choice of tempering time is one of the key factors controlling leucite crystallization on the zirconia surface in dental porcelain ceramics. The potentiality of a two-step sintering technique and Zr additive as a simple ceramic fabrication method to obtain highly dense dental porcelain ceramic-nanocomposites was demonstrated. After a two-step sintering, it was found that the microstructure was mainly composed of a dispersed dendritic leucite crystalline and a glassy matrix.

KEYWORDS: ALUMINOSILICATE GLASS; FLEXURAL STRENGTH; LEUCITE; CRYSTALLIZATION; GROWTH; SYSTEM

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EFFECTS OF ULTRASONIC IRRADIATION ON DEGRADATION OF MICROCYSTIN IN FISH PONDS

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ABSTRACT

Surface cyanobacterial bloom causes deterioration of pond water and accumulation of toxins and musty odors (Geosmin & 2-methylisoborneol, MIB) in aquaculture activities. This study investigated the effectiveness of ultrasonic technology on Microcystis sp. surface scum settling, including microcystin (cyanotoxin) and musty odors degradation in pond water. Water from fish ponds, with 5.162 +/- 0.92 mg L(-1) of initial chlorophyll 'a' was sonicated at 5 frequencies (29, 43, 108, 200 & 1000 kHz). Ultrasonic irradiation of 200 kHz had the greatest effect in settling Microcystis scum. Moreover, ultrasonication at 200 kHz effectively reduced microcystin and musty odors. Scanning electron microscopy (SEM) confirmed that sonification at a frequency of 200 kHz for 240 s did not disintegrate Microcystis sp. cells, but easily broke up the sticky mucus layer of the scum. Thus, ultrasonification at 200 kHz is promising technique to sink Microcystis surface scum, without cell disintegration, and could be used to reduce microcystin toxin and musty odor substances in aquaculture ponds. (C) 2011 Friends Science Publishers

KEYWORDS: BLUE-GREEN-ALGAE; WATER; LR; CYANOBACTERIA; DESTRUCTION; ENVIRONMENT; FLAVORS; TOXINS; RR

EFFECTS OF UNIAXIAL STRESS ON DIELECTRIC PROPERTIES OF LITHIUM MODIFIED POTASSIUM SODIUM NIOBATE CERAMICS

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ABSTRACT

In this work, the solid solution of \((K(0.5)Na(0.5))(1-x)Li(x))NbO(3)\) ceramics with \(x=0.03, 0.04, 0.05, 0.06\) and 0.07 was prepared by a conventional mixed-oxide and solid-state sintering method. The structural phase formation and microstructure were characterized by X-ray diffraction technique and scanning electron microscopy. The ceramics were identified by XRD as a single-phase perovskite structure with symmetry gradually changing from orthorhombic to tetragonal. The grain size and the optimum density of the sintered ceramics were noticeably compositional-dependent. The dielectric properties of the \((K(0.5)Na(0.5))(1-x)Li(x))NbO(3)\) ceramics under the uniaxial compressive stress were observed at stress up to 180 MPa. The results showed that the dielectric constant and the dielectric loss tangent increased with applied stress. The change in the dielectric properties with stress was seen to depend on the composition and grain size. The observations were interpreted in terms of the intrinsic and extrinsic contributions to the changes in dielectric properties upon the applied compressive stress. (C) 2011 Elsevier B.V. All rights reserved.

KEYWORDS: LEAD-FREE PIEZOCERAMICS; ZIRCONATE-TITANATE CERAMICS; FREE PIEZOELECTRIC CERAMICS; LI

ELECTRIC FIELD ASSISTED PROCESSING AND CHARACTERIZATION OF ALSb NANOCRYSTALS

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ABSTRACT

AlSb nanocrystals were produced by the direct flow of electrons through powder mixture of 1: 1 M ratio Al:Sb. The phase, morphology, and vibration modes were characterized using XRD, TEM, and Raman spectroscopy. The optical property was also investigated using UV-Vis-NIR spectrophotometry. In the present research, the products were pure AlSb nanocrystals at 80 A for 10 min, and 110 A for 3 s, with the indirect energy band gaps of 1.647 eV and 1.688 eV, respectively. (C) 2011 Elsevier B. V. All rights reserved.

KEYWORDS: SEMICONDUCTOR COMPOUNDS; ALUMINUM ANTIMONIDE; REFRACTIVE-INDEX; PHOTOLUMINESCENCE; ELECTRODEPOSITION; SPECTRA; GAP

ELECTRICAL CONDUCTIVITY AND DIELECTRIC PROPERTY OF FLY ASH GEOPOLYMER PASTES

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ABSTRACT

The electrical conductivity and dielectric properly of fly ash geopolymer pastes in a frequency range of 100 Hz-10 MHz were studied. The effects of the liquid alkali solution to ash ratios (L/A) were analyzed. The mineralogical compositions and microstructures of fly ash geopolymer materials were also investigated using X-ray diffraction (XRD) and scanning electron microscopy (SEM). The 10 mol sodium hydroxide solution and sodium silicate solution at a sodium silicate-to-sodium hydroxide ratio of 1.0 were used in making geopolymer pastes. The pastes were cured at 40 degrees C. It is found that the electrical conductivity and dielectric constant are dependent on the frequency range and L/A ratios. The conductivity increases but the dielectric constant decreases with increasing frequency.

KEYWORDS: CEMENT COMPOSITES; SLAG CEMENT; WORKABILITY; RELAXATION; CONCRETE; STRENGTH; KINETICS

ELECTROPOLYMERIZATION OF LAYER-BY-LAYER PRECURSOR POLYMER FILMS

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ABSTRACT

The layer-by-layer (LbL) self-assembly has been used to fabricate polymer thin films on any solid substrates. The multilayer polymer thin films are constructed by alternating adsorption of anionic and cationic polymers. Polyelectrolyte multilayer ultrathin films containing anionic poly[2-(thiophen-3-yl) ethyl methacrylate-co-methacrylic acid]; P(TEM-co-MA) and cationic poly[4-(9H-carbazol-9-yl)-N-butyl-4-vinyl pyridium bromide]; P4VPCBZ, were fabricated. The growth of multilayer ultrathin films was followed by UV-Vis absorption spectrophotometer and surface plasmon resonance spectroscopy (SPR). The deposition of P(TEM-co-MA)/P4VPCBZ as multilayer self-assembled ultrathin films regularly grow which showed linear growth of absorbance and thickness with increasing the number of layer pair. Cross-linking of the layers was verified by cyclic voltammetry (CV), UV-Vis spectrophotometry and electrochemical surface plasmon resonance (EC-SPR) spectroscopy with good electro-copolymerizability. This was verified by spectroelectrochemistry. The SPR angular-reflectivity measurement resulted in shifts to a higher reflectivity according to the change in the dielectric constant of the electropolymerized film. Copyright (C) 2011 John Wiley & Sons, Ltd.

KEYWORDS: ULTRATHIN FILMS; THIN-FILMS; SPECTROELECTROCHEMICAL PROPERTIES; ELECTROCHEMICAL POLYMERIZATION; NETWORK FILMS; CROSS-LINKING; THIOPHENE; COPOLYMERS; POLYTHIOPHENE; ELECTRODEPOSITION

Published in POLYMERS FOR ADVANCED TECHNOLOGIES Volume: 22 Issue: 5 Pages: 753-758 May, 2011. DOI: 10.1002/pat.1886.
Endophytic fungi from Pecteilis susannae (L.) Rafin (Orchidaceae), a threatened terrestrial orchid in Thailand

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ABSTRACT

Eight endophytic fungi were isolated from roots of the threatened terrestrial orchid, Pecteilis susannae (L.) Rafin. Phylogenetic analysis based on an alignment of internal transcribed spacer regions of nuclear rDNA indicated that seven isolates belonged to the genus Epulorhiza and one to Fusarium. All fungal isolates were cultured with orchid seeds collected from three field sites near Doi Suthep-Pui National Park, Chiang Mai, Thailand. Seed germination and protocorm development were evaluated up to 70 days after sowing. Percent symbiotic seed germination was highest (86.2%) when seeds were cultured with Epulorhiza (CMU-Aug 013). The protocorm development was the most advanced up to stage 2, continued embryo enlargement, or rupture of the testa, and the highest percentage was 17.8% when seeds were cultured with Epulorhiza (CMU-Aug 007). Without fungi, seed germination and protocorm development were 62.1% and 11.1%, respectively. The dependency of P. susannae on fungal symbionts for early seedling development is yet to be determined. Optimizing seed germination and seedling fitness will assist the conservation of this threatened orchid in Thailand.

KEYWORDS: Symbiotic seed-germination; mycorrhizal fungi; in-situ; propagation; identification; Platanthera; Macrocera; diversity; seedlings; culture

Published in Mycorrhiza Volume: 21 Issue: 3 Pages: 221-229 April, 2011. DOI: 10.1007/s00572-010-0327-1.
ENHANCED ELECTRICAL PROPERTIES OF LEAD-FREE Bi(2)GeO(5) FERROELECTRIC GLASS CERAMICS BY THERMAL ANNEALING

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ABSTRACT

To study the effect of thermal annealing on the electrical properties of lead-free Bi(2)GeO(5) ferroelectric glass ceramics, the glass ceramics with composition of Bi(2)GeO(5) were prepared by the conventional melt-quenching and heat-treatment methods subsequently. Glass ceramics of Bi(2)GeO(5) was produced by subjecting the glasses from BiO(1.5)-GeO(2)-BO(1.5) system to the heat treatment schedule at 475 degrees C for 18 h. After that, the resulting samples were separately annealed at 275 and 375 degrees C for 4, 8, 12 and 18 h, respectively. The important properties of the annealed Bi(2)GeO(5) glass ceramics such as physical properties, phase formation and electrical properties were then investigated. It was found that the annealing treatment played an important role on electrical properties of these glass ceramics. The XRD patterns confirm the secondary phase of Bi(4)Ge(3)O(12) co-existed with Bi(2)GeO(5) which increased at higher annealing temperature and time. This caused a change in density and related electrical properties of the Bi(2)GeO(5) glass ceramics. Both annealing temperature of 275 and 375 degrees C with various times can improve dielectric properties and ferroelectric behavior of the resulting Bi(2)GeO(5) glass ceramics when comparing with that of un-annealed sample. The optimum annealing temperature and time for the improvement of dielectric properties of Bi(2)GeO(5) glass ceramics was found at 375 degrees C/12 h, where the maximum values of the dielectric constant (epsilon(r)) of 246 and low dielectric loss (tan delta) of 0.024 were obtained. Moreover, the ferroelectric property of all annealed glass ceramics exhibited the slim P-E loop and P(r) values which slightly increased with increasing annealing temperature and time. However, the P-E loops are not the feature of truly ferroelectric, it may be represent a lossy capacitor behavior.

KEYWORDS: CRYSTAL STRUCTURE
ENHANCEMENT OF THE EFFICIENCY OF POLYMER SOLAR CELLS BY BLENDING Nb/ZnO NANOPARTICLES INTO POLY(3-HEXYLTHIOPHENE):[6,6]-PHENYL C61-BUTYRIC ACID METHYL ESTER

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ABSTRACT

Bulk-heterojunction (BHJ) solar cells utilizing P3HT:PCBM composite loaded with niobium-doped zinc oxide nanoparticles (Nb/ZnO NPs) produced by flame spray pyrolysis were fabricated. The devices loaded with and without Nb/ZnO NPs were compared. It was found that niobium doping led to a slight increase in open circuit voltage and an increase in short-circuit current. The effect of co-solvent (1,3,5-trichlorobenzene; TCB) in chlorobenzene in the polymer solution was also investigated on the morphology and performance of a P3HT: PCBM and P3HT: PCBM: Nb/ZnO bulk-heterojunction solar cells. The device efficiency was improved due to a good quality of the thin film nanostructure and annealing time.
EXCITED-STATE INTERMOLECULAR PROTON TRANSFER REACTIONS OF 7-AZAINDOLE(MeOH)(n) (n=1-3) CLUSTERS IN THE GAS PHASE: ON-THE-FLY DYNAMICS SIMULATION

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ABSTRACT

Ultrafast excited-state intermolecular proton transfer (PT) reactions in 7-azaindole(methanol)(n) (n = 1-3) [7AI(MeOH)(n=1-3)] complexes were performed using dynamics simulations. These complexes were first optimized at the RI-ADC(2)/SVP-SV(P) level in the gas phase. The ground-state structures with the lowest energy were also investigated and presented. On-the-fly dynamics simulations for the first-excited state were employed to investigate reaction mechanisms and time evolution of PT processes. The PT characteristics of the reactions were confirmed by the nonexistence of crossings between S π π and S π σ states. Excited-state dynamics results for all complexes exhibit excited-state multiple-proton transfer (ESmultiPT) reactions via methanol molecules along an intermolecular hydrogen-bonded network. In particular, the two methanol molecules of a 7AI(MeOH)(2) cluster assist the excited-state triple-proton transfer (ESTPT) reaction effectively with highest probability of PT.

KEYWORDS: PROTON/HYDROGEN ATOM RELAY; HYDROGEN-BONDED COMPLEXES; 2-(2’-HYDROXYPHENYL) BENZOTHIAZOLE; ELECTRONIC-STRUCTURE; MOLECULAR-DYNAMICS; FLUORESCENT-PROBE; ENERGY SURFACES; WATER; SPECTROSCOPY; SOLVATION

EXISTENCE AND ITERATION FOR A MIXED EQUILIBRIUM PROBLEM AND A COUNTABLE FAMILY OF NONEXPANSIVE MAPPINGS IN BANACH SPACES

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ABSTRACT

We prove the existence of a solution of the mixed equilibrium problem (MEP) by using the KKM mapping in a Banach space setting. Then, by virtue of this result, we construct a hybrid algorithm for finding a common element in the solutions set of a mixed equilibrium problem and the fixed points set of a countable family of nonexpansive mappings in the frameworks of Banach spaces. By using a projection technique, we also prove that the sequences generated by the hybrid algorithm converge strongly to a common element in the solutions set of MEP and common fixed points set of nonexpansive mappings. Moreover, some applications concerning the equilibrium and the convex minimization problems are obtained. (C) 2011 Elsevier Ltd. All rights reserved.

KEYWORDS: STRONG-CONVERGENCE THEOREMS; COMMON FIXED-POINTS; HILBERT-SPACES; APPROXIMATION

EXISTENCE AND STABILITY OF ITERATIVE ALGORITHMS FOR THE SYSTEM OF NONLINEAR QUASI-MIXED EQUILIBRIUM PROBLEMS

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ABSTRACT

In this paper, we consider the system of nonlinear quasi-mixed equilibrium problems. The existence theorems of solutions of such problems are provided by considering the limit point of an iterative algorithm. This means, we not only give the conditions for the existence theorems of the presented problems but also provide the algorithm to find such solutions. Moreover, the stability of such an algorithm is also discussed. The results presented in this paper are more general, and may be viewed as an extension, refinement and improvement of the previously known results in the literature. (C) 2010 Elsevier Ltd. All rights reserved.

KEYWORDS: COCOERCIVE VARIATIONAL-INEQUALITIES; SMOOTH BANACH-SPACES; PROJECTION METHODS; GENERALIZED SYSTEM
EXPLOITING GREEN ANALYTICAL PROCEDURES FOR ACIDITY AND IRON ASSAYS EMPLOYING FLOW ANALYSIS WITH SIMPLE NATURAL REAGENT EXTRACTS

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ABSTRACT

Green analytical methods employing flow analysis with simple natural reagent extracts have been exploited. Various formats of flow based analysis systems including a single line FIA, a simple lab on chip with webcam camera detector, and a newly developed simple lab on chip system with reflective absorption detection and the simple extracts from some available local plants including butterfly pea flower, orchid flower, and beet root were investigated and shown to be useful as alternative self indicator reagents for acidity assay. Various tea drinks were explored to be used for chromogenic reagents in iron determination. The benefit of a flow based system, which allows standards and samples to go through the analysis process in exactly the same conditions, makes it possible to employ simple natural extracts with minimal or no pretreatment or purification. The combinations of non-synthetic natural reagents with minimal processed extracts and the low volume requirement flow based systems create some unique green chemical analyses. (C) 2011 Elsevier B.V. All rights reserved.

KEYWORDS: INJECTION SPECTROPHOTOMETRIC DETERMINATION; BATATAS L. LAM.; CRUDE EXTRACT; ENZYMATIC SOURCE

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FABRICATION AND PROPERTIES OF PLASMA-SPRAYED 
Al(2)O(3)/ZrO(2) COMPOSITE COATINGS

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ABSTRACT

Al(2)O(3) /xZrO(2) (where x = 0, 3, 13, and 20 wt.%) composite coatings were deposited onto mild steel substrates by atmospheric plasma spraying of mixed alpha-Al(2)O(3) and nano-sized monoclinic-ZrO(2) powders. Microstructural investigation showed that the coatings comprised well-separated Al(2)O(3) and ZrO(2) lamellae, pores, and partially molten particles. The coating comprised mainly of metastable gamma-Al(2)O(3) and tetragonal-ZrO(2) with trace of original alpha-Al(2)O(3) and monoclinic-ZrO(2) phases. The effect of ZrO(2) addition on the properties of coatings were investigated in terms of microhardness, fracture toughness, and wear behavior. It was found that ZrO(2) improved the fracture toughness, reduced friction coefficient, and wear rate of the coatings.

KEYWORDS: ALUMINA-TITANIA COATINGS; TRIBOLOGICAL BEHAVIOR; TOUGHENING MECHANISMS; FRACTURE-BEHAVIOR; CERAMIC COATINGS; WEAR-RESISTANCE; MICROSTRUCTURE; TRANSFORMATION; ZIRCONIA; ZRO2
FACTORICATION OF FERROELECTRIC GLASS CERAMICS FROM \( (K(0.5)Na(0.5))NbO(3)\)-SiO(2)-Al(2)O(3) GLASS SYSTEM

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ABSTRACT

In this research, the fabrication of glass ceramics containing ferroelectric KNN crystals has been carried out in aluminosilicate glass system by using conventional mixed oxide technique in alumina crucible. Alumina was chosen to increase mechanical robust and the stability of KNN glass ceramic in ratio 0, 5, 10 and 15 mol%. The received glass ceramics were all transparent. The glasses were subjected to heat treatment processes at the temperature between 600 and 700 degrees C in order to form the glass ceramics with desired crystal phases. X-ray diffraction (XRD) and scanning electron microscopy (SEM) techniques were used for phase identification and microstructural studies, respectively. The bulk crystallization of KAlSiO(2) phase was observed in the glass ceramics with heat treatment temperatures from 600-675 degrees C while KNN phase started to appear at higher temperature of 700 degrees C. The glass ceramic containing 23.75 mol% SiO(2) possesses the optimum values of dielectric constant (\(\varepsilon_r\)): similar to 260 and low dielectric loss (\(\tan \delta\)): similar to 0.02 at 10 kHz in room temperature.

KEYWORDS: CRYSTALLIZATION; NIOBATE
FABRICATION OF MODIFIED SWNTs/GLASSY CARBON ELECTRODE FOR THE DETERMINATION OF DOPAMINE

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ABSTRACT

The SWNTs film was grown on the GC electrode by dropping a suspension of SWNTs in DMF on the GC electrode surface and then evaporating the solvent under an infrared heat lamp for 1 h, giving a modified SWNTs/GC electrode. Finally, the SWNTs/GC was rinsed thoroughly with absolute ethanol and deionized water just before use. The optimum working electrode, pH, and buffer solution were glassy carbon electrode (GC), 0.1M phosphate buffer pH 7.5 respectively. The SWNTs/DMF film on the GC surface increased linearly with the amounts of SWNTs suspension over the range from 1 to 10 μL, and then increased slightly from 10 to 20 μL. SWNTs suspension of 10 μL was used for making the modified glassy carbon electrode. DPV technique was employed for the determination of dopamine. The drug samples containing dopamine obtained from Radvitee Hospital, Bangkok Thailand were tested as in the mentioned procedure.

KEYWORDS: ASCORBIC-ACID; NANOTUBES
FABRICATION OF WO(3) NANOFIBERS BY HIGH VOLTAGE ELECTROSPINNING

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ABSTRACT

Mixtures of 0.1, 0.3, and 0.5 mmol ammonium metatungstate hydrate (AMH), and poly (vinyl alcohol) (PVA) were electrospun by a +20 kV direct voltage to synthesize fibers. Those of 0.5 mmol AMH were further calcined to have PVA removed and crystalline degree improved. At 500 degrees C and 2 h calcination, WO(3) nanofibers, including two main stretching modes, 3.24 eV direct energy gap, and 378 nm wavelength violet emission were detected. A possible formation mechanism of WO(3) nanofibers was proposed according to the experimental results. (C) 2011 Elsevier B.V. All rights reserved.

KEYWORDS: FTIR SPECTROSCOPY; TUNGSTEN
ABSTRACT

Mixtures of zinc acetate dihydrate, ammonium metatungstate hydrate, and 5 wt%, 6 wt%, and 7 wt% of poly (vinyl alcohol) (PVA) were electrospun by a + 15 kV direct voltage to produce fibers. In the present research, the electrospun fibers of 6 wt% PVA were further calcined at 400-600 degrees C for 3 h. The sanmartinite monoclinic structured ZnWO(4) was detected by X-ray diffractometer (XRD) and selected area electron diffraction (SAED), weight loss by thermogravimetric analyser (TGA), morphology and particle size by scanning and transmission electron microscopes (SEM, TEM) and atomic force microscope (AFM), including their vibration modes by Fourier transform infrared spectrometer (FTIR) and Raman spectrometer. The 4.42 eV direct energy gap (E(g)) and 460nm emission wavelength, caused by the electronic transition of (WO(6))(2-) octahedrons, were determined by UV-visible absorption and photoluminescence (PL) spectrometers. A possible formation mechanism of ZnWO(4) nanofibers was also proposed according to the experimental results. (C) 2011 Elsevier B.V. All rights reserved.

KEYWORDS: HYDROTHERMAL PROCESS; FTIR SPECTROSCOPY; POWDERS; MORPHOLOGY; HYDROGEL; FIBERS
FACTORS AFFECTING THE SHRINKAGE OF FLY ASH GEOPOLYMERS

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ABSTRACT

The shrinkage of fly ash geopolymers was studied in the present study. Fly ash was used as the source material for making the geopolymers. The effects of the concentration of NaOH, sodium silicate-to-NaOH ratio, liquid-to-ash ratio, curing temperature, and curing time on shrinkage were investigated. The geopolymers were cured at 25, 40, and 60 degrees C, respectively. The results indicate that the shrinkage of geopolymers is strongly dependent on curing temperature and liquid-to-ash ratio. The increase in shrinkage is associated with the low strength development of geopolymers. It is also found that NaOH concentration and sodium silicate-to-NaOH ratio also affect the shrinkage of geopolymers but to a lesser extent.

KEYWORDS: ELEVATED-TEMPERATURES; ALTERNATIVE MATRICES; HAZARDOUS-WASTES; PART II; STRENGTH; BEHAVIOR; IMMOBILIZATION; STABILIZATION; WORKABILITY

Published in INTERNATIONAL JOURNAL OF MINERALS METALLURGY AND MATERIALS Volume: 18 Issue: 1 Pages: 100-104 February, 2011. DOI: 10.1007/s12613-011-0407-z.
FINE STRUCTURE OF WING SCALES OF BUTTERFLIES, EUPLOEA MULCIBER AND TROIDES AEACUS

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ABSTRACT

Wing scales of male Euploea mulciber (E. mulciber) and Troides aeacus (T. aeacus) butterflies were investigated from interest in photonic crystal by scanning electron microscopy and optical reflectance measurement. On the basis of the structural observation, the colouration in different areas in their wings was discussed. It was particularly deduced that a violet-green iridescence characteristic of E. mulciber’s forewing is caused only in a wavelength range from similar to 380 to similar to 510 nm by multiple interference from a highly tilted, triple-layered cuticle arrangement on the brown scales. It was also found that T. aeacus does not produce a blue-green sheen such as observed by Troides magellanus because its scales have no multiple cuticle layers but microrib layers unable to produce any backscattering diffraction. (C) 2011 Elsevier Inc. All rights reserved.

KEYWORDS: SASAKIA-CHARONDA BUTTERFLIES; MADAGASCAN SUNSET MOTH; COLORS; INSECTS
FINITE SIZE SCALEING OF HYSTERESIS BEHAVIOR: MONTE CARLO SIMULATION ON DIFFOUR MODEL

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ABSTRACT

In this work, Monte Carlo simulation was used to study the size dependence of the dynamic hysteresis properties of 2 dimensional ferroelectric system. The DIFFOUR model and Metropolis algorithm were used to investigate the size effect on hysteresis properties. From the simulation, it was found that the competition between the electric field parameters and the system size plays a crucial role on the phase-lag between the polarization and the electric field signals, which defines particular hysteresis properties. In describing the hysteresis behavior qualitatively, finite size scaling formalism, in a power law form, was used to predict relations among the field parameters, system size, and hysteresis. The purpose was to establish phenomenological knowledge of how dynamic perturbations affect the hysteresis in finite ferroelectric system. Comparison with related experiments was also discussed.

KEYWORDS: GRAIN-SIZE; THIN-FILMS; FERROELECTRIC PROPERTIES; DEPENDENCE; CERAMICS
FIRST REPORT ON MICROCYSTINS CONTAMINATION IN GIANT FRESHWATER PRAWN (MACROBRACHIUM ROSENBERGII) AND NILE TILAPIA (TILAPIA NILOTICA) CULTURED IN EARTHEN PONDS

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ABSTRACT

Phytoplankton including cyanobacterial blooms frequently occurred in aquaculture ponds. Some cyanobacteria produced toxins that may accumulate in the food web and eventually to aquaculture products. The aim of this study was to investigate the incidence of cyanobacteria and the contamination of microcystins in giant freshwater prawn (Macrobrachium rosenbergii) and Nile tilapia (Tilapia nilotica) cultured in earthen ponds. This study was carried out in green water system of 4 prawn and 6 fish ponds during April 2006 - February 2007. Cyanobacterial composition was identified by microscopic method and microcystins were analyzed by ELISA technique. It was shown that the amount of cyanobacteria especially Microcystis aeruginosa Kutzing (n.d.-45,000 cells/L) and microcystins (n.d.-3.20 μg/kg d.w.) in the prawn ponds was higher than that in fish ponds (n.d.-983 cells/L & n.d.-0.84 μg/kg d.w.). Both prawn and fish contained concentrations of microcystins close to or above the recommended limit for human consumption (0.04 μg/kg day TDI guidelines set by the WHO). This result implied that aquaculture products especially giant freshwater prawns cultured in earthen ponds with green water system are likely to be contaminated with microcystins. The finding is useful for aquaculture in term of food safety in Thailand. (C) 2011 Friends Science Publishers

KEYWORDS: MYTILUS-GALLOPROVINCIALIS; BIOACCUMULATION; CYANOBACTERIA; DEPURATION; TOXIN; LR

FIXED POINT PROPERTIES OF C*-ALGEBRAS

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ABSTRACT

This paper derives relations between the following properties of a C*-algebra: (i) it has the fpp, (ii) the spectrum of every self-adjoint element is finite, (iii) it is finite dimensional, (iv) it is generated by two projections p and q and the spectrum of p + q is homeomorphic to a compact ordinal to alpha < omega(omega), (v) it is generated by two projections and the real Banach algebra generated by every self-adjoint element has the w-fpp, (vi) it has the w-fpp. We prove that (i) implies (ii) using standard fixed point theory, give two proofs that (ii) implies (iii), one based on a result of Ogasawara and another based on geometric properties of projections, and observe that (iii) implies (i) by Brouwer's fixed point theorem. We prove that (iv) implies (v) using the structure of the universal C*-algebra generated by two projections, and discuss a conjecture that ensures (iv) implies (vi). (C) 2010 Elsevier Inc. All rights reserved.

KEYWORDS: BANACH-SPACES; NONEXPANSIVE-MAPPINGS
FIXED POINT THEOREMS BY WAYS OF ULTRA-ASYMPTOTIC CENTERS

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ABSTRACT

We use an approach on ultra-asymptotic centers to obtain fixed point theorems for two classes of nonself multivalued mappings. The results extend and improve several known ones.

KEYWORDS: MULTIVALUED NONEXPANSIVE-MAPPINGS; SET-VALUED MAPPINGS; NONLINEAR MAPPINGS; BANACH-SPACES
FIXED POINT THEOREMS FOR SOME GENERALIZED MULTIVALUED NONEXPANSIVE MAPPINGS

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ABSTRACT

In this paper, we introduce a condition on multivalued mappings which is a multivalued version of condition (C(\lambda)) defined by Garcia-Falset et al. (2011) [3]. It is shown here that some of the classical fixed point theorems for multivalued nonexpansive mappings can be extended to mappings satisfying this condition. Our results generalize the results in Lim (1974), Lami Dozo (1973), Kirk and Massa (1990), Garcia-Falset et al. (2011), Dhompongsa et al. (2009) and Abkar and Eslamian (2010) [4-6,3,7,8] and many others. (C) 2011 Elsevier Ltd. All rights reserved.

KEYWORDS: SET-VALUED MAPPINGS; BANACH-SPACES; CONVERGENCE THEOREMS

FLAME–MADE Nb–Doped TiO(2) ETHANOL AND ACETONE SENSORS

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ABSTRACT

Undoped TiO(2) and TiO(2) nanoparticles doped with 1-5 at.% Nb were successfully produced in a single step by flame spray pyrolysis (FSP). The phase and crystallite size were analyzed by XRD. The BET surface area (SSA(BET)) of the nanoparticles was measured by nitrogen adsorption. The trend of SSA(BET) on the doping samples increased and the BET equivalent particle diameter (d(BET)) (rutile) increased with the higher Nb-doping concentrations while d(BET) (anatase) remained the same. The morphology and accurate size of the primary particles were further investigated by high-resolution transmission electron microscopy (HRTEM). The crystallite sizes of undoped and Nb-doped TiO(2) spherical were in the range of 10-20 nm. The sensing films were prepared by spin coating technique. The mixing sample was spin-coated onto the Al(2)O(3) substrates interdigitated with Au electrodes. The gas sensing of acetone (25-400 ppm) was studied at operating temperatures ranging from 300-400 degrees C in dry air, while the gas sensing of ethanol (50-1,000 ppm) was studied at operating temperatures ranging from 250-400 degrees C in dry air.

KEYWORDS: OXYGEN GAS SENSOR; THIN-FILMS; ELECTRICAL-PROPERTIES; SENSING PROPERTIES; TEMPERATURE; POWDERS; NANOPARTICLES; TITANIUM; CO
FLAME-MADE SINGLE PHASE Zn(2)TiO(4) NANOPARTICLES

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ABSTRACT

Using zinc naphthenate and titanium tetra isopropoxide (1:1 mol.\%) dissolved in ethanol as precursors, single phase Zn(2)TiO(4) nanoparticles were synthesized by the flame spray pyrolysis technique. The Zn(2)TiO(4) nanoparticles were characterized by X-ray diffraction (XRD), scanning electron microscopy (SEM), transmission electron microscopy (TEM) and energy dispersive spectroscopy (EDS). The BET surface area (SSA(BET)) of the nanoparticles was measured by nitrogen adsorption. The average diameter of Zn(2)TiO(4) spherical particles was in the range of 5 to 10 nm under 5/5 (precursor/oxygen) flame conditions. All peaks can be confirmed to correspond to the cubic structure of Zn(2)TiO(4) (JCPDS No. 25-1164). The SEM result showed the presence of agglomerated nanospheres with an average diameter of 10-20 nm. The crystallite sizes of spherical particles were found to be in the range of 5-18 nm from the TEM image. An average BET equivalent particle diameter (dB) was calculated using the density of Zn(2)TiO(4). (C) 2011 Elsevier B.V. All rights reserved.

KEYWORDS: LOW-TEMPERATURE; ZNTIO3; TRANSFORMATION; CERAMICS
FLOW INJECTION AND RELATED TECHNIQUES IN BLOOD STUDIES FOR CLINICAL SCREENING AND ANALYSIS: A REVIEW

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ABSTRACT

Blood studies for clinical screening/analysis are geared toward point of care testing. Flow based techniques have expanded their applications with unique approaches that may be adaptable for use as alternative disease screening/diagnosis. Many newly developed systems for solution based chemical analysis can be easily adapted for use with plasma and serum. However, cell and intracellular analyses are different. Blood cell analyses require a particular way of sample introduction and detection. This review emphasizes the applications of flow based techniques, especially those that were coupled with FI/SI, in clinical studies through analysis of red blood cells and their intracellular substances.

KEYWORDS: ATOMIC-ABSORPTION-SPECTROMETRY; MICROWAVE-ASSISTED MINERALIZATION; UNDILUTED WHOLE-BLOOD; CHEMICALLY MODIFIED ELECTRODES; TANDEM MASS-SPECTROMETRY; SOLID-PHASE EXTRACTION; VIVO SAMPLE UPTAKE; SPECTROPHOTOMETRIC DETERMINATION; CHEMILUMINESCENCE DETECTION; ENZYMATIC DETERMINATION
FLOW INJECTION COLORIMETRIC METHOD USING ACIDIC CERIC NITRATE AS REAGENT FOR DETERMINATION OF ETHANOL

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ABSTRACT

Ceric ammonium nitrate has been used for qualitative analysis of ethanol. It forms an intensely colored unstable complex with alcohol. In this work, a simple flow injection (FI) colorimetric method was developed for the determination of ethanol, based on the reaction of ethanol with ceric ion in acidic medium to produce a red colored product having maximum absorption at 415 nm. Absorbance of this complex could be precisely measured in the FI system. A standard or sample solution was injected into a deionized water donor stream and flowed to a gas diffusion unit, where the ethanol diffused through a gas permeable membrane made of plumbing PTFE tape into an acceptor stream to react with ceric ammonium nitrate in nitric acid. Color intensity of the reddish product was monitored by a laboratory made LED based colorimeter and the signal was recorded on a computer as a peak. Peak height obtained was linearly proportional to the concentration of ethanol originally presented in the injected solution in the range of 0.1-10.0% (v/v) ($r^2 = 0.9993$), with detection limit of 0.03% (v/v). With the use of gas diffusion membrane, most of the interferences could be eliminated. The proposed method was successfully applied for determination of ethanol in some alcoholic beverages, validating by gas chromatographic method. (C) 2011 Elsevier B.V. All rights reserved.

KEYWORDS: MEMBRANELESS GAS-DIFFUSION; ALCOHOLIC BEVERAGES; OXIDATION; SYSTEM; UNIT; GLYCEROL; WINES; PERVAPORATION; CERIUM(IV); LIQUORS

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FORMATION OF CuO NANORODS AND THEIR BUNDLES BY AN ELECTROCHEMICAL DISSOLUTION AND DEPOSITION PROCESS

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ABSTRACT

Copper oxide nanorods (NRs) and their bundles were deposited on glass substrates by an electrochemical dissolution and deposition process. Changes in the electrode separation, the deposition time and the voltage could be used to control the morphologies, the thickness and the ratio of bundles/NRs. The formation of the NRs and their bundles was explained by an aggregation mechanism. A transformation of the Cu phase in the as-deposited sample to a single CuO phase was effected by an annealing treatment at 500 degrees C. The increasing photoluminescence (PL) intensity of the annealed sample resulted from a grain size growth and an improvement in the crystallinity. (C) 2011 Elsevier B.V. All rights reserved.

KEYWORDS: OXIDE THIN-FILMS; STRUCTURAL-PROPERTIES; ORIENTED AGGREGATION; COPPER; PHOTOLUMINESCENCE; NANOPARTICLES; OXIDATION; NANOCRYSTALLINE; NANOWIRES; GROWTH
ABSTRACT

In this paper, we prove strong convergence theorems of modified Halpern's iteration for finding a common element of the zero point set of a maximal monotone operator and the fixed point set of a relatively nonexpansive mapping in a Banach space by using two hybrid methods. Using these results, we obtain new convergence results for resolvents of maximal monotone operators and relatively nonexpansive mappings in Banach spaces.

KEYWORDS: STRONG-CONVERGENCE THEOREMS; HILBERT-SPACES; HYBRID METHODS; FIXED-POINTS
GENETIC AFFINITY AND ADMIXTURE OF NORTHERN THAI PEOPLE ALONG THEIR MIGRATION ROUTE IN NORTHERN THAILAND: EVIDENCE FROM AUTOSOMAL STR LOCI

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ABSTRACT

The Khon Mueang (KM) are the largest group of northern Thai people. Our previous mtDNA studies have suggested an admixture process among the KM with the earlier Mon-Khmer-speaking inhabitants of this region. In this study, we evaluate genetic affinities and admixture among 10 KM populations in northern Thailand lying along the historical Yuan migration route, and 10 neighboring populations belonging to 7 additional ethnic groups: Lawa, Mon (Mon-Khmer-speaking groups), Shan, Yuan, Lue, Khuen and Yong (Tai-speaking groups) by analyzing 15 hypervariable autosomal short tandem repeat loci. The KM exhibited close relationships with neighboring populations, especially the Tai-speaking groups, reflecting an admixed origin of the KM. Admixture proportions were observed in all KM populations, which had a higher contribution from the parental Tai than the Mon-Khmer groups. Different admixture patterns of the KM along the migration route might indicate high heterogeneity among the KM. These patterns were not directly associated with geographical proximity, suggesting other factors, like variation in the timing of admixture with the existing populations may have had an important role. More genetic data from different marker systems solely transmitted through the male or female lineages are needed to complete the description of genetic admixture and population history of the KM. Journal of Human Genetics (2011) 56, 130-137; doi: 10.1038/jhg.2010.135; published online 25 November 2010

KEYWORDS: MULTILOCUS GENOTYPE DATA; POPULATION-STRUCTURE; PARENTAL POPULATIONS; MICROSATELLITE LOCI; ANDHRA-PRADESH; MOLECULAR-DATA; DNA DIVERSITY; PROPORTIONS; INDIA; SOFTWARE
GENETIC STRUCTURE OF KHON MUEANG POPULATIONS ALONG A HISTORICAL YUAN MIGRATION ROUTE IN NORTHERN THAILAND

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ABSTRACT

The genetic structure and diversity of the Khon Mueang, who constitute the majority of the current northern Thai populations, is poorly understood. In present study, 433 unrelated individuals from 10 Khon Mueang villages, located in different geographic areas along historical Yuan migration route, were analyzed using the mtDNA hypervariable region (HVR) 1 and 17 Y chromosome short tandem repeats (Y-STRs) as markers. The studied populations from the Chiang Mai-Lamphun basin showed the evidence of demographic expansion and gene flow process in this area. Genetic structure of the geographically diverse Khon Mueang was driven by geography, while genetic differentiation of Chiang Mai-Lamphun populations was shaped by genetic exchange with the neighbouring populations in the area. Contrasting patterns of mtDNA and Y chromosome variations, influenced by sex-bias rates of migration and admixture, suggests that male and female Khon Mueang do not have identical demographic histories.

KEYWORDS: HUMAN Y-CHROMOSOME; MITOCHONDRIAL-DNA VARIATION; STATISTICAL TESTS; MTDNA VARIATION; MICROSATELLITE; POLYMORPHISMS; PHYLOGEOGRAPHY; HAPLOTYPES; PATTERNS
GENETIC STRUCTURE OF THE MON-KHMER SPEAKING GROUPS AND THEIR AFFINITY TO THE NEIGHBOURING TAI POPULATIONS IN NORTHERN THAILAND

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ABSTRACT

Background: The Mon-Khmer speaking peoples inhabited northern Thailand before the arrival of the Tai speaking people from southern China in the thirteenth century A. D. Historical and anthropological evidence suggests a close relationship between the Mon-Khmer groups and the present day majority northern Thai groups. In this study, mitochondrial and Y-chromosomal DNA polymorphisms in more than 800 volunteers from eight Mon-Khmer and ten Tai speaking populations were investigated to estimate the degree of genetic divergence between these major linguistic groups and their internal structure. Results: A large fraction of genetic variation is observed within populations (about 80% and 90% for mtDNA and the Y-chromosome, respectively). The genetic divergence between populations is much higher in Mon-Khmer than in Tai speaking groups, especially at the paternally inherited markers. The two major linguistic groups are genetically distinct, but only for a marginal fraction (1 to 2%) of the total genetic variation. Genetic distances between populations correlate with their linguistic differences, whereas the geographic distance does not explain the genetic divergence pattern. Conclusions: The Mon-Khmer speaking populations in northern Thailand exhibited the genetic divergence among each other and also when compared to Tai speaking peoples. The different drift effects and the post-marital residence patterns between the two linguistic groups are the explanation for a small but significant fraction of the genetic variation pattern within and between them.

KEYWORDS: MITOCHONDRIAL-DNA VARIATION; HUMAN Y-CHROMOSOME; BAYESIAN-ANALYSIS; MICROSATELLITE; SOFTWARE; POLYMORPHISMS; DISTANCES; ORIGINS; PEOPLES; EUROPE
GENOME SCREENING FOR REDUCING TYPE I POLYKETIDE SYNTHASE GENES IN TROPICAL FUNGI ASSOCIATED WITH MEDICINAL PLANTS

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ABSTRACT

The aim of this work was to employ primers, which encode ketosynthase (KS) domains designed to detect Lovastatin-type PKSs (highly reduced molecules), to identify fungal species that have the potential for polyketide production. Using this strategy we have identified twenty-three KS sequences from twenty different fungal strains associated with medicinal plants found in Thailand. Phylogenetic analysis based on these sequences suggested that rapid screening provided the potential to explore significant PKS structural diversity. With this primer set a unique subclade of reducing type I PKS was identified. This encodes uncharacterized functional enzyme systems, which may suggest a novel function for these pks. Two fungi, Eupenicillium shearii and Myrothecium pandanicola within this novel clade, were investigated for polyketide synthesis. Three compounds, p-hydroxyphenopyrrozin (1) phenopyrrozin (2), and 2,3-dihydro-5-methoxy-2-methylchromen-4-one (3), were identified.

KEYWORDS: ASPERGILLUS-PARASITICUS; ENDOPHYTIC FUNGUS; NODULISPORIUM SP; BIOSYNTHESIS; DIVERSITY; METABOLITES; DOMAIN; IDENTIFICATION; NIDULANS; THAILAND
GLYCOLTHERMAL SYNTHESIS AND CHARACTERIZATION OF HEXAGONAL CdS ROUND MICROPARTICLES IN FLOWER–LIKE CLUSTERS

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ABSTRACT

Hexagonal CdS round microparticles in flower-like clusters were synthesized by glycolthermal reactions of CdCl(2) and thiourea as cadmium and sulphur sources in 1,2-propylene glycol (PG) at 100-200 degrees C for 10-30 h. Phase and morphology were detected using X-ray diffraction (XRD), and scanning and transmission electron microscopy (SEM, TEM). The products were pure phase of hexagonal wurtzite CdS. The quantitative elemental analysis of Cd:S ratio was detected using energy dispersive X-ray (EDX) analyzer. Raman spectrometer revealed the presence of fundamental and overtone modes at 296 and 595 cm(-1), corresponding to the strong 1LO and weak 2LO modes, respectively. Photonic properties were investigated using UV-visible and photoluminescence (PL) spectroscopy. They showed the same absorption at 493-498 nm, and emission at 431 nm due to the excitonic recombination process. A possible formation mechanism was also proposed, according to experimental results. (C) 2011 Elsevier B.V. All rights reserved.

KEYWORDS: MICROWAVE-ASSISTED SYNTHESIS; SOURCE MOLECULAR PRECURSOR; MICROCRYSTALLINE CdS; NANOPARTICLES; NANOCRYSTALLINE; NANORODS; SULFIDE; GROWTH; FABRICATION; DENDRITES
GLYCOPROTEOMIC ANALYSIS AND MOLECULAR MODELING OF HAPTOGLOBIN MULTIMERS

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ABSTRACT

Extra-thiol groups on the alpha-subunit allow haptoglobin (Hp) to form a variety of native multimers which influence the biophysical and biological properties of Hp. In this work, we demonstrated how differences of multimeric conformation alter the glycosylation of Hp. The isoform distributions of different multimers were examined by an alternative approach, i.e. 3-D-(Native/IEF/SDS)-PAGE, which revealed differences in N-glycosylation among individual multimers of the same Hp sample. Glycomic mapping of permethylated N-glycan indicated that the assembled monomer and multimeric conformation modulate the degree of glycosylation, especially the reduction in terminal sialic acid residues on the bi-antennary glycan. Loss of the terminal sialic acid in the higher order multimers increases the number of terminal galactose residues, which may contribute to conformation of Hp. A molecular model of the glycosylated Hp multimer was constructed, suggesting that the effect of steric hindrance on multimeric formation is critical for the enlargement of the glycan moieties on either side of the monomer. In addition, N241 of Hp was partially glycosylated, even though this site is unaffected by steric consideration. Thus, the present study provides evidence for the alteration of glycan structures on different multimeric conformations of Hp, improving our knowledge of conformation-dependent function of this glycoprotein.

KEYWORDS: PANCREATIC-CANCER; FUCOSYLATED HAPTOGLOBIN; ENDOPLASMIC-RETICULUM; STATISTICAL-ANALYSIS; N-GLYCOSYLATION; PROTEIN; BINDING; SITE; ISOFORMS; GLYCANS
GLYCOPROTEOMICS ANALYSIS TO IDENTIFY A GLYCOFORM ON HAPTOGLOBIN ASSOCIATED WITH LUNG CANCER

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ABSTRACT

Glycosylation is a common protein modification that is of interest in current cancer research because altered carbohydrate moieties are often found during cancer progress. A search for biomarkers in human lung cancer serum samples using glycoproteomic approaches identified fucosylated haptoglobin (Hp) significantly increased in serum of each subtype of lung cancer compared to normal donors. In addition, MS provided evidence of an increase of Hp fucosylation; the glycan structure was determined to be an alpha 2,6-linked tri-sialylated trian-tennary glycan containing alpha 1,3-linked fucose attached to the four-linked position of the three-arm mannose of N-linked core pentasaccharide. These preliminary findings suggest that the specific glycoform of Hp may be useful as a marker to monitor lung cancer progression.

KEYWORDS: SIALYL-LEWIS-X; PANCREATIC-CANCER; HEPATOCELLULAR-CARCINOMA; FUCOSYLATED HAPTOGLOBIN; N-GLYCANS; BIOMARKER DISCOVERY; SERUM; IDENTIFICATION; DIAGNOSIS; GLYCOSYLATION
GmERF PROMOTERS GIVE HIGH WOUND-INDUCIBLE EXPRESSION IN TRANSGENIC SOYBEAN

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ABSTRACT

Analysis of promoter responses to specific stimuli is not only important to gain a better understanding of the regulation of gene expression but also for the development of crops with enhanced disease/pest resistance. As plants show similar responses to mechanical wounding, pathogen invasion and damage from chewing insects, studies of wound-inducible promoters could provide insights to the mechanisms of regulation of stress-responsive genes. Here we studied induction of Glycine max Ethylene Response Factor (GmERF) genes and their promoters. Transcript analysis of 10 GmERF genes revealed that GmERF genes are highly responsive to wounding, methyl jasmonate and ethylene in hypocotyls and cotyledons of soybean seedlings. Four GmERF promoters were subsequently isolated, fused to the Green Fluorescent Protein (gfp) gene and introduced into soybean. In transgenic plants, the GmERF3 and GmERF10 promoters directed low background GFP expression in roots, pod tissues, epidermis, and vascular tissues. However, these promoters were highly inducible in wounded cotyledons, hypocotyls and young leaves. GFP was not induced in wounded roots, indicating that wound induction of these promoters is tissue specific. We also found no induction of expression in wounded roots for most of the 10 GmERF genes studied. Further analysis of induction under different stimuli, along with fine analysis of promoter sequences, will allow us to expand our knowledge of the regulation of gene expression under stress conditions.
GROWTH, MORPHOLOGY, AMMONIUM UPTAKE AND NUTRIENT ALLOCATION OF MYRIOPHYLLUM BRASILIENSE CAMBESS. UNDER HIGH NH(4)(+) CONCENTRATIONS

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ABSTRACT

The effects of high NH(4)(+) concentration on growth, morphology, NH(4)(+) uptake and nutrient allocation of Myriophyllum brasiliense were investigated in hydroponic culture. The plants were grown under greenhouse conditions for 4 weeks using four levels of NH(4)(+) concentration: 1, 5, 10 and 15 mM. M. brasiliense grew well with a relative growth rate of c. 0.03 day(-1) at NH(4)(+) concentration up to 5 mM. At the higher NH(4)(+) concentrations the growth of the plants was stunted and the plants had short roots and few new buds, especially when grown in 15 mM NH(4)(+) where the submerged leaves were lost and there were rotten roots and submerged stems. To avoid NH(4)(+) toxicity, the plants may have a mechanism to prevent cytoplasmic NH(4)(+) accumulation in plant cells. The net uptake of NH(4)(+) significantly decreased and the total N significantly increased in the plants treated with 10 and 15 mM NH(4)(+), respectively. The plant may employ NH(4)(+) assimilation and extrusion as a mechanism to compensate for the high NH(4)(+) concentrations. However, the plants may show nutrient deficiency symptoms, especially K deficiency symptoms, after they were exposed to NH(4)(+) concentration higher than 10 mM. The present study provides a basic ecophysiology of M. brasiliense that it can grow in NH(4)(+) enriched water up to concentrations as high as 5 mM.

KEYWORDS: MACROPHYTE VALLISNERIA NATANS; FREE AMINO-ACIDS; SUBMERGED MACROPHYTES; PHRAGMITES-AUSTRALIS; PHYSIOLOGICAL STRESS; LIGHT AVAILABILITY; GLYCERIA-MAXIMA; UPTAKE KINETICS; NITROGEN; WATER
HIGH PERFORMANCE LIQUID CHROMATOGRAPHIC DETERMINATION OF SOLASODINE IN SOLANUM SPECIES

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ABSTRACT

This study incorporates HPLC analysis of solasodine from Solanum indicum Linn. and Solanum trilobatum Linn. Solasodine was determined by HPLC using SphereClone 3 µm ODS, 100 x 4.6 mm as an analytical column with the mobile phase 10 mM phosphate buffer-acetonitrile (75:25, v/v) adjusted to pH 3.0. The flow rate was adjusted to 1.0 mL min\(^{-1}\). The injection volume was adjusted to 50 µL and the absorption was made at 530 nm. Linear calibration curve was obtained over the concentration range of 2.5-60.0 µg mL\(^{-1}\) of solasodine with a correlation coefficient of 0.9980. The limit of detection (LOD) was found to be 0.13 µg mL\(^{-1}\). The limit of quantification (LOQ) value was found to be 0.43 µg mL\(^{-1}\). The RSD of the proposed method obtained by assaying six replicate injections of 10, 20 and 30 µg mL\(^{-1}\) of solasodine for intra-day and inter-day were found to be 1.8-2.4 and 1.0-2.8 %, respectively. The mean percentage recovery was found to be 97.23 +/- 4.71 %. The proposed method was applied to the determination of solasodine in Solanum indicum Linn. and Solanum trilobatum Linn. in Solanaceae family. The mean contents of solasodine in Solanum indicatum Linn. and Solanum trilobatum Linn. were found to be 0.48 and 1.32 mg g\(^{-1}\), respectively. The method has been applied to the determination of solasodine in various plant samples.

KEYWORDS: THIN-LAYER-CHROMATOGRAPHY; NONAQUEOUS CAPILLARY-ELECTROPHORESIS; STEROIDAL ALKALOIDS; GAS-CHROMATOGRAPHY; GLYCOALKALOIDS; SEPARATION; QUANTIFICATION; SOLANIDINE; LACINIATUM; GLYCOSIDES

HIGH-ENERGY HEAVY ION BEAM ANNEALING EFFECT ON ION BEAM SYNTHESIS OF SILICON CARBIDE

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ABSTRACT

Silicon carbide (SiC) is a superior material potentially replacing conventional silicon for high-power and high-frequency microelectronic applications. Ion beam synthesis (IBS) is a novel technique to produce large-area, high-quality and ready-to-use SiC crystals. The technique uses high-fluence carbon ion implantation in silicon wafers at elevated temperatures, followed by high-energy heavy ion beam annealing. This work focuses on studying effects from the ion beam annealing on crystallization of SiC from implanted carbon and matrix silicon. In the ion beam annealing experiments, heavy ion beams of iodine and xenon, the neighbors in the periodic table, with different energies to different fluences, I ions at 10, 20, and 30 MeV with 1-5 x 10(12) ions/cm(2), while Xe ions at 4 MeV with 5 x 10(13) and 1 x 10(14) ions/cm(2), bombarded C-ion in implanted Si at elevated temperatures. X-ray diffraction, Raman scattering, infrared spectroscopy were used to characterize the formation of SiC. Non-Rutherford backscattering and Rutherford backscattering spectrometry were used to analyze changes in the carbon depth profiles. The results from this study were compared with those previously reported in similar studies. The comparison showed that ion beam annealing could indeed induce crystallization of SiC, mainly depending on the single ion energy but not on the deposited areal density of the ion beam energy (the product of the ion energy and the fluence). The results demonstrate from an aspect that the electronic stopping plays the key role in the annealing. (C) 2011 Elsevier B.V. All rights reserved.

KEYWORDS: DEPOSITION; LAYERS; FILMS; SI; IMPLANTATION; GROWTH; THIN
HOW DID FLOW INJECTION ANALYSIS, AND ITS RELATED TECHNIQUES, DEVELOP IN VARIOUS PARTS OF THE GLOBE? REFLECTIONS OF PROMINENT FIA PRACTITIONERS

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ABSTRACT

We present here some reflections gathered from responses to questions that were sent to FIA-researchers and practitioners who have devoted themselves to flow injection analysis and its related techniques during the last four decades. These comments were obtained shortly before the commencement of the 16th International Conference on Flow Injection Analysis, including related techniques (April 25–30, 2010, Pattaya, Thailand). These responses were arranged into a Power Point presentation for the opening session (see: http://www.science.cmu.ac.th/icfia2010/). (Follow the links http://www.science.cmu.ac.th/icfia2010/downloads fiabio icfia16.html or http://www.science.cmu.ac.th/icfia2010/icfia16fiabiopart14. pdfwww.science.cmu.ac.th/icfia2010/ where more details of each respondent's recollections are provided, along with pioneering pictures.) The questions were: 1. What initiated your interest in flow injection analysis? 2. When and where did you start working in this area of research? Your present affiliation? 3. What aspects of your work in flow analysis do you find most intriguing or satisfying? 4. In your opinion, what are the likely trends/future directions of flow analysis (which may include aspects such as fields of application, manifold architecture, modes of detection, etc.). 5. Please indicate five key publications that you feel are representative your work. The information reflects how FIA and kindred techniques were developed in various places, and also emphasizes the usefulness of the techniques....
Christian (USA) “... It goes back to my sabbatical in Europe in 1978/1979. I had been following the early literature in FIA, and while at the University of Geneva in 1979, I spent a lot of time in the library searching the literature in the field (before the availability of electronic databases!), in preparation for submission of a proposal to NSF. I uncovered some early references not known before and included them in the NSF proposal. While the proposal was not funded (a fate of early work in the field), ...” My first FIA work was with my student, Tim Kelly, and our first publication was “Fluorometer for Flow Injection Analysis with Application to Oxidase Enzyme Dependent Reactions”, T.A. Kelly and G.D. Christian, Anal. Chem., 53, 2110 (1981). I was lucky to arrange for visits of Jarda Ruzicka to the University of Washington, and as a result, in 1987 we were fortunate to have him join our department as professor, moving from the Technical University of Denmark. We enjoyed a fruitful research collaboration for many years, and our first publication together was “Stopped-Flow Determination of Reaction Rate Parameters”, J. H. Hungerford, G.D. Christian, J. Ruzicka and J. C. Giddings, FIA Newslett., 1(2), June, 1984, followed with "Reaction Rate Measurement by Flow Injection Analysis Using the Gradient Stopped-Flow Method", J.H. Hungerford, G.D. Christian, J. Ruzicka and J.C. Giddings, Anal. Chem., 57, 1794–1798 (1985). We have over 100 joint publications. ...” 23. Ian D McKelvie (Australia) “... My interest in FIA was triggered by a Talanta paper by Shoji Motomizu in 1983 on phosphate analysis using the Malachite Green method. My colleagues and I were studying phosphorus cycling in mountain streams, and we needed a sensitive phosphate method that was cheaper, faster and more portable than the IC techniques that we were using at the time. So we tried FIA. ... What still endears FIA to me, is the ability to do fast, sensitive and precise environmental analyses, e.g., at sea, using relatively simple, low cost instruments. ... We have only scratched the surface in our application of FIA to autonomous environmental monitoring, and in my view, it is here that flow techniques still show greatest promise.”... 24. Kate Grudpan (Thailand) “... No experience until nearly the end of PhD study under Dr Colin Taylor in Liverpool, by support of the British Council for a visit (1980) to Prof Betteridge’s FIA lab in Swansea. Various ideas in cost effective FIA set-ups were created. This line of research is very useful where budget is limited. In 1986, I had the chance to start collaboration with Ian McKelvie, still in the line of cost effective approach. In 1990, during Alexander von Humboldt Foundation Fellowship at (Nuclear) Karlsruhe Research Center in Germany, FIA for radioactivity was investigated. In 1996, a visit to the University of Washington, under support from the International Atomic Energy Agency (IAEA), was the first opportunity to meet Gary Christian and Jarda Ružička. Researches in flow-based analysis in Thailand have been increasing since, with the direct and indirect support of Gary Christian. Close collaboration has been established with
Japanese Association for Flow Injection Analysis (especially with Shoji Motomizu and Tadao Sakai). All of the abovementioned concern “cost effective” approaches. Recently, the THAI Association for Flow-based Analysis has been established. The development of cost effective analysis flow techniques for telehealth, clinical and environmental analysis is a major future challenge, and as part of this, utilisation of natural reagents should be further explored.”
HYDROTHERMAL SYNTHESIS, CHARACTERIZATION, AND OPTICAL PROPERTIES OF WOLFRAMITE ZnWO(4) NANORODS

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ABSTRACT

In this research, the effects of pH, reaction temperature and holding reaction time on the synthesis of one-dimensional ZnWO(4) nanostructures by a hydrothermal method were studied. Phase, morphology and atomic vibration were characterized by X-ray diffraction (XRD), scanning and transmission electron microscopy (SEM and TEM), and Fourier transform infrared (FTIR) and Raman spectroscopy. The pure monoclinic ZnWO(4) structure was synthesized at the pH solutions of 7 and 8. By varying the pH values, the mixtures of monoclinic ZnWO(4) and hexagonal ZnO as major and minor phases were detected at the pH 9 and 10 solutions, and the pure hexagonal ZnO phase at the pH 11 and 12. SEM and TEM images proved that ZnWO(4) nanorods grew along the [021] direction, with the reaction temperature and time to control their morphologies. The Zn-O, Zn-O-W, and W-O stretching vibrations were detected at 474, 888, and 726 cm⁻¹, and their corresponding bending vibrations at 430, 826, and 582 cm⁻¹, respectively. The optical properties of ZnWO(4) nanorods were also investigated by UV-visible (UV-vis) and photoluminescence (PL) spectroscopy. The above analyses proved that the appropriate condition for synthesizing of ZnWO(4) nanorods is at pH 8 by the 200 degrees C and 24 h hydrothermal treatment.

KEYWORDS: SPLITTING AGENT; PHOTOLUMINESCENCE; NANOPARTICLES; LUMINESCENCE; TEMPLATE; EMISSION; FABRICATION; POWDERS; RAMAN
IDENTIFICATION OF AMINO ACID RESIDUES OF A DESIGNED ANKYRIN REPEAT PROTEIN POTENTIALLY INVOLVED IN INTERMOLECULAR INTERACTIONS WITH CD4: ANALYSIS BY MOLECULAR DYNAMICS SIMULATIONS

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ABSTRACT

We applied molecular dynamics simulations to investigate the binding properties of a designed ankyrin repeat protein, the DARPin-CD4 complex. DARPin 23.2 has been reported to disturb the human immunodeficiency virus (HIV) viral entry process by Schweizer et al. The protein docking simulation was analysed by comparing the specific ankyrin binder (DARPin 23.2) to an irrelevant control (2JAB) in forming a composite with CD4. To determine the binding free energy of both ankyrins, the MM/PBSA and MM/GBSA protocols were used. The free energy decomposition of both complexes were analysed to explore the role of certain amino acid residues in complex configuration. Interestingly, the molecular docking analysis of DARPin 23.2 revealed a similar CD4 interaction regarding the gp120 theoretical anchoring motif. In contrast, the binding of control ankyrin to CD4 occurred at a different location. This observation suggests that there is an advantage to the molecular modification of DARPin 23.2, an enhanced affinity for CD4. (C) 2011 Elsevier Inc. All rights reserved.

KEYWORDS: HIV-PROTEASE; SHAPE COMPLEMENTARITY; DIELECTRIC MEDIUM; HEPT DERIVATIVES; NEURAL-NETWORKS; GEOMETRIC FIT; FREE-ENERGIES; DOCKING; BINDING; INHIBITORS
IMPACT OF HIV-1 VIRAL LOAD ON GENOTYPIC CHARACTERISTICS AMONG PATIENTS FAILING NON-NUCLEOSIDE REVERSE TRANSCRIPTASE INHIBITOR-BASED FIRST-LINE REGIMENS IN NORTHERN THAILAND

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ABSTRACT

Widespread use of antiretroviral drugs has significantly increased drug resistance. In the resource limited countries, delayed detection of drug resistance may lead to accumulation of drug resistance mutations. We investigated the genotypic drug resistance mutation patterns in HIV-infected patients with various levels of plasma HIV RNA levels. Fifty-nine HIV-infected patients with antiviral therapy failure were recruited. Genotypic assays of HIV-1 protease and reverse transcriptase genes were analyzed. There was a significant difference in CD4 cell counts and percentage of CD4 (p < 0.05) between groups of patients with high and low viral load, who failed first-line non nucleoside reverse transcriptase inhibitor-based regimens. In addition, patients with HIV-1 viral load $\geq 4$ log(10) have a significantly higher likelihood of being infected with HIV-1 containing 3 to 5 resistance-associated mutations than those with HIV-1 viral load $< 4$ log(10). Thus, delayed detection of increased HIV-1 viral load and antiretroviral drug-resistance may lead to accumulation of drug-resistant mutations and decreased CD4 cell count and percentage.

KEYWORDS: IMMUNODEFICIENCY-VIRUS TYPE-1; DRUG-RESISTANCE; PROTEASE INHIBITOR; MUTATIONS; THERAPY; JAPAN
IMPACT OF RHIZOBIAL INOCULANTS ON RHIZOSPHERE BACTERIAL COMMUNITIES OF THREE MEDICINAL LEGUMES ASSESSED BY DENATURING GRADIENT GEL ELECTROPHORESIS (DGGE)

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ABSTRACT

Denaturing Gradient Gel Electrophoresis (DGGE) was used to study the impact of rhizobial inoculants on the rhizosphere bacterial communities of three medicinal legumes: Indigofera tinctoria, Pueraria mirifica and Derris elliptica Benth. Rhizosphere soils were collected from these legumes grown naturally in 11 provinces of Thailand. The host-specific rhizobial strains were inoculated to their hosts planted in the collected rhizosphere soils of each legume. Four months after planting, total bacterial communities DNA was extracted from the uninoculated rhizosphere soils and the inoculated rhizosphere soils. DGGE fingerprints of PCR-amplified 16S rDNA were obtained from the bacterial communities. PCR-DGGE analysis showed that the bacterial community structures in native rhizospheres of the three legumes were different from each other based on the generated dendrogram and Sorensen's index. These results suggest that different plant species and soil characteristics synergically affected the rhizosphere bacterial communities. The bacterial diversity of I. tinctoria and P. mirifica native rhizospheres were significantly different from that of D. elliptica Benth. native rhizosphere. Our results also showed that the inoculants contributed to the slight changes in rhizosphere community structures. In comparison with each other, the plants appeared to have a much stronger influence on the bacterial communities rather than the inoculants. Hierarchical cluster analysis revealed that the community structure of the inoculated rhizosphere of D. elliptica Benth. was more divergent from those of inoculated rhizospheres of I. tinctoria and P. mirifica. The ribotype richness which indicates species diversity, was highest in I. tinctoria rhizosphere, followed by P. mirifica rhizosphere and D. elliptica Benth. rhizosphere, respectively.

KEYWORDS: 16S RIBOSOMAL-RNA; MICROBIAL COMMUNITY; SOIL; DIVERSITY; ALFALFA; GROWTH; GENE

IMPROVEMENT OF FERROELECTRIC AND DIELECTRIC PROPERTIES OF ANNEALED PYROCHLORE FREE PZT BASED CERAMICS

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ABSTRACT

The method of thermal annealing was applied to 0.05PZN-0.15PNN-0.8PZT ceramics to improve its electrical properties. The ceramics were prepared via a columbite method: sintered at 1250 degrees C for 2 h, followed by the thermal annealing at 900 degrees C for 8-24 h. Improvements in many electrical properties such as dielectric and ferroelectric properties were observed. Annealing for 8 h was found to be the optimum annealing condition for the ceramics. The results were discussed in term of densification and composition variation after annealing.

KEYWORDS: FABRICATION; TRANSITION
IMPROVEMENT OF POLY(3-PHENYLTHIOPHENE)-BASED BULK HETEROJUNCTION ORGANIC SOLAR CELLS

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ABSTRACT

This paper describes the synthesis and photovoltaic studies of Poly(3-Phenylthiophene) (P3PhT). P3PhT was synthesized by the chemically oxidized polymerization in the presence of FeCl₃. Bulk heterojunction solar cells based on polymer were fabricated by using chloroform, chlorobenzene, and dichlorobenzene at different weight ratios of P3PhT. The different ratios of P3PhT as the electron donor blended with [6,6]-phenyl-C₆₁-butyric acid methyl ester (PC(61)BM) as the electron acceptor were investigated. A maximum power conversion efficiency was achieved at a 2:3 (wt:wt) P3PhT:PC(61)BM blend ratio in dichlorobenzene.

KEYWORDS: POLYMER PHOTOVOLTAIC CELLS

IMPROVING SOLID–STATE FERMENTATION OF MONASCUS PURPUREUS ON AGRICULTURAL PRODUCTS FOR PIGMENT PRODUCTION

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ABSTRACT

In the present study, the effects of culture medium and temperature on red pigment production and mycelia growth were evaluated. The maximum red pigment production was found when Monascus purpureus CMU001 was cultivated on potato dextrose broth at 30°C for 2 weeks. The highest amount of dry weight was achieved when cultivated on tryptone glucose yeast extract medium. Cheap agricultural products and residues were used as substrates for pigment production. Corn meal was the best substrate for pigment production (19.4 U/gds) when compared to peanut meal, coconut residue, and soybean meal. The highest pigment yield (129.63 U/gds) was found when corn meal was supplemented with 8% (w/w) glucose, followed by coconut residue (63.50 U/gds), peanut meal (52.50 U/gds), and soybean meal (22.50 U/gds). Galactose, sorbose, psicose, and mannitol were found to be good supplements next to glucose but not xylitol. Pigment was not stable at high temperature and long exposure to UV. The intensity of red pigment decayed 30.57% and 5.41% after autoclaving and pasteurization, respectively.

KEYWORDS: RED PIGMENTS; JACKFRUIT SEED; CULTURE; RUBER; RICE; CORN
INFECTION DYNAMICS AND MOLECULAR IDENTIFICATION
OF METACERCARIAE IN CYPRINOIDS FROM CHIANG MAT
AND SAKON NAKHON PROVINCES

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ABSTRACT

The infection dynamics of metacercariae were assessed in cyprinoid fish (cyprinoids) from Chiang Mai and Sakon Nakhon Provinces, Thailand, during October 2008 to September 2009. The samples were collected during 3 seasons from rivers and local markets. Metacercarial infection was determined by acid-pepsin digestion and confirmed using HAT-RAPD PCR method. Thirteen and 16 species of cyprinoids were collected from Chiang Mai and Sakon Nakhon with overall prevalences of metacercarial infection of 84.5 and 47.6%, respectively. *Haplorchis taichui*, *Haplorchoides sp*, and *Centrocestus caninus* were found in Chiang Mai and 4 species of metacercariae: *H. taichui*, *Haplorchoides sp*, *O. viverrini* and an unknown trematode species in Sakon Nakhon. *H. taichui* and *Haplorchoides sp* metacercariae in 3 species of cyprinoids (Henicorhynchus siamensis, Cyclocheilichthys armatus, Amblyrhyynchichthys truncatus) had the highest prevalence (100%) in Chiang Mai, while the highest prevalence (100%) of metacercaria in Sakon Nakhon was *Haplorchoides sp* in 1 species of cyprinoids (Cyclocheilichthys armatus). The overall prevalence from Chiang Mai Province was highest in the rainy season (95.6%), lower in the hot-dry season (88.1%) and lowest in the cool season (72.5%). In Sakon Nakhon Province the highest prevalence was in the hot-dry season (52.7%), and lower in the rainy and cool season, 44.4% and 43.5%, respectively. The HAT-RAPD profiles confirmed the identity of metacercariae and adult stage of *H. taichui*, *Haplorchoides sp*, *C. caninus* and *O. viverrini*.

KEYWORDS: OPISTHORCHIS-VIVERRINI; TAICHUI
INFLUENCE OF SEASONALITY ON THE OCCURRENCE OF MYXOMYCETES

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ABSTRACT

The present study represented an effort to develop a better understanding of the assemblages of myxomycetes fruiting under natural conditions in the field during two different seasons in the tropical forests of Chiang Mai Province, northern Thailand. Sixty-seven species of myxomycetes were recorded, including eight new records for Thailand. Species richness and diversity were higher for the warm-wet season than for the cool-dry season. Some members of the order Stemonitales were encountered only during the warm-wet season, whereas members of the order Physarales appear to be better adapted to tolerate the dry conditions of the cool-dry season. General patterns of occurrence of myxomycetes in forest ecosystems are discussed.

KEYWORDS: DIVERSITY; THAILAND; ECOLOGY; RESERVE; FOREST; REGIONS; ISLAND

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INVESTIGATION OF PLANT HORMONE LEVEL CHANGES IN SHOOT TIPS OF LONGAN (DIMOCARPUS LONGAN LOUR.) TREATED WITH POTASSIUM CHLORATE BY LIQUID CHROMATOGRAPHY-ELECTROSPRAY IONIZATION MASS SPECTROMETRY

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ABSTRACT

The endogenous levels of indole-3-acetic acid (IAA), gibberellins (GAs), abscisic acid (ABA) and cytokinins (CKs) and their changes were investigated in shoot tips of ten longan (Dimocarpus longan Lour.) trees for off-season flowering until 60 days after potassium chlorate treatment in comparison with those of ten control (untreated) longan trees. These analytes were extracted and interfering matrices removed with a single mixed-mode solid phase extraction under optimum conditions. The recoveries at three levels of concentration were in the range of 72-112%. The endogenous plant hormones were separated and quantified by liquid chromatography-electrospray ionization-mass spectrometry (LC-ESI-MS). Detection limits based on the signal-to-noise ratio ranged from 10 ng mL(-1) for gibberellin A4 (GA4) to 200 ng mL(-1) for IAA. Within the first week after potassium chlorate treatment, dry weight (DW) amounts in the treated longan shoot tips of four gibberellins, namely: gibberellin A1 (GA1), gibberellinic acid (GA3), gibberellin A19 (GA19) and gibberellin A20 (GA20), were found to increase to approximately 25, 50, 20 and 60 ng g(-1) respectively, all of which were significantly higher than those of the controls. In contrast, gibberellin A8 (GA8) obtained from the treated longan was found to decrease to approximately 20 ng g(-1) DW while that of the control increased to around 80 ng g(-1) DW. Certain CKs which play a role in leaf bud induction, particularly isopentenyl adenine (iP), isopentenyl adenosine (iPR) and dihydrozeatin riboside (DHZ), were found to be present in amounts of approximately 20, 50 and 60 ng g(-1) DW in the shoot tips of the control longan. The analytical results obtained from the two-month off-season longan flowering period indicate that high GA1, GA3, GA19 and GA20 levels in the longan shoot tips contribute to flower bud induction while high levels of CKs, IAA and ABA in the control longan contribute more to the vegetative development. (C) 2011 Elsevier BM. All rights reserved.

KEYWORDS: GROWTH; CYTOKININ; PURIFICATION; ARABIDOPSIS; INHIBITION; METABOLISM; EXTRACTION; INITIATION; INDUCTION; ACID

INVESTIGATIONS ON MORPHOLOGY AND FERROELECTRIC PROPERTIES OF NaNbO(3)-PbTiO(3) COMPOSITE CERAMICS

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ABSTRACT

Ceramics in NN-PT system with a formula (1-x)NaNbO(3)-(x)PbTiO(3) (where x = 0, 0.1, 0.2, ..., 1.0) were prepared by a solid state mixed oxide technique. The phase formation behavior and microstructure were studied using x-ray diffraction (XRD) and scanning electron microscopy (SEM), respectively. The dielectric and ferroelectric properties of the compounds were studied and discussed. Phase pure perovskites of NN-PT ceramics were obtained over a wide compositional range. This work was then aimed to determine the phase formation, morphology, dielectric and ferroelectric properties of NN-PT ceramics. Interestingly, the results showed that the addition of PT have been strongly affected on morphology and ferroelectric properties of NN ceramics.

ISOLATION AND CHARACTERIZATION OF ORIENTIA TSUTSUGAMUSHI FROM RODENTS CAPTURED FOLLOWING A SCRUB TYPHUS OUTBREAK AT A MILITARY TRAINING BASE, BOTHONG DISTRICT, CHONBURI PROVINCE, CENTRAL THAILAND

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ABSTRACT

Orientia tsutsugamushi, an obligate intracellular Gram-negative bacterium, is the causative agent of scrub typhus, a vector-borne disease transmitted by infected chiggers (trombiculid mite larvae). In 2002, an outbreak of scrub typhus occurred among Royal Thai Army troops during the annual field training at a military base in Bothong district, Chonburi province, central Thailand. This report describes the outbreak investigation including its transmission cycle. Results showed that 33.9% of 174 trained troops had scrub typhus-like signs and symptoms and 9.8% of those were positive for O. tsutsugamushi-specific antibodies by indirect fluorescence antibody assay. One hundred thirty-five rodents were captured from this training area, 43% of them had antibodies against O. tsutsugamushi. Six new O. tsutsugamushi isolates were obtained from captured rodent tissues and successfully established in cell culture. Phylogenetic studies showed that these six isolates were either unique or related to a native genotype of previously described isolates from Thailand.

ISOLATION AND CHARACTERIZATION OF THE GMSCREAM PROMOTER FAMILY FROM SOYBEAN

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ABSTRACT

Promoters are one of the key regulatory elements required for precise control of gene expression. The isolation and functional analysis of promoters can provide valuable insight into factors which modulate gene expression and supply useful components for genetic engineering. Recovery of novel promoters which give high expression in plant tissues may have application in situations where high expression levels are required. Here, we present isolation and early characterization of the Glycine max high expression level (GmScream) family of promoters. Using soybean transcriptomic database generated by RNA-Seq technology, the promoters of genes which have high expression were first identified. GmScream promoters fragments (about 1.5 kb) were amplified from soybean genomic DNA and cloned upstream the green fluorescent protein (gfp) gene. The expression level of GFP driven by each GmScream promoter was determined using both transient and stable expression. For transient expression studies, promoter constructs were introduced into lima bean cotyledons via particle bombardment and subsequently transient expression intensity profiles were collected over 100 h using an automated image collection and image analysis system. GmScream promoter constructs were also cloned into a binary vector and introduced into Agrobacterium rhizogenes K599 for production of soybean hairy roots, where GFP expression levels were also evaluated for rapid analysis of gene expression in stablytransformed tissues. These rapid validation methods can be used for quantification of promoter strength. The GmScream family of promoters was also analyzed for the presence of common cis regulatory elements. We hope that this new family of soybean promoters will be useful for both basic research and production of transgenics for crop improvement.
ISOLATION, STRUCTURE ELUCIDATION AND BIOLOGICAL ACTIVITY OF METABOLITES FROM SCH-642305-PRODUCING ENDOPHYTIC FUNGUS PHOMOPSIS SP CMU-LMA

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ABSTRACT

Eight polyketide compounds were isolated from the cultivation broth of Phomopsis sp. CMU-LMA. We have recently described LMA-P1, a bicyclic 10-membered macrolide, obtained as a bioconversion derivative of Sch-642305, the major compound isolated in this study. Benquinol is the ethyl ester derivative of the 13-dihydroxytetradeca-2,4,8-trienoic acid produced by Valsa ambiens. This compound is concomitantly produced with the 6,13-dihydroxytetradeca-2,4,8-trienoic acid (DHTTA) previously isolated from Mycosphaerella rubella. The absolute configuration of the new compound, (2R,3R,45,5R)-3-hydroxy-2,4-dimethyl-5-[(S,Z)-3-methylpentenyl]-tetrahydro-pyranone LMA-P2 was confirmed by X-ray crystallography. The delta-lactone 2,3-dihydroxytetradecan-5-olide (DHTO) was previously isolated from Seiridium unicorne. This compound may form through the cyclization of the methyl-2,3,5-trihydroxytridecanoate LMA-P3, a new linear polyketide isolated in this study. Benquoine, a new 14-membered lactone generated from the cyclization of benquinol, is proposed as the key precursor for the biosynthesis of Sch-642305. Antimicrobial activity and cancer cell viability inhibition by the new compounds were investigated. Benquoine exhibits antimicrobial activity against Gram positive bacteria, and cytotoxicity against HCT-116 cancer cell line. (C) 2011 Elsevier Ltd. All rights reserved.

KEYWORDS: BACTERIAL-DNA PRIMASE; HYDROXYTETRADECATRIENOIC ACID; STEREOSELECTIVE-SYNTHESIS; MYCOSPHAERELLA-RUBELLA; CONCISE SYNTHESIS; (+)-SCH 642305; INHIBITOR; METHODOLOGY; LACTONE
ISOTHERMAL PHASE TRANSFORMATION SEQUENCE IN
Fe-22wt%Cr-3.2wt%Mo-6.2wt%Ni-0.037wt%C CAST DUPLEX
STAINLESS STEEL

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ABSTRACT

Isothermal phase transformation behaviour in a Fe-22wt%Cr-3.2wt%Mo-6.2wt%Ni-0.037wt%C cast duplex stainless steel has been studied. The steel was solution heat-treated at 1175 degrees C for 1 hour and isothermally heat-treated in the temperature range of 500-1,000 degrees C for 8 to 32 hours, followed by water quenching. Microstructure characterisation was performed by scanning electron microscopy and electron probe microanalysis. The typical microstructure before heat treatment consists of primary austenite (gamma(1)) and delta-ferrite. Four secondary phases were observed after transformation including carbide, chi (chi), sigma (sigma) and secondary austenite (gamma(2)). These phases can be distinguished by the bright contrast level in backscattered electron images in the order of chi > sigma > gamma(1) or gamma(2) > delta > carbide. The transition temperature range where the sigma phase took precedence over the chi phase as a major transformation product is approximately above 700 degrees C. Features of the isothermal phase transformation sequence of the cast material are discussed in comparison to that of wrought duplex stainless steel.

KEYWORDS: SECONDARY PHASES; SIGMA-PHASE; PRECIPITATION; TOUGHNESS
JAMES CONSTANT FOR INTERPOLATION SPACES

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ABSTRACT

Estimates for the James constant for various norms in real interpolation spaces for finite families of Banach spaces are given. As a corollary it is shown that if a family contains at least one space which is uniformly nonsquare, then the interpolation space is uniformly nonsquare. (C) 2011 Elsevier Inc. All rights reserved.

KEYWORDS: BANACH-SPACES; COMPLEX INTERPOLATION; CONVEXITY
JOINING CARBON NANOTUBES

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ABSTRACT

To fully exploit the exceptional electronic and mechanical properties of carbon nanotubes in real-world applications, it is desirable to create carbon nanotube networks in which separate, multiple nanotubes are joined so that as many as possible of the properties of single nanotubes are conserved. In this review we summarize the progress made towards this goal, covering techniques including electron and ion beam irradiation, Joule heating and spark plasma sintering.

KEYWORDS: ELECTRON-BEAM IRRADIATION; CHEMICAL FUNCTIONALIZATION; STRUCTURAL MODIFICATION; MECHANICAL-PROPERTIES; INDUCED DEPOSITION; ROOM-TEMPERATURE; ION-IRRADIATION; Y-JUNCTIONS; SINGLE; BUNDLES

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LANTHANIDE SULFATE FRAMEWORKS: SYNTHESIS, STRUCTURE, AND OPTICAL PROPERTIES

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ABSTRACT

Layered lanthanide sulfate compounds with three different structures have been prepared and characterized. The compounds [C(10)H(10)N(2)] [La(SO(4))(2)] center dot 2H(2)O (I), [C(10)H(10)N(2)] [La(SO(4))(2)(H(2)O)(2)](2) (Ha), [C(10)H(10)N(2)] [Pr(SO(4))(2)(H(2)O)(2)](2) (IIb), [C(10)H(10)N(2)] [Nd(2)(SO(4))(4)(H(2)O)(2)](2) (IIIa), [C(10)H(10)N(2)] [Sm(2)(SO(4))(4)(H(2)O)(2)](2) (IIIb), and [C(10)H(10)N(2)] [Eu(2)(SO(4))(4)(H(2)O)(2)](2) (IIIC) have anionic lanthanide sulfate layers separated by protonated bipyridine molecules. The layers are formed by the connectivity between the lanthanide polyhedra and sulfate tetrahedra. The formation of a two-dimensional La-O-La layer (Ia), Pr-O-Pr chains (IIb), and a tetramer cluster (IIIa) is noteworthy. The compounds exhibit honeycomb (I), square (IIa, IIb), and honeycomb (IIIa-IIIc) net arrangements, when the connectivity between the lanthanide ions is considered. Optical studies indicate the observation of characteristic metal-centered emission at room temperature. The Nd compound (IIIa) exhibits a two-photon upconversion behavior.

KEYWORDS: METAL-ORGANIC FRAMEWORKS; SECONDARY BUILDING UNITS; COORDINATION POLYMERS; MAGNETIC-PROPERTIES; CRYSTAL-STRUCTURE; HYDROTHERMAL SYNTHESIS; ADSORPTION-DESORPTION; HYBRID STRUCTURES; ENERGY-TRANSFER; IRON AGRICULTURAL RESEARCH SERVICEENATES

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LARVAL FAT BODY CELLS DIE DURING THE EARLY PUPAL STAGE IN THE FRAME OF METAMORPHOSIS REMODELATION IN BOMBYX MORI

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ABSTRACT

In holometabolus insects, morphology of the larval fat body is remodeled during metamorphosis. In higher Diptera, remodeling of the fat body is achieved by cell death of larval fat body cells and differentiation of the adult fat body from primordial cells. However, little is known about remodeling of the fat body at pupal metamorphosis in Lepidoptera. In this study, we found that cell death of the larval fat body in Bombyx mori occurs at shortly after pupation. About 30% of the fat body cells underwent cell death on days 1 and 2 after pupation. The cell death involved genomic DNA fragmentation, a characteristic of apoptosis. Surgical manipulation and in vitro culture of fat body cells revealed that 20-hydroxyecdysone and juvenile hormone had no effect on either initiation or progression of cell death. During cell death, a large increase in activity of caspase-3, a key enzyme of cell death, was observed. Western blot analysis of the active form of caspase-3-like protein revealed that the length of caspase-3 of B. mori was much larger than that of caspase-3 in other species. The results suggest that larval fat body cells of B. mori are removed through cell death, which is mediated by a caspase probably categorized in a novel family. (C) 2011 Elsevier Ltd. All rights reserved.

KEYWORDS: INSECT STEROID-HORMONE; STORAGE PROTEINS; JUVENILE-HORMONE; TEMPORAL ORGANIZATION; MANDUCA-SEXTA; DEATH; SILKWORM; DROSOPHILA; HEMOLYMPH; EVENTS
LEAD-FREE TERNARY PEROVSKITE COMPOUNDS WITH LARGE ELECTROMECHANICAL STRAINS

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ABSTRACT

Lead-free compounds based on perovskite solid solutions in the ternary system (Bi(1/2)Na(1/2))TiO(3)-(Bi(1/2)K(1/2))TiO(3)-Bi(X(1/2)Ti(1/2))O(3), Where $X = \text{Ni}$ and Mg have been shown to exhibit large electromechanical strains. While the perovskite end members Bi(Mg(1/2)Ti(1/2))O(3) and Bi(Ni(1/2)Ti(1/2))O(3) display limited stability in their pure state, both compounds were found to have solid solubilities of at least 50 mol. % with (Bi(1/2)Na(1/2))TiO(3) and (Bi(1/2)K(1/2))TiO(3). Most importantly, under relatively large applied fields, these materials exhibited large hysteretic electromechanical strains characterized by a parabolic shape. With effective piezoelectric coefficients ($d_{33}^*$) greater than 500 pm/V, these systems have excellent potential as a Pb-free piezoelectric materials. (C) 2011 American Institute of Physics. [doi:10.1063/1.3647627]

KEYWORDS: FREE PIEZOELECTRIC CERAMICS; PHASE-TRANSITION; SOLID-SOLUTIONS; TEMPERATURE
LIGHTWEIGHT GEOPOLYMER MADE OF HIGHLY POROUS SILICEOUS MATERIALS WITH VARIOUS Na(2)O/Al(2)O(3) AND SiO(2)/Al(2)O(3) RATIOS

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ABSTRACT

The syntheses of lightweight geopolymeric materials from highly porous siliceous materials viz. diatomaceous earth (DE) and rice husk ash (RHA) with high starting SiO(2)/Al(2)O(3) ratios of 13.0-33.5 and Na(2)O/Al(2)O(3) ratios of 0.66-3.0 were studied. The effects of fineness and calcination temperature of DE, concentrations of NaOH and KOH, DE to RHA ratio; curing temperature and time on the mechanical properties and microstructures of the geopolymer pastes were investigated. The results indicated that the optimum calcination temperature of DE was 800 degrees C. Increasing fineness of DE and starting Na(2)O/Al(2)O(3) ratio resulted in an increase in compressive strength of geopolymer paste. Geopolymer pastes activated with NaOH gave higher compressive strengths than those with KOH. The optimum curing temperature and time were 75 degrees C and 5 days. The lightweight geopolymer material with mean bulk density of 0.88 g/cm(3) and compressive strength of 15 kg/cm(2) was obtained. Incorporation of 40% RHA to increase starting SiO(2)/Al(2)O(3) and Na(2)O/Al(2)O(3) ratios to 22.5 and 1.7 and enhanced the compressive strength of geopolymer paste to 24 kg/cm(2) with only a marginal increase of bulk density to 1.01 g/cm(3). However, the geopolymer materials with high Na(2)O/Al(2)O(3) (>1.5) were not stable in water submersion.

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KEYWORDS: RICE HUSK ASH; FLY-ASH; MECHANICAL-PROPERTIES
MARKER IDENTIFICATION FOR MASTITIS AND ITS ASSOCIATION IN THAI-FRIESIAN CATTLE IN NORTHERN THAILAND

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ABSTRACT

The objective of this research is to find molecular markers for mastitis which are associated with diseased and non-diseased cows in Northern Thailand (Chiang Mai and Lamphun) by using Amplified Fragment Length Polymorphism (AFLP) and studying the association between discovered markers and mastitis. Three DNA sequences (A3, A7 and A8) among 12 sequences generated by AFLP which differ between cows with and without mastitis showed a similarity with previously described genes: PDZ domain containing 1 (PDZK1) and sodium channel protein type 8 subunit alpha (SCN8A). Four Single-Nucleotide Polymorphisms (SNP) were detected: G>T, T deletion and C>T (SCN8A-10 and SCN8A-54). Association analysis between genotypes of each gene and phenotype (diseased or non-diseased and somatic cell count) showed that SNP SCN8A-54 is associated with mastitis (p<0.01) and subclinical mastitis (p<0.01). This study demonstrated new molecular markers associated with bovine mastitis of the Thai-Friesian cattle breed in northern Thailand.

KEYWORDS: QUANTITATIVE TRAIT LOCI; SOMATIC-CELL COUNT; CLINICAL MASTITIS; DAIRY-CATTLE; FUNCTIONAL TRAITS; ECONOMIC-LOSSES; HOLSTEIN CATTLE; MILK-PRODUCTION; GENOME SCAN; CONFORMATION

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ABSTRACT

The bed collapse technique, firstly proposed by Rietema in 1967, is a standard technique used for the characterization of powders belonging to Geldart’s Group A classification. When applying this technique to gas fluidization, a windbox gas deaeration rate needs to be considered carefully. The bed collapse model developed by Cherntongchai and Brandani in 2005 was the first to consider clearly the gas deaeration rate by taking into account system configurations and yielded the intrinsic dense phase properties from both 1-valve and 2-valve collapse curves. In this work, the mathematical description of the pressure drop profile for 1-valve and 2-valve bed collapse experiments is investigated with the aim of establishing if the dense phase voidage and velocity can be determined directly. This can greatly reduce data processing time, because a series of pressure signals are analyzed directly rather than having to convert digital images into bed collapse profiles. The pressure signals provide also the direct detection of the shock wave front location for both 1-valve and 2-valve bed collapse experiments, which cannot be detected visually. Excellent agreement between the model prediction and experimental data from the collapsing bed pressure drop profile was successfully achieved. (C) 2010 Elsevier Ltd. All rights reserved.

KEYWORDS: DENSE PHASE PROPERTIES; SOLID FLUIDIZED-BEDS; HIGH-TEMPERATURE; TIME-SERIES; FLUCTUATIONS; MODEL; PROPAGATION; SIMULATION; EXPANSION; WAVES
MICROSTRUCTURE AND ELECTRICAL PROPERTIES OF BaFe(0.5)Nb(0.5)O(3) DOPED WITH GeO(2) (1-5 wt.%)  
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ABSTRACT  
In this work, the effects of GeO(2) dopant on the electrical properties of BaFe(0.5)Nb(0.5)O(3) (BFN) perovskite ceramics were investigated. The BFN powder was prepared by a conventional mixed-oxide method using stoichiometric amounts of BaCO(3), Fe(2)O(3) and Nb(2)O(5). Afterward the GeO(2) contents, ranging from 1 to 5 wt.%, were added to the calcined BFN powder and mixed via vibro-milling method. The mixtures were pressed and sintered at 1125-1150 degrees C for 4 h to form dense ceramics. We showed that the addition of GeO(2) caused a reduction of grain size and formation of secondary phases: Ba(3)Fe(2)Ge(4)O(14) and BaGeO(3). The maximum densities of these BFN doped with GeO(2) ceramics were slightly lower than those of the pure BFN due to the occurrence of pores. We also found that the GeO(2) doping could improve the dielectric properties of these ceramics at room temperature (25 degrees C). The 1 wt.% GeO(2) doped sample exhibited higher dielectric constant of about 1800 and lower dielectric loss of 0.45 comparing to that of pure BFN. However, the dielectric constant values of these ceramics at high temperature (>25 degrees C) were decreased significantly with the increase of GeO(2) concentration. In addition, the GeO(2) additive gave a weak ferroelectric behavior, leading to change in the pyroelectric coefficient and spontaneous polarization of the GeO(2) doped BFN ceramics.  

KEYWORDS: DIELECTRIC-PROPERTIES; CERAMICS; SR
MICROSTRUCTURE AND ELECTRICAL PROPERTIES OF NIOBIUM DOPED BARIUM TITANATE CERAMICS

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ABSTRACT

The effects of Nb addition on phase, microstructure and electrical properties of barium titanate ceramics were investigated. Nb-doped barium titanate ceramics \((\text{BaTi}(1-x)\text{Nb}(x))\text{O}(3)\), \(x = 0 \text{ to } 0.02\) were prepared by conventional mixed-oxide method. All barium titanate compositions show tetragonal perovskite structure. Low Nb concentration \((x = 0.005)\) results in abnormal grain growth in barium titanate. However, the grain size becomes uniform and decreases as Nb content increases, suggesting Nb inhibits grain growth in the studied composition range. The dielectric constant increases as the amount of Nb increases. The temperature of tetragonal to cubic phase transition shifts to lower temperature and the temperature curves become broadening with increasing of Nb content. Measurement of ferroelectric P-E hysteresis loop at 50 Hz and applied electric field of 15 kV shows that the remanent polarization of barium titanate ceramics tends to decrease as Nb content increases. Change in dielectric properties and the P-E hysteresis loop did not show large aging effect in the Nb-doped barium titanate ceramics.

KEYWORDS: DIELECTRIC-PROPERTIES; GRAIN-GROWTH; BATIO3
MICROSTRUCTURE: SURFACE AND CROSS-SECTIONAL STUDIES OF HYDROXYAPATITE FORMATION ON THE SURFACE OF WHITE PORTLAND CEMENT PASTE IN VITRO

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ABSTRACT

The formation of hydroxyapatite was investigated at the surface and at the cross-section of white Portland cement paste samples before and after immersion in simulated body fluid. Scanning electron microscope images showed that hydroxyapatite were found at the surface of white Portland cement after immersion in simulated body fluid. Hydroxyapatite grains of mostly approximate to 1 μm size with some grain size of approximate to 2-3 μm were seen after 4 days immersion period. More established hydroxyapatite grain size of approximate to 3 μm grains were observed at longer period of immersion at 7 and 10 days. The cross-section of the samples was investigated using line scanning technique and was used to determine the hydroxyapatite layer. A strong spectrum of phosphorus is detected up to 6-8 μm depth for samples after 4, 7 and 10 days immersion in simulated body fluid when compared to weak spectrum detected before immersion. The increase in the phosphorus spectrum corresponds to the hydroxyapatite formation on the surface of the samples after the samples were placed in simulated body fluid. (C) 2011 Elsevier B. V. All rights reserved.

KEYWORDS: MINERAL TRIOXIDE AGGREGATE; SELF-SETTING PROPERTIES; BIOACTIVE GLASS; TRICALCIUM SILICATE; SEALING ABILITY; VIVO; APEXIFICATION; FILLINGS; MODEL
MICROWAVE SYNTHESIS AND CRYSTAL STRUCTURES OF TWO COBALT-4,4’-BIPYRIDINE-SULFATE FRAMEWORKS CONSTRUCTED FROM 1-D COORDINATION POLYMERS LINKED BY HYDROGEN BONDING

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ABSTRACT

Two extended solids displaying both one-dimensional coordination polymer and two-dimensional hydrogen-bonded structural features has been prepared under microwave-assisted hydrothermal conditions. [Co(H(2)O)(4)(4,4’-bipyridine)](4,4’-bipyridineH(2))center dot 2(SO(4))center dot 2H(2)O (1) contains one-dimensional coordination polymer chains of composition [Co(4,4’-bipyridine)(H(2)O)(4)(2+)](n) that are linked into a three dimensional framework by hydrogen bonding through uncoordinated sulfate and water. Within this framework is located a twice protonated 4,4’-bipyridine molecule (C(10)N(2)H(10)(2+)) which forms two short N-H center dot center dot center dot O hydrogen bonds and eight further non-classical C-H center dot center dot center dot O interactions. The close approach of guest and framework and the large number of interactions between them suggest the cation is important in templating this phase. [Co(2)(4,4’-bipyridine)(2)(SO(4))(2)(H(2)O)(6)center dot 4(H(2)O)(2) displays one dimensional chains of cobalt-bipyridine which are sinusoidal in nature. Two sets of these chains run parallel to the crystallographic [2 1 2] and [(2) over bar 1 (2) over bar] directions. Two-dimensional hydrogen-bonded sheets parallel to the xz plane link these; further hydrogen bonds to uncoordinated water help to form a three-dimensional honeycomb network with the centroids of the six-membered rings aligned parallel to the a-axis. The use of microwave synthesis for framework solids of this type is described and the structures of the frameworks and the interactions responsible for their assembly are discussed. The thermal and spectroscopic behaviour of the two phases are described. (C) 2010 Elsevier Ltd. All rights reserved.

KEYWORDS: METAL-ORGANIC FRAMEWORKS; HYDROTHERMAL SYNTHESIS; THERMAL-PROPERTIES; BUILDING-BLOCKS; LIGANDS; 4,4’-BIPYRIDINE; COMPLEXES; DESIGN; GROWTH; CARBOXYLATES
MICROWAVE-ASSISTED HYDROTHERMAL SYNTHESIS OF LEAD ZIRCONATE FINE POWDERS

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ABSTRACT

A rapid synthesis of lead zirconate fine powders by microwave-assisted hydrothermal technique is reported. The influences of type of lead precursor, concentration of potassium hydroxide mineraliser, applied microwave power and irradiation time are described. The synthesised powders were characterised by powder X-ray diffraction, field emission scanning electron microscopy, energy-dispersive X-ray spectroscopic microanalysis and light scattering technique. The merits of the microwave application in reducing reaction time and improving particle mono-dispersion and size uniformity as well as the drawbacks, viz. low purity of the desired phase and increasing demand of mineraliser, are discussed in relation to conventional heating method.

KEYWORDS: HOMOGENEOUS PRECIPITATION; ROUTE; NANOPOWDERS
MICROWAVE-ASSISTED SYNTHESIS AND CHARACTERIZATION OF ROSELIKE AND FLOWER-LIKE ZINC OXIDE NANOSTRUCTURES

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ABSTRACT

Hexagonal zinc oxide was synthesized by 180 W, 20 min microwave heating of 1:5 and 1:12.5 mole ratios of zinc chloride and sodium hydroxide as starting materials in aqueous solution system. The products were characterized using X-ray diffraction (XRD), scanning and transmission electron microscopy (SEM, TEM), and Fourier transform infrared (FTIR) and Raman spectroscopy. Rose-like particles of nanoplates and flower-like particles of nanorods of hexagonal zinc oxide with optical phonon E(2) vibration mode at 440 cm⁻¹, and the stretching modes of Zn-O at 426 and 565 cm⁻¹ were detected.

KEYWORDS: OPTICAL-PROPERTIES; THERMAL EVAPORATION; ZNO NANORODS; NANOCRYSTALS; MORPHOLOGY; NANOWIRES; CDS
MICROWAVE-ASSISTED SYNTHESIS AND OPTICAL PROPERTY OF CdMoO(4) NANOPARTICLES

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ABSTRACT

Microwave-assisted synthesis is a novel method used to synthesize CdMoO(4) nanoparticles in propylene glycol. The effects of reaction time and microwave power on phase, morphologies, and optical properties of CdMoO(4) nanoparticles were studied, using X-ray diffraction (XRD). Raman spectroscopy, Fourier transform infrared spectroscopy (FTIR), transmission electron microscopy (TEM), and UV-visible spectroscopy. The present analyses proved that these crystalline powders were scheelite-type tetragonal structured CdMoO(4), with the crystallite size of 14-20 nm, and 4.51-4.73 eV band gaps, controlled by the synthetic conditions. (C) 2010 Elsevier Ltd. All rights reserved.

KEYWORDS: ROOM-TEMPERATURE SYNTHESIS; PHOTOLUMINESCENCE PROPERTIES; HYDROTHERMAL SYNTHESIS; MICROSPHERES; MOLYBDATE; POWDERS
MONODISPERSITY AND STABILITY OF GOLD NANOPARTICLES STABILIZED BY USING POLYVINYL ALCOHOL

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ABSTRACT

Gold nanoparticles (Au NPs) have been prepared by reduction of hydrogen tetrachloroaurate aqueous solution (HAuCl(4)) with trisodium citrate and stabilized with polyvinyl alcohol (PVA). The optimization of Au NPs was obtained by varying the volume of trisodium citrate from 0.4 - 0.8 mL, and characterized by UV-vis spectroscopy and transmission electron microscopy (TEM). It was found that the absorbance spectra exhibited its absorption peak at around 520 nm for all cases, with a minimum value at 0.7 mL of trisodium citrate. This suggested that the size of Au NPs to be smallest at condition 0.7 mL trisodium citrate, thereby indicating the optimum conditions. Stability of Au NPs was achieved by monitoring absorbance of Au NPs over regular time periods. It was found that wavelength at maximum absorbance changed with time after synthesis except for the 0.7 mL condition which was stable. This suggested that, at condition 0.7 mL, the Au NPs were quite stable up to 700 hours; this could be explored for further applications. Moreover, TEM results showed Au NPs obtained at optimum condition exhibited near spherical shapes with a mean diameter and standard deviation of 4.5 and 1.4 nm, respectively. Also moreover, FT-IR result suggested that Au NPs were coated with a PVA layer.

KEYWORDS: SILVER NANOPARTICLES; OPTICAL-PROPERTIES; WATER; SIZE
MONTE CARLO INVESTIGATION OF CRITICAL PROPERTIES OF FERROELECTRIC FILMS: THE DIFFOUR HAMILTONIAN FRAMEWORK

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ABSTRACT

In this work, Monte Carlo simulation was used to investigate the ferroelectric films behavior using the DIFFOUR Hamiltonian. The considered electric dipole directions were considered to range from 2 to 14 directions, in representing various domain structures. Metropolis algorithm was used to extract the polarization, the susceptibility, and critical behavior for each domain structure. It was found that the critical temperature increases with increasing the films thickness due to stronger ferroelectric interaction, but reduces in structure with more possible dipole-switching directions due to lower energy barrier. Scaling of the critical temperature with films thickness and its shifting exponent are reported.

KEYWORDS: SIMULATION; MODEL

MORPHOLOGY AND TENSILE PROPERTIES OF POLYPROPYLENE-MULTIWALLED CARBON NANOTUBES COMPOSITE FIBERS

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ABSTRACT

In this work, we analyzed tensile properties of polypropylene-multiwalled carbon nanotubes composite fibers. The multiwalled carbon nanotubes (MWCNTS) were used in different contents of 0, 1, 2, 3, 4, and 5 wt %. Dispersing agents were used to disperse MWCNTs in polypropylene matrix. After the dispersing agent was removed, the mixture was melt mixed. The fibers were spun by a home-made melt spinning equipment and stretching was done at a draw ratio of 7.5. By using 1-5 wt % of MWCNTs, the modulus of composite fibers increased by 69-84% and tensile strength increased about 39% when compared with the virgin polypropylene fibers. In addition, the MWCNTs dispersion in the matrix was monitored by scanning electron microscopy and transmission electron microscopy. (C) 2010 Wiley Periodicals, Inc. J Appl Polym Sci 119: 962-967, 2011

KEYWORDS: ELECTRICAL-RESISTIVITY; MECHANICAL-PROPERTIES; CRYSTALLIZATION; REINFORCEMENT; BEHAVIORS

ABSTRACT

Wurtzite ZnO (hcp) was produced by the 80 degrees C sonothermal reactions of 1:5, 1:10, and 1:20 molar ratios of Zn(NO(3))(2)center dot 6H(2)O:NaOH in water, containing 2 g, 5 g, 10 g, and 20 g of polyethylene glycol (PEG) with the molecular weights (MWs) of 6000, 10000, and 20000 for 1 h, 3 h, and 5 h. ZnO phase with different morphologies was detected. When the amount of NaOH, both MW and the amount of PEG, and the experimental time were increased, the products still retain their single phase, but their morphologies were changed from nanoplates in clusters to nanospeAgricultural Research Service with sharp tips gathering together in the shape of flowers, and long nanorods with oval tips in clusters. In the present work, formation mechanism of these products was also discussed. (C) 2011 Elsevier Ltd and Techna Group S.r.l. All rights reserved.

KEYWORDS: SONOCHEMICAL SYNTHESIS; HYDROTHERMAL PROCESS; NANOSTRUCTURES; GROWTH; NANOPARTICLES; TEMPERATURE; NANOROD
MUTATION ANALYSIS OF EGFR GENE OF LUNG CANCER PATIENTS IN THE NORTHERN THAILAND

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ABSTRACT

Background: Mutations in the tyrosine kinase domain of epidermal growth factor receptor (EGFR) is mandatory for dramatic responses to EGFR tyrosine kinase inhibitors either gefitinib or erlotinib. Lung cancer patients who have mutant EGFR also have better responses to systemic chemotherapy and longer survival than those who do not have mutation. This study aims to investigate the incidence of EGFR mutation at tyrosine kinase domain among the northern Thai lung cancer patients. Methods: Tumor tissues were obtained retrospectively from paraffin blocks of 68 non-small cell lung cancer patients who received surgical resection at Maharaj Nakorn Chiangmai Hospital, Faculty of Medicine, Chiang Mai University between January 2007 and December 2009. Tissues were subjected to DNA extraction, DNA amplification by polymerase chain reaction and followed by direct sequencing. Clinical parameters, including age, sex, smoking, histology and TNM stage, were analyzed to identify the correlation between these parameters and EGFR mutations. Results: Ten EGFR mutations were found in 18 out of 68 patients (26.47%). Six of which, delE746-A750, delL747-S752insQ, A839T, V581I, E868G and L858, were previously reported mutations. The other four, L688F, a722T, G724D and P848S, were novel mutations. EGFR mutation status was statistic significant associated with female (P=0.0038) or adenocarcinoma histology (P=0.0343). Correlation between clinical parameters and EGFR mutations and prognosis are being analyzed. Conclusion: The incidence of EGFR mutation among the northern Thai lung cancer patients is similar to the incidence of EGFR mutation worldwide. EGFR mutation status is statistically associated with female or adenocarcinoma histology.

KEYWORDS: LUNG CANCER, EGFR, NORTHERN THAILAND, CLINICAL PARAMETERS

NANOSTRUCTURED INTERPENETRATING POLYMER NETWORK (IPN) PRECURSOR ULTRATHIN FILMS

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ABSTRACT

The formation of a nanostructured interpenetrating polymer network (IPN) via electropolymerization is described. The electro-copolymerization of alternate layer-by-layer (LbL) self-assembled polyelectrolytes with thiophene and carbazole pendant monomers was demonstrated facilitating IPN formation of p-conjugated polymers or conjugated polymer network (CPN) films. UV-Vis spectroscopy, QCM, and ellipsometry confirmed linear nanostructured LbL film growth. Electrochemical crosslinking by cyclic voltammetry (CV) manifested highly regular peak current increases with successive cycles. A quantitative correlation of the LbL layer number with the cathodic charge and scan rate was observed. Electrochemical impedance analysis confirmed CPN film formation and the change in capacitance behavior.

KEYWORDS: QUARTZ-CRYSTAL MICROBALANCE; SELF-ASSEMBLED MONOLAYERS; THIN-FILMS; SPECTROELECTROCHEMICAL PROPERTIES; POLYELECTROLYTE MULTILAYERS; IMPEDANCE SPECTROSCOPY; CROSS-LINKING; THIOPHENE; POLYTHIOPHENE; COPOLYMERS

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NEMATICIDAL ACTIVITY OF FERVENULIN ISOLATED FROM A NEMATICIDAL ACTINOMYCETE, STREPTOMYCES SP. CMU-MH021, ON MELOIDOGYNE INCognITA

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ABSTRACT

An isolate of the actinomycete, Streptomyces sp. CMU-MH021 produced secondary metabolites that inhibited egg hatch and increased juvenile mortality of the root-knot nematode Meloidogyne incognita in vitro. 16S rDNA gene sequencing showed that the isolate sequence was 99% identical to Streptomyces roseovericillatus. The culture filtrates form different culture media were tested for nematicidal activity. The maximal activity against M. incognita was obtained by using modified basal (MB) medium. The nematicidal assay-directed fractionation of the culture broth delivered fervenulin (1) and isocoumarin (2). Fervenulin, a low molecular weight compound, shows a broad range of biological activities. However, nematicidal activity of fervenulin was not previously reported. The nematicidal activity of fervenulin (1) was assessed using the broth microdilution technique. The lowest minimum inhibitory concentrations (MICs) of the compound against egg hatch of M. incognita was 30 μg/ml and juvenile mortality of M. incognita increasing was observed at 120 μg/ml. Moreover, at the concentration of 250 μg/ml fervenulin (1) showed killing effect on second-stage nematode juveniles of M. incognita up to 100% after incubation for 96 h. Isocoumarin (2), another bioactive compound produced by Streptomyces sp. CMU-MH021, showed weak nematicidal activity with M. incognita.

KEYWORDS: PLANT-PARASITIC NEMATODES; ROOT-KNOT NEMATODE; CERATOCYSTIS-MINOR; METABOLITES; PATHOGENS; AGENTS; FUNGI
NEOTYPE DESIGNATION FOR SPHINGIUS THECATUS
THORELL, 1890, SYNONYMIES, NEW RECORDS AND
DESCRIPTIONS OF SIX NEW SPECIES FROM SOUTHEAST
ASIA (ARANEAE, LIOCRANIDAE)

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ABSTRACT

A neotype is designated for Sphingius thecatus Thorell, 1890, the type species
of the genus from type locality of Penang Island, Malaysia; its conspecific female is
described for the first time. Detailed morphological descriptions and illustrations
for both sexes are provided. Six new species are described from Southeast Asia:
S. rama sp. nov. and S. prolixus sp. nov. from eastern Thailand; S. elongatus sp.
nov. from southern Thailand; S. superbus sp. nov. and S. bifurcatus sp. nov. from
Thailand and Malaysia; S. spinosus sp. nov. from Thailand, Malaysia and Indonesia.
Sphingius pingtung Tso et al., 2005 known from Taiwan, China is considered a
junior synonym of S. scrobiculatus Thorell, 1897. Sphingius sinensis (Schenkel,
1963), originally placed in Scotophaeoides (Gnaphosidae), is regarded as a
junior synonym of S. gracilis (Thorell, 1895). Additional specimens of S. gothicus
Deeleman-Reinhold, 2001 were collected from northeastern and central Thailand,
expanding species distribution range towards the south. Specimens of S. punctatus
Deeleman-Reinhold, 2001 were collected from Thailand and Indonesia. Sphingius
vivax (Thorell, 1897) and S. scrobiculatus Thorell, 1897 are recorded from Thailand
for the first time.

KEYWORDS: new species; new record; new synonymy; first description;
biodiversity; taxonomy
NEW CLERODANE DITERPENOID FROM THE BULBILS OF DIOSCOREA BULBIFERA

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ABSTRACT

A new clerodane diterpenoid has been isolated from the acetone extract of bulbils of Dioscorea bulbifera. The structure of compound 1 was established as 15,16-epoxy-6 alpha-O-acetyl-8 beta-hydroxy-19-nor-clero-13(16),14-diene-17,12;18,2-diolide on the basis of comprehensive spectroscopic techniques.
NEW LIGHT-EMITTING POLY\{(9,9-di-n-octylfluorenediyl vinylene)-alt-[1,5(2,6-dioctyloxy)naphthalene vinylene]\}

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ABSTRACT

A new conjugated light-emitting AB copolymer containing alternating fluorene and naphthalene units, poly\{(9,9-di-noctylfluorenediyl vinylene)-alt-[1,5-(2,6-dioctyloxy) naphthalene vinylene]\} (PFV-alt-PNV), was synthesized via Horner-Emmons polymerization. The polymer is completely soluble in common organic solvents and exhibits good thermal stability up to 400 degrees C. UV-visible, fluorescence and photoluminescence measurements of the copolymer show peak maxima at 427, 500 and 526 nm, respectively. A light-emitting device containing the new polymer was fabricated using a simple indium tin oxide configuration: (ITO)/PEDOT: PSS/PFV-alt-PNV/Al. Measurements of current versus electric field were carried out, with an onset of light emission occurring at 2.5 V. The electroluminescence brightness was observed to reach a maximum of 5000 cd m\(^{-2}\). (C) 2011 Society of Chemical Industry

KEYWORDS: CONJUGATED POLYMERS; ELECTROLUMINESCENT DIODES; CARRIER CONFINEMENT; ORGANIC MATERIALS; CHAIN-LENGTH; COPOLYMERS; PHOTOLUMINESCENCE; DERIVATIVES; LEDS; POLY(9,9-DI-N-OCTYLFLUORENYL-2,7-VINYlene)
NOTES ON BURMESE SPIDERS FORMERLY ATTRIBUTED TO THE GENUS STORENA (ZODARIIDAE, ARANEAE)

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ABSTRACT

Studies on the spider fauna of Southeast Asia resulted in a review of five Storena species which were previously described from Burma. These species were misplaced in Storena Walckenaer, 1805, a zodariid genus that is endemic to Australia. Four species are here transferred to Mallinella Strand, 1906: Mallinella suavis (Thorell, 1895) comb. nov., M. exornata (Thorell, 1887) comb. nov., M. fronto (Thorell, 1887) comb. nov., and M. decorata (Thorell, 1885) comb. nov. Mallinella irrorata (Thorell, 1887) belongs to an undescribed genus of the subfamily Zodariinae. This study also gives a complete list of all Storena specimens examined and studied by Thorell which are now deposited in four European museums.

KEYWORDS: MALLINELLA; NEW STATUS; CONSPECIFIC SEX; SYNONYMY; TAXONOMY
N-TERMINAL REGION OF CHITINASE I OF BACILLUS CIRCULANS KA-304 CONTAINED NEW CHITIN-BIDING DOMAIN

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ABSTRACT

Chitinase I (CHI1) of Bacillus circulans KA-304 forms protoplasts from Schizophyllum commune mycelia when the enzyme is combined with alpha-1,3-glucanase of B. circulans KA-304. CHI1 consists of an N-terminal unknown region and a C-terminal catalytic region classified into the glycoside hydrolase family-19 type. An N-terminal region-truncated mutant of CHI1 (Cat CHI1), which was expressed in Escherichia coli Rosetta-gami B (DE3), lost colloidal chitin- and powder chitin-binding activities. The colloidal chitin- and the powder chitin-hydrolyzing activities of CatCHI1 were lower than those of CHI1, and CatCHI1 was not effective in forming the protoplast. A fusion protein of the N-terminal region of CHI1 and green fluorescent protein (Nterm-GFP) was expressed in E. coli, and the fusion protein was adsorbed to colloidal chitin, powder chitin, and chitosan. Fluorescence microscopy analysis showed that Nterm-GFP bound to the S. commune cell-wall.

KEYWORDS: STREPTOMYCES-CYANEUS SP-27; FAMILY 19 CHITINASE; SCHIZOPHYLLUM-COMMUNE; PROTOPLAST FORMATION; BINDING DOMAIN; SUBSTRATE-BINDING; CLONING; EXPRESSION; GRISEUS; GENE

OBSERVATIONS ON TWO NEMATODE SPECIES PARASITIZING FRESHWATER FISHES IN THAILAND, INCLUDING SPINITECTUS THAIENSIS SP NOV (CYSTIDICOLIDAE) FROM PSEUDOMYSTUS SIAMENSIS (BAGRIDAЕ)

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ABSTRACT

One new and one already known species of parasitic nematodes are described from the intestine of freshwater fishes in Chiang Mai Province, northern Thailand: Spinitectus thaiensis sp. nov. (Cystidicolidae) from the catfish Pseudomystus siamensis (Regan) (Bagridae, Siluriformes) in the Fang Brook, a tributary of the Kok River (the Mekong River basin), Fang District and Oceanicucullanus chitwoodae Le-Van-Hoa et Pham-Ngoc-Khue, 1971 (Cucullanidae) from the cyprinid Mystacoleucus marginatus (Valenciennes) (Cyprinidae, Cypriniformes) in the Ping River (the Chao Phraya River basin), Muang District. The new species, S. thaiensis, is very similar to S. petrowi Belous, 1965, differing from it, in addition to some biometrical differences, mainly in having simple cuticular spines (instead of transversely oriented peg-like spines with rounded ends) on the ventral surface of the female tail; the spicules are 156-171 and 66-72 μm long, the vulva is situated at 74% of female body length, and the entire oesophagus including the vestibule represents 14-15% of body length in the male and 12% in the female. The latter species, O. chitwoodae, was studied for the first time by scanning electron microscopy, which enabled to recognize some previously unrecorded morphological details in this species. The finding of O. chitwoodae in M. marginatus in Thailand represents new host and geographical records for this nematode.

KEYWORDS: REDESCRIPTION; PISCES
PETROCHEMISTRY AND TECTONIC SETTING OF MAFIC VOLCANIC ROCKS IN THE CHON DAEN-WANG PONG AREA, PHETCHABUN, THAILAND

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ABSTRACT

The mafic volcanic rocks and hypabyssal rocks in the Chon Dean-Wang Pong area are possibly the southern extension of the western Loei Volcanic Subbelt, Northeast Thailand. They are least-altered, and might have been formed in Permian-Triassic times. The rocks are commonly porphyritic, with different amounts of plagioclase, clinopyroxene, orthopyroxene, amphibole, Fe-Ti oxide, unknown mafic mineral, and apatite phenocrysts or microphenocrysts, and are uncommonly seriate textured. The groundmass mainly shows an intergranular texture, with occasionally hyalophitic, intersertal and ophitic-subophitic textures. The groundmass constituents have the same minerals as the phenocrysts or microphenocrysts and may contain altered glass. The groundmass plagioclase laths may show a preferred orientation. Chemically, the studied rock samples can be separated into three magmatic groups: Group I, Group II, and Group III. These magmatic groups are different in values for Ti/Zr ratios. The averaged Ti/Zr values for Group I, Group II, and Group III rocks are 83 +/- 6, 46 +/- 12, and 29 +/- 5, respectively. In addition, the Group I rocks have higher P/Zr, but lower Zr/Nb relative to Group II and Group III rocks. The Group I and Group II rocks comprise tholeiitic andesite-basalt and microdiorite-microgabbro, while the Group III rocks are calc-alkaline andesite and microdiorite. According to the magmatic affinities and the negative Nb anomalies on normal mid-oceanic ridge basalt (N-MORB) normalized multi-element plot, arc-related lavas are persuasive. The similarity between the studied lavas and the Quaternary lavas from the northern Kyukyu Arc, in terms of chondrite-normalized rare earth element (REE) patterns and N-MORB normalized multi-element patterns, leads to a conclusion that the mafic volcanic rocks and hypabyssal rocks in the Chon Daen-Wang Pong area have been formed in a volcanic arc environment.

KEYWORDS: NORTHERN THAILAND; RADIOLARIAN FAUNAS; CHIANGMAI; GEOCHEMISTRY; DISCRIMINATION; ELEMENTS; DIAGRAM; SERIES
PHASE EVOLUTION AND DIELECTRIC PROPERTIES OF BARIUM ZIRCONATE TITANATE – BARIUM IRON NIOBATE CERAMICS

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ABSTRACT

The structural and dielectric properties of (1-x)BaZr(0.9)Ti(0.1)O(3) (BZT) - xBaFe(0.5)Nb(0.5)O(3) (BFN) ceramics system were investigated as a function of the BaFe(0.5)Nb(0.5)O(3) content by X-ray diffraction (XRD) and dielectric measurement technique. Studies were performed on the samples prepared by solid state reaction for x = 0.2, 0.4, 0.6 and 0.8. Maximum density of the ceramic was obtained at 1450 degrees °C for every mixing conditions. The evolution of the tetragonal phase, indicating phase transition from cubic to tetragonal with increasing with BFN ratio. Lattice parameters were found to decrease with the BFN content. The dielectric properties of (1-x) BZT - xBFN ceramics were studied. It was found that the dielectric constant and broadness of their peak of these ceramics increased with increasing BFN contents, with the dielectric loss measured at 1 kHz was shown lower than 2.00 at working temperature ranging from room temperature to 400 degrees °C.

KEYWORDS: THIN-FILMS; PEROVSKITES; SR
PHASE FORMATION AND DIELECTRIC PROPERTIES OF Ba(0.9)Sr(0.1)[Ti(1-x)(Fe(0.5)Nb(0.5))(x)]O(3) CERAMICS

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ABSTRACT

In this work, the complex perovskite Ba(0.9)Sr(0.1)[Ti(1-x)(Fe(0.5)Nb(0.5))(x)]O(3) (BST-FN) ceramic system with x = 0.0, 0.1, 0.2, 0.3, 0.4 and 0.5 were synthesized via a solid state reaction method. The ceramics were subsequently examined at room temperature by X-ray diffraction using Cu Kα radiation to identify the phase composition of each sample. The structures of the samples were found to be tetragonal and the tetragonality of which decreased with increasing the FN content. The relative permittivity and loss tangent were found to increase with temperature. The highest epsilon(r) was 2941 with the tan d of 0.713 for x = 0.2 at room temperature and at 1 kHz.

KEYWORDS: PEROVSKITE; BAFE0.5NB0.5O3; PERMITTIVITY; TEMPERATURE; CA; SR
PHENOLIC CONTENT AND FREE RADICAL SCAVENGING ACTIVITIES IN RAMBUTAN DURING FRUIT MATURATION

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ABSTRACT

The 1,1-diphenyl-2-picrylhydrazyl (DPPH(center dot)) scavenging activity, changes and accumulation of phenolic content were studied in the peel, seed and pulp of rambutan, Nephelium lappaceum L. (Rongrien and Seechompoo cultivAgricultural Research Service) during fruit maturation. The IC(50) values of the radical scavenging activity of the peels, in both cultivAgricultural Research Service remained low through fruit development (1.42-4.75 mu g/mL) but the values of the seed and pulps were low at the beginning and increased markedly toward fruit development until harvest (4.87 to >1000 mu g/mL). The accumulation of phenolic compounds in rambutan peels of Rongrien and Seechompoo cultivAgricultural Research Service increased continuously until reaching a maximum of 1653 and 733 mg per fruit at the time of being harvested, at 112 and 98 days after full bloom (DAFB), respectively. Ellagic acid, corilagin and geraniin in the peels of both cultivAgricultural Research Service were observed and quantified. The major component in the peels of the two cultivAgricultural Research Service was geraniin. The accumulation of ellagic acid, corilagin and geraniin in the peels increased and reached the maximum at the harvest stage, especially the major constituent of geraniin (1011 and 444 mg/fruit for Rongrien and Seechompoo, respectively). The free radical scavenging property was observed to have a relationship with the phenolic content quantified in different parts of the rambutan fruit. This research demonstrates potential data on phenolic constituents through fruit development, especially in the peels at the time of harvest. (C) 2011 Elsevier B.V. All rights reserved.

KEYWORDS: NEPHELIUM-LAPPACEUM L.; ANTIOXIDANT ACTIVITIES; MEDICINAL-PLANTS; EXTRACTS; BIOSYNTHESIS; IDENTIFICATION; CULTIVAGRICULTURAL RESEARCH SERVICE; TANNINS; SKIN
PHYLOGENETIC ANALYSIS OF NOSEMA CERANAE ISOLATED FROM EUROPEAN AND ASIAN HONEYBEES IN NORTHERN THAILAND

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ABSTRACT

Nosema ceranae was found to infect four different host species including the European honeybee (A. mellifera) and the Asian honeybees (Apis florea, A. cerana and A. dorsata) collected from apiaries and forests in Northern Thailand. Significant sequence variation in the polar tube protein (PTP1) gene of N. ceranae was observed with N. ceranae isolates from A. mellifera and A. cerana, they clustered into the same phylogenetic lineage. N. ceranae isolates from A. dorsata and A. florea were grouped into two other distinct clades. This study provides the first elucidation of a genetic relationship among N. ceranae strains isolated from different host species and demonstrates that the N. ceranae PTP gene was shown to be a suitable and reliable marker in revealing genetic relationships within species. (C) 2011 Elsevier Inc. All rights reserved.

KEYWORDS: BEES APIS-MELLIFERA; MICROSPORIDIAN PARASITE; LEPIDOPTERAN PESTS; COLONY COLLAPSE; PATHOGEN; HYMENOPTERA; INFECTION; SEQUENCES; TAIWAN; APIDAE
PHYTOREMEDIATION OF AGRICULTURAL RESEARCH SERVICEENIC IN SUBMERGED SOIL BY WETLAND PLANTS

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ABSTRACT

Wetland aquatic plants including Canna glauca L., Colocasia esculenta L. Schott, Cyperus papyrus L. and Typha angustifolia L. were used in the phytoremediation of submerged soil polluted by Agricultural Research Serviceenic (As). Cyperus papyrus L. was noticed as the largest biomass producer which has Agricultural Research Serviceenic accumulation capacity of 130-172 mg As/kg plant. In terms of Agricultural Research Serviceenic removal rate, however, Colocasia esculenta L. was recognized as the largest and fastest Agricultural Research Serviceenic remover in this study. Its Agricultural Research Serviceenic removal rate was 68 mg As/m²/day while those rates of Canna glauca L., Cyperus papyrus L. and Typha angustifolia L. were 61 mg As/m²/day, 56 mg As/m²/day, and 56 mg As/m²/day, respectively. Although the 4 aquatic plants were inferior in Agricultural Research Serviceenic accumulation, their high Agricultural Research Serviceenic removal rates were observed. Phytostabilization should be probable for the application of these plants.

KEYWORDS: ATOMIC-ABSORPTION SPECTROMETRY; RICE; ACCUMULATION; REMOVAL; WATER
PLASTER MATERIALS FROM WASTE CALCIUM SULFATE CONTAINING CHEMICALS, ORGANIC FIBERS AND INORGANIC ADDITIVES

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ABSTRACT

Plaster materials made of waste gypsum or flue-gas-desulferized (FGD) gypsum with chemicals, organic and inorganic additives were studied. Glucose, citric acid and sodium bicarbonate were incorporated to retard the hydration of Plaster. Saw dust (SD), coconut fibers (CCF) and tobacco waste fiber (TWF) were incorporated to improve the thermal property. Diatomaceous earth (DE), fly ash (FA) and bottom ash (BA) were incorporated to improve the mechanical and thermal properties. Citric acid, TWF, sodium bicarbonate and glucose could be used to retard the setting time of fresh FGD-plaster to approximately 25 min comparable to that of commercial plaster while the other additives did not retard the hydration. In presences of these retarding additives, needle shaped gypsum changed into lower aspect ratio particles. SD, CCF, DE, FA and BA modified gypsum crystal growth and reduced the crystal length. These changes in morphology consequently gave significant alterations of mechanical and thermal properties of the materials. The additions of organic and inorganic additives resulted in a reduction of bulk density and increases in water absorption, and similar strength compared to commercial gypsum. A good thermal insulating property was obtained from the samples with the incorporation of coconut fiber, BA and DE. In addition, these samples had a good performance in fire proof. (C) 2011 Elsevier Ltd. All rights reserved.

KEYWORDS: GYPSUM; HEMIHYDRATE; CRYSTALLIZATION; ASH; BRICKS; WATER; LIME

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PREDICTION OF THE DISULPHIDE BONDING STATE OF CYSTEINES IN PROTEINS USING CONDITIONAL RANDOM FIELDS

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ABSTRACT

The formation of disulphide bonds between cysteines plays a major role in protein folding, structure, function and evolution. Many computational approaches have been used to predict the disulphide bonding state of cysteines. In our work, we developed a novel method based on Conditional Random Fields (CRFs) to predict the disulphide bonding state from protein primary sequence, predicted secondary structures and predicted relative solvent accessibilities (all-state information). Our experiments obtain 84% accuracy, 88% precision and 94% recall, using all-state information. However, our results show essentially identical results when using protein sequence and predicted relative solvent accessibilities in the absence of secondary structure.

KEYWORDS: CONNECTIVITY PREDICTION; SECONDARY STRUCTURE; SUBSTRATE-BINDING; ISOMERASE; RECOGNITION

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PREPARATION AND ELECTRICAL PROPERTIES OF (1-x) Ba(0.9)Sr(0.1)[Ti(0.8)(Fe(0.5)Nb(0.5))(0.2)]O(3)-xBiZn(0.5) Ti(0.5)O(3) CERAMICS

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ABSTRACT

The (1-x)Ba(0.9)Sr(0.1)[Ti(0.8)(Fe(1/3)Nb(2/3))(0.2)]O(3)-xBiZn(1/2)Ti(1/2)O(3) solid solution ceramics were synthesized via a solid-state reaction method where x = 0.02, 0.04, 0.06, 0.08 and 0.10. The structural and electrical properties of these ceramics system were investigated as a function of the BZT content by X-ray diffraction (XRD) and dielectric measurement techniques. The XRD analysis demonstrated that with increasing BZT content in (1-x) BSTFN-xBZT, the structural change occurred from the rhombohedral to the tetragonal phase at room temperature. Changes in the dielectric behavior were found to depend on the BZT content.

KEYWORDS: DIELECTRIC-PROPERTIES; PEROVSKITE; PERMITTIVITY

PREPARATION OF CCTO POWDERS AND CERAMICS BY A SIMPLE SOLID STATE MIXED OXIDE METHOD

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ABSTRACT

In this research, CaCu(3.1)Ti(4)O(12.1): CC(3.1) TO ceramics were prepared by a simple solid state mixed oxide method. The optimum temperature for calcination the formation of phase pure perovskite and lattice parameters “a” of unit cell close to lattice parameter in the basis JCPDS file was found about 900 degrees C for 8 h. Phase formation was examined by X-ray diffraction technique. The sintering process was carried out at 1000, 1025 and 1050 degrees C for 8 h. The results show that the microstructure of fracture mode for variation sintered samples change from intergranular to intragranular mode with increasing sintering temperature. The density, average grain size, Vickers hardness and dielectric constant were increased with increasing the sintering temperature.

KEYWORDS: HIGH-DIELECTRIC-CONSTANT; CACU3TI4O12 CERAMICS; MICROSTRUCTURE
PREPARATION OF Pt-BASED TERNARY CATALYST AS CATHODE MATERIAL FOR PROTON EXCHANGE MEMBRANE FUEL CELL BY SOLUTION ROUTE METHOD

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ABSTRACT

In this research, Pt-based ternary catalysts for proton exchange membrane fuel cell (PEMFC) have been successfully prepared by the solution route method. This type of catalyst was claimed to improve the activities of oxygen reduction reaction (ORR). The ternary catalyst was prepared using 10% platinum, 5% cobalt, and 5% chromium by weight support on untreated and treated carbons by reduction with NaBH₄ at room temperature. The FTIR spectra showed a new functional group as carboxyl group on treated carbon using H₂O₂. The XRD patterns for both carbon samples confirmed platinum and carbon phases in the products. The EDS spectra detected platinum, cobalt, chromium, oxygen and carbon atoms in the prepared catalysts. The XAS patterns revealed that the products were mixed Pt-CoO-Cr₂O₃ catalysts. The SEM and TEM images showed more dispersion of catalyst on the treated carbon support surface than on the untreated carbon support. Particles size were 3.97 nm for untreated carbon and 1.93 nm for treated carbon. Finally, the electrochemical property was tested by CV technique. It indicated that Pt-CoO-Cr₂O₃/C catalyst supported on treated carbon exhibited the highest performance among the prepared ternary alloy catalysts. (C) 2011 Elsevier B.V. All rights reserved.

KEYWORDS: OXYGEN-REDUCTION CATALYSTS; ALLOY CATALYSTS; CARBON; ELECTROCATALYSTS; PEMFC
PROBABILITY DENSITY ESTIMATION USING TWO NEW KERNEL FUNCTIONS

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ABSTRACT

This paper considers two new kernel estimators of a density function $f(x)$. The errors of the estimators are measured by the mean squared error (MSE($f\hat{(x, \tilde{X})}$)) and the mean integrated squared error (MISE($f\hat{()}$)). The estimates of these error measures are also given. The estimators of MSE($f\hat{(x, \tilde{X})}$) and MISE($f\hat{()}$) are found to be asymptotically unbiased. Properties of the proposed estimators depend on the corresponding kernel functions used to derive them together with their bandwidths. The bandwidths used for comparison of the properties are the Silverman rule of thumb (SRT), two-stage direct plug-in (DPI) and the solve-the-equation (STE) bandwidths. A simulation study is carried out to compare the AMISE of the estimates with those of uniform, Epanechnikov and Gaussian kernel functions. For data with outlier and bimodal distributions, the proposed estimates perform better than the uniform and Gaussian estimates. One of the proposed kernel estimates with STE bandwidth performs well when data are with a strongly skewed distribution. This estimates with SRT bandwidth performs well when data are skewed bimodal with small sample size. For data with claw distribution, the estimate with SRT bandwidth is better than the others. The same results hold when the STE bandwidth is used with large sample sizes. For data distributed as discrete comb, one of the proposed estimates with STE bandwidth performs better than the others. Another proposed kernel estimate also performs better than the uniform and Gaussian estimate.
PROJECTED CLIMATE CHANGE OVER SOUTHEAST ASIA SIMULATED USING A WRF REGIONAL CLIMATE MODEL

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ABSTRACT

Dynamical downscaling of a global climate model is applied at 60-km horizontal resolution to project changes from 1990-1999 to 2045-2054 of temperature and precipitation over Southeast Asia. The regional climate model reproduces the observed spatial distribution of temperature well, with a cold bias for maximum temperatures and a warm bias for minimum temperatures. Wet-season precipitation is simulated with less skill than dry-season precipitation. Projected warming varies from <0.1 to 3 degrees C depending on the location and season, with greater warming at night than daytime for all seasons. Precipitation increases on average, with local decreases in the dry season. Copyright (C) 2011 Royal Meteorological Society

KEYWORDS: US PACIFIC-NORTHWEST; SUMMER MONSOON; PART I; VARIABILITY; PRECIPITATION; CONVECTION
QUANTUM MECHANICS/MOLECULAR MECHANICS MODELING OF SUBSTRATE-ASSISTED CATALYSIS IN FAMILY 18 CHITINASES: CONFORMATIONAL CHANGES AND THE ROLE OF ASP142 IN CATALYSIS IN CHIB

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ABSTRACT

Family 18 chitinases catalyze the hydrolysis of beta-1,4-glycosidic bonds in chitin. The mechanism has been proposed to involve the formation of an oxazolinium ion intermediate via an unusual substrate-assisted mechanism, in which the substrate itself acts as an intramolecular nucleophile (instead of an enzyme residue). Here, we have modeled the first step of the chitin hydrolysis catalyzed by Serratia marcescens chitinase B for the first time using a combined quantum mechanics/molecular mechanics approach. The calculated reaction barriers based on multiple snapshots are 15.8-19.8 kcal mol⁻¹ [B3LYP/6-31+G(d)//AM1-CHARMM22], in good agreement with the activation free energy of 16.1 kcal mol⁻¹ derived from experiment. The enzyme significantly stabilizes the oxazolinium intermediate. Two stable conformations ((4)C(1)-chair and B(3,O)-boat) of the oxazolinium ion intermediate in subsite -1 were unexpectedly observed. The transition state structure has significant oxacarbenium ion-like character. The glycosyl residue in subsite -1 was found to follow a complex conformational pathway during the reaction ((1,4) B -> [(4)H(5)/(4)E](double dagger) -> (4)C(1) <-> B(3,O)), indicating complex conformational behavior in glycoside hydrolases that utilize a substrate-assisted catalytic mechanism. The D142N mutant is found to follow the same wild-type-like mechanism: the calculated barriers for reaction in this mutant (16.0-21.1 kcal mol⁻¹) are higher than in the wild type, in agreement with the experiment. Asp142 is found to be important in transition state and intermediate stabilization.

KEYWORDS: ACID AMIDE HYDROLASE; TRANSITION-STATE STABILIZATION; GLUTATHIONE-S-TRANSFERASE; A BETA-LACTAMASE; MOLECULAR-DYNAMICS; CHORISMATE MUTASE; ENZYME CATALYSIS; QM/MM METHODS; ACTIVE-SITE; ANTIBIOTIC-RESISTANCE
RAMAN SPECTROSCOPIC STUDY ON ARCHAEOLOGICAL GLASSES IN THAILAND: ANCIENT THAI GLASS

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ABSTRACT

Glasses have been used as ornamental and decorative objects in Thailand for several hundred years as seen in archaeological artifacts, such as glass beads found throughout the regions. Decorative glasses can generally be seen as architectural components in Buddhist temples and old-styled palaces. They came in various colors ranging from transparent to amber, blue, green and red of different shades and tones. Fragments of archaeological glass samples were characterized for the first time using Raman spectrophotometer with the aim of obtaining information that would lead to the identification of the glass samples by means of laser scattering. The samples were also investigated using other techniques, such as proton induced X-ray emission spectroscopy, scanning electron microscopy cooperated with energy dispersive X-ray fluorescence spectrometer and synchrotron radiation to induced X-ray fluorescence. The results showed that they were mostly lead-silica based glasses whose colors were induced by metal ions. The differences in chemical compositions were confirmed by Raman signature spectra. Crown Copyright (C) 2011 Published by Elsevier B.V. All rights reserved.

KEYWORDS: LOCAL SAND; CERAMICS; GLAZES; RED; NANOPARTICLES; IDENTIFICATION; JEWELRY; SPECTRA; MOSAICS; POTTERY
RAPHIDASCARIS (ICHTHYASCARIS) ARII SP N. (NEMATODA: ANISAKIDAE), A NEW ASCARIDOID NEMATODE FROM MARINE CATFISHES IN THE GULF OF THAILAND

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ABSTRACT

A new nematode species, Raphidascaris (Ichthyascaris) arii sp. n. (Anisakidae), is described from male and female specimens found in the intestine of two species of marine siluriform fishes, the spotted catfish Arius maculatus (Thunberg) (Ariidae) (type host) and the striped eel catfish Plotosus lineatus (Thunberg) (Plotosidae) from the coastal region of the Gulf of Thailand, Thailand. Based on light and scanning electron microscopy examinations, the new species differs from other nine representatives of the subgenus Ichthyascaris Wu, 1949 mainly in the length of spicules (210-333 μm), body length of gravid females (10-17 mm), and in the presence of small cuticular spines or protuberances on the tail tip of both sexes and 21-30 pairs of preanal and 8 pairs of postanal papillae in the male. This is the first species of this subgenus reported from fishes of the order Siluriformes and the first species of the subgenus Ichthyascaris Wu, 1949 recorded from the Gulf of Thailand.

KEYWORDS: NEW-CALEDONIA; FISHES; REDESCRIPTION; PARASITE
REDUCTION OF ENZYMATIC BROWNING OF HARVESTED ‘DAW’ LONGAN EXOCARP BY SODIUM CHLORITE

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ABSTRACT

Post-harvest exocarp browning is a major problem resulting in reduced shelf-life of longan fruits. The objective of this study was to evaluate the possibility of using sodium chlorite (SC) as an anti-browning agent for controlling enzymatic browning of harvested longan fruits during storage at ambient conditions. Longan fruits cv. Daw were dipped in 0.001%, 0.005%, 0.01%, and 0.05% SC (W/V) for 10 min. The fruits were packed in cardboard boxes and stored at 25 +/- 1 degrees C with a relative humidity of 82 +/- 5% for 72 h. Changes in browning index, colour parameter (L* and b* values), polyphenol oxidase (PPO) activity, peroxidase (POD) activity, and total phenolic content were measured. The results showed that the fruits treated with SC had lower browning index, but higher L* (lightness) and b* (yellowness) values than those of the control group during storage for 48 h. SC at a concentration of 0.01% was the most effective in reducing exocarp browning. The application of SC reduced PPO and POD activities and delayed a decrease in the total phenolic content. The treatment with 0.01% and 0.05% SC had the lowest PPO and POD activities, and maintained the highest total phenolic content. It was concluded that an application of SC is an alternative method for reducing exocarp browning and maintaining quality of harvested longan fruits.

KEYWORDS: POLYPHENOL OXIDASE; DIOXIDE TREATMENT; LITCHI FRUIT; INHIBITION; ACID; PEROXIDASE; APPLE; PERICARP; THERMOSTABILITY; PURIFICATION
RELATIONSHIP BETWEEN MICROSTRUCTURE, HARDNESS AND CORROSION RESISTANCE IN 20 wt.%Cr, 27 wt.%Cr and 36 wt.%Cr high CHROMIUM CAST IRONS

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ABSTRACT

The microstructures, hardness and corrosion behavior of high chromium cast irons with 20, 27 and 36 wt.%Cr have been compared. The matrix in as-cast 20 wt.%Cr, 27 wt.%Cr and 36 wt.%Cr high chromium cast irons is pearlite, austenite and ferrite, respectively. The eutectic carbide in all cases is M(7)C(3) with stoichiometry as (Cr(3.37), Fe(3.63))C(3), (Cr(4.75), Fe(2.25))C(3) and (Cr(5.55), Fe(1.45))C(3), respectively. After destabilization at 1000 degrees C for 4 h followed by forced air cooling, the microstructure of heat-treatable 20 wt.%Cr and 27 wt.%Cr high chromium cast irons consisted of precipitated secondary carbides within a martensite matrix, with the eutectic carbides remaining unchanged. The type of the secondary carbide is M(7)C(3) in 20 wt.%Cr iron, whereas both M(23)C(6) and M(7)C(3) secondary carbides are present in the 27 wt.%Cr high chromium cast iron. The size and volume fraction of the secondary carbides in 20 wt.%Cr high chromium cast iron were higher than for 27 wt.%Cr high chromium cast iron. The hardness of heat-treated 20 wt.%Cr high chromium cast iron was higher than that of heat-treated 27 wt.%Cr high chromium cast iron. Anodic polarisation tests showed that a passive film can form faster in the 27 wt.%Cr high chromium cast iron than in the 20 wt.%Cr high chromium cast iron, and the ferritic matrix in 36 wt.%Cr high chromium cast iron was the most corrosion resistant in that it exhibited a wider passive range and lower current density than the pearlitic or austenitic/martensitic matrices in 20 wt.%Cr and 27 wt.%Cr high chromium cast irons. For both the 20 wt.%Cr and the 27 wt.%Cr high chromium cast irons, destabilization heat treatment gave a slight improvement in corrosion resistance.

KEYWORDS: HEAT-TREATMENT; WHITE IRON; ELECTRON-MICROSCOPY; SECONDARY CARBIDES; PRECIPITATION; WEAR; BEHAVIOR; ALLOYS

ROOM TEMPERATURE IMIDAZOLIUM IONIC LIQUID:
A SOLVENT FOR EXTRACTION OF CARBAMATES PRIOR TO LIQUID CHROMATOGRAPHIC ANALYSIS

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ABSTRACT

A simple and rapid method for preconcentration of carbamate insecticides, including methomyl, propoxur, carbofuran, carbaryl, isoprocarb, methiocarb and promecarb, has been developed. It was based on a liquid-liquid microextraction using a [C(4)MIM][PF(6)] room temperature ionic liquid as an extraction solvent prior to analysis by high performance liquid chromatography with UV detection. Experimental parameters affecting the extraction performance, such as the volumes of sample, extractant and dissolving solvent, and extraction time, were studied. Under the selected conditions, the enrichment factors in the range between 10 and 25 could be achieved with the limit of detection in the range of 2-40 µg L⁻¹, and with the relative standard deviations of lower than 0.6 and 10.2% for retention time and peak area, respectively. The proposed method offers advantages in reduction of the exposure danger to toxic solvents used in the conventional liquid-liquid extraction, simplicity of the extraction processes, rapidity, and sensitivity enhancement. The method was demonstrated to apply to the analysis of fruit and natural surface water samples. (C) 2011 Elsevier B.V. All rights reserved.

KEYWORDS: CLOUD-POINT EXTRACTION; SOLID-PHASE MICROEXTRACTION; TANDEM MASS-SPECTROMETRY; FLUORESCENCE DETECTION; WATER SAMPLES; MULTIRESIDUE METHOD; PESTICIDE-RESIDUES; CARBOFURAN; CARBARYL; METHIOCARB

SCREENING AND OPTIMIZATION OF INDOLE-3-ACETIC ACID PRODUCTION AND PHOSPHATE SOLUBILIZATION FROM RHIZOBACTERIA AIMED AT IMPROVING PLANT GROWTH

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ABSTRACT

A total of 216 bacterial strains were isolated from rice rhizospheric soils in Northern Thailand. The bacterial strains were initially tested for solubilization of inorganic phosphate, indole acetic acid (IAA) production, selected strains were then tested for optimized conditions for IAA production and whether these caused stimulatory effects on bean and maize seedling growth. It was found that all strains had solubilized inorganic phosphate (P), but only 18.05\% produced IAA. The best IAA producer was identified by biochemical testing and 16S rDNA sequence analysis as Klebsiella SN 1.1. In addition to being the best IAA producer, this strain was a high P-solubilizer and produced the highest amount of IAA (291.97 +/- A 0.19 ppm) in culture media supplemented with l-tryptophan. The maximum production of IAA was achieved after 9 days of incubation. The culture requirements were optimized for maximum IAA production. The tested of IAA production by selected isolates was studied in a medium with 0, 0.1, 0.2, 0.5, 0.7, and 0.9\% (v/v) l-tryptophan. Low levels (12.6 ppm) of IAA production was recorded without tryptophan addition. Production of IAA in Klebsiella SN 1.1 increased with an increase to 0.2\% (v/v) tryptophan concentration. The production of IAA was further confirmed by extraction of crude IAA from this isolate and subsequent Thin Layer Chromatography (TLC) analysis. A specific spot from the extracted IAA production was found to correspond with a standard spot of IAA with the same R (f) value. The Klebsiella strain SN 1.1 also demonstrated stimulatory effects on bean seedlings in vivo.

KEYWORDS: INDOLE ACETIC-ACID; ROOT-NODULES; BACTERIA; WHEAT; MICROORGANISMS; IDENTIFICATION; BIOSYNTHESIS; AZOSPIRILLUM; RHIZOSPHERE; PHOSPHORUS

SEASONAL VARIATION OF METACERCARIAE IN CYPRINOID FISH FROM KWAE NOT BAMROONGDAN DAM, PHITSANULOK PROVINCE, NORTHERN THAILAND

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ABSTRACT

A seasonal investigation of the occurrence of metacercariae in cyprinoid fish was conducted at the Kwae Noi Bamroongdan Dam, Phitsanulok Province, northern Thailand during December 2008 - August 2009. A total 361 cyprinoid fish from 10 species were examined by artificial digestion method evaluating for metacercariae. The metacercariae determined were Haplorchis taichui, Haplorchis pumilio, Haplorchoides sp and Centrocestus caninus. The prevalence of metacercariae ranged from 76.5% to 82.6%, with an intensity of infection of 23.4 to 36.6. H. taichui, Haplorchoides sp and C. caninus had the highest prevalence in the cool season, while H. pumilio was more prevalent during the hot season. The highest infection prevalence (100%) was seen in Rasbora metallicus, Barbodes gonionotus and R. metallicus. No significant differences in the type of metacercariae were found between seasons, indicating year-round infestation of cyprinoid fish.

KEYWORDS: PREVALENCE
SELECTIVITY OF FLAME-SPRAY-MADE Nb/ZnO THICK FILMS TOWARDS NO(2) GAS

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ABSTRACT

Unloaded ZnO and Nb/ZnO nanoparticles containing 0.25, 0.5 and 1 mol.% Nb were produced in a single step by flame-spray pyrolysis (FSP) technique. The nanoparticles were characterized by X-ray diffraction (XRD), scanning electron microscopy (SEM) and transmission electron microscopy (TEM). The BET surface area (SSA(BET)) of the nanoparticles was measured by nitrogen adsorption. FSP yielded small Nb particles attached to the surface of the supporting ZnO nanoparticles, indicating a high SSA(BET). The morphology and accurate size of the primary particles were further investigated by TEM. Nb/ZnO nanoparticles paste composed of ethyl cellulose and terpineol as binder and solvent respectively was coated on Al(2)O(3) substrate interdigitated with gold electrodes to form thick films by spin coating technique. After the sensing tests, the morphology and the cross-section of sensing film were analyzed by SEM and EDS analyses. The influence on a low dynamic range of Nb concentration on NO(2) response (0.1-4 ppm) of thick film sensor elements was studied at the operating temperatures ranging from 250 to 350 degrees C in the presence of dry air. The optimum Nb concentration was found be 0.5 mol.% and 0.5 mol.% Nb exhibited an optimum NO(2) response of similar to 1640 and a short response time (27 s) for NO(2) concentration of 4 ppm at 300 degrees C. (C) 2011 Elsevier B.V. All rights reserved.

KEYWORDS: SENSING CHARACTERISTICS; ROOM-TEMPERATURE; ZINC-OXIDE; ELECTRON-DENSITY; SNO2 NANOWIRES; SENSORS; ZNO; NITROGEN; TIO2; AIR
SELECTIVITY TOWARDS H(2) GAS BY FLAME-MADE PT-LOADED WO(3) SENSING FILMS

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ABSTRACT

In this work, unloaded WO(3) and 0.25-1.0 wt% Pt-loaded WO(3) powders were produced by flame spray pyrolysis (FSP) and structurally characterized by X-ray diffraction (XRD), scanning electron microscopy (SEM) and high-resolution transmission electron microscopy (HR-TEM). The BET surface area (SSA(BET)) of the nanoparticles was measured by nitrogen adsorption. Thick WO(3) films (30 µm) on alumina substrates interdigitated with gold electrodes were prepared by spin-coating technique and tested for gas sensing towards H(2), CO, C(2)H(4) and C(2)H(5)OH gases at concentrations ranging from 0.01 to 1 vol% in dry air with operating temperatures ranging from 150 to 300 degrees C. The sensing films exhibited excellent H(2) sensing performances with a very high response, short response time and high selectivity towards CO, C(2)H(4) and C(2)H(5)OH gases. The response (within seconds) and recovery (within minutes) times were very fast. It was found that 1.0 wt% Pt-loaded WO(3) sensing films showed extremely excellent H(2) sensing performances at 150 degrees C with the highest sensor response (S similar to 1.34 x 10(5)) and the highest selectivity compared to the other gases. (C) 2011 Elsevier B.V. All rights reserved.

KEYWORDS: SPUTTERED THIN-FILMS; ETHANOL VAPOR; SNO2 FILMS; SENSOR; HYDROGEN; TUNGSTEN; SURFACE; CATALYSTS; PD
SENSING OF ACETONE VAPOR BY FLAME-MADE Sn/ZnO NANOPARTICLES

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ABSTRACT

Pure ZnO and Sn-doped ZnO nanoparticles were synthesized using flame spray pyrolysis technique. Precursor solutions (0.5 M) were prepared by dissolving the appropriate amounts of zinc naphthenate and tin (II) 2-ethylhexanoate in xylene. The nanopowders were characterized by X-ray diffraction (XRD), Brunauer Emmett, and teller (BET), and transmission electron microscopy (TEM) techniques. The sensing films were prepared by spin coating. The response of gas sensors were tested during backward cycle under exposure acetone vapor (25-400 ppm) at operating temperatures ranging from 200-400 degrees C. The cross-section and films morphology were further characterized by field emission scanning electron microscopy-energy dispersive spectroscopy (FESEM-EDS) techniques. It was found that 3 at.% Sn-doped ZnO sensor showed the best sensing performance towards acetone in terms of the highest response and fastest response times within a few minutes.

KEYWORDS: ZNO THIN-FILMS; DOPED ZNO; SPRAY-PYROLYSIS; GAS SENSOR
SENSITIVITY IMPROVEMENT OF ETHANOL SENSOR BASED ON ZnO NANOSTRUCTURE BY METAL IMPREGNATION

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ABSTRACT

Chemical sensors based on ZnO nanostructure were fabricated and studied toward ethanol vapour. The adding metal by metal impregnation technique was used for sensitivity improvement of ethanol sensor based on ZnO nanostructure. ZnO nanostructures were prepared by thermal oxidation technique under normal atmosphere and exhibited diameter of 40-300 nm and length of several micrometers. The ethanol sensing properties of sensor based on ZnO nanostructure with platinum and gold nanoparticle were investigated. The improvement of sensitivity due to metal adding was observed and found that adding metal with both Au and Pt resulted in the highest sensitivity of 85 at 1000 ppm. The sensitivity improvement by metal impregnation is due to catalytic properties of metal in both ethanol adsorption reaction $k$(Eth)(T) and oxygen adsorption reaction $k$(Oxy)(T) at the surface as described in sensitivity formula.

KEYWORDS: THIN-FILMS; GAS; NO2

SEQUENTIAL INJECTION ANODIC STRIPPING VOLTAMMETRY WITH MONOSEGMENTED FLOW AND IN-LINE UV DIGESTION FOR DETERMINATION OF Zn(II), Cd(II), Pb(II) and Cu(II) IN WATER SAMPLES

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ABSTRACT

A cost-effective sequential injection system incorporating with an in-line UV digestion for breakdown of organic matter prior to voltammetric determination of Zn(II), Cd(II), Pb(II) and Cu(II) by anodic stripping voltammetry (ASV) on a hanging mercury drop electrode (HMDE) of a small scale voltammetric cell was developed. A low-cost small scale voltammetric cell was fabricated from disposable pipet tip and microcentrifuge tube with volume of about 3 mL for conveniently incorporated with the SI system. A home-made UV digestion unit was fabricated employing a small size and low wattage UV lamps and flow reactor made from PTFE tubing coiled around the UV lamp. An in-line single standard calibration or a standard addition procedure was developed employing a monosegmented flow technique. Performance of the proposed system was tested for in-line digestion of model water samples containing metal ions and some organic ligands such as strong organic ligand (EDTA) or intermediate organic ligand (humic acid). The wet acid digestion method (USEPA 3010a) was used as a standard digestion method for comparison. Under the optimum conditions, with deposition time of 180s, linear calibration graphs in range of 10-300 µg L⁻¹ Zn(II), 5-200 µg L⁻¹ Cd(II), 10-200 µg L⁻¹ Pb(II), 20-400 µg L⁻¹ Cu(II) were obtained with detection limit of 3.6, 0.1, 0.7 and 4.3 µg L⁻¹, respectively. Relative standard deviation were 4.2, 2.6, 3.1 and 4.7% for seven replicate analyses of 27 µg L⁻¹ Zn(II), 13 µg L⁻¹ Cd(II), 13 µg L⁻¹ Pb(II) and 27 µg L⁻¹ Cu(II), respectively. The system was validated by certified reference material of trace metals in natural water (SRM 1640 NIST). The developed system was successfully applied for speciation of Cd(II) Pb(II) and Cu(II) in ground water samples collected from nearby zinc mining area. (C) 2011 Elsevier B.V. All rights reserved.

KEYWORDS: MERCURY DROP ELECTRODE; THROUGH CELL; FILM ELECTRODE; TRACE-METALS; SYSTEM; CADMIUM; LEAD; COPPER

SEQUENTIAL INJECTION LAB-AT-VALVE (SI-LAV)
SEGMENTED FLOW SYSTEM FOR KINETIC STUDY OF AN ENZYME

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ABSTRACT

A sequential injection-Lab-at-valve (SI-LAV) segmented flow system for kinetic study of an enzyme was developed. Air segments were introduced for separation of enzyme and substrate zones and separation of the stacked zones from the carrier solution which ensure the measurement of the initial rate and minimize the dilution/dispersion effect. The open-ended mixing chamber makes it possible to use air segments in the flow system without the need for additional air segment discarding steps. The enzyme horseradish peroxidase (HRP) kinetic parameters based on initial rate was used as a model study. The operation of the system is virtually the same as that of the conventional batch-wise process. The kinetic parameters (i.e. K(m) and V(max)) of HRP obtained using the proposed system agree well with those obtained using the batch-wise process as well. The proposed system offers additional benefits of volume down scaling, improved rapidity and automatic features that does not require a skillful operator. (C) 2011 Elsevier B.V. All rights reserved.

KEYWORDS: MICHAELIS-MENTEN; PARAMETERS; CONSTANTS

SEQUENTIAL INJECTION SPECTROPHOTOMETRIC DETERMINATION OF TETRACYCLINE ANTIBIOTICS IN PHARMACEUTICAL PREPARATIONS AND THEIR RESIDUES IN HONEY AND MILK SAMPLES USING YTTRIUM (III) AND CATIONIC SURFACTANT

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ABSTRACT

A sequential injection analysis (SIA) spectrophotometric method for determining tetracycline (TC), chlortetracycline (CTC) and oxytetracycline (OTC) in different sample matrices were described. The method was based on the reaction between tetracyclines and yttrium (III) in weak basic micellar medium, yielding the light yellow complexes, which were monitored at 390, 392 and 395 nm, respectively. A cationic surfactant, cetyltrimethylammonium bromide (CTAB) was used to obtain the micellar system. The linear ranges of calibration graphs were between 1.0 x 10(-5) and 4 x 10(-4) mol L(-1), respectively. The molar absorptivities were 5.24 x 10(5), 4.98 x 10(4) and 4.78 x 10(4) L mol(-1) cm(-1). The detection limits (3 sigma) were between 4.9 x 10(-6) and 7.8 x 10(-6) mol L(-1) whereas the limit of quantitations (10 sigma) were between 1.63 x 10(-5) and 2.60 x 10(-5) mol L(-1) the interday and intraday precisions within a weak revealed as the relative standard deviations (R.S.D., n = 11) were less than 4%. The method was rapid with a sampling rate of over 60 samples h(-1) for the three drugs. The proposed method has been satisfactorily applied for the determination of tetracycline and
its derivatives in pharmaceutical preparations together with their residues in milk and honey samples collected in Chiang Mai Province. The accuracy was found to be high as the Student’s t-values were found to be less than the theoretical ones. The results were compared favorably with those obtained by the conventional spectrophotometric method. (C) 2011 Elsevier B.V. All rights reserved.

**KEYWORDS:** FLOW-INJECTION; CETYL PYRIDINIUM CHLORIDE; DRUG FORMULATIONS; CHLORTETRACYCLINE; OXYTETRACYCLINE; LUMINESCENCE; COMPLEXES; ASSAY; SERUM; ZINC
SEQUENTIAL INJECTION SYSTEM WITH MODIFIED GLASS CAPILLARY FOR AUTOMATION IN IMMUNOASSAY OF CHONDROITIN SULFATE

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ABSTRACT

Sequential injection was introduced to perform a multi-step immunoassay. Modified low cost hematocrit glass capillary was employed as the immobilization surface for a competitive immunoassay of chondroitin sulfate (CS), a potential biomarker for cancer. Glass capillary is low cost and adapts well to the flow system without causing back pressure. The analysis time per sample run with automation of the multi-step immunoassay is improved as compared to the conventional batch-wise micro-plate format. The performance of the sequential injection capillary immunoassay (SI-CI) system for CS was evaluated with spiked human serum samples.

KEYWORDS: FLOW; CANCER; HYALURONAN; ANTIBODY; BIOMARKERS; BIOSENSOR; ELECTRODE; SENSORS; MARKER; WATER
SEQUENTIAL INJECTION-BEAD INJECTION-LAB-ON-VALVE COUPLED TO HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY FOR ONLINE RENEWABLE MICRO-SOLID-PHASE EXTRACTION OF CARBamate RESIDUES IN FOOD AND ENVIRONMENTAL SAMPLES

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ABSTRACT

A sequential injection-bead injection-lab-on-valve system was hyphenated to HPLC for online renewable micro-solid-phase extraction of carbamate insecticides. The carbamates studied were isoprocarb, methomyl, carbaryl, carbofuran, methiocarb, promecarb, and propoxur. LiChroprep (R) RP-18 beads (25-40 mu m) were employed as renewable sorbent packing in a microcolumn situated inside the LOV platform mounted above the multiposition valve of the sequential injection system. The analytes sorbed by the microcolumn were eluted using 80% acetonitrile in 0.1% acetic acid before online introduction to the HPLC system. Separation was performed on an Atlantis C-18 column (4.6 x 150 mm, 5 mu m) utilizing gradient elution with a flow rate of 1.0 mL/min and a detection wavelength at 270 nm. The sequential injection system offers the means of performing automated handling of sample preconcentration and matrix removal. The enrichment factors ranged between 20 and 125, leading to limits of detection (LODs) in the range of 1-20 mu g/L. Good reproducibility was obtained with relative standard deviations of < 0.7 and 5.4% for retention time and peak area, respectively. The developed method has been successfully applied to the determination of carbamate residues in fruit, vegetable, and water samples.
SEVEN NEW SPECIES OF SYSTARIA SIMON, 1897
FROM SOUTHEAST ASIA (ARANEAE, CLUBIONIDAE,
SYSTARIINAE)

Dankittipakul Pakawin and Singtripop Tippawan

ABSTRACT

The male of Systaria cervina (Simon, 1897) is newly described; the female internal genitalia are illustrated for the first time. Seven new species are described from Southeast Asia: S. decidua sp. nov. and S. lanna sp. nov. from northern Thailand; S. insolita sp. nov. from northeastern Thailand; S. bifida sp. nov. from southern Thailand and Myanmar; S. acuminata sp. nov. from southern Thailand and Indonesia; S. convolutiva sp. nov. from Indonesia; S. deelemanae sp. nov. from the Philippines. Two additional characters are recognized among Systaria species and considered synapomorphies for the genus: the base of the cymbium on retrolateral side is provided with a sharply pointed cymbial tubercle or an elevated, oblique ridge; the anterior bursae of the internal female genitalia are distinctly sclerotized.

KEYWORDS: MITURGIDAE
SIMULTANEOUS DETERMINATION OF SOME FOOD ADDITIVES IN SOFT DRINKS AND OTHER LIQUID FOODS BY FLOW INJECTION ON-LINE DIALYSIS COUPLED TO HIGH PERFORMANCE LIQUID CHROMATOGRAPHY

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ABSTRACT

Flow injection on-line dialysis was developed for sample pretreatment prior to the simultaneous determination of some food additives by high performance liquid chromatography (FID-HPLC). A liquid sample or mixed standard solution (900 μL) was injected into a donor stream (5%, w/v, sucrose) of FID system and was pushed further through a dialysis cell, while an acceptor solution (0.025 mol L⁻¹ phosphate buffer, pH 3.75) was held in the opposite side of the dialysis membrane. The dialysate was then flowed to an injection loop of the HPLC valve, where it was further injected into the HPLC system and analyzed under isocratic reverse-phase HPLC conditions and UV detection (230 nm). The order of elution of five food additives was acesulfame-K, saccharin, caffeine, benzoic acid and sorbic acid, respectively, with the analysis time of 14 min. On-line dialysis and HPLC analysis could be performed in parallel, providing sample throughput of 4.3 h⁻¹. Dialysis efficiencies of five food additives were in ranges of 5-11%. Linear calibration graphs were in ranges of 10-100 mg L⁻¹ for acesulfame-K and saccharin, 10-250 mg L⁻¹ for benzoic acid and 10-500 mg L⁻¹ for caffeine and sorbic acid. Good precisions (RSD <5%) for all the additives were obtained. The proposed system was applied to soft drink and other liquid food samples. Acceptable percentage recoveries could be obtained by appropriate dilution of the sample before injecting into the system. The developed system has advantages of high degrees of automation for sample pretreatment, i.e., on-line sample separation and dilution and low consumption of chemicals and materials. Crown Copyright (C) 2011 Published by Elsevier B.V. All rights reserved.

KEYWORD: SOLID-PHASE MICROEXTRACTION; BENZOIC-ACID; SORBIC ACID; ARTIFICIAL SWEETENERS; ORGANIC-ACIDS; ION CHROMATOGRAPHY; AUTOMATED PREPARATION; INTENSE SWEETENERS; SAMPLE PREPARATION; ACESULFAME-K
SINTERING BEHAVIOR OF TRIOL SOL–GEL DERIVED Nb–doped PZT CERAMICS: EFFECTS ON PHASE, MICROSTRUCTURE AND ELECTRICAL PROPERTIES

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ABSTRACT

The ceramics were fabricated from nano-sized Nb-doped PZT powder, which was synthesized by a triol sol-gel method. The powder was pressed and sintered at the temperature in between 900-1250 degrees C for 2-6 h with heating/cooling rates of 5-20 degrees C min(-1). The XRD results showed that increasing the sintering temperature caused phase changes from dominate rhombohedral to co-existence of tetragonal and rhombohedral phases which can be observed at the sintering temperature up to 1000 degrees C. In addition, changes of heating rate and holding time also affected phases presented in the ceramics. SEM micrographs showed small grain with a diameter of similar to 0.3 mu m occurred at 900 degrees C. The uniform grain size of similar to 1 mu m was found at temperature above 1000 degrees C. Grain growth behavior was dominant at 1200 degrees C as the grain size increases to similar to 5 mu m. The optimum sintering condition for Nb-doped PZT ceramics was found to be 1100 degrees C with a heating rate of 5 degrees C min(-1) for a 6 h dwell time. This condition provided the ceramic with density similar to 95%, a uniform grain size distribution with an average grain size of 1.7 mu m, a remnant polarization of 20.4 mu C cm(-2) and a coercive field of 7.6 kV cm(-1).

KEYWORDS: POWDERS; SIZE
SIXTEENTH INTERNATIONAL CONFERENCE ON FLOW INJECTION ANALYSIS INCLUDING RELATED TECHNIQUES (ICFIA 2010) PREFACE

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ABSTRACT

The 16th International Conference on Flow Injection Analysis and Related Techniques (ICFIA 2010) was held at the Garden Sea View Resort Hotel in Pattaya, Thailand, during 25–30 April 2010. The conference was held jointly with the Japanese Association for Flow Injection Analysis (JAFIA). Also, the newly established Thai Association for Flow-based Analysis (Thai-AFA) contributed to this meeting. It was hosted and organized by Duangjai Nacapricha, Mahidol University, Orawon Chailapakul, Chulalongkorn University, and Jaroon Jakmunee and Kate Grudpan, Chiang Mai University. Professor Gary D Christian has continued to support the Conference since it was first organized in 1987 in USA. ICFIA has been similar to Talanta in terms of encouraging and promoting researches in every geographical part of the world. This leads to different aspects of opportunities. Under the typical atmosphere of ICFIA, with easy going but high degrees of academic interaction, friendly collaborations among multi-nations as well as multi-generations have been observed. There were 189 participants at ICFIA 2010, from twenty countries and from five continents. The scientific program included 44 oral presentations and 145 poster presentations. Starting in the Monday morning session with an invited opening lecture, Gary Christian (University of Washington, USA) traced the evolution of flow injection analysis and related Conferences. Following the lecture, a PowerPoint slideshow presentation, along with some (historical) photos and music, provided remembrances from pioneers and other prominent members of the FIA community. Descriptions of what interested them in FIA and their views of historical developments and some of their key contributions, indicate how FIA and kindred techniques were developed in various places, and also emphasizes the usefulness of the techniques. Selected parts of the information were extracted out and put into an article in this special issue, “How did Flow Injection Analysis, and its related techniques, develop in various parts of the globe? Reflections of prominent FIA practitioners” The oral and poster contributions were diverse in a broad spectrum, including instrumentation, detection systems, reactors, flow
gradients, microfluidics, separations, preconcentration, speciation, reagents, and applications. The ICFIA program ended with an invited closing lecture on Friday by Victor Cerd (University of the Balearic Islands, Spain), discussing current and future projects in flow analysis from his laboratory, emphasizing instrumentation and various applications. Instruments and literature were exhibited by Bangkok High Lab Co., Ltd., representing FIAlab Instruments, and providing electrochemical, photometric and microfluidic systems; eDAQ, providing detectors and software for FIA, electrophoresis, and chromatography; Fortunesci, representing international companies for fittings, sample preparation, and chromatography; Merck, for chromatolith columns and high purity solvents for HPLC, Sithiporn Associates Co., Ltd., representing Foss, and Thai Unique, Ltd., representing Lachat Instruments. Annually, The Japanese Association for Flow Injection Analysis announces the prestigious FIA Awards. At ICFIA 2010, the prestigious FIA Awards for Science were presented to Petr Solich and Duangjai Nacapricha at the Conference banquet. The FIA Honor Award for Science was presented separately to Bo Karlberg (University of Stockholm) and Ari Ivaska (Abo Akademi University) who were not present at the conference. In the 48th annual meeting of JAFIA (held in Osaka Prefecture University, November 27th, 2009), the FIA Award for Science was presented to Kei Toda (Kumamoto University), and the FIA Award for Younger Researchers was presented to Hiroshi Shiigi (Osaka Prefecture University). As a tradition for ICFLIs, social activities are always arranged, and for ICFIA 2010, an opening ceremony and welcome party with cocktails was held at the swimming pool. This offered a chance for regular and new attendees to meet. A typical Thai barbeque was held Tuesday evening for diners in a style “cook their own food on a grill-pot”. Wednesday was a traditional day for excursions, with visits to Nongnooch Tropical Botany Garden, and including colorful Thai dancers and an elephant show, to the Suphattra Land farm for experiences with a variety of Thai fruits, and in the evening to the famous Tiffany show, a Pattaya well-known show, followed by a stroll along the “Walking Street”. The conference banquet and party was held on Thursday evening, with Thai performances and music with local instruments, and game entertainment by participants. A Conference report on the ICFIA 2010 may be found in: G.D. Christian, JFIA 27 (1) (2010) 66–70. ICFIA 2011(17th ICFIA), the next conference, will be held in Krakow, Poland, July 3–8, 2011, hosted by Paweł Kościelniak at Jagiellonian University. Details may be obtained by e-mail: kosieln@chemia.uj.edu.pl or from the website: http://www.chemia.uj.edu.pl/icfia2011/. This Special Issue represents 36 peer reviewed papers submitted by conference attendees, including the lead article on the reflections of prominent FIA practitioners. They provide an excellent cross-section of research on instrumentation and a variety of applications of the flow-based techniques. Thanks are due to the Special Issue editor team: Duangjai Nacapricha, Orawon Chailapakul and Jaroon Jakmunee, Advisor: Gary Christian (co-Editor-in-chief, Talanta), Elsevier special issue manager: Patricia Massar, Production section: Siobhan Ryan, and the reviewers.
SnO(2) NANOWIRES MIXED NANODENDRITES FOR HIGH ETHANOL SENSOR RESPONSE

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ABSTRACT

Mixed morphology of SnO(2) nanowires and nanodendrites was synthesized on the gold-coated alumina substrates by carbothermal reduction of SnO(2) in closed crucible. The products were characterized by scanning electron microscopy, x-ray diffractometer, and transmission electron microscopy. Results showed the SnO(2) nanowires and the SnO(2) nanodendrites branched out from the main nanowires. Both SnO(2) nanostructures were pure tetragonal rutile structure. The nanowires were grown in [101] and [1 (21) over bar] directions with the diameter of 50-150 nm and the length of a few 10 mm. The nanodendrites were about 100-300 nm in diameter. The growth mechanism of the SnO(2) nanostructures was also discussed. Characterization of ethanol gas sensor, based on the mixed morphology of the SnO2 nanostructures, was carried out. The optimal temperature was about 360 degrees C and the sensor response was 120 for 1000 ppm of ethanol concentration. (C) 2011 Elsevier B. V. All rights reserved.

KEYWORDS: HYDROTHERMAL SYNTHESIS; RAPID OXIDATION; GAS SENSORS; NANO-SHEETS; NANOPARTICLES; NANOBELTS; GROWTH; NANOSTRUCTURES; MICROSPHERES; SURFACE
SOLVOTHERMAL SYNTHESIS, SINTERING BEHAVIOR AND DIELECTRIC PROPERTIES OF POTASSIUM NIOBATE FINE POWDERS

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ABSTRACT

Fine potassium niobate powders composing of sub-micrometer sized lumber particles were synthesized under solvothermal conditions, with the use of mixed water-ethyl alcohol as the reaction medium and the application of the prior ultrasonication as the activation step. The influences of ethyl alcohol on particle shape and size, and the prior ultrasonication on the sintering behavior of the synthesized powders are present and discussed in relative to the conventional hydrothermal cases. The temperature dependent dielectric constants (Er) and dielectric losses (tan delta) of the sintered ceramics are also included, showing the origin of the losses to stem from the loss of potassium oxide in the sintering process.

KEYWORDS: THIN-FILMS; HYDROTHERMAL SYNTHESIS; KNBO₃; CERAMICS
SPHAERISPORANGIUM SIAMENSE SP NOV., AN ACTINOMYCETE ISOLATED FROM RUBBER-TREE RHIZOSPHERIC SOIL

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ABSTRACT

A Gram-positive aerobic actinomycete, designated SR14.14(T), isolated from the rhizospheric soil of rubber tree was determined taxonomically using a polyphasic approach. The organism contained meso-diaminopimelic acid and the N-acetyl type of peptidoglycan. The predominant menaquinones were MK-9, MK-9(H(2)) and MK-9(H(4)). Madurose was detected in the whole-cell hydrolysates. Mycolic acids were not presented. Major phospholipids were diphosphatidylglycerol, phosphatidylethanolamine and phosphatidylinositol mannoside. Major cellular fatty acid was iso-C(16:0) and the G+C content was 71.9 mol%. Phylogenetic analysis based on 16S rRNA gene sequence suggested that the isolate belongs to the genus Sphaerisporangium. The sequence similarity value between the strain SR14.14(T) and its closely related species, Sphaerisporangium album, was 97.8%. DNA-DNA hybridization values between them were well below 70%. Based on genotypic and phenotypic data, strain SR14.14(T) represents a novel species in the genus Sphaerisporangium, for which the name Sphaerisporangium siamense sp. nov. is proposed. The type strain is SR14.14(T) (=BCC 41491(T)=NRRL B-24805(T)=NBRC 107570(T)). The Journal of Antibiotics (2011) 64, 293-296; doi: 10.1038/ja.2011.17; published online 16 March 2011

KEYWORDS: PHYLOGENETIC TREES; NOCARDIA; STRAINS; ACTINOBACTERIA; CLASSIFICATION; PROPOSAL
STABILITY: A KEY ISSUE FOR SELF-ASSEMBLED MONOLAYERS ON GOLD AS THIN-FILM COATINGS AND NANOPARTICLE PROTECTANTS

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ABSTRACT

This review examines the use of self-assembled monolayers (SAMs) on gold as nanoscale protective coatings for both nominally flat substrates and for nanoparticles. The thermal and chemical stabilities of the SAMs are discussed, and the various strategies used by researchers to generate thin films with enhanced resistance to corrosion and/or decomposition are described. The use of multidentate adsorbates to achieve the desired objectives is emphasized. (C) 2011 Elsevier B.V. All rights reserved.

KEYWORDS: ORGANIZED MOLECULAR ASSEMBLIES; H STRETCHING MODES; TRIDENTATE CHELATING ALKANETHIOLS; TRANSFORM MASS-SPECTROMETRY; LIGAND-EXCHANGE REACTIONS; INDUCED CROSS-LINKING; CHAIN DiYNOIC ACIDS; NORMAL-ALKYL CHAINS; THERMAL-STABILITY; POLYCRYSTALLINE GOLD
ABSTRACT

The estimation of stature is a very important step in developing a biological profile for forensic identification. However, little previous work has been done on stature estimation among modern Thai people, despite a growing number of forensic cases in Thailand in recent years. The current study was carried out on a sample of 200 skeletons from a northern Thai population (132 males and 68 females), ranging in age from 19 to 94 years. The maximum lengths of six long bones (humerus, radius, ulna, femur, tibia and fibula) were measured and stature reconstruction formulae generated using linear regression. These equations were then tested on a holdout sample of 15 females and 15 males. Results reveal that the three lower limb bones are the most accurate estimators of stature among the males, with the fibula equation producing the lowest standard error of the estimate (SE = 4.89 cm), followed by the femur (SE = 5.06 cm). Results for females were mixed. The femur produced the lowest standard error among the females (SE = 5.21 cm), followed by the radius (SE = 5.63 cm). However, when tested against the holdout sample (n = 30), the femur equations were considerably more accurate, with a mean absolute error of 3.5 cm and a median absolute error of 2.4 cm. Females exhibited a higher standard error of the estimate than reported in many previous studies. This higher error may be the result of a recent secular trend in stature affecting the females of our sample somewhat more than the males. (C) 2011 Elsevier Ireland Ltd. All rights reserved.

KEYWORDS: ANTHROPOMETRY; CHINESE; FORMULAS; WHITES
STRONG CONVERGENCE FOR A COUNTABLE FAMILY OF STRICT PSEUDOCONTRACTIONS IN Q-UNIFORMLY SMOOTHER BANACH SPACES

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ABSTRACT

We introduce a new iterative algorithm for finding a common fixed point of a countable family of strict pseudocontractions in q-uniformly smooth and uniformly convex Banach spaces. We then prove that the sequence generated by the proposed algorithm converges strongly to a common fixed point of an infinite family of strict pseudocontractions. Our results mainly improve and extend the results announced by Yao et al. [Y. Yao, Y.-C. Liou, G. Marino, Strong convergence of two iterative algorithms for nonexpansive mappings in Hilbert spaces, Fixed Point Theory Appl. 2009 (2009) 7 pages. doi:10.1155/2009/279058. Art. ID 279058]. (C) 2011 Elsevier Ltd. All rights reserved.

KEYWORDS: FIXED-POINT PROBLEMS; NONEXPANSIVE-MAPPINGS; PSEUDO-CONTRACTIONS; HILBERT-SPACES; ITERATIVE ALGORITHMS; EQUILIBRIUM PROBLEMS; NONLINEAR OPERATORS; WEAK CONVERGENCE; THEOREMS; APPROXIMATION
STRONG CONVERGENCE OF MODIFIED HALPERN ITERATIONS IN CAT(0) SPACES

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ABSTRACT

Strong convergence theorems are established for the modified Halpern iterations of nonexpansive mappings in CAT(0) spaces. Our results extend and improve the recent ones announced by Kim and Xu (2005), Hu (2008), Song and Chen (2008), Saejung (2010), and many others.

KEYWORDS: BANACH-SPACES; NONEXPANSIVE-MAPPINGS; FIXED-POINTS; ACCRETIVE-OPERATORS; THEOREMS; RESOLVENTS
STRONG CONVERGENCE THEOREMS FOR A COUNTABLE FAMILY OF NONEXPANSIVE MAPPINGS IN CONVEX METRIC SPACES

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ABSTRACT

We introduce a new modified Halpern iteration for a countable infinite family of nonexpansive mappings \{T(n)\} in convex metric spaces. We prove that the sequence \{x(n)\} generated by the proposed iteration is an approximating fixed point sequence of a nonexpansive mapping when \{T(n)\} satisfies the AKTT-condition, and strong convergence theorems of the proposed iteration to a common fixed point of a countable infinite family of nonexpansive mappings in CAT(0) spaces are established under AKTT-condition and the SZ-condition. We also generalize the concept of W-mapping for a countable infinite family of nonexpansive mappings from a Banach space setting to a convex metric space and give some properties concerning the common fixed point set of this family in convex metric spaces. Moreover, by using the concept of W-mappings, we give an example of a sequence of nonexpansive mappings defined on a convex metric space which satisfies the AKTT-condition. Our results generalize and refine many known results in the current literature.

KEYWORDS: COMMON FIXED-POINTS; APPROXIMATION
STUDY OF THERMIONIC RF-GUN PHASE-SPACE DYNAMICS AND SLICE EMITTANCE UNDER INFLUENCE OF EXTERNAL ELECTROMAGNETIC FIELDS

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ABSTRACT

A high brightness electron source of ultra-small emittance and high-average current is one of the most important components for future accelerators. In a RF-electron-gun, rapid acceleration can reduce emittance growth due to space charge effects. However, twisting or rotation of the transverse phase-space distribution as a function of time is observed in thermionic RF-electron-guns and may set a lower limit to the projected beam emittance. Such rotation being caused by the variation of the RF field with time may be compensated by fields from a specific cavity. In this work, we study RF-electron-gun phase-space dynamics and emittance under the influence of external fields to evaluate the compensation schemes. (C) 2010 Elsevier B.V. All rights reserved.
SUITABLE GROWTH CONDITIONS AND NUTRITION FACTORS ON IN VITRO CULTURE OF PHLEBOPUS PORTENTOSUS (BOLETALES)

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ABSTRACT

Phlebopus portentosus is one of the most popular wild edible mushrooms in northern Thailand. As this mushroom may not be obligately ectomycorrhizal, we look into the possibilities for its commercial cultivation. In this paper we report the effects of pH, temperature, carbon and nitrogen sources and 15 culture growth media on the growth of P. portentosus. The results indicated that mycelia of P. portentosus grow well at pH 4.0. The fungus was able to grow at temperatures ranging from 20-35 degrees C, with an optimal growth temperature of 30 degrees C. Glucose and ammonium salts produced the largest radial growth. Among 15 culture media tested, modified Murashige & Skoog and fungal-host media were the best for the mycelia growth. Sclerotia-like structures were formed on these media after three weeks of incubation.

KEYWORDS: NITROGEN-SOURCES; DIFFER; MEXICO
SYNTHESIS AND HIGH-TEMPERATURE THERMOELECTRIC PROPERTIES OF Ni(3)GaSb and Ni(3)InSb

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ABSTRACT

Ni(3)GaSb and Ni(3)InSb were successfully synthesized by the direct reaction of Ni and GaSb or InSb. The XRD patterns and the lattice parameters of these compounds were in good agreement with the literature data. The Seebeck coefficient (S), the electrical resistivity (rho), and the thermal conductivity (kappa) of Ni(3)GaSb and Ni(3)InSb were examined in the temperature range from room temperature to 1073 K. Both compounds indicated metal-like characteristics. The power factor (S(2) rho(-1)) values increased with temperature and reached maximum at 1073 K. The kappa and the dimensionless figure of merit ZT of both samples increased with temperature. The maximum values of the ZT of Ni(3)GaSb and Ni(3)InSb were obtained at 1073K to be 0.022 and 0.023, respectively. (C) 2011 Elsevier B.V. All rights reserved.

KEYWORDS: EFFICIENCY; GALLIUM; GROWTH; INDIUM; INSB

SYNTHESIS AND OPTICAL PROPERTIES OF LIGHT-EMITTING POLYFLUORENE DERIVATIVES

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ABSTRACT

The emitting-polymers, Polyfluorene (PF) and Poly(fluorene-benzothiadiazole-quinoline) [PF-BT-QL], have been synthesized by the Suzuki coupling reactions. The properties of polymers were characterized using UV-Vis spectroscopy, GPC, DSC, TGA, Photoluminescence (PL), Fluorescence (FL), Electroluminescence (EL) spectroscopy. The synthetic polymers were soluble in common organic solvents and easily spin-coated onto the indium-tin oxide (ITO)-coated glass substrates. Light-emitting devices (LEDs) with ITO/PEDOT:PSS/ Polymer/LiF/Al configuration were fabricated, and the devices using copolymers showed red shift EL spectra relative to that of PF. The turns on voltages of copolymers were lower than that of PF. Author Keywords: Light-emitting polymer; polyfluorene; polymer light-emitting diode

SYNTHESIS AND PROPERTIES OF 0.8PZT-0.10PZN-0.10PNN CERAMICS

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ABSTRACT

The 0.8PZT-0.10PZN-0.10PNN powders were synthesized via a columbite method. Pure perovskite phase was obtained at the calcinations temperature >= 900 degrees C. Ceramics with the same composition were fabricated at various sintering temperatures. The densest ceramic with pure phase perovskite was obtained at the sintering temperature of 1250 degrees C for 4 h. The ceramics showed two phase transition at similar to 265 degrees C and similar to 291 degrees C which correspond to orthorhombic to tetragonal and tetragonal to cubic phase transition, respectively. The obtained ceramics also showed a very high dielectric constant >40000. The ferroelectric properties were investigated and discussed.

KEYWORDS: DIELECTRIC-PROPERTIES; SYSTEM; ORDER
SYNTHESIS AND THERMAL CONDUCTIVITIES OF ZnIn(2)Te(4) AND CdIn(2)Te(4) WITH DEFECT-CHALCOPYRITE STRUCTURE

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ABSTRACT

ZnIn(2)Te(4) and CdIn(2)Te(4) have a defect-chalcopyrite tetragonal crystal structure with structural vacancies. In order to investigate the effects of vacancies on the lattice thermal conductivity (kappa(lat)), single phase samples of ZnIn(2)Te(4) and CdIn(2)Te(4) were synthesized and their kappa(lat) values were examined in the temperature range from room temperature to 850 K. The kappa(lat) data for ZnIn(2)Te(4) and CdIn(2)Te(4) were compared with those of Zn- and Cd-series chalcopyrite compounds with no vacancies. The results revealed that the presence of vacancies alone in the defect-chalcopyrite structure does not result in effective phonon scattering. (C) 2011 Elsevier B. V. All rights reserved.

KEYWORDS: THERMOELECTRIC-MATERIALS; SEMICONDUCTORS; ZNSIAS2
SYNTHESIS OF BARIUM TITANATE–BARIUM MAGNESIUM NIOBATE SOLID SOLUTION BY A MIXED–OXIDE METHOD

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ABSTRACT

In the present study, the phase formation characteristics of the (1-x) BaTiO(3)-xBa(Mg(1/3)Nb(2/3))O(3) (or (1-x)BT-xBMN) system were examined as a function of processing conditions. Various preparation techniques and processing parameters are investigated in all samples. Phase formation and microstructural evolution are examined via X-ray diffraction (XRD) and scanning electron microscopy (SEM), respectively. From the results, it can be seen that complete solid solutions in the BT-BMN system was obtained. The optimum calcination temperature of the powder in this system increases with increasing BMN content. Additionally, the average particle size also increases with increasing BMN content. The larger particle size of BT-BMN powders may relate to the higher optimum calcination temperature for each composition.

KEYWORDS: N = NB; DIELECTRIC-PROPERTIES; BATIO3 CERAMICS; POWDERS; ROUTE; MG; TA; CO
SYNTHESIS OF MoO(3) NANOBELTS BY MEDIUM ENERGY NITROGEN ION IMPLANTATION

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ABSTRACT

Ion implantation has been revealed as a potential technique to modify the surface of materials. In this work, MoO(3) nanobelts were synthesized on MoO(3) whisker surfaces by means of ion implantation with 60 key nitrogen ions at a dose of 1 x 10(16) atom/cm(2) and characterized by scanning electron microscopy, Raman spectroscopy, and transmission electron microscopy. The result showed that the nanostructures of MoO(3) occurred over the whisker surfaces and had belt-like shapes. The size of the synthesized MoO(3) nanobelts mostly ranged from 20 to 60 nm in width and 300 to 800 nm in length. The nanobelts were found to have an orthorhombic crystal structure with growth preferential in the [001] direction. The growth process of the nanobelts based on the common vapor-solid mechanism is discussed. (C) 2010 Elsevier B.V. All rights reserved.

KEYWORDS: ORTHORHOMBIC MOLYBDENUM TRIOXIDE; THERMAL EVAPORATION; ALPHA-MoO3 NANORODS; FIELD-EMISSION; NANOWIRES; NANOSTRUCTURES; NANORIBBONS; NANOTUBES; WHISKERS; OXIDES

THE EFFECT OF GeO(2) AND In(2)O(3) DOPING ON THE DIELECTRIC PROPERTIES OF CaCu(3)Ti(4)O(12) CERAMICS PREPARED VIA VIBRO–MILLING METHOD

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ABSTRACT

In this work, effects of GeO(2) and In(2)O(3) doping on the dielectric properties of CCTO were investigated. Doping levels range from 0.5 to 2.0 mol%. The vibro-milling method was employed for processing. The dopant addition produced a slightly smaller grain size. A reduction in dielectric constant was observed, but it is still high. The 2.0 mol% GeO(2) and In(2)O(3) doped samples exhibited high dielectric constant of about 25,000 and 23,000 and low dielectric loss with 0.06 and 0.05 respectively at room temperature and at 10 kHz. The dielectric measurements showed that the modified samples exhibited a strong dielectric independency of temperature and frequency. In addition, the loss tangent reduced after doping. From this results, it can be incurred that GeO(2) and In(2)O(3) doping, processed via vibro-mill are the suitable methods to achieve the stability of high epsilon(r) and low loss ceramics.

KEYWORDS: CONSTANT; FILMS
THE EFFECT OF SOLVENTS ON ZnS NANOSTRUCTURES SYNTHESIZED BY BIOMOLECULE-ASSISTED SOLVOTHERMAL METHOD

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ABSTRACT

Nanostructured ZnS (hexagonal and cubic) were synthesized by a 200 degrees C and 24 h solvothermal reaction of Zn(CH3COO)(2)center dot 2H(2)O and L-cysteine (C(3)H(7)NO(2)S) in water, propylene glycol (PG) and glycerol (GR) solvents. The products, characterized by XRD, were specified as pure ZnS (hexagonal) in water, and ZnS (cubic) in PG and GR. SEM and TEM analyses showed the particle sizes and agglomerated behaviors, mainly related to the reaction media, which were in accordance with BET adsorption of nitrogen, with blue shift energy gaps relative to the bulk. (C) 2011 Elsevier B.V. All rights reserved.

KEYWORDS: NANOPARTICLES; SEMICONDUCTOR; NANOWIRES; ROUTE
THE EFFECT OF ZrO(2) NANOPARTICLES ON MECHANICAL PROPERTY AND DIELECTRIC RESPOND OF CaCu(3.1)Ti(4)O(12.1) CERAMICS

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ABSTRACT

Giant dielectric CaCu(3.1)Ti(4)O(12.1) based composites containing nanoparticles of ZrO(2) were synthesized using a conventional mixed oxide method. Then properties of the nanocomposites were characterized using a variety of methods. The addition of ZrO(2) inhibited grain growth and changed the mode of fracture from a partially inter-granular in pure CaCu(3.1)Ti(4)O(12.1) to a mostly intra-granular fracture in the composite samples. The nanocomposites also exhibited a frequency stability of the dielectric constant and a low tangent loss (0.06) at 3-9 kHz. The hardness and dielectric results are also discussed and related to the microstructure.

KEYWORDS: MORPHOTROPIC PHASE-BOUNDARY; CaCu3Ti4O12 CERAMICS; ELECTRICAL-PROPERTIES
THE GALAXY POPULATION OF ABELL 1367:
PHOTOMETRIC AND SPECTROSCOPIC DATA

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ABSTRACT

Aims. Photometric and spectroscopic observations of the galaxy population of the galaxy cluster Abell 1367 have been obtained, over a field of 34′ x 90′, covering the cluster centre out to a radius of similar to 2.2 Mpc. Optical broad-and narrow-band imaging was used to determine galaxy luminosities, diameters and morphologies, and to study current star formation activity of a sample of cluster galaxies. Near-infrared imaging was obtained to estimate integrated stellar masses, and to aid the determination of mean stellar ages and metallicities for the future investigation of the star formation history of those galaxies. Optical spectroscopic observations were also taken, to confirm cluster membership of galaxies in the sample through their recession velocities. Methods. U, B and R broad-band and Ha narrow-band imaging observations were carried out using the Wide Field Camera (WFC) on the 2.5 m Isaac Newton Telescope on La Palma, covering the field described above. J and K near-infrared imaging was obtained using the Wide Field Camera (WFCAM) on the 3.8 m UK Infrared Telescope on Mauna Kea, covering a somewhat smaller field of 0.75 square degrees on the cluster centre. The spectroscopic observations were carried out using a multifibre spectrograph (WYFFOS) on the 4.2 m William Herschel Telescope on La Palma, over the same field as the optical imaging observations. Results. Our photometric data give optical and near-infrared isophotal magnitudes for 303 galaxies in our survey regions, down to stated diameter and B-band magnitude limits, determined within R(24) isophotal diameters. Our spectroscopic data of 328 objects provide 84 galaxies with detections of emission and/or absorption lines. Combining these with published spectroscopic data gives 126 galaxies within our sample for which recession velocities are known. Of these, 72 galaxies are confirmed as cluster members of Abell 1367, 11 of which are identified in this study and 61 are reported in the literature. Ha equivalent widths and fluxes are presented for all cluster galaxies with detected line emission. Conclusions. Spectroscopic and photometric data are presented for galaxies in the nearby cluster Abell 1367, as the first stage of a study of their stellar population and star formation properties.

KEYWORDS: STAR-FORMATION RATES; ALPHA SURFACE PHOTOMETRY; SPIRAL GALAXIES; VIRGO CLUSTER; H-ALPHA; DISK GALAXIES; NEARBY CLUSTERS; COMA SUPERCLUSTER; NEUTRAL HYDROGEN; GAS
THE GALAXY POPULATION OF ABELL 1367: THE STELLAR MASS-METALLICITY RELATION

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ABSTRACT

Using wide baseline broad-band photometry, we analyse the stellar population properties of a sample of 72 galaxies, spanning a wide range of stellar masses and morphological types, in the nearby spiral-rich and dynamically young galaxy cluster Abell 1367. The sample galaxies are distributed from the cluster centre out to approximately half the cluster Abell radius. The optical/near-infrared colours are compared with simple stellar population synthesis models from which the luminosity-weighted stellar population ages and metallicities are determined. The locus of the colours of elliptical galaxies traces a sequence of varying metallicity at a narrow range of luminosity-weighted stellar ages. Lenticular galaxies in the red sequence, however, exhibit a substantial spread of luminosity-weighted stellar metallicities and ages. For red-sequence lenticular galaxies and blue cloud galaxies, low-mass galaxies tend to be on average dominated by stellar populations of younger luminosity-weighted ages. Sample galaxies exhibit a strong correlation between integrated stellar mass and luminosity-weighted stellar metallicity. Galaxies with signs of morphological disturbance and ongoing star formation activity, tend to be underabundant with respect to passive galaxies in the red sequence of comparable stellar masses. We argue that this could be due to tidally driven gas flows towards the star-forming regions, carrying less enriched gas and diluting the pre-existing gas to produce younger stellar populations with lower metallicities than would be obtained prior to the interaction. Finally, we find no statistically significant evidence for changes in the luminosity-weighted ages and metallicities for either red-sequence or blue-cloud galaxies, at fixed stellar mass, with location within the cluster.

KEYWORDS: COLOR-MAGNITUDE RELATION; NEAR-INFRARED PHOTOMETRY; FUNDAMENTAL-PLANE-SURVEY; INDUCED STAR-FORMATION; H-ALPHA SURVEY; ELLIPTIC GALAXIES; GLOBULAR-CLUSTERS; ENVIRONMENTAL DEPENDENCE; CONTINUUM COLORS; SPIRAL GALAXIES

THE INFLUENCE OF HEAT TREATMENT CONDITION ON ELECTRICAL PROPERTIES OF GLASS-CERAMICS CONTAINING FERROELECTRIC LEAD BISMUTH GERMANATE ((Pb(3)Bi(2)(GeO(4))(3))

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ABSTRACT

Glasses have been formed from PbO-Bi(3)O(2)-GeO(2) system by conventional melt-quenching method. The glasses were melted in Pt crucible in an air atmosphere. The resulting glass pieces were subjected to the heat treatment schedule at various crystallization temperatures. The glass and glass-ceramics samples were then investigated by XRD and SEM spectroscopy. The dielectric and ferroelectric properties were also measured. Moreover, DTA analysis has been used to examine the crystallization temperatures of glasses. The controlled heat treatment process has been applied to the crystallization temperatures and glass-ceramic samples were obtained. The XRD showed that the crystals of ferroelectric phase, hexagonal Pb(3)Bi(2)(GeO(4))(3);PBG, were precipitated in the glass matrix and this is the dominant phase in the region of 34.50 mol% PbO : 11.49 mol% Bi(2)O(3) : 54.01 mol% GeO(2) on the heat treatment temperature at 527 degrees C. The dielectric constant (epsilon(r)) and P-E loop of Pb(3)Bi(2)(GeO(4))(3) glass-ceramic confirmed that this material may have high possibility to be ferroelectric at room temperature with coercive field (E(c)) of 30.9 kV/cm. However, the remanent polarization (P(r)) = 1.36 mu C/cm(2) is rather small, therefore it is quite difficult to confirm that the P-E loop is the feature of truly ferroelectric, it may represent a lossy capacitor behavior.
THE NUTRITIONAL VALUE OF EDIBLE FRESHWATER ALGA CLADOPHORA SP (CHLOROPHYTA) GROWN UNDER DIFFERENT PHOSPHORUS CONCENTRATIONS

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ABSTRACT

Culture of an edible freshwater alga Cladophora sp. was subjected to phosphorus (P) supply (1.07-14.78 mg L(-1) of PO(4)-P) in order to determine its proximate compositions, vitamins, minerals and carotenoid compositions. The alga was mass cultured by using 10% of canteen wastewater with the addition of di-potassium hydrogen orthophosphate at the concentrations of 0, 5, 10, 15 and 20 mg L(-1). The results showed that with increased P concentration, protein, vitamin A, P, beta-carotene, lutein and zeaxanthin contents increased but carbohydrate content decreased indicating that P supply could enhance carotenoid production and some nutritional values of this alga. (C) 2011 Friends Science Publishers

KEYWORDS: OYSTER PINCTADA-MARGARITIFERA; BIOCHEMICAL-COMPOSITION; LARVAE; MICROALGAE; CULTURE; BIOMASS
THE PREVENTION OF PERICARP BROWNING AND THE MAINTENANCE OF POST-HARVEST QUALITY IN VIETNAMESE LONGAN CV. LONG, USING SODIUM METABISULFITE TREATMENT

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ABSTRACT

The impact of sodium metabisulfite (Na₂S₂O₅) treatment on the prevention of pericarp browning and the maintenance of the postharvest quality of Vietnamese longan cv. Long during storage was studied by soaking bunches of the fruit in 2.5 or 5 or 7.5% of sodium metabisulfite solution for 5 and 10 min at room temperature and then storing them at 5 ± 1 degrees C for 28 days. The visual appearance expressed as pericarp and flesh color; the lightness of fruit pericarp (L* value); the yellowness of fruit pericarp (b* value); polyphenol oxidase (PPO) activity; the percentage of fruit decay and fruit drop; total soluble solids (TSS) content were studied. The results show that the 10 min soaking treatment in 7.5% sodium metabisulfite solution maintained L* and b* values and low PPO activity, with the fruit showing no signs of severe pericarp browning or fruit decay throughout the 21 days in storage. Moreover, the postharvest quality of the longan fruit revealed no difference over time; plus the percentage of fruit drop was only 5.2%, when compared with the control was 5.8% and other treatments ranged from 5.5 to 5.9%. (C) 2011 Friends Science Publishers

KEYWORDS: FRUIT; DECAY
THE REGULAR PART OF A SEMIGROUP OF TRANSFORMATIONS WITH RESTRICTED RANGE

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ABSTRACT

Let $T(X)$ be the full transformation semigroup on the set $X$ and let $T(X,Y)$ be the semigroup consisting of all total transformations from $X$ into a fixed subset $Y$ of $X$. It is known that $F(X,Y) = \{ \alpha \in T(X,Y) : X \subseteq Y \}$, is the largest regular subsemigroup of $T(X,Y)$ and determines Green's relations on $T(X,Y)$. In this paper, we show that $F(X,Y) \cong T(Z)$ if and only if $X = Y$ and $|Y| = |Z|$; or $|Y| = 1 = |Z|$, and prove that every regular semigroup $S$ can be embedded in $F(S(1), S)$. Then we describe Green's relations and ideals of $F(X,Y)$ and apply these results to get all of its maximal regular subsemigroups when $Y$ is a nonempty finite subset of $X$. 

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THE RELATIONSHIP OF CRYSTALLIZATION BEHAVIOR, MECHANICAL PROPERTIES, AND MORPHOLOGY OF POLYPROPYLENE NANOCOMPOSITE FIBERS

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ABSTRACT

This study aimed at the fabrication of lightweight and high performance nanocomposite fibers. Polypropylene/multiwalled carbon nanotubes (PP/MWCNTs) nanocomposite fibers (0-5 wt% of MWCNTs) were prepared via melt spinning process. The MWCNTs were dispersed in the dispersing agent before mixing with PP powder. After mixing, the dispersing agent was removed. Then the nanocomposites were spun into fibers. The fibers were spun and stretched with 7.5 draw ratios. Crystallization behavior and thermal properties of PP/MWCNTs nanocomposite fibers were studied using the differential scanning calorimeter (DSC) and thermogravimetric analyzer (TGA). The DSC curves of PP/MWCNTs nanocomposite fibers showed the crystallization peak at a temperature higher than that of neat PP fibers. These results revealed that the MWCNTs acted as nucleating sites for PP crystallization. The additions of MWCNTs into PP leaded to an increase in both crystallization temperature and crystallization enthalpy. However, no significant changes in the melting temperatures of the PP nanocomposites were detected. Degradation temperature of samples obtained from the TGA curves showed increase thermal degradation behavior for the PP/MWCNTs with the content of MWCNTs. It was found that the increase of tensile strength and modulus corresponded well with the increase of crystallinity of the composite fibers.

KEYWORDS: WALLED CARBON NANOTUBES; THERMAL-DEGRADATION; COMPOSITES; POLYETHYLENE; MELT; REINFORCEMENT; POLYSTYRENE; ORIENTATION
THE SPIDER GENUS HERSILIA IN THAILAND, WITH DESCRIPTIONS OF TWO NEW SPECIES (ARANEAE, HERSILIIDAE)

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ABSTRACT

The spider genus Hersilia in Thailand, with descriptions of two new species (Araneae, Hersiliidae). - Our examination of a hersiliid spider collection from Thailand revealed eight species of which two species are new (Hersilia serrata sp. n. male, female, H. thailandica sp. n., male). Extended geographic ranges are recorded for H. sundaica Baehr & Baehr, 1993 and H. martensi Baehr & Baehr, 1993, which are reported from Thailand for the first time. H. asiatica Song & Zheng, 1982, which was previously documented from northeastern Thailand, is now also found in northern and southern Thailand. A substantial number of females from Thailand are similar to H. striata Wang & Yin, 1985, previously known from China, but can be distinguished by slight differences in their genital morphology.
THE STRUCTURAL AND ELECTRICAL PROPERTIES OF (1-x)BaTiO(3)-xBaFe(0.5)Nb(0.5)O(3) CERAMICS

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ABSTRACT

The structural and electrical properties of (1 - x)BaTiO(3) – xBaFe(0.5) Nb (0.5)O(3) ceramics system were investigated as a function of the BaFe(0.5)Nb(0.5) O(3) content by X-ray diffraction (XRD), dielectric and ferroelectric measurement techniques. Studies were performed on the samples prepared by solid state reaction for x = 0, 0.2, 0.4 and 0.6. The XRD analysis demonstrated that with increasing BFN content in (1-x)BT-xBFN, the structural change occurred from the tetragonal to the cubic phase at room temperature. Changes in the dielectric, ferroelectric and piezoelectric behavior were then related to these structures depending on the BFN content.

KEYWORDS: DIELECTRIC PERMITTIVITY; BaFe0.5Nb0.5O3; SR
THEORETICAL INVESTIGATION OF NOVEL CARBAZOLE-FLUORENE BASED D-pi-A CONJUGATED ORGANIC DYES AS DYE-SENSITIZER IN DYE-SENSITIZED SOLAR CELLS (DSCs)

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ABSTRACT

The ground state structure and frontier molecular orbital of newly synthesized carbazole-fluorene based D-p-A organic dyes, CFP1A, CFP2A, CFP1CA, and CFP2CA, were theoretically investigated using density functional theory (DFT) at B3LYP/6-31G(d,p) level. These dye molecules have been constructed based on carbazole-fluorene as the electron-donating moiety while introducing benzene units as pi-spacer connected to different anchor groups, such as acrylic acid and cyanoacrylic acid, as acceptors. The electronic vertical excitation energies and absorption wavelength were carried out using time-dependent DFT (TD-DFT). Furthermore, the adsorptions of phenylacrylic acid and phenylcyanoacrylic acid on the TiO(2) anatase (101) surface were carried out by means of quantum-chemical periodic calculations employing periodic PBE functional with DNP basis set. The results promise that anchor dyes with strong withdrawing CN group have easier injected electron to the conduction band of semiconductor implying that CFP1CA and CFP2CA show better performance among four dyes. Additionally, the intramolecular charge transfers (ICT) from electron donor group to anchoring group of CFP1CA and CFP2CA have shown better performance. The calculated results provide the efficiency trend of our new dyes as CFP1CA approximate to CFP2CA approximate to CFP1A > CFP2A which are excellently agree with experimental observation. (C) 2011 Wiley Periodicals, Inc. J Comput Chem 32: 1568-1576, 2011
THEORETICAL INVESTIGATION ON THE ELECTRONIC AND OPTICAL PROPERTIES OF POLY(FLUORENEVINYLENE) DERIVATIVES AS LIGHT-EMITTING MATERIALS

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ABSTRACT

Density functional theory (DFT) and time-dependent DFT (TDDFT) were employed to study ground-state properties, HOMO-LUMO gaps (Δ(H-L)), excitation energies (E(g)), ionization potentials (IPs), and electron affinities (EA) for PFV-alt-PDONV and PFV-alt-PDIH-PPV having different alternating groups. Excited-state properties were investigated using configuration interaction singles (CISs) while fluorescence energies were calculated using TDDFT. The results show that PFV-alt-PDONV exhibits blue-shifted energies for both HOMO-LUMO gaps (Δ(H-L)) and excitation energies (E(g)) compared with PFV-alt-PDIH-PPV. The predicted IP and EA clearly indicate that PFV-alt-PDIH-PPV has both easier hole creation and electron injection than that of PFV-alt-PDONV. The maximal absorption wavelengths of all polymers are strongly assigned to π -> π* transition. The predicted radiative lifetimes of PFV-alt-PDONV and PFV-alt-PDIH-PPV for B3LYP/6-31G(d) are 0.36 and 0.61 ns, respectively, indicating that PFV-alt-PDIH-PPV should have a better performance for long-time emission than that of PFV-alt-PDONV.

KEYWORDS: DENSITY-FUNCTIONAL THEORY; EXCITED-STATE PROPERTIES; EXCITATION-ENERGIES; CONJUGATED POLYMERS; SOLAR-CELLS; DIODES; OLIGOTHIOPHENES; OLIGOFUORENES; POLYFLUORENE; COPOLYMERS

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THERMOSTABILITY OF PHYCOBILIPROTEINS AND ANTIOXIDANT ACTIVITY FROM FOUR THERMOTOLERANT CYANOBACTERIA

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ABSTRACT

Four cyanobacterial strains including Cyanosarcina sp. SK40, Phormidium sp. PD40-1, Scytonema sp. TP40 and Leptolyngbya sp. KC45 were selected and investigated for the phycobiliprotein (PBP) content and thermostable antioxidant activity of their cell-free extracts. The highest content of 181.63 mg/g dry weight phycobiliprotein was found in Leptolyngbya sp. KC45 with phycoerythrin (PE) as the main phycobiliprotein. Among the PBPs of four thermotolerant cyanobacteria, PE from Leptolyngbya sp. KC45 exhibited the highest thermal stability as 80% of the original level remained after being heated at 60 degrees C for 30 min. Antioxidant activities were detected in the cell-free extracts of all cyanobacteria and that of Leptolyngbya sp. KC45 was also found in the highest value of 7.44 +/- 0.14 and 3.89 +/- 0.08 mg gallic acid equivalent (GAE) g(-1) dry weights determined by 2,2-diphenyl-1-picrylhydrazyl radical (DPPH) and reducing power assay, respectively. This also corresponded to the phenolic compound content. Based on DPPH and reducing power assay, antioxidant activities of all cyanobacterial extracts showed the high thermostability as approximately 80% remained after being heated at 80 degrees C for 30 min. However, it clearly indicated that the thermostability of antioxidant activity from the hot spring cyanobacterial cell-free extract was not contributed only by the PE, but also came from phenolic compounds and other oxidative substances.

KEYWORDS: BLUE-GREEN-ALGA; SPIRULINA-PLATENSIS; IN-VITRO; C-PHYCOCYANIN; SULFATED POLYSACCHARIDES; EXTRACTION; PHYCOBILISOMES; TEMPERATURE; INHIBITION; MICROALGAE

TOTTALLY GEODESIC SURFACES WITH ARBITRARILY MANY COMPRESSIONS

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ABSTRACT

A closed totally geodesic surface in the figure eight knot complement remains incompressible in all but finitely many Dehn fillings. In this paper, we show that there is no universal upper bound on the number of such fillings, independent of the surface. This answers a question of Ying-Qing Wu.

KEYWORDS: DEHN SURGERY; 3-MANIFOLDS
TRANSDUCTION OF BACULOVIRUS VECTORS TO QUEEN HONEYBEES, APIS MELLIFERA

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ABSTRACT

The potential uses of baculovirus as a gene vector to queen honeybees were examined in this study. We used a green fluorescent protein-expressing baculovirus with wild-type envelope and two pseudotype viruses of which one overexpressed GP64 and the other expressed a virion protein of a honeybee virus on the envelope. After injection of these baculoviruses into queen pupae, infection was detected in the fat bodies, but not in the ovaries. Pupae injected with a titer of 1 x 10(5) infectious units survived to eclose, and the infection was also detected in the fat bodies of adult queen honeybees, suggesting that baculoviruses can transiently express genes in the fat bodies, and therefore, can be used for further analysis of gene functions. In addition, although the viruses examined in this study failed to express the reporter gene in the ovaries, the infection in the fat bodies suggests that baculoviruses could be potentially useful for transgenesis, if appropriately developed.

KEYWORDS: DEFORMED-WING VIRUS; NUCLEAR POLYHEDROSIS-VIRUS; GERM-LINE TRANSFORMATION; YELLOW-FEVER MOSQUITO; VIVO GENE-TRANSFER; TRANSPOSABLE ELEMENT; PIGGYBAC TRANSPOSON; CELL-RECEPTOR; AEDES-AEGYPTI; PCR ANALYSIS

ABSTRACT

Thailand’s implementation of the Directly Observed Treatment, Short course (DOTS) strategy to increase tuberculosis (TB) control program efficacy has not achieved the World Health Organization (WHO) TB key targets. We defined two TB control models in the study. Patients in Model 1 were treated with a conventional DOTS strategy and in Model 2, patients were treated the same as Model 1 but were given a phone call reminder to take their medication. Multi-drug resistant tuberculosis (MDR-TB) and non-MDR-TB patients were randomized into either Model 1 or 2. Treatment outcomes were given as cure rates, completion rates, failure rates or success rates at 18 months in the MDR-TB group and 6 months in the non-MDR-TB group. The sputum conversion rate at 1 month were evaluated for both groups. In the MDR-TB group, the sputum conversion rate was 20% (95% CI 8-45) in Model 1 and 90% (95% CI 73-98) in Model 2 (p<0.001). In the non-MDR-TB group, the sputum conversion rate was 52% (95% CI 36-70) in Model 1 and 37% (95% CI 22-56) in Model 2 although the difference was not significant (p=0.221). The Model 2 success rates were significantly higher (73.7%, 96.7%) in both the MDR-TB and non-MDR-TB groups (p<0.001, p=0.047). The MDR-TB rate in northern Thailand decreased from 4.1% during April-September 2008 to 1.8% during April-September 2009. Further study of the association between implementation of Model 2 and MDR-TB incidence reduction needs to be carried out.

KEYWORDS: MULTIDRUG-RESISTANT TUBERCULOSIS; DRUG-RESISTANCE
TWO NEW SIBLING SPECIES OF PROCAMALLANUS (SPIROCAMALLANUS) (NEMATODA: CAMALLANIDAE) FROM MARINE FISHES IN THE GULF OF THAILAND

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ABSTRACT

Based on light and scanning electron microscopical examinations, 2 new morphologically similar species of the subgenus Procamallanus (Spirocamallanus) (Nematoda: Camallanidae) possessing 2 caudal spikes are described from the intestine of marine perciform fishes from the Gulf of Thailand off the Thai coast, i.e., Procamallanus (S.) rigbyi n. sp. from Otolithes other (Bloch and Schneider) (Sciaenidae) and Procamallanus (S.) similis n. sp. from Sillago sihama (Forsskal) (Silaginidae). The former species is mainly characterized by the presence of 13-14 spiral ridges in the buccal capsule, location of deirids at about mid-way between the buccal capsule and the nerve ring, and by the length of the right spicule (315-360 μm), whereas the latter is characterized by 10-12 spiral ridges, deirids situated at short distance posterior to the buccal capsule, and the right spicule 435-492 pm long. Because of their inadequate descriptions, most species of this subgenus reported from marine fishes of the Indo-Pacific region are considered species inquirendae. Spirocotyle Yasmin and Bilqees, 2007 is considered a junior synonym of Procamallanus Baylis, 1923. Since Procamallanus (S.) otolithi Ashraf, Farooq and Khanum, 1977, P. (S.) otolithi (Gupta and Garg, 1986) and P. (S.) otolithi (Yasmin and Bilqees, 2007) are junior homonyms to P. (S.) otolithi Bilqees and Kazmi, 1974, they are renamed Procamallanus (S.) pakistanensis n. nom., Procamallanus (S.) problematicus n. nom., and Procamallanus (S.) incognitus n. nom., respectively (all species inquirendae). Procamallanus rigbyi and P. similis are the first nominal species of this genus reported from marine fishes off the coast of Thailand.

KEYWORDS: CORAL-REEF FISHES; NEW-CALEDONIA
TWO NEW SPECIES OF CUCULLANUS MULLER, 1777  
(NEMATODA: CUCULLANIDAE) FROM MARINE FISHES OFF THAILAND

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ABSTRACT

Based on light and scanning electron microscopical observations, two new species of Cucullanus Muller, 1777 (Nematoda: Cucullanidae) are described from the intestine of marine perciform fishes in the coastal region of the Gulf of Thailand, Thailand: Cucullanus rastrelligeri n. sp. from the short mackerel Rastrelliger brachysoma (Bleeker) (Scombridae) and Cucullanus thaiensis n. sp. from the brownstripe red snapper Lutjanus vitta (Quoy & Gaimard) (Lutjanidae). The former species, C. rastrelligeri, is mainly characterised by an elongate pseudobuccal capsule, the presence of a ventral sucker, markedly short spicules (306-360 μm), a median papilla-like formation on the anterior anal lip and a distinctly elevated posterior anal lip, the location of the deirids and excretory pore, and by the distribution of genital papillae in the male. The latter species, C. thaiensis, is characterised by a broad pseudobuccal capsule, the presence of a ventral sucker and spicules 680 μm long. It is morphologically closest to C. pargi Gonzalez-Solis, Tuz-Paredes & Quintal-Loria, 2007, but differs from it mainly in the distribution of the genital papillae in the male and apparently larger gravid females, and, whereas C. thaiensis occurs in the West Pacific (Gulf of Thailand), C. pargi was described from the West Atlantic (Caribbean Sea). C. rastrelligeri and C. thaiensis are the first nominal species of cucullanid nematodes reported from marine fishes in Thai waters. Indocucullanus thapari Gupta & Srivastava, 1984 is transferred to Cucullanus as C. thapari (Gupta & Srivastava, 1984) n. comb.

KEYWORDS: SP-N. NEMATODA; PARANA RIVER; PARASITES; PISCES; MEXICO; BRAZIL; NOV

Published in SYSTEMATIC PARASITOLOGY Volume: 78 Issue: 2 Pages: 139-149 February, 2011. DOI: 10.1007/s11230-010-9286-3.
TWO NEW SPECIES OF RHABDOCHONA (NEMATODA: RHABDOCHONIDAE) FROM FRESHWATER FISHES IN THAILAND

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ABSTRACT

Two new species of rhabdochonid nematodes are described from the intestine of freshwater fishes in Chiang Mai Province, northern Thailand: Rhabdochona (Rhabdochona) pseudomysti sp. n. from the catfish Pseudomystus siamensis (Regan) (Bagridae, Siluriformes) in the Fang Brook, a tributary of the Kok River (the Mekong River basin), Fang District and Rhabdochona (Globochona) thaiensis sp. n. from the cyprinid Mystacoleucus marginatus (Valenciennes) (Cyprinidae, Cypriniformes) in the Ping River (the Chao Phraya River basin), Muang District. Rhabdochona pseudomysti is mainly characterized by simple, leaf-like oval deirids (a unique feature among Rhabdochona spp.), a prostom with 14 anterior teeth, the presence of basal prostomal teeth, the length ratio of the muscular and glandular portions of oesophagus (1:2.1-2.6), an unusually long left spicule (1.10-1.22 mm), length ratio of spicules (1:11.5-14.7), arrangement of genital papillae, and conspicuously elevated vulva! lips. Rhabdochona thaiensis differs from other representatives of the subgenus Globochona Moravec, 1972 possessing caudal projections on the tail tip in that it has only 2 claw-shaped projections located ventrally on the tail tip of both males and females; the species is mainly characterized by the presence of distinct pseudolabia, 8 anterior prostomal teeth, absence of basal teeth, bifurcated deirids, length ratio of the muscular and glandular portions of oesophagus (1:11.3-11.9), conspicuously short (135-141 μm) left spicule, arrangement of genital papillae, and somewhat elevated vulva! lips. Fully developed eggs of R. pseudomysti and R. thaiensis remain unknown. These are the first nominal species of Rhabdochona reported from Thailand.

KEYWORDS: N-SP; TAXONOMY; RAILLIET; MEXICO; REDESCRIPTION; THELAZIOIDEA; BIOGEOGRAPHY; ARGENTINA; PARASITES; BIOLOGY

VEGETATIVE PROPAGATION OF RARE TREE SPECIES FOR FOREST RESTORATION

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ABSTRACT

Nine rare tree species were selected for investigating their suitability for cuttings: 1) Copteronia paniculata Bl. var.paniculata, 2) Diospyros coetanea Flet., 3) Gardenia sootepensis Hutch., 4) Haldina cordifolia (Roxb.) Rids., 5) Ilex umbellulata (Wall.) Loesn., 6) Mesua ferrea L., 7) Rothmania sootepensis (Craib) Brem., 8) Schoutenia glomerata King ssp. peregrine (Craib) Roekm. & Hart., and 9) Scleropyrum pentandrum (Dennst.) Mabb. Five separate experiments were run to test the effect of various treatments; i) concentrations and forms of rooting hormones, ii) node positions iii) fungicide, iv) leaf area, and v) propagation media. None of these treatments were successful in producing viable planting stock in sufficient quantities, although limited success was achieved with Schoutenia glomerata. The best treatment was no hormone treatment (control), which produced the highest relative performance score (86.1%). It required almost 10 months from collecting cuttings to potting of rooted cuttings.
WATER QUALITY AND TROPHIC STATUS IN MAIN RIVERS OF THAILAND

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ABSTRACT

The water quality and trophic status monitoring in the main rivers of Thailand during all three seasons in March 2008, August 2008 and January 2009 were investigated. Water samples were collected from 6 regions in Thailand which differed in geological and useful characteristics. In northern Thailand, the Ping River was selected; in the central region, the Tha Chin River; in the northeast region, the Chin River; in the eastern region, the Chanthaburi River; in the western region, the Kwai River and in the southern region, the Tapee River. Samples were taken from the upper, middle and lower parts of each river. At each site, some physical and chemical parameters were studied and the water quality was classified based on its trophic status. It was found that the water quality at most of the sampling sites were not clearly different and could be classified as clean-moderate water quality (oligotrophic-mesotrophic status). However, the water quality at some sampling sites were different, especially, upstream of the Ping and Tapee Rivers which could be classified as clean (oligotrophic status) and downstream of the Tha Chin River showed moderate to polluted water quality (mesotrophic-eutrophic status).

KEYWORDS: MULTIVARIATE STATISTICAL TECHNIQUES

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WEAK CONVERGENCE THEOREMS FOR EQUILIBRIUM PROBLEMS WITH NONLINEAR OPERATORS IN HILBERT SPACES

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ABSTRACT

In this paper, we introduce an iterative sequence for finding a common element of the set of fixed points of a nonspreading mapping, the set of solutions of an equilibrium problem and the set of solutions of the variational inequality problem for a monotone and Lipschitz-continuous mapping. We show that the sequence converges weakly to a common element of the above three sets.

KEYWORDS: NONEXPANSIVE-MAPPINGS; MONOTONE MAPPINGS

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ZINC OXIDE WHISKERS BY THERMAL OXIDATION METHOD

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ABSTRACT

ZnO whiskers were grown in quartz tube by thermal oxidation method. Zinc powder was heated in a horizontal quartz tube with a furnace at a temperature of 700 degrees C for 2 hr, under normal atmosphere. Three different kinds of the products can be obtained after the oxidation process. One is transparent whiskers located at the bottom of the quartz tube. Next is cotton-like bulk and the other is white, fluffy product. The products were characterized by field emission scanning electron microscopy (FE-SEM) and energy dispersive spectroscopy (EDS). It was found that the products composed of whiskers and tetrapod whiskers. The lengths and the diameter of whiskers were in the range of 10-240 mm and 0.20-4.60 mm, respectively while the percent of yield was up to 20% by weight. The lengths and the diameter of tetrapod whiskers were in the range of 3.15-10.63 mm and 0.13-2.64 mm while the percent of yield was up to 68% by weight.

KEYWORDS: ZnO WHISKERS; GROWTH; NANOSTRUCTURES; NANOWIRES; NANOCRYSTALS; EVAPORATION; TRANSPORT
POTENTIAL OF TOURIST ATTRACTIONS FOR
THE ELDERLY TOURISTS
IN UPPER NORTHERN, THAILAND

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ABSTRACT

As the number of elders tends to increase every year, the world will inevitably step into Aging Society. The elders will eventually become tourism crucial target market. While upper north of Thailand has many tourist attractions; however no survey has been carried out to find persuasive attractions for elderly tourists. This research studies the potential of tourist attractions for the elderly tourists in 8 provinces of the upper north of Thailand. The objectives are 1) to survey potential of tourist attractions in the upper north areas, 2) to consider the potential of tourist attractions which is appropriate for the elderly tourists, and 3) to study tourism marketing for elder tourists. The methods of this study have 2 steps, 1) collecting data from the tourist attractions and focusing the potential attractions considering four elements: accessibilities, amenities, value of attraction sites, and facilities in the neighboring areas. The study found that the potential of attractions in the upper north for the elderly tourists is in the range of medium to low, 2) interviewing Thai and foreign tourists by questionnaires about traveling behavior and the significant factors in selecting tourist destinations. It was found that both Thai and international tourists focus on value of tourist attractions the most. The result of this research can be applied in tourism planning, marketing planning, and public relations for the elderly tourists in order to develop tourist attractions for the elders properly. The suggestions for the improvement include increasing the value of tourist attractions, providing prompt facilities and arranging management training for relevant organizations and staff, and preparing marketing and public relations plans to reach the target tourists.

KEYWORDS: Elderly Tourists, Potential, Tourist Attractions, Thailand
TOURISM DEVELOPMENT GUIDELINES FOR THE ELDER TOURISTS

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ABSTRACT

As anticipated that the world will become the elder’s society, the United Nations presumes that the number of the elders will increase from 687.9 million in 2006 to 1,968 million in 2050. The elders will eventually become major tourism target. Therefore Thailand is obliged to focus on tourism development to serve elder tourists. This research collected the information from eight cities in the upper north of Thailand and evaluated potential tourist attractions considering from the four elements; accessibilities, amenities, value and facilities in the neighborhood area. The marketing study interviewed elder Thai and foreign tourists, tourism entrepreneurs, and relevant groups in the upper north. The results found that there has been neither tourism development for the elders nor enough information about their tourism behavior and need. Tourism entrepreneurs and service providers are found not prepared for the elders. The services should therefore be exclusively different from the overall tourism services. The tourism development guidelines for the elder tourists in the upper north should contain marketing communication strategy as well as marketing promotion in order to connect with those who play a major role in making decision on tour arrangement for the elder targets. As a reason of physical limitation, unstable income, and more free time, the tourism development guidelines for the elder tourists should be proper and consistent to the characteristic of the elder tourists. The trip should be like ‘slow tourism’ to allow the elder tourists enjoy their journey, take a rest, refresh their mind, and add values for their lives. However, the attractions should provide necessary facilities for the elder tourists such as ramp, elevator or first aid point including food and accommodation services to fit their physical condition. These will be driven to serve the rapid growth of elder tourism.

KEYWORDS: Tourism Development, Elderly Tourists, Northern Thailand.

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USING KNOWLEDGE MANAGEMENT TO DRIVE CREATIVE CITIES IN THAILAND

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ABSTRACT

Creative city is an urban complex where cultural activities of various sorts are an integral component of the city’s economic and social functioning. Such cities tend to be built upon a strong social and cultural infrastructure, to have relatively high concentrations of creative employment, and to be attractive to inward investment because of their well-established cultural facilities. Local people are one’s crucial resource. Creativity is replacing location, natural resources and market access as a principal key to urban dynamism. Now Thailand promotes 10 Creative Cities Model to enhance creative economy in Thailand. Each city has different kind of creative product from their cultural and lifestyle. This research aims to study analyze, synthesize, and formulate structural knowledge of Creative City using SECI model (Socialization, Externalization, Combination, Internalization). This paper describes the interplay of explicit and tacit knowledge generated, transferred, and recreated in city, socialization or transfer of tacit knowledge. Knowledge Management (KM) can assist in promoting innovation and creativity; sharpen ideas from concept through reality. This paper presents a model in which to promote continued competitiveness in an increasingly interlinked and interdependent global marketplace. The model distinguishes between a tacit knowledge and an explicit knowledge as well as suggests areas for research within the context of this model.

KEYWORDS: Knowledge Management, Creative City, Thailand
A STUDY OF SEASONALITY AND DYNAMIC CORRELATIONS BETWEEN LOCAL AND REGIONAL, NATIONAL APIS LEVEL

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ABSTRACT

To monitor and improve the urban air quality, Chinese government has began to make many effort, inter-regional cooperation to cut and improve air quality has been required. In this paper, we focus on the seasonality of the first and second moment of the APIs of 42 Chinese sample cities, and investigate the dynamic correlation of air pollution index (APIs) between 42 Chinese cities and their corresponding regional and national levels, comparison with the model without seasonal consideration is made. By adopting a DCC-garch model that accounts for the seasonality, we found that i) transformed DCC-garch model including seasonality dummies improve the estimation result in this study; ii) seasonality feature of the second moment follow that of the first moment, with the condition mean and variance of the second and autumn significantly lower than spring, whereas that of winter is higher than spring; iii) the correlation between local APIs and their corresponding regional, national levels are dynamic; iv) compare with DCC-garch model estimation, the transformed model doesn’t change the feature of the dynamic correlations very much.

KEYWORDS: API; Chinese cities; regional; national; seasonality; DCC-GARCH model; dynamic correlation.
AN APPLICATION OF EVT TO ANALYSE US CORN MARKET

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ABSTRACT

Corn is not only a food source, but also used for ethanol production, livestock feed. The corn market is volatile since the last three decades, with price reaching USD770 per bushel on June 2011. The volatility of corn return is of great importance to the farmers, policy makers and even consumers. Safeguarding them from the risk of volatile corn return is important. In this paper, we apply extreme value theory to predict corn return series. Two unconditional methods: Block Maximum Method (BMM) and Point over threshold (POT) were used. We use BMM to estimate the Return Level, and POT to calculate the static Value at Risk (VaR) and Expected shortfall (ES). We also use GARCH(1,1)-EVT (conditional-EVT) method to estimate dynamic VaR. The results show that compared with the normal-GARCH model and t-GARCH model, the dynamic EVT-GARCH performs better.
ANALYSIS OF DEPENDENCE STRUCTURE BETWEEN HOUSE PRICES AND STOCK INDEXES USING ARCHIMEDEAN COPULAS

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ABSTRACT

This paper examines the correlation between two kinds of stock market indexes, which are real estate index and Shenzhen Component Index, and house prices respectively. The Archimedean copulas function was introduced for the correlation analysis. The Kolmogorov-Smirnov test and qqplot were employed to do the fitted test. Furthermore, three non-linear rank correlation coefficients, the kentall.tau and spearman.rho, and the tail correlation, were used for further research. The empirical results show that the Clayton copula function was the best fitting function to describe the dependence of bivariate series. On the one hand, the non-linear rank correlation coefficient of house prices and Shenzhen component indexes were the biggest. On the other hand, their lower-tailed correlations were the highest as well.

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ANALYSIS OF EQUILIBROPATHY ACUPUNCTURE INVOLVING CHRONIC PAIN TREATMENT AND HEALING RATES

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ABSTRACT

This research aims to analyse the factors influencing the level of chronic pain by using Ordered Probit and Tobit analyses methods. The dependent variables of pain treatment model are divided into 4 levels; a little, moderate, a lot and no pain left. The independent factors are gender, age, occupation, chronic pain period, number of treatment, accident record and survival record of the patient, who are treated by Equilibropathy acupuncture of Weibull analysis. The results of the study using Ordered Probit and Tobit analyses are that the most statistical significant variables are age, employees and the numbers of treatment. These variables are oppositely related to the level of pain relief. For survival analysis using Weibull analysis method focusing on pain relief, the researcher found that the statistical significant variables are female gender and company employee or government office. These two variables are directly related with the survival. For the chronic patient’s survivals who are cured by acupuncture, they are still in pain and have to do acupuncture frequently at the beginning and gradually decrease later.

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CAN RISING TOURISM INCOME COMPENSATE FADING AGRICULTURAL INCOME? A GENERAL EQUILIBRIUM ANALYSIS OF INCOME DISTRIBUTION AND WELFARE IN A RURAL VILLAGE IN NORTHERN THAILAND

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ABSTRACT

This study applies CGE model to investigate the effects of rising tourism income and fading agricultural income in Mae Kam Pong village in Chiang Mai, Thailand, on 4 issues: the expansion and recession of major economic sectors, income distribution, social welfare of the village, and welfare of the poorest households. Simulations show that services and construction sectors will expand while tea, commerce and tourism sectors will face the recession. Tourism sector will fade out from the village when tea price drops 20% and tourism price increases around 30%. For the income distribution, the richest quintile will be the top gainer whereas the poorest quintile will be the top loser. The village can maintain its social welfare by raising tourism price 46.5% to compensate the drop of tea price around 10%. It is impossible to maintain the social welfare when tea price drops 20%. The dropping welfare of the poorest households cannot return to its original level after tourism price increases.

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CHARITABLE GIVING BEHAVIOR IN THAILAND AND MUKDAHARN PROVINCE: TOBIT VS. DOUBLE-HURDLE MODELS

Jintanee Jintranun\textsuperscript{1,2}, Peter Calkins\textsuperscript{3}, Songsak Sriboonchitta\textsuperscript{3} and Chukiat Chaiboonsri\textsuperscript{3}

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ABSTRACT

As an Asian and Buddhist nation, Thailand is one country where the population is particularly concerned with charitable giving, and does so through several channels. This paper seeks to quantify the probability and monetary level of charitable donations for Thailand. We employ data collected by the National Statistical Office on seventy-six (76) provinces -- with a detailed separate sample from one target province Mukdaharn -- to estimate both Tobit and double-hurdle models composed of Probit and truncated phases. The latter is particularly appropriate for disaggregating household behavior into two phases: household participation behavior (0/1) and household expenditure behavior (in continuous monetary terms). The results reveal that, to fully explain the probability and level of charitable giving, economic factors must be complemented by the level of education, the conservative nature of the family (number of members, use of traditional language), and the proximity to the East-West Economic Corridor. In contrast, expenditures on “recreational” consumption of tobacco and alcohol reduce the probability and level of participation in charity. Unexpectedly, there is a significantly positive relationship between gambling expenditure and the probability of giving to religious charity, which may be attributed to either guilt or higher earnings.

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DETECTION OF REGIME SWITCHING IN STOCK PRICES BEFORE “WINDOW DRESSING” AT THE YEAR END USING GENETIC ALGORITHM

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ABSTRACT

The study discovers buying strategy before the year end of eight stocks in the Stock Exchange of Thailand. In most cases, the buying signals gathers around 14 to 30 days before the last working day of the year. The regime switching of most cases is not less than 14 days. The maximum profit of this investment strategy is 13.01 percent with the average profit of 4.79 percent. Comparing to the real data that have been observed, genetic algorithm yields investment strategies that achieve around 37.48 % of the highest possible profit.
DETERMINANTS OF BORROWERS AND LOAN SIZES OF MICROCREDIT FOR VILLAGES AND URBAN COMMUNITIES IN THAILAND

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ABSTRACT

This paper investigates the determinants of borrowers and loan size of village and urban community fund (VF) in Thailand. Previous studies have been done, but the answer is still unclear who really get benefits from the VF program between the poor and non-poor. We apply Logit model to figure out the characteristics of borrowers. Sample selection problem is taking into account in this paper. We use Tobit and Heckman selection model to analyze the determinants of the loan size. The data are from Thailand Socioeconomic Survey in 2009. Overall results indicate that the program targets at women, poor people and farm operating households. These groups tend to receive larger size of loan too. Furthermore, borrowers with back-up assets such as houses are easier to get loan. Entrepreneur spirit which can be observed from the operation of home-business is a determinant of the borrower and loan size. VF program can be viewed as a supplementary source of credit to.

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DOES PRICE MATTER? THE FMOLS AND DOLS ESTIMATION OF RICH COUNTRIES TOURISTS OUTBOUND TO FOUR ASEAN COUNTRIES

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ABSTRACT

To provide the alternative idea of tourism demand research, instead to explore tourism demand of panel group of origins to particular destination country, this paper adopts panel analysis to find long run relationship between number of tourists outbound from 8 rich countries to the panel of 4 ASEAN countries namely Malaysia, Philippines, Singapore and Thailand. Five statistic tests for panel unit root and ten types of panel cointegration test have ensured the appropriation of data to be estimated. The panel individual FMOLS test and group mean FMOLS and DOLS test have led to find the positive direction of relative cost of living which represents price competitiveness among the destinations and relative economic growth between origin and destination countries and number of outbound tourists. The results reveal that, Singapore is mostly advantage compare to its neighbors in term of relative price and is not different among from Malaysia and Thailand in term of relative economic growth. Philippines however need to accelerate its tourism promotion to enhance international tourist arrivals. The travel cost proxied by jet fuel cost does not follow theoretically negative sign to number of tourists who travel to the region.

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ECONOMIC FACTORS INFLUENCING THE URBAN REAL ESTATE PRICE IN THE PEOPLE’S REPUBLIC OF CHINA

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ABSTRACT

This paper sought to find correlation between the real estate price fluctuations and macroeconomic fundamentals in China by using China's panel data of 21 main cities stretching from 2000 to 2010. This study found that impact factors had good explanatory power in explaining changes in house prices. Real GDP, the real mortgage rate, real per capita disposable income and real land transaction price index have positive effects on house price. However, advance statistical techniques in panel data econometrics were adopted. Over the whole same sample period, the house price and rent have a different order of integration. But these are not cointegrated. The results show that the bubble exists in the urban real estate market in China. Finally, this study proposed policy suggestions according to the empirical results.
EFFECTS OF MICROCREDIT ON POVERTY REDUCTION IN THAILAND USING PROPENSITY SCORE MATCHING AND AVERAGE TREATMENT EFFECT MODEL

Siwaporn Fongthong and Komsan Suriya

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ABSTRACT

This paper evaluates impacts of Village Fund as the microcredit program in Thailand. It employs a propensity score matching to estimates the effect of microcredit on poverty reduction of household using 41,296 cross-sectional data from the Thailand Socioeconomic Survey (SES) of 2009. The findings show the effects of microcredit on poverty reduction only for fishermen’s and general workers’ households and reduce headcount poverty of those households by 1.0-1.7 percent and 2.5 to 7.0 percent respectively. For poverty gap index, microcredit reduces the poverty gap by 1.1 to 1.7 percent for fishermen’s households and 0.6 to 1.3 percent for general workers’ households. Furthermore, microcredit can reduce poverty severity for fishermen’s and general workers’ households by 0.6 percent and 0.2 to 0.3 percent respectively.
FACTORS EFFECTING OUTPUT IN DEVELOPED COUNTRY: PANEL SAMPLE SELECTION APPROACH

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ABSTRACT

The vast theoretical and empirical researches suggest various factors that determine output in developed countries. However, the existing empirical evidence is mixed and various researches concern the impact of macroeconomic and political factors on output separately. This may lead to incomplete results. Therefore, this paper attempt to search for factors that determine output in 22 developed countries over the 1996-2008 period which considering impact both of macroeconomic and social-political indicator on output. In addition, the problem will come up if GNI per capita is not the appropriate criteria to distinguish between developed and developing country and if the selected samples are not representative of the underlying population of developed nation in the world, ordinary least squares coefficients (OLS) may be biased. Hence, this study applies a new empirical methodology: the panel sample selection framework which takes into account the selective nature of the samples. The results show that there exists sample selection bias and lead to estimation by Ordinary Least Square will bias and inconsistent. Moreover, the factors that determined country to become developed country are GNI per capita and Health care expenditure. The main conclusions are that both of macroeconomic and social-political variables play important role to determine output in developed countries.

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FOREIGN DIRECT INVESTMENT, HUMAN CAPITAL ANDECONOMIC GROWTH IN PEOPLE’S REPUBLIC OF CHINA

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Piyaluk Buddhawongsa and Chaiwat Nimanussornkul

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ABSTRACT

The impact of foreign direct investment (FDI) on economic growth has received great attention in empirical studies. A number of studies test the effect of FDI on economic growth through human capital variables. This study is aimed at testing the relationship between FDI and economic growth as well as the relationship between economic growth and the interaction of FDI and human capital. The study examines secondary data of 30 provinces in China during the period 1995 to 2009 based on a panel data approach. The result shows that FDI by itself does not generate a technology spillover effect to enhance economic growth, but generates a relatively large positive effect on economic growth when it is interacting with knowledgeable human capital. Considering the interaction of FDI and technical human capital, evidence shows that there is a negative effect on economic growth. The result reveals that knowledgeable human capital is muchmore efficient than technical human capital in enhancing China’s economic growth together with FDI.
HOLD A MIRROR UP TO NATURE : A NEW APPROACH ON CORRELATION EVALUATION WITH FUZZY DATA AND ITS APPLICATIONS IN ECONOMETRICS

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ABSTRACT

How to evaluate an appropriate correlation with fuzzy data is an important topic in the economics. Especially when the data illustrate uncertain, inconsistent and incomplete type. Traditionally, we use Pearson’s Correlation Coefficient to measure the correlation between data with real value. However, when the data are composed of fuzzy numbers, it is not feasible to use such a traditional approach to determine the fuzzy correlation coefficient. This study proposes the calculation of fuzzy correlation with of fuzzy data: interval, triangular and trapezoidal. Empirical studies are used to illustrate the application for evaluating fuzzy correlations. More related practical phenomena can be explained by this appropriate definition of fuzzy correlation.

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HOUSE PRICES AND ECONOMIC GROWTHS IN PEOPLE'S REPUBLIC OF CHINA USING PANEL DATA

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ABSTRACT

This paper investigates the cointegration and causality between house prices and economic growths in 30 provinces in People’s Republic of China during 1998 to 2009, using panel unit root test, panel cointegration test, Granger causality and error correction models. The results show that house prices and economic growths have a long run cointegration relationship and there are huge house price elasticity coefficients among 30 provinces. Regarding the causality, there is a long-run causality from economic growths to house prices, but not vice versa. Moreover, there exists a strong bidirectional Granger-causality between house prices and economic growths in the short run.

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MODELING THE EFFECTS OF COMMUNITY-BASED TOURISM ON HOUSEHOLD INCOME AND POVERTY ALLEVIATION IN THAILAND WITH ECONOMETRIC TREATMENTS OF ENDOGENEITY AND SELECTION BIAS PROBLEMS

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ABSTRACT

This study reinvestigated the study of Suriya (2011) on the effects of Community-based tourism (CBT) on household income and poverty reduction at the village level in Thailand by using variables on income-side to measure the intensity of participation in CBT instead of the supply-side variables. It used various econometric modelings to treat possible endogeneity and selection bias problems. It extended the investigation to cover the effects of participation in tourism activities on household income change, per capita income change, household income growth, per capita income growth, poverty exit and change of poverty gap. It found that only the participation did not count for the merits of tourism on household income but the intensity of participation did. Tourism could help boosting up household income and reduce poverty for those who participated intensely and control the benefits in core tourism and tourism-induced sectors. These findings differed from Suriya (2011) which mentioned that only tourism-induced sector was significance for the change. CBT could push per capita income of households higher depending of the change of household members. It could reduce the poverty gap for the poor. It also widened the difference between household income and poverty line for the non-poor which might prevent them to fall into poverty again. However, participation in CBT could not increase household income growth and per capita income growth.

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MODELING THE VOLATILITY IN CHINA’S RAILWAY FREIGHT VOLUME BASED ON CONDITIONAL VOLATILITY MODEL

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ABSTRACT

China’s railway, as an important component of logistics transportation, promotes the rapid development of modern logistics and also facilitates the growth of economy. How to improve the efficiency of railway freight is becoming a crucial issue for the development of modern logistics. This paper uses symmetric and asymmetric conditional volatility models, namely GARCH(1,1) GJR-GARCH(1,1) and EGARCH(1,1), estimates the volatility in monthly railway freight volume. The volatility estimated results indicate that it has an asymmetric effect on risk from positive and negative shocks of equal magnitude. Moreover, there is a leverage effect in the monthly growth rate of railway freight volume, whereby negative shocks increase volatility but positive shocks of very similar magnitude decrease volatility. These empirical results seem to be similar to a wide range of financial stock market prices, so that the models used in financial economics are also applicable to railway freight volume. Volatility experienced by logistics transportation industry has significant implications for capital investment, resource allocation and yield management. The empirical findings of this paper provide useful insights which can be expected to be of interest to the private and public sectors in logistics management policy formulation with regard to railway transportation.

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MODELING THE VOLATILITY OF RUBBER PRICE RETURN USING VARMA GARCH MODEL

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ABSTRACT

Thailand, Malaysia and Indonesia are also the main producers and exporters of rubbers in the world. Since the trade of Thailand depends highly on the USA and Japan, the exchange rate becomes a crucial factor. On the other hand, the volatility of oil price can affect the price of natural rubbers as well as the price of synthetic rubbers, which is the substitute of natural rubbers. Then we try to find out the relationship between volatility of rubber price return and other four variables, which are average temperature, average precipitation, volatility of oil index return and dollar index return by using VARMA-GARCH and VARMAH-AGARCH model. The results showed the volatility of dollar index return is more important than volatility of oil index. On the other hand, most of the coefficient of average temperature and average precipitation are significant in both two models, the value of coefficient are very small. The rolling windows shows that the correlation between the volatility of rubber price return and volatility of oil index return is the smaller than the correlation between the volatility of rubber price return and other three variables.

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NEW SERVICES DEVELOPMENT AND PRICING STRATEGY OF RAIL TRANSPORTERS TO DELIVER PRODUCTS OF SMALL AND MEDIUM-SIZED AND COMMUNITY ENTERPRISES IN CHIANG MAI, THAILAND: AN ANALYSIS WITH BINARY LOGIT AND HEDONIC PRICE MODELS

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ABSTRACT

This study aims to find the possibility of launching new services that may be offered by the rail transporter that suit the needs of SMEs and Community Enterprises in Chiang Mai, Thailand to transport their products to Bangkok and other provinces. It also decomposes current land transportation costs. Binary choice model reveals that the most potential services are door-to-door service and over-night express transportation. The most potential target groups are SMEs in San Kampaeng district. Hedonic price model discovers the sizes of four influential factors in land transportation costs which are distance between origin and destination, weights of goods, packing service and door-to-door service.

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PREDICTING PRICE OF PALM OIL USING EXTREME VALUE THEORY

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ABSTRACT

This paper uses the extreme value theory focusing on the Block Maxima (BM) and Peak-Over-Threshold (POT) modeling to predict extreme price events and forecast extreme value of palm oil price in the future. We fit the Generalized Extreme Value (GEV) and Generalized Pareto Distribution (GPD) models to examine growth in the price of palm oil for 25 years (mid-1986 to mid-2011). Both GEV and GPD methods revealed that palm oil price will peak at an incremental rate in the next 5, 10, 25, 50 and 100 year periods. The BM and POT models are two effective approaches for predicting prices caused by extreme events. The results could be useful to the government as well as the buyers (e.g. exporter) and sellers (e.g. farmers) in the palm oil industry for future strategic planning.

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PREDICTION IN ECONOMETRICS: TOWARDS MATHEMATICAL JUSTIFICATION OF SIMPLE (AND SUCCESSFUL) HEURISTICS

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ABSTRACT

Many heuristic and semi-heuristic methods have been proposed to predict economic and financial processes. Some of these heuristic processes are intuitively reasonable, some seemingly contradict to our intuition. The success of these heuristics leads to a reasonable conjecture that these heuristic methods must have a more fundamental justification. In this paper, we provide such a justification for two simple (and successful) prediction heuristics: of an intuitive exponential smoothing that provides a reasonable prediction for slowly changing processes, and of a seemingly counter-intuitive idea of an increase in volatility as a predictor of trend reversal. As a possible application of these ideas, we consider a new explanation of the price transmission phenomenon.

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THE DEPENDENCE MEASURES OF SOUTH EAST ASIAN COUNTRIES' CURRENCY: USING COPULAS APPROACH

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ABSTRACT

The specific objective aims to study a dependent structure of a single market bridging the economic development among members of ASEAN that find itself facing important financial opportunities. Copulas approach was experimented of Thai Baht exchange rate return and each of the selected currencies in ASEAN during the periods of 2008-2011. The results of the study confirmed a dependent structure as an appropriate solution for Thailand’s exchange rate return in percentage and each of the selected currencies in ASEAN during the specific period but not for Vietnam's exchange rate return. Based on empirical copula approach, the dependence measures indicated a moderate correlation between Thai Baht exchange rate return in percentage and Brunei's exchange rate. A Pearson linear correlation coefficient is 0.335 that indicates a moderate correlation with statistically significant at the 0.01 level. A Kendall’s tau statistics of dependence measure is 0.3411878. In addition, a Spearman’s tau statistics of dependence measure is 0.4865837. Both tests showed an adequate internal consistency Thai Baht exchange rate return in percentage and Brunei’s currency in ASEAN.
VALUE AT RISK ANALYSIS OF GOLD PRICE RETURNS USING EXTREME VALUE THEORY

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ABSTRACT

There are many approaches to evaluate the return. However, Extreme Value Theory is the right method to analysis Value at Risk of Gold Price Return. The method is covered to the block maxima and the Peak over thresholds modeling. This study uses a daily gold price in US dollar over the period of January 1, 1985 through August 31, 2011. The purpose is to evaluate a value at risk of the daily gold price return. It is very useful to manage a risk allocation in portfolio. Moreover, the paper is included to the forecasting in the next 20-years

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LOW PREVALENCE OF DEPRESSION, FAVORABLE PLASMA Efavirenz CONCENTRATIONS AND THE ASSOCIATION WITH CYP2B6-516G>T POLYMORPHISM IN HIV-INFECTED THAI POPULATION

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ABSTRACT

Background: Concerns have been raised about the possibility of high plasma efavirenz(EFV) concentration in Asian people with 600mg standard dose. Single nucleotide polymorphisms of the hepatic cytochrome P450 isoenzyme 2B6(CYP2B6) gene have been an explanation for inter-individual variations in EFV concentrations. This study aimed to determine whether the therapeutic range is achieved, to assess for depression-associated symptoms, and to explore the influence of pharmacogenomic on EFV concentrations in Thai population. Methods: A cross sectional study. HIV-infected patients aged between 18-60 years who have been on EFV-containing regimen for > 48 weeks were enrolled. Single blood specimen was collected for mid-dose plasma EFV concentration and determining of the CYP2B6-516 G>T polymorphism. Clinical information was retrieved from medical records. Hamilton Rating Scale for Depression, Thai Version(Thai HRSD-17) is used to assess severity of depression. A score > 8 and >18 are indicative of mild and major depression, respectively. Results: A total of 100 patients were enrolled. The median age and body weight were 41.5 years (IQR 35.4-47.4) and 55.9 kg (IQR 49.1-65.8), respectively. Their mean CD4 lymphocyte count was 452 (SD158). The median duration on EFV was 3.6 years (IQR 2.3-5.4). The median EFV plasma concentration was 2,616 ng/ml (IQR 1,854-3,629) at mean time of 14.0 hours (SD0.9) after the last dose. Seventy-nine patients (79%) had an EFV plasma concentration between 1,000-4,000 ng/ml, none had a level < 1,000, while 21 patients (21%) had a level > 4,000 ng/ml. There were 19 cases with mild depression, 5 of 19 had high plasma EFV level. The only case that met the criteria of major depression had normal EFV concentration. CYP2B6-516 G/G, G/T and T/T genotypes were found in 49%, 37% and 14% of cases, respectively. The CYP2B6 516G>T allele frequency was 32.5%. The mean (±SD) EFV concentration for those with GIG, GIT and TIT genotypes were 2,082 ng/ml (630), 3,166 ng/ml (1,074) and 11,196 ng/ml (6,265), respectively (P<0.01). No correlation between EFV concentrations and depression score was observed (P=0.75). Conclusions: Favorable plasma EFV level was achieved in majority of Thai HIV-infected patients with standard dosing. CYP2B6-516G>T polymorphisms significantly affect the interindividual variation of drug level. After 48 weeks on treatment, the prevalence of depression was low and not associated with plasma EFV concentration.

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PREVALENCE OF HEPATITIS B CO-INFECTION AND HEPATITIS B SEROPROTECTIVE ANTIBODY AMONG PERINATALLY HIV-INFECTED THAI ADOLESCENTS

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ABSTRACT

Background: HIV and Hepatitis B co-infection is associated with high risk of progression to chronic liver diseases. Universal hepatitis B immunization for Thai infant was implemented in 1992, but whether its effect persists among HIV-infected individuals remain unknown. This study aims to determine the seroprevalence of HBV co-infection and the seroprotective antibody among perinatally HIV-infected adolescents. Methods: A cross sectional study of HIV infected adolescents aged between 12-25 years. Hepatitis B surface antigen(HBsAg), hepatitis B surface antibody(anti-HBs) and hepatitis B core antibody(anti-HBc) were measured. Co-infection was defined as having HBsAg positive, natural infection was defined as having antiHBc positive, and seroprotective antibody was defined as having anti-HBs > 10 mIU/mL. Results: From Nov 2010 to Apr 2011, 510 patients with mean age of 15 years were enrolled, 212(42%) were male. Their mean current CD4 lymphocyte count was 679(SD316), 85% of cases with available HIV RNA were viral suppressed. 303(60%) cases have either reported or documented childhood hepatitis B vaccination. Sixteen children were HBV/HIV co-infected [3%; 95% CI: 2-5%]. Natural infection was evidenced in 24 cases [5%; 95%CI: 3-7%]. 21% of children had protective antibody against hepatitis B with significantly higher proportion among adolescent who received hepatitis B revaccination after receiving antiretroviral therapy (93% vs. 96%, p<0.01). There was no gender difference in prevalence of hepatitis B seroprotection(p=0.27). Conclusions: The prevalence of HBV co-infection in HIV-infected Thai adolescents is higher than general Thai population. The prevalence of hepatitis B seroprotective antibody is low despite of childhood vaccination; four-fifth of cases are at risk for hepatitis B infection. Revaccination of hepatitis B vaccine is encouraged.

EFFECTIVENESS OF MEMORY-ASSISTING MEDIUM IN ELDERLY PERSONS WITH DEMENTIA

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ABSTRACT

People with dementia find it difficult to perform common daily functions that were easy for them previously. While dementia patients struggle in their daily life, their need for assistance can be a burden on the caregiver. It is important to listen and understand this problem by assuming a collaborative part of Occupational Therapy intervention, which is individually designed. This research aimed to study the effectiveness of using the memory-assisting medium in enabling an elderly person with dementia to perform activities, and gain the caregiver’s opinion. The subject was a ninety-year old demented man, who lived in a rural area of Chiang Mai, Thailand. A qualitative research was used, with the researcher, subject and caregiver working together in the real situation of the subject’s home. This process began with an analysis of memory problems that affected the activity performance of the subject, and the necessity for assistance from the medium according to problems and needs. The final step was to assist the memory by the medium over a period of four weeks. Opinions from the subject and caregiver were explored during the process. This study found that the problem of forgetting to turn off the television, electric fans and lights in daytime were of major concern, which led to the need for memory-assisting medium. Labeled signs with colorful and eye-catching photos of the relevant appliances were developed and displayed at strategic places in the home. It was found that the number of times he forgot to turn off the television, electric fans and lights in daytime was reduced. Reflective opinions of both the demented elderly man and his caregiver were illustrated in all periods of the process. This medium was helpful and should be continued for use in daily life by the subject. In addition, this process should be developed to help in problems of daily activities in others, enhance the abilities of elderly subjects with dementia and reduce the burden on the caregiver.

HIPPOTHERAPY ON GROSS MOTOR FUNCTION AND GAIN CHILDREN WITH CEREBRAL Palsy

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ABSTRACT

The purpose of this study was to determine the effects of the hippotherapy program on gross motor function, lower extremity ranges of motions (ROMs), and gait in children with cerebral palsy (CP). Potential effects of hippotherapy include improvements in muscle tone, coordination, righting reaction, equilibrium reaction, muscle strength, joint range of motion, weight bearing, posture and gait. Ten children (5 males and 5 females) with cerebral palsy from special school for disability in Chiangmai voluntarily participated in the study. The mean aged was 8.3+1.64 years (ranged 6–12 years). There were 8 spastic diplegia including 3 children who walked independently, and 5 children who walked with walker. The other two children included one with left hemiparesis who walked independently and one with mild athetosis who walked with walker. Using Gross Motor Function Classification System (GMFCS), four participants were on level II and six children were on level III. Methods: The hippotherapy program was conducted at Chiangmai Pack Squadron, Mae Rim district, Chiang Mai. The children exercised actively while horse-back riding on saddle pads for 30 minutes, 2 times per week for 8 weeks intervention. Several measurements were performed pre- and post-training. The Modified Gross Motor Function Measure (GMFM Thai version) Dimension D (Standing) and E (Walking, running, and jumping) were assessed. Hip and knee ROMs were evaluated from videotaping with the use of a SiliconCOACH* video analysis program. The spatiotemporal gait parameters (velocity, step length, stride length, stance time, single/double support time, toe in/ toe out) were investigated while the children were walking with their preferred speed on walkway a GAITRite mat. Analysis: The modified GMFM scores, hip and knee ROMs were compared between pre- and post-training using paired t-test. Comparison of gait parameters between pre- and post-training were determined using Wilcoxon Signed-Ranks test (p<0.05). The results showed that after hippotherapy program, as compared to pretest, there were statistically significant differences in the modified GMFM
Dimension D score (pre 76.15±14.76%, post 79.23±13.81%, mean difference 3.08±4.15%) and in the modified GMFM Dimension E score (pre 43.89±23.36%, post 49.72±21.59%, mean difference 5.83±4.28%). There were also significant improvements in hip flexion and extension ROMs, knee flexion ROM, right leg stance time, walking speed and double support time in children who walked with walker and barefoot ($p<0.05$). In conclusion, the hippotherapy program administered in the study show improvements in gross motor function, hip and knee ROMs and gait stability. Therefore, hippotherapy is recommended to be one of an alternative intervention for children with CP. The physical therapists may consider hippotherapy in treatment when such cooperative program with organization engaged in equestrian activities is possible.

**KEYWORDS:** CEREBRAL PALSY, HIPPOThERAPY GMFM, GAIT
HSPG MAY INVOLVE IN PROLIFERATION AND DIFFERENTIATION OF PROMYELOCYTE

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ABSTRACT

Heparan sulfate proteoglycans (HSPGs) present on bone marrow stromal cells and extracellular matrix. It plays major roles in normal proliferation and differentiation as well as maintenance of hematopoietic stem cells. Hematopoietic growth factors such as bFGF and GM-CSF as well as hematopoietic progenitor cell inhibitory cytokine, MIP-1α all require HSPGs as their co-receptor. 2F12 and 1E4 are monoclonal antibodies (MAb) raised against HSPG isolated from human liver. Preliminary study showed that MAb2F12 specifically recognized antigen on normal granulocyte. The expression was significantly increased on HL-60, leukemic promyelocytic cell line. In contrast, 1E4 reacted only on leukemic cells in erythro/myeloid lineage but not either normal granulocyte or monocyte. Moreover, MAb1E4 was shown to react with granulocyte population in approximately 3% of HIV-infected blood samples. We hypothesized that MAb2F12 and MAb1E4 specific molecules may play a role or involve in differentiation and maturation of myelocytic cell lineage in patients with AML and HIV-infection. Since promyelocyte could be induced to either granulocyte or monocyte/macrophage by specific inducer, in this study, HL-60 was separately induced to mature granulocyte and monocytes using 1.3% DMSO and PHA-activated PBL cell culture medium, respectively. Induced cells were examined for cell morphology with Wright-Giamsa stain. Expression of MAb2F12 and MAb1E4 specific molecules were performed by indirect immunofluorescent technique and analyzed by flow cytometry. We found that expression of MAb2F12 specific molecule was reduced after DMSO reduction. In contrast, expression of MAb1E4 specific molecule was reduced after HL-60 was differentiated to monocyte/macrophage. Taken together, we proposed that HSPGs presented on myelocytic cells might involve in cell differentiation and maturation. The mechanism needs to be explored.

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POSITIVE CHARACTERISTICS OF OCCUPATIONAL THERAPISTS AND DIRECTION OF PROFESSIONAL DEVELOPMENT IN THAILAND FROM THE PERSPECTIVE OF OCCUPATIONAL THERAPY STUDENTS

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ABSTRACT

Professional development is considered an ongoing process conducted in a sustainable manner. Accordingly, students are expected to play a role as part of the systemic reform effort. The purpose of this study was to explore the positive characteristics of occupational therapists and survey the direction of professional development from the perspective of occupational therapy students. The research subjects comprised occupational therapy students at Chiang Mai University. A qualitative research method was used to explore the positive characteristics of occupational therapists. Regarding the direction of professional development, eighty students were systemic selected. Rating scale questionnaires was compiled. An analysis of data was conducted by the mean average score and standard deviation in each part. The results illustrated that professional occupational therapists should present themselves externally with good appearance and suitable behavior, while their internal characteristics should comprise kindness, generosity and responsibility. In their performance, they should exercise social, learning and management skills. Regarding the direction of professional development, very high average value statements revealed that occupational therapists should be polite and hospitable with clients and create good human relations, while occupational therapy students should develop a good attitude in their profession. Furthermore, professional association should promote this career to a broader section of society. Lastly, the government should provide more positions, which are compatible with the country’s population rate, for occupational therapist.
LEVEL OF MATRIX METALLOPROTEINASE–2 AND MATRIX METALLOPROTEINASE–8 IN ROOT CANAL EXUDATES DURING ENDOdontIC TREATMENT

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ABSTRACT

Introduction: Matrix metalloproteinases (MMP) are Zn2+-dependent endopeptidases that are capable of degrading extracellular matrix and basement membrane protein components. They play an important role in many physiological phenomena as well as many pathological conditions, such as atherosclerosis, rheumatoid arthritis, recurrent aphthous ulcers, periodontitis and periradicular diseases. Objectives: In this study, differences in levels of matrix metalloproteinase-2 (MMP-2) and matrix metalloproteinase-8 (MMP-8) in root canal exudates, between teeth diagnosed with normal pulp without periradicular lesions, and teeth diagnosed with pulp necrosis with periradicular lesions, were investigated. Methods: Exudate samples from both groups were obtained during root canal treatment. All samples were analyzed to determine the presence of bacteria using a culturing method, the levels of MMP-2 and MMP-8 by ELISA and the levels of proMMP-2 and activeMMP-2 by gelatin zymography. Results: Traces of protein were found in all samples. Eight of 12 samples of exudates from the first collection of pulp necrosis with periradicular lesions showed positive cultures and all 12 samples from the last collection showed negative cultures. ELISA demonstrated marked differences in MMP-2 and MMP-8 levels between the exudates from the first collection of pulp necrosis and the exudates of normal pulp (p=0.000, p=0.000) as well as between those from the first collection and the third collection (p=0.000, p=0.000). There were no significant differences between MMP-2 and MMP-8 levels between the exudates of normal pulp and those of the third collection. Gelatin zymography showed decreasing levels of MMP-2 and activeMMP-2 during root canal treatment. Conclusions: MMP-2 and MMP-8 were found in root canal exudates of teeth with periradicular lesions. MMP-2 and MMP-8 have potential to be biomarkers of periradicular lesions. This study was supported by Thailand Research Fund, the Commission on Higher Education and Faculty of Dentistry, Chiang Mai University, Thailand.
NEEDS FOR POSTGRADUATE EDUCATION AND INFLUENCING FACTORS AMONG THAI DENTISTS AFTER DENTISTRY GRADUATION FOR 1-5 YEARS

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ABSTRACT

Objectives: In a sample of Thai dentists 1-5 years after graduation, we determined: 1) the need for postgraduate education, including specific fields of interest, desired programs within those fields, as well as preferred dental schools or institutions. 2) factors influencing the selection particular programs and institutions.

Methods: This cross-sectional survey was conducted using a mailed questionnaire. A total of 2,129 dentists who graduated from 8 dental schools in Thailand in the years 2004-2008 were eligible for inclusion in the study. The calculated sample size needed for this study was 337. A questionnaire was comprised of 3 parts: general personal data, need for postgraduate education and affecting factors, and open-ended additional comments for the use of the desired program directors.

Results: A total of 480 questionnaires were received, a 22.5 percent response rate. Overall, 85.2 percent of responding dentists indicated a need for postgraduate study, whilst orthodontics and prosthodontics were the most popular subjects for clinical degree programs. Concerning the preferred program of study, the residency training program and 1-year higher diploma program were chosen by 25.0% and 22.1% of the participating dentists, respectively. As reasons for selecting certain program types (MS, Higher diploma and PhD) within a given field, increasing clinical skill was ranked most highly by 60.0% compared to 0.6% and 26.3% for research, and both reasons combined, respectively. Availability of courses within specific field of interest, courses offering preparation for increased practical skill and learning atmosphere were ranked important by respondents as factors affecting their selection of a preferred dental school.

Conclusions: The present survey shows the currently preferred specialty areas and programs for professional dental education among Thai dental practitioners 1-5 years after graduation.

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This study was supported by a grant from Faculty of Dentistry, Chiang Mai University, Chiang Mai, Thailand. The list of dentists in this study was from The Dental Council Thailand.
LOW-FLOW DESFLURANE ANESTHESIA IN OBESE PATIENTS: KINETIC BEHAVIORS AND EARLY RECOVERY PROFILE

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ABSTRACT

Introduction: Desflurane is a rather new fluorinated anesthetic agent with a very low blood-gas partition coefficient and low oil-gas partition coefficient. These should allow rapid wash-in and rapid emergence, even in obese patients. Because of its price and a low potency, a low-flow technique is advised. This study was aimed to study the kinetic behaviors of desflurane during high-flow wash-in, low-flow maintenance and early recovery profile in obese patients when no premedication had been used. Methods: Twenty unpremedicated obese adult patients (BMI 25-35) were enrolled to receive desflurane as the main anesthetic agent. After propofol induction and intubation, desflurane 4% in a fresh gas flow of 6 L/min (N\textsubscript{2}O:O\textsubscript{2}=3:3) was administered via an absorber circuit in conjunction with rocuronium and fentanyl. Ventilator setting was adjusted to keep the end-tidal CO\textsubscript{2} between 35-40 mmHg. At the start of surgical procedure, the inflow was decreased to 1 L/min (N\textsubscript{2}O:O\textsubscript{2}=0.5:0.5) and desflurane was switched to 5% and maintained throughout the surgery. At the end of the procedure, desflurane was turned off and the inflow was back to 6 L/min of O\textsubscript{2}. Atropine and neostigmine were then given to antagonize the effect of rocuronium. Delivered concentration (F\textsubscript{d}), inspired concentration (F\textsubscript{i}) and end-tidal concentration (F\textsubscript{a}) of desflurane were measured and recorded from the start of desflurane until switched off. The times from discontinuation of desflurane to eye opening on command, squeezing the observer’s hand on command and extubation were recorded, as well as the time to 80% decline of F\textsubscript{a}. Results: During the initial high flow, the 1\textsuperscript{st} equilibrium was attained at 5 min with the F\textsubscript{a} of 3.4% (F\textsubscript{a}/F\textsubscript{i}=3.4/4.0=0.85). The 2\textsuperscript{nd} equilibrium was then attained at 10 min with the FA of 3.6% (F\textsubscript{a}/F\textsubscript{i}=3.6/4.0=0.90). While in low-flow maintenance, the F\textsubscript{i} gradually increased with corresponding increases of FA. The FA/FI at 10, 30 and 60 min after the start of low flow were ..., ..., and 3.8/4.2 (0.91) respectively (p>0.05). When back to high flow of O\textsubscript{2} at the end of surgery, the time to 80% decline of F\textsubscript{a} was 1 min. The times to eye opening, hand squeezing and extubation were 6.25, 6.80 and 7.40 min respectively. Discussion and
conclusion: In obese patients, desflurane provides fast wash-in during the initial high flow and, Under 1 L/min of maintenance flow, fast wash-out and fast recovery when premedication had not been used. We recommend the $F_D$ of desflurane at 5% during a low flow of 1 L/min as an economical and safe practice where the facilities are limited, the end-tidal gases and bispectral analyzers in particular.

**KEYWORDS:** ANESTHETIC TECHNIQUE, LOW-FLOW ANESTHESIA, VOLATILE ANESTHETIC, DESFLURANE, RECOVERY PROFILE, OBESE PATIENT

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DEVELOPMENT OF NURSING ADMINISTRATION RESEARCH DATABASE

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ABSTRACT

In Thailand the number of nursing research studies have increased dramatically over the years. There have been several attempts to gather these research reports; however, currently there is no nursing administration research database. The objectives of this developmental study were to develop a nursing administration research database program and to describe research characteristics from 1989 to 2009. The database program development process consisted of database initial study, database design, database testing, and database operation. An ASP.net on Net Framework 2.0 was used to develop the database and the MS SQL SERVER EXPRESS 2008 was used for database management. The nursing administration research collection project comprised 3 steps including; 1) planning step, this step involved the preparation of nursing administration research collection, 2) implementing step, which involved searching, selecting, and storing relevant nursing administration research in Thailand from 1989 to 2009 by using the Research Screening Form, and 3) summarizing step, this step involved writing a report and disseminating findings from this study. Results of this study were; 1) the Nursing Administration Research Database program was developed. This program can be used continually to collect more nursing administration research and other areas of research, 2) the results of research characteristics were found as follows; there were 1,864 nursing administration research studies in Thailand, 73.23% were master degree theses. Research themes were classified into 10 themes. Most research was conducted in the human resource management theme (25.74%) and organizational management (18.26%), and not many studies in other themes. This database is an important source for rapidly and systematically searching nursing administration research with a wide range of potential benefits for nursing education, research, management, and practice. It is suggested that researchers should consider conducting research to cover all aspects of nursing administration.
ASSESSMENT OF SOLUBLE SOLIDS OF STRAWBERRY FRUIT CV. NO. 80 USING NIR TECHNIQUE

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ABSTRACT

Evaluation of total soluble solids of strawberry fruit cv. No. 80 using near infrared (NIR) spectroscopy with wave-length ranging from 700 nm to 1100 nm was study. NIRSystem6500 was used to acquire the spectrum while a total soluble solids (TSS) was measured using digital refractometer. The fruit was separated into 2 groups by percentage of red color break using the following criteria: white stage; less than 25% color break and red stage; more than 75% color break. The soluble solids content of white stage equal to 10.02% and was significant different from total soluble solids of red stage (10.66%). The partial least squares regression (PLSR) models for prediction TSS of strawberry showed that the calibration equations formulated by the relationship between values of spectrum and TSS could predict TSS values with the correlation coefficient; $R$ equal to 0.81, the standard error of calibration (SEC) and the standard error of prediction (SEP) equal to 0.46 and 0.49, respectively.

ABSTRACT

The purpose of this study was to compare the sample preparations for detection the corn seed infected with *Aspergillus flavus* by NIR (near infrared) spectroscopy. There were two kinds of samples: full corn and grounded sample. The non-infected (normal seed) and the infected seeds at 5, 10, 15 and 20% w/w were scanned the spectra by using NIRSystem 6500 wavelength range 1100-2500 nm. Samples were grounded by the sample milling instrument. The mathematical techniques such as smoothing and second derivative were used to transform the NIR spectra. The calibration equation to predict the quantity of infected seeds of full corn and grounded sample were developed by partial least squares regression (PLSR). It was found that the calibration equation for the infected seed prediction of grounded sample provided the higher value of the correlation coefficient (R) than full corn sample which were 0.98 and 0.81 respectively. Meanwhile, the standard errors of calibration (SEC), the standard errors of prediction (SEP) and the averages of difference between actual and NIR values (Bias) of grounded sample were lower than those from full corn sample. There were 4.09%, 4.01%, 0.94 and 1.14%, 1.33%, 1.28 respectively. Therefore, grounded sample is suggested before subject to NIR spectroscopy to detect the infected maize seed. However, the full corn sample could be suggested if the light scattering effect was reduced.
CONTROLLING MAIZE SEED FUNGI CONTAMINATION BY USING VARIOUS ESSENTIAL OIL MIXTURE

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ABSTRACT

The effect of various mixture of essential oil for control maize seeds fungi were investigated. Seeds coated with clove (CO) and basil (BO), clove (CO) and peppermint (PO) and basil (BO) and peppermint (BO) at ratio of 1:3, 1:1 and 3:1 were used respectively. The seed-borne fungi from uncoated seed were assayed by Blotter method. 5 seed-borne fungi from uncoated seed were assayed by Blotter method. 5 seed-borne fungi were found; 100% *Aspergillus flavus*, 17.5% *Aspergillus niger*, 19.5% *Rhizopus sp.*, 6.0% *Penicillium sp.* and 5.5% *Fusarium sp.*. The seeds coated with the mixture of CO and BO at the ratio of 1:1 and 3:1 showed their potential of controlling *A. flavus* 79.0% and 87.5%, *A. niger* 100% and 100%, *Rhizopus sp.* 61.5% and 66.7%, *Penicillium sp.* 83.3% and 100% and *Fusarium sp.* 54.5% and 90.9% respectively. Anyhow, the combination of CO and BO (1:1) showed less affects on seed germination, seed vigor by accelerated aging, seedling classification and seedling growth rate compare to the combination of CO and BO (3:1) and to the control treatment. Therefore, CO and BO (1:1) showed the best appropriate concentrations that control effectively seed-borne fungi and there was no negative effects on seed vigor and viability.

EFFECT OF ACTIVE PACKAGING ON QUALITY OF CHINESE KALE

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ABSTRACT

The aim of this work was to study the influence of passive MAP, perforated polyethylene package and three different oxygen transmission rate active packaging on the quality of fresh Chinese kale (Brassica oleracea L. var. albo-glabra) stored at 5 °C. Chinese kale was trimmed off defects and undesirable parts, then packaged 500 grams in each type of packaging, namely unperforated polypropylene package, perforated polyethylene package (Doi Kham Brand) and active packaging with three different oxygen transmission rates (OTR): 1,000-1,200, 1,200-1,400 and 1,400-1,600 cc/m\(^2\)-day then sealed. Five packaging treatments together with passive atmosphere within the package were applied. Weight loss, wilting, physiological disorders, bacterial decay, visual appearance, color change, total soluble solids, chlorophyll, vitamin C content and shelf life were monitored. Yellowing of leave in a short time was a major problem of Chinese kale. The amounts of vitamin C and chlorophyll tended to decrease with storage time, which correlated with the diminishing green color. Chinese kale packaged in active packaging had longer storage life compared to passive MAP polypropylene package and perforate PE package, which differed significantly (p<0.05) from each other. High oxygen transmission rate of film was generally related to a high quality produce. Active packaging with OTR of 1,400-1,600 cc/m2-day was the best treatment for overall visual quality.


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EFFECT OF VACUUM COOLING OPERATION PARAMETERS ON COOLING TIME AND WEIGHT LOSS OF CHINESE CABBAGE

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ABSTRACT

The effect of vacuum pressure reserving operation mode on cooling time, weight loss percentage and temperature variation of Chinese cabbage were investigated. Vacuum cooling of Chinese cabbage using different vacuum pressure reserving operation modes were experimented. The final pressures for vacuum cooled Chinese cabbage packed were set at five different levels; 5, 5.5, 6, 6.5 and 7 millibar; and at the 3 levels of the time reserving; 20, 25 and 30 minutes, respectively for each level of pressure. Cooling Chinese cabbage 4 ± 1 °C with lower final pressures consumed longer cooling times than higher final pressures. The different operation conditions resulted in both effects on the cooling time and final temperature of Chinese cabbage. Lower final pressure and longer final time caused higher weight loss. The optimum condition for vacuum cooling process of Chinese cabbage with initial temperature of 15-20 °C was at the final pressure of 6 mbar with pressure reserving of 30 minutes. The cooling time of Chinese cabbage was 44 minutes. The energy consumption for precooling process of Chinese cabbage of 538 kilograms (full load) was 0.22 kwh and the electricity cost was 0.035 baht (1 $US=31 Thai bahts) per kilogram of fresh Chinese cabbage. The weight loss percentage of Chinese cabbage during vacuum cooling process was 2.29%.
EFFICIENCY OF SEED PELLETING WITH UREA FORMALDEHYDE ON THE QUALITY OF SWEET CORN SEED

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ABSTRACT

The optimum levels of Urea formaldehyde (UF) as slow released fertilizers for improving sweet corn pelleted seed were investigated. Sweet corn seeds were pelleted with UF concentrations of 0.6, 0.8, 1.0, 1.2, 1.4, 1.6, 1.8 and 2.0 gN per Kg seed compare with unpelleted seeds and pelleted seeds without UF. Standard germination test, germination index, shoot and root growth rate, seedling growth rate and seedling vigor classification were evaluated. The results indicated that pelleted seeds without UF decreased germinability of sweet corn seeds. All concentrations of UF and pelleted seed without UF showed better performance in vigorous of the seed such as the germination index, shoot and root growth rate and seedling vigor classification than unpelleted seeds. However, the pelleted treatment with UF 1.0 gN showed the best results in quality tests than other concentrations. Therefore, the pelleted treatment with 1.0 gN of UF was the optimized level to improve sweet corn pelleted seeds qualities.

PASTING CELL : AN ALTERNATIVE SAMPLE CELL FOR DETECTION OF THE MILLED RICE INFECTED WITH *Aspergillus flavus* BY NIR SPECTROSCOPY

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ABSTRACT

The objective of this study was to reduce the quantity of milled rice sample in near infrared spectroscopy (NIRS). The milled rice (non-infected) and the milled rice mixing with infected milled rice by *Aspergillus flavus* at 5, 10, 15 and 20% w/w were investigated. The samples were contained in the coarse sample cell and were measured the reflectance spectra using NIRSystem6500 in wavelength region from 700 to 2500 nm. Then, the same samples were packed in the pasting cell before measuring the spectra. The smoothing and second derivative techniques were used to transform the spectral data. The calibration equation was developed by partial least squares regression (PLSR). It was found that the value of the correlation coefficients (R) of the PLSR calibration result of the pasting cell was higher than from the coarse sample cell, which were 0.97 and 0.82 respectively. Moreover, The standard errors of calibration (SEC), the standard errors of prediction (SEP), the averages of difference between actual and NIR values (Bias) of the pasting cell was lower than those from the coarse sample cell. There were 1.60%, 1.82%, -0.28 and 4.04%, 4.18%, 0.02 respectively. Therefore, the pasting cell could be replaced the coarse sample cell effectively and the quantity of milled rice can be reduced.

RADIO FREQUENCY THERMAL TREATMENT AS ALTERNATIVE INSECTS PESTS CONTROL IN STORAGE

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ABSTRACT

Pest control in crop production farm, storage and during marketing has been practiced in tropic and sub-tropic conventionally with the chemical treatments. The demand for food safety for human health concern and the green production for environmental friendly purpose, the alternative to chemical treatments for insect pest control and management become the research, policy, and practical challenges. Radio frequency (RF) treatment can be one of the appropriate technical measures taking into account the need for cost effectiveness for Thailand to be competitive in world agriculture. It was found that in post-harvest management process, especially in rice preserved for packaging and exporting, post-harvest losses were usually found from infestation of insects during storage, which include rice weevil (Sitophilus oryzae L.), angoumois grain moth (Sitotroga cerealella (Ollivier)), rice moth (Corcyra cephalonica (Stainton)) and lesser grain borer (Rhyzopertha dominica F.). The efficacy of RF on controlling these storage insects showed the reaction of the insects depended on the insect species and their growth stage. After using RF (27.12MHz) at 70°C for 150 sec of exposure time completely controlled Rhyzopertha dominica F. in paddy rice, however the 100% mortality of Sitophilus oryzae L., occurred at the lower temperature of 50°C for 15 min. The RF-tolerance stages of Rhyzopertha dominica F. were egg adult and larval stages, respectively. The effectiveness of RF on controlling stored insect would depend without adverse effect on commodity of exposed agricultural products. Corcyra cephalonica (Stainton) in milled rice and 180 sec for controlling Corcyra cephalonica and Rhyzopertha dominica F. were egg adult and larval stages, respectively. The effectiveness of RF on controlling stored insect would depend without adverse effect on commodity of exposed agricultural products.

USING UREA FORMALDEHYDE AND POLYETHYLENENEGLYCOLON SEED COATING TO IMPROVE THE QUALITY OF MAIZE SEED

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ABSTRACT

The objective of this experiment was to study the optimum urea formaldehyde and polyethyleneglycol concentration that were slowly released available nitrogen for maize seeds with sufficient and efficient quality. The seeds were coated with urea formaldehyde at the concentration 0.2, 0.6, 0.8, 1.0, 1.2 g N in combination with containing 3% (w/v) of PEG 6000. The qualities of coated seed were tested by germination percentage, germination index, seedling vigor classification, shoot and root growth rate and accelerated aging test. The results showed that coated seeds with urea formaldehyde at 0.4 g N and provide strong germination germination index, and comparing with uncoated seeds.3% (w/w) of PEG 6000 percentage, seedling vigor classification accelerated aging test.
FORMULATION OF BREAKFAST CEREAL FROM GERMINATED BROWN JASMINE RICE (KPSKD5) FLOUR

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ABSTRACT

The objective of this research was to formulate the ratio of germinated brown jasmine rice (KPSKD5) flour (60-95%) corn girt (0-20%) and soy protein isolate (5-20%) using mixture experiment. Results demonstrated that different mixtures had the significantly effect (p<0.05) on the density (0.17-0.21 g/ml), expansion ratio (6.35-9.45), GABA content (5.47-15.03 mg/100g dry sample), sweetness (4.3-5.0) and overall-liking (5.2-6.1). Extrusion process led to the reduction of GABA content in extruded product was less than 4.41 mg/100g dry sample when compared to non-extruded sample. Optimal formula consists of 95% germinated brown jasmine rice flour, 0% corn girt and 5% soy protein isolate, respectively which resulted in the highest GABA content (15.03 mg/100 g dry sample).
PHYSICAL, CHEMICAL AND SENSORY CHARACTERIZATION OF THE THAI-CRISPY PORK RIND ‘KAEB MOO’

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ABSTRACT

Crispy pork rind, called Kaeb Moo in Thai, is a typical and very popular food in the northern region of Thailand. It is made from deep frying pork skin, previously cut in slices. There are basically two different types of Kaeb Moo, the first one consisting only of the skin layer and the second one where subcutaneous fat is also present. Kaeb Moo may undergo rapid change of quality, as rancidity, after it has been processed. However, little has been done so far for quality assessments and certification of the Thai crispy pork rind. In this research, investigations on chemical, physical and sensorial aspects of Kaeb Moo were performed in order to investigate the quality parameters of this product. Samples were purchased from well-known local producers of Chiang Mai Province, or prepared in-house. The average hardness of each sample ranged from 15.0 to 40.0 kgf, while moisture and fat contents were 0.3 - 2.3% and 20.0 - 36.5%, respectively. The degrees of lipid oxidation were in the range of 0.10 - 2.57 μg malondialdehyde g-1. Volatile compounds were investigated by headspace-solid phase microextraction technique and GC-MS. The following compounds were found: propanal, hexanal, heptanal, 2-heptanone, 2-pentyl furan, heptane, octane, and 4-methyl octane. Descriptive analysis profiling was used to express the sensorial attributes and 18 important attributes of Kaeb Moo were described by 12 trained panelists. Finally, consumer acceptance test (n = 400) using 9-point hedonic scale was carried out in respect to color, odour, taste, crispness, and overall-liking.

REDUCTION OF FAT CONTENT AND GLYCEMIC INDEX OF GLUTEN-FREE COOKIE USING DIETARY FIBER FROM ALBEDO OF POMELO FRUIT

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ABSTRACT

The objective of this research was to formulate the gluten-free cookie with reduced fat and lower glycemic index by replacing rice flour and butter with dietary fiber from pomelo albedo (PF). Mixture experiment was designed by varied the PF (0-10%), rice flour (53.2-59.11%) and butter (36.8-40.89%). Results showed that PF replacement had significantly effect (p<0.05) on b* values, total starch content, hardness, fat content and glycemic index of the product. Optimal formula consists of 55.17% rice flour, 37.77% butter and 7.05% PF. The developed product had lower fat content by about 30.8% when compared to control. In addition, the predicted glycemic index was 53.8, indicating low glycemic index cookie.

EFFECTS OF BLENDING CARBOXYMETHYLCELLULOSE WITH GELATIN SCAFFOLD FOR SKIN SUBSTITUTES

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ABSTRACT

Effects of carboxymethylcellulose (CMC), a derivative of cellulose, blended with biopolymer gelatin scaffolds were studied. The CMC solution was mixed with gelatin solution in various ratios and fabricated to porous structure via freeze drying process. Thermal and chemical crosslinking techniques were used to induce conjugation of free amide and carboxyl groups in protein structures of the different types of scaffold. Physical and mechanical properties of different gelatin/CMC scaffolds were characterized via Scanning Electron Microscope (SEM) and Universal Testing Machine (UTM), respectively. The morphology of the gelatin/CMC scaffolds seemed to mainly depend upon the mixing ratios of gelatin and CMC solutions. Adding of CMC to the scaffolds decreased in pore sizes and seemed to have more porous than pure gelatin scaffolds, especially when used the 1-ethyl-3-3-dimethylaminopropyl carbodiimide hydrochloride (EDC) and N-hydroxysuccinimide (NHS) crosslinked scaffolds. The scaffold which used gelatin and CMC in the ratio of 80 and 20, respectively occurred in the highest level of water absorption with the ratio of 44.67 ± 3.86. The mechanical analysis demonstrated that adding CMC in ratio of 80:20 of gelatin and carboxymethylcellulose and used thermal crosslinking increased the compressive modulus of the scaffold with significant different compared to pure gelatin scaffold. However, the compressive modulus of the scaffolds decreased in some ratio of gelatin blended with carboxymethylcellulose. Using EDC/NHS for crosslinking the scaffolds increased in compressive modulus in all ratios of gelatin blended with carboxymethylcellulose scaffolds. These results suggested that using CMC as an additive in ratio of 80:20 of gelatin and CMC, respectively and using thermal and EDC/NHS crosslinking improved in physical and mechanical properties of the scaffolds. Therefore, the best condition of gelatin/CMC scaffold can be used in the future experiments for applying in tissue engineering applications.

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HAPPINESS AT WORK OF EMPLOYEES IN SMALL AND MEDIUM-SIZED ENTERPRISES, CHIANG MAI

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ABSTRACT

Thailand is currently a developing country, its fundamental economic system is still predominantly driven by small and medium business units. Thus, giving support and encouragement to small and medium-sized enterprises (SMEs) is the most important policy in strengthening the Thai economy, in order to be able to grow and develop like others countries such as the United Kingdom, Germany, Finland, Australia, Japan and Malaysia. The aims of this research are to study factors which are affecting the happiness of employees at work in SMEs and to measure the level of happiness at work. A total of 300 employees were investigated by structured questionnaires. The conceptual framework was developed by five factors of happiness in the workplace which were 1) job characteristics 2) organization's shared value 3) relationship 4) quality of work life; and 5) leadership. The results shown that the level of happiness of SMEs employees in Chiang Mai was at the high level and the level of opinion towards the five factors affecting happiness at work was also at the high level. Relationship, quality of work life and leadership were three factors that led to happiness at work and able to predict happiness at work. The prediction ability was at 59.4% (R Square= 0.594)
THE STUDY OF EMPLOYMENT OVERVIEW IN LUANG PRABANG, LAO PEOPLE’S DEMOCRATIC REPUBLIC

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ABSTRACT

This study is a qualitative research aims to investigate the employment situation in LuangPrabang, Lao People’s Democratic Republic. The interview data collected from students, lecturers, graduates, and employers were analyzed using open coding method by two independent researchers. The results showed that the need of labor in Laos keeps increasing because of the country development policy and the economic growth. Currently, number of Laotian workforce with university degree is small so newly graduates are able to select the job they want. In addition, this study indicated that students prefer secure job which are hardly found in Luang Prabang where most of the employers are SMEs (Small and Medium Enterprises) having unclear hiring system causing insecure employment condition. This finding also showed that just graduated labor lacks of work experience. The problem worries employers who require urgent solution to be done under cooperative efforts between university, government and private sectors.
METHODOLOGY FOR MEASURING THE COMPETITIVENESS OF MEDICAL TOURISM IN THAILAND

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ABSTRACT

The objective of this article is to propose a framework for measuring medical tourism competitiveness in Thailand by synthesizing previous researches involving framework and measurement of destination competitiveness. The result of synthesizing previous researches found that medical tourism competitiveness can be measured in both macro level as country, region and micro level like industry, hospital. The methods to measure these competitiveness can be done in both qualitative by using the concepts of destination competitiveness models like Porter’s model, and quantitative as benchmarking with Data Envelopment Analysis (DEA). However, the measurement of competitiveness at macro level is easier to conduct than the micro level due to the limited data. The conclusions of the measurement at macro level can lead to create the public policy that support or enhance the competitiveness of medical tourism of a country. While the measurement of medical tourism competitiveness at micro level should be focus in benchmarking to find the factors that can be use to assign the strategy for enhance competitiveness of industry or hospital. The framework proposed in this study can be used as the approach and significant information to develop the empirical methodology for measure medical tourism competitiveness in Thailand. The objective would be to generate sustainable development planning through an efficient budget allocation to enhance the development of medical tourism in Thailand.

Oral Presented in World Research Summit for Tourism and Hospitality on December 10th-13th, 2011 at Hotel ICON, Hong Kong.
THE EFFECTIVENESS OF USING VCD AEROBIC EXERCISES ON PHYSICAL FITNESS IN OBESE CHILDREN

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ABSTRACT

The epidemiology of Thai children with obesity is growing rapidly. The excessive weight of a child can be reduced by exercises and physical activity. Obese children tend to have lower strength and physical fitness, compared to normal children. The previous study found that the VCD aerobic exercises is as effective for obese children aged 9-10 years as in normal children in terms of reaching the moderate exercise intensity. The purpose of this study was to determine the effectiveness of using VCD aerobic exercises for 8 weeks on physical fitness in children with obesity aged 9-10 years. Thirty children with obesity (according to the Thai Growth Chart criterion), aged 9-10 years were recruited from Dara Academy school in Chiang Mai. They were measured body weight, height, waist circumference, HR, BP, skin fold to body fat, sit and reach and sit-ups test. The children performed the aerobic exercises using the twenty-nine minutes video, 3 times a week for 8 weeks, (a total of 24 times) with their teachers. In addition, the children were asked to finish their self diary reports. The paired t-test statistic analysis was used to compare the pre-post exercises training on the physical fitness. Two children from the total of thirty participants refused to engage in this program. Thus, the 28 obese children, (17 boy and 11 girl); mean age 9.90 ± 0.41 year old participated in the study. They were classified as over weight (n=4, 14%), slightly obesity (n=12, 43%) and obesity (n=12, 43%), during pre-exercise session. The participants exercised using the aerobic exercise VCD for 19.89 times (83 ± 0.12%). The results showed the increasing number of children who were in the normal weight criteria (n=3, 11%), whereas decreasing in the number of children in over weight (n=2) and in obesity (n=1) at post-exercise session. Body weight and BMI were not changed, but BMI tended to decrease (p = 0.081). Height and waist circumference increased significantly (p < 0.05). The body fat percentage decreased. HR and BP were not difference between pre and post training sessions. The sit and reach test increased from 0.86±6.74 to 3.93±6.86 cm. In addition, there was no significant difference in sit-ups test before and after training (17.79+8.73 to
19.61+9.66 times) but there was a tendency to increase (p = 0.053). The 8 weeks aerobic exercises program is effective to improve physical fitness in children with obesity aged 9-10 years. Apart from appropriate food intake, the aerobic exercises VCD program may help to promote the better physical health and can be an alternative way for children to perform exercises and be more physically active in the school.

**KEYWORDS:** CHILDREN WITH OBESITY, AEROBIC EXERCISE, BMI, PHYSICAL FITNESS

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Funded by Faculty of Associated Medical Sciences, Chiang Mai University.
ABSTRACT

This research aimed to study the correlation between various systems of entrance exam and learning achievement of students who matriculated in Faculty of Dentistry Chiang Mai University in academic year 2005 – 2008. Database was developed for academic records of 361 students with student ID 48…-51… from the first year they entered until academic year 2010. Students were assigned into five groups according to system of entrance exam they took to enter dental school; program for students with special talent in sports, program for students with outstanding academic performance, collaborative project to increase production of dentists, central entrance exam and northern quota exam. Those dental students’ grade point averages (GPA) are compared. Descriptive statistics, Kruskall Wallis Test, ANOVA, multiple comparison and correlation analysis were used for data analysis. The research findings were as follow: Students with student ID 48… - 51… from the first year to the third year in dental school; students from program for special talent in sports had mean GPA 2.6800 which was lower than students from other four groups with significantly difference, while students from collaborative project to increase production of dentists had mean GPA 3.0187 which was lower than students from program for students with outstanding academic performance and central exam with significantly difference. While students from program for outstanding academic performance, central entrance exam and northern quota exam had no significantly difference in GPA. In class of student ID 48… in the first year to the sixth year; students from program for special talent in sports had mean GPA 2.4350 and students from collaborative project to increase production of dentist had mean GPA 2.7526, which were lower than other three groups with significantly difference. There was no significantly difference in GPA among student ID 48 from program for students with outstanding academic performance, central entrance exam and northern quota exam. Student ID 49…, 50… and 51… from all entrance systems had no significantly difference in GPA, they performed learning
achievement equally well in dental school. The grade point average of student ID 48… – 50… in dental school had significantly positive correlation with the high school grade point average in every academic years except student ID 51… which had significantly positive correlation only in the first academic year. The mean GPA in high school of dental student ID 48… – 51… was 3.788 seeing that the student ID 51… got the highest GPA. Students from program for outstanding academic performance renounced their right to study in Faculty of Dentistry CMU in the highest rate at 57.69%, the second were students from northern quota exam at 25.00% respectively.

Supported by a grant from Faculty of Dentistry, Chiang Mai University, Chiang Mai, Thailand.
DETECTION OF AGGREGATIBACTER ACTINOMYCETEMCOMITANS, PORPHYROMONAS GINGIVALIS, TANNERELLA FORSYTHIA AND THEIR VIRULENCE GENES IN PATIENTS WITH PERIODONTAL DISEASES

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ABSTRACT

Aim of the study was to detect Aggregatibacter actinomycetemcomitans, Porphyromonas gingivalis and Tannerella forsythia, and virulence genes from various types of periodontal disease. Twenty subgingival plaque samples from each patient's group, including aggressive periodontitis, chronic periodontitis, and gingivitis were analyzed by conventional PCR, nested PCR, and multiplex PCR. The results revealed that A. actinomycetemcomitans was detected at 80, 40, and 45% from each group, respectively. All three Cdt genes which encoded cytolethal distending toxin of this pathogen were detected at 56.25, 50, and 44.44% respectively. For P. gingivalis, the high prevalence of 85, 75, and 85% were found from each group. Virulence genes, fimA gene and prtC gene, which encoded fimbriae and collagenase productions, were also detected at 58.82, 80, and 52.94% respectively. The highest prevalence was reported for Tannerella forsythia in all groups with 100, 100, and 90% respectively. The virulence gene which encoded cysteine protease production, prtH gene, was detected at 90, 80, and 72.22% respectively. Furthermore, the significant difference between groups was found in A. actinomycetemcomitans. (P value < 0.05). It was concluded that the prevalence of A. actinomycetemcomitans was significantly found in aggressive periodontitis, whereas the prevalence of the other two pathogens were high in all groups. For the detection of virulence genes, about a half of A. actinomycetemcomitans-positive samples exhibited all 3 Cdt genes, whereas P. gingivalis-positive samples were mostly found both fimA and prtC genes. For the T. forsythia-positive samples, prtH gene was higher in aggressive and chronic periodontitis than in gingivitis group.

Supported by a grant from Faculty of Dentistry, Chiang Mai University, Chiang Mai, Thailand.
EFFICACY OF FLUOCINOLONE ACETONIDE IN ORABASE COMPARED WITH DEXAMETHASONE IN ORABASE IN TREATMENT OF ORAL LICHEN PLANUS

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ABSTRACT

The objective of this study was to compare the efficacy between two topical steroids, 0.1 % fluocinolone acetonide in orabase and 0.1% dexamethasone in orabase in the treatment of atrophic and erosive oral lichen planus (OLP). Twenty-six patients with histologically confirmed erosive and atrophic OLP were recruited in this double-blinded study. Patients were divided into two groups. In group 1 (N=13), patients were given 0.1% dexamethasone in orabase and in the group 2 (N=13), patients were given 0.1% fluocinolone acetonide in orabase. They were instructed to use the medication four times a day. The lesions were evaluated before and after 2, and 4 weeks of treatment using the clinical scoring the intensity of OLP. The visual analogue scale (VAS) was used for scoring the intensity of pain. Patient's satisfaction was evaluated after 4 weeks of treatment by using the rating scale. The results showed that both drugs were similarly effective to reduce pain and severity of OLP. There were no statistically significant differences in improvement of both clinical score and VAS between two groups (P>0.05). The patients were highly satisfied with both drugs. In conclusion, topical application of both fluocinolone acetonide and dexamethasone is an effective treatment of OLP, and dexamethasone appears not to be more effective than fluocinolone acetonide in management of OLP. Most patients were satisfied with both drugs.

Supported by a grant from Faculty of Dentistry, Chiang Mai University, Chiang Mai, Thailand.
INFLUENCE OF ZIRCONIA ADDITION ON MICROSTRUCTURE AND MECHANICAL PROPERTIES OF PORCELAIN CERAMIC-NANOCOMPOSITES

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ABSTRACT

The effects of ZrO2-reinforced on the mechanical properties and crystallization behavior of leucite (KAlSi2O6) in dental ceramic with the short time - one step sintering and/or tempering firing procedure were investigated. Dense dental ceramic/20 wt.% ZrO2 composites were prepared by sintering pressurelessly at 1060-1140 °C for 25-40 min and/or tempering at 1040 °C for 0-90 min. Microscope investigation and X-ray diffraction revealed the important role played by the m-ZrO2 phase and the formation of nanocomposite structures of dental ceramic reinforced with crystalline leucite phase. Leucite crystals were initiated and grown up from the surface of ZrO2 particles and acted as the bridge between them. Mean flexural strength and toughness of the materials can reach values of 154.6-192.8 MPa and 2.03-2.50 MPa•m1/2, respectively, which are higher than the dental ceramic (83.4 MPa, 1.01 MPa•m1/2) alone, with the significant statistical difference (p < 0.001). The optimum sintering and/or tempering condition could be better conciliated with the nanocomposite structures formation and can improve the strength of the composite at high temperatures and suitable dwell times.

Supported by a grant from Faculty of Dentistry, Chiang Mai University, Chiang Mai, Thailand.
MUTATION ANALYSIS IN THAI FAMILIES AFFlicted WITH NEWLY RECOGNIZED SKELETAL DYSPLASIA SYNDROME

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ABSTRACT

Mutations in Sterile Alpha Motif (SAM) domain of P63 have been reported to be associated with Ankyloblepharon-Ectodermal Dysplasia-Cleft lip/palate syndrome (AEC) and Rapp-Hodgkin Syndrome (RHS). SAM domain, a protein-protein interaction module, is found in cytoplasmic signaling proteins and several transcriptional regulatory proteins which are involved in development and differentiation. Here we report a SAM domain mutation (p.Asp564His) in P63 that predisposed the patients to have non-syndromic cleft palate and non-syndromic cleft lip and palate.

Supported by a grant from Faculty of Dentistry, Chiang Mai University, Chiang Mai, Thailand.

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MUTATION ANALYSIS OF WNT7A IN TWO THAI SISTERS WITH SEVERE AL-AWADI/RAAS-ROTHSCHILD/SCHINZEL PHOCOMELIA SYNDROME

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ABSTRACT

Al-Awadi/Raas-Rothschild/Schinzel phocomelia (AARRS) syndrome, a rare autosomal recessive disorder, comprises malformations of upper and lower limbs with severely hypoplastic pelvis and abnormal genitalia. Mutations in WNT7A have been reported as cause of the syndrome. We report on 2 sisters in a Thai family with short and malformed long bones, absent fibulae, flexion contracture of digits, and a/hypoplastic nails. Fusion between severely malformed femora and slender tibiae has never been reported in patients with WNT7A mutations. Lower limbs were more severely malformed than the upper ones and the pelvis was also severely affected. Multiple fusions of long bones and of the femoral heads to the acetabula were evident. A novel homozygous missense mutation in coding exon 4 of the WNT7A was detected in both affected daughters (c.664C>T) leading to an amino acid exchange from arginine to tryptophan (p.Arg222Trp; R222W). The phenotype is likely to results from an abnormality of all three signaling centers in the developing limb resulting in ventralization with a loss of dorsal structures (aplasia/hypoplasia of nails) a loss of anterior-posterior identity (single distal bones in lower limb without polarity) and an outgrowth defect resulting in distal truncations.

Supported by a grant from Faculty of Dentistry, Chiang Mai University, Chiang Mai, Thailand.
QUALITY OF WORKING LIFE OF PERSONNEL AT THE DENTAL HOSPITAL FACULTY OF DENTISTRY CHIANG MAI UNIVERSITY

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ABSTRACT

This research is a descriptive study. The sample is personnel at the Dental Hospital Faculty of Dentistry Chiang Mai University of 101 people. Objectives were to determine the quality of working life and the factors that affect the quality of working life of Personnel. The tool used to study the quality of life questionnaires to the researchers created using the concept of quality of life and work of Walton (Walton, 1973). Consists of eight indicators, data were analyzed by the frequency distribution of mean and standard deviation. And analyzed for the relationship. The results showed that the quality of working life of personnel at the Dental Hospital Faculty of Dentistry Chiang Mai University. Overall level. With an average of 3.02. And on the quality of life is found in various aspects of the medium. The average in each of the following. A sufficient and fair compensation is the average of 2.67. The working conditions, safety and health is average of 2.85. The progress and stability in is average of 2.97. The opportunity to develop their own performance is average of 2.78. The compatibility and relationships with other persons with the average of 3.16. The privacy is the average of 3.02. The rhythm of life that is balanced is average of 3.29. And the benefit to society as is average of 3.47. The quality of life is related to age, marital status, work status and salary are statistically significant at 0.001, 0.01 and 0.05, respectively. Discuss the results of the study show that quality of life of personnel at a moderate level in all aspects. This may be because in the course of this research is in the midst of the management system of the University of the Autonomous University of the State. The personnel get paid increased. The personnel is mostly local people has resulted in enough quality of life itself.

Supported by a grant from Faculty of Dentistry, Chiang Mai University, Chiang Mai, Thailand.
THE RESPONSE OF MOUSE OSTEOBLASTS FOLLOWING DENTAL IRRADIATION

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ABSTRACT

Cellular responses following low dose irradiation has been widely debated for several years. Some previous studies revealed the detrimental effects of low dose radiation, however, several studies illustrated in contrast. Periapical radiography, a commonly used imaging modality in dental clinic, is determined as the lowest diagnostic dose received by patient. The effect of dental irradiation at the dose of periapical radiography on mouse osteoblasts has not been revealed. Therefore, in this study, we tested the hypothesis that 1) the low doses of dental radiation, particularly the dose of periapical radiography, on mouse osteoblasts can detoxify by measuring the reduction of ROS (reactive oxygen species) and can lead to increase cellular proliferation by measuring cyclin D1 expression and cell viability, and 2) the high doses of dental irradiation can increase ROS production and lead to cellular apoptosis by measuring Bax, Bcl-2 expression. We irradiated mouse osteoblastic cell line (MC3T3-E1) with vary doses of periapical irradiation (0, 1, 5, 10 doses) by using the portable dental x-ray machine. We evaluate cell viability using MTT assay, the expression of Bax, Bcl-2, and cyclin D1 at 24 hours following each irradiation and ROS production at 4 hours following each irradiation. We found that the ROS production was significantly reduced after one-dose of periapical radiography, however, 10-doses of periapical radiation was significantly increased (p<0.05). All doses of irradiation did not affect cell viability as determined by MTT assay, and did not change the apoptotic marker such Bax to Bcl-2 ratio. However, the high doses of dental irradiation (10 doses) significantly reduced the expression of cellular proliferation marker (cyclin D1). Our findings suggest that low dose of dental radiation seems to have osteoblastic detoxification by reducing ROS production. However, high doses of dental irradiation impair osteoblastic proliferation without any changes on cell viability and apoptotic responses.

Supported by a grant from Faculty of Dentistry, Chiang Mai University, Chiang Mai, Thailand.
THE STUDY OF FACTORS AFFECTING THE RESEARCH FUNDING REQUEST OF ACADEMIC STAFFS IN FACULTY OF DENTISTRY, CHIANG MAI UNIVERSITY

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ABSTRACT

The purpose of this study was to examine the factors that prevent academic staffs in the Faculty of Dentistry, Chiang Mai University from requesting research funding. Questionnaires were sent to 98 academic staffs in the Faculty of Dentistry, Chiang Mai University. The response rate was 71.43%. The results demonstrated that most of them were female 67.14%, graduated Master’s degree 41.43% and had been working for 11-15 years 25.71%. More than a half of them held academic positions and had research experiences. About 85% engaged in private practice. The most frequent factors affecting the research funding request were high work-load, lack of mentor, minimum work-load criteria, criteria for proposing academic title, conditions of scholarships, lack of mentor’s data, and criteria of research funding awarding, respectively. Furthermore, lack of research assistants was found in this study. It was concluded that the most important factors affecting the research funding request in the Faculty of Dentistry were high work-load, both teaching and practicing, lack of mentors and lack of research assistants.

Supported by a grant from Faculty of Dentistry, Chiang Mai University, Chiang Mai, Thailand.
THE USE OF IMPRESSION AND REPLICA TECHNIQUE FOR MEASURING HUMAN DENTINAL FLUID FLOW

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ABSTRACT

Twenty five intact lower primary incisors were tested within 24 hours after extracted. Tip of root was cut at 1 mm below the CEJ. Dental pulp tissue was removed with barded broach under water. Pulp cavity was filled with NSS and tooth was connected to manometer. Cutting the incisal edge until exposed dentin, then further removed 1 mm. Intrapulpal pressure was raised to 0, 15, 30 and 45 cmH2O consecutively for 30 seconds. Half of prepared surface was etched while another half was left unetched. The silicone impression material was used to record study surface. Resin replica was casted from the impression and examine under SEM. Fluid droplet (FD) sizes were measures and analysed using Scion Image Program. The experimented dry dentin surface (DS) was examined under SEM. The tooth was separated into 2 sections then measure the distance between cut DS and pulpal roof. The result showed the replicas of unetched dentin surface, small FD were recorded during applying pressure from 30 seconds in most cases. The FD appeared at the peripheral area more than in the central. The X±SD of the diameter of fluid droplets in the peripheral area of the unetched dentin surface were 5.29±0.62, 5.35±0.45, 5.87±0.45 and 6.51±0.77 µm at 0, 15, 30 and 45 cmH2O, respectively. The FD sizes recorded at 45 cmH2O were statistically significant greater than those at 0 cmH2O and 15 cmH2O. The FD sizes recorded at 45 cmH2O were statistically significant greater than those at 0 cmH2O. The dentinal tubules (DT) were found at the replica of an etched DS of all samples. The X±SD of the diameter of DT in the central area of the etched dentin surface were 2.46±0.10, 2.47±0.3, 2.48±0.07 and 2.56±0.05 µm at 0, 15, 30 and 45 cmH2O, respectively. The DT sizes recorded at 45 cmH2O were statistically significant greater than those at 0 cmH2O. The dry surface of an experimented unetched exposed dentin was uneven...
and the opening end of DT was not found. But, the opening end was found on the etched exposed dentin. They appeared like circular shape in every sample. The X±SD of the diameter of the DT of dry DS was 2.77±0.10 µm at the central area and 2.32±0.09 µm at the peripheral area. The size of DT at the central area of the dentin dry surface was statistically significant greater than those at the peripheral area. The diameter of the DT at the central area of the etched exposed dentin dry surface was statistically significant greater than those at the central area of etched dentin after apply different pressure. The X±SD of the distance from the dental pulp to the central area of unetched DS, etched dentin surface and dry DS were approximate 1.64±0.33, 1.66±0.29 and 1.62±0.34 mm, respectively. Conclusion: There was fluid appearance on unetched dentin surface in primary teeth during apply intrapulpal pressure. The shape of FD was round or ellipse and some droplets coalesced. Raising pulpal pressure resulted in the increase of the size of fluid droplets. No FD was observed on etched dentin surface in primary teeth during apply intrapulpal pressure.
ENHANCING HEALTH COMMUNICATION SYSTEM ON REPRODUCTIVE HEALTH FOR SHAN MIGRANT WORKERS

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ABSTRACT

This project aimed at developing a reproductive health communication system for Shan migrant workers. The process consisted of three strategies as follows: 1) a strategy to develop a network of health communication, 2) a strategy to build capacity of leaders for health communication, and 3) a strategy to develop reproductive health media. The project had employed participatory methods in every activity. Results of the project were as follows. 1. A network of reproductive health communication for Shan migrant workers was set up. The network consisted of three major partners: academic, governmental, and non-governmental organizations. A synergy of the project working group was represented by health and communication faculty members from Chiang Mai University, an official from Chiang Mai Primary Health Office together with Shield Project, and an official from MAP Foundation. The networking was a multi-lateral coordination between partners in planning and conducting reproductive health promotion. Each partner had a clearly defined role such as acting as a motive force, providing academic support, supporting reproductive health promotion activities, and encouraging Shan laborers for reproductive health self-care. 2. There were health communicators who were aware of the importance of reproductive health care and were equipped with basic knowledge on reproductive health communication. These health communicators were knowledgeable and skilled as health leaders for reproductive health campaign through various activities. Being equipped with knowledge and skills in radio spot production, print media, and display-boards, they were capable of producing media for reproductive health campaign. 3. There were various forms of health media which included voice media, print media, and campaign media such as radio spots, brochures, pamphlets, flip chart and display boards aimed at reproductive health care promotion. A synthesis of key lessons
learned from this project concluded that 1. Developing an effective and sustainable health communication system should include three main partners i.e., academic, governmental, and non-governmental organizations in order to have synergic cooperation among academic power, policy power, and social power as a driving force for health distribution to reach target groups thoroughly and creatively. 2. Health communication system with a wide-range impact should consist of prime key movers and secondary movers. The prime key movers act as a driving force in determining objectives and strategies as well as providing academic, policy, and social support. The secondary movers who should be closely related to the target groups could involve health communication activities as parts of their responsibility for health information distribution thoroughly and sustainably. 3. Developing media for health campaigns needs technical-oriented factors to increase both efficiency and efficacy of the media.

**KEYWORDS:** HEALTH COMMUNICATION, NETWORK DEVELOPMENT, CAPACITY BUILDING OF HEALTH LEADERS, HEALTH MEDIA DEVELOPMENT, REPRODUCTIVE HEALTH, SHAN MIGRANT WORKERS.
CHEMICAL SYNTHESIS OF NANOSTRUCTURED FERRITE MATERIALS FOR MEDICAL SECTORS AND COMPUTERIZED INDUSTRIES

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ABSTRACT

CuFe\textsubscript{2}O\textsubscript{4} with spinel structure was synthesized by chemical processes, such as refluxing, solvothermal and microwave-hydrothermal methods, which are simple and environmentally friendly. The products were then calcined at 450 – 900°C for further characterization using different techniques. Among them were XRD, FTIR, SEM, TEM, and SAED. In the present research, the products were composed of nanometer/micrometer particles with spinel structure. Upon increasing the calcination temperatures, these particles were enlarged and crystalline improved. Their magnetic properties were also studied by a vibrating-sample magnetometer (VSM). They were found that the properties were controlled by particle-sizes, crystalline degrees, and arrangement of cations inside the spinel crystals.

\underline{Supported by Science and Technology Research Institute, Chiang Mai University.}
DESIGN AND CONSTRUCTION OF A SATURATION OF PERIPHERAL OXYGEN BY A DIFFERENTIATION OF INFRARED ABSORBANCE AT TRANSPARENCY TISSUE: CASE STUDY FOR THE DEVELOPMENT OF MICRO–MECHATRONIC ENGINEERING PROTOTYPE SUPPORTING APPLIED SCIENCE AND MEDICINAL SCIENCE: A PILOT PROJECT

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ABSTRACT

A Prototype has been designed and fabricated using low-cost materials and/or components which are easily available in Thailand to replace and/or reduce the expensive imported oximeter. The device is based on and advance virtual reduced instruction set computer (RISC) in which the RISC is programmed as a basic optical sensor of a noninvasive pulse oximetry input device. It consists of both red and infrared LED’s with peak emission wavelengths of 660 nm and 940 nm respectively, and a silicon photodiode. The Photodiode used has a broad range of spectral responses that overlaps the emission spectra of both the red and infrared LED’s. The light intensity detected by the photodetector depends, not only on the intensity of the incident light, but also mainly on the opacity of the skin, reflection by bones, tissue scattering, and the amount of blood in the vascular bed. Then it calculates oxygen saturation, which is often referred to as SaO\(^2\) or SpO\(^2\), is defined as the ratio of oxyhemoglobin (HbO\(^2\)) to the total concentration of hemoglobin present in the blood:

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SaO_2 = \frac{HbO_2}{(HbO_2 + Hb)}
\]
Oxyhemoglobin (HbO₂) and hemoglobin (Hb), exhibit significantly different optical spectra in the wavelength range from 600nm to 1000nm. A typical empirical calibration for non-invasive red light absorption versus IR absorption has been carried out and compared with Co-Pulse Oximeter which is a medical standardization. The accuracy of the designed RISC is ±1% Saturated Blood Oxygen and ±0.5% for Heart rate. The performance of the developed pulse oximeter was evaluated by measuring oxygen saturation values and pulse rates from ten students in the laboratory with different genders (5 boys and 5 girls) using the purposed pulse oximeter and the imported commercial one. It was found that results obtained from both medical devices were compared favorably verified by using the student t-test at 95% confident level. The fabricated pulse oximeter has been satisfactorily applied to measure oxygen saturation values and pulse rate simultaneously from local people in Chiang Mai Province with different ages, genders, and occupation together with various patients in the hospitals or clinics.
DEVELOPMENT OF BEE WAX COATING MATERIALS FOR COMMERCIAL FRUIT PRODUCTION SYSTEM

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ABSTRACT

Bee wax coating materials for commercial fruit production system for mango and ‘Sai Nam Pueng’ tangerine were developed. The aims of this research were to developed a suitable bee wax coating formulas which can be produced in a commercial scale, kept for at least 1 year at ambient temperature (25-30 °C) and used in the commercial coating machine without any effect on it coating properties. In addition it was tested for commercial tangerine coating machine. The results revealed that the coating formula suitable for mango consisted of 74.4, 15.0, 0.2, 6.0, 4.0 0.4 and 0.2 % of water, bee wax, ethanol, oleic acid, resin and mango latex extracted, respectively. The coating formula appropriated for ‘Sai Nam Pueng’ tangerine composed of 74.6, 15.0, 0.2, 6.0, 4.0 and 0.4 of bee wax, ethanol, oleic acid and resin, respectively. The quantities of both developed formulas were able to be enhance up to 1 liter. These formulas could be stored at the ambient temperature for up to 1 year while their properties similar to the freshly prepared sample. The coating formula developed for tangerine could be used with a commercial coating machine. The quality of the coated ‘Sai Nam Pueng’ tangerine fruit was excepted by the consumer when stored at 25 °C for 2 weeks after coating and up to 5 weeks when stored at 15 °C. Thus, the developed coating formulas could be used for exporting ‘Sai Nam Pueng’ tangerine to export market. However, The coating formula for mango fruit was not studied for the commercial mango coating machine because the machine has not be used in the mango production system.

Supported by Science and Technology Research Institute, Chiang Mai University.
DEVELOPMENT OF REDUCED SUGAR STRAWBERRY PRODUCTS WITH NATURAL COLOR AND FLAVOR: STRAWBERRY JAM, STRAWBERRY FILLING AND STRAWBERRY TOPPING USING OSMOTIC TECHNIQUE AND EVALUATION OF BUSINESS POTENTIAL

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ABSTRACT

This research was conducted to develop the formulations and processes of reduced sugar products without the addition of coloring and flavoring: strawberry jam, strawberry filling and strawberry topping, using osmotic technique. In addition, evaluation of business potential was performed. Osmotic strawberries were prepared by mixing strawberries with sugar in the ratio of 2:1 and stored at 4 °C until the sugar was completely dissolved. The strawberry products using osmotic strawberries were then compared with those of using non-osmotic strawberries. Results showed that these three products using osmotic strawberries had the L* value, a* value and consumer acceptability ratings higher than those of using non-osmotic strawberries (p≤0.05). Reduced sugar products using sucralose and erythritol as the sweetener with a combination of sugar: strawberry jam, strawberry filling and strawberry topping, using osmotic strawberries, were developed. Consumer acceptance of the reduced sugar products were not significantly different from the normal formulation products (p>0.05). This finding indicated that osmotic technique could be the optimal pretreatment of strawberries before processing. There is a high business possibility for production of the strawberry reduced sugar products since raw materials are located in Samoeng district and the processing is not complicated. Moreover, the reduced sugar products have a market potential.
EPIDEMIOLOGY AND MOLECULAR DETECTION OF THE GIANT LIVER FLUKE, *Fasciola gigantica*, INCLUDING SOME RUMEN FLUKES

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ABSTRACT

Epidemiology and molecular detection of giant liver fluke, *Fasciola gigantica* including rumen flukes in cows (*Bos indicus*) and buffaloes (*Bubalus bubalis*) were investigated during October 2010 – September 2011. Two sectors of this study were divided; first, to determine epidemiology and morphological study of adult stage in definitive host and larval stage in snail intermediate host, whereas the last was performed to investigate molecular approaches for specific detection. For the result of epidemiological study, 9 fluke species were recorded which indicated as follows; 1 of giant liver fluke (*F. gigantica*), 8 of rumen flukes (*Paramphistomum epiclitum*, *Fischoederius elongatus*, *F. sp.*, *Orthocoelium streptocoelium*, *O. dicranocoelium*, *Calicophoron calicophoron* and 2 of unknown rumen flukes (unknown1 and 2). From these, *F. gigantic* was predominated in buffaloes than in cows by revealing the prevalence of infection of 63.33% and 26.32% respectively. For the epidemiology of rumen fluke, *F. elongates* showed highest prevalence (100%) in buffaloes, while the highest prevalence in cows was determined by *P. epiclitum* (68.42%). For the epidemiology of larval stage, 7 snail species were found (*Filopaludina martensi martensi*, *F. doliaris*, *Melanoides tuberculata*, *Adamietta housei*, *Lymnaea auricularia rubiginosa*, *Indoplanorbis exustus* and *Tarebia granifera*) and the presences of cercariae in these snail hosts were therefore determined. Four cercarial types were recovered; gymnophalus cercariae, amphistome cercariae, parapleurolophocercous cercariae and furcocercous cercariae. Parapleurolophocercous cercariae showed the highest prevalence of infection (63.33%) in *M. tuberculata* snail, while the lowest (10%) was observed in gymnophalus cercaria infected in *L. auricularia rubiginosa* snail. This cercarial type (gymnophalus) has been recognized as the cercarial type of *F. gigantica*. 
For molecular study, specific DNA marker for the detection of *F. gigantica* was investigated by using HAT-RAPD PCR method. Nineteen arbitrary primers were used to generate DNA fingerprint and *F. gigantica* specific DNA fragment was screened. The result showed that, 550 bp fragment generated from OPP-11 primer was desired to be the serotype of *F. gigantica* specific. After purified from agarose gel, the fragment was then prepared to sequencing (ligation, transformation). According to sequence data, specific primers (forward/reverse) were designed and sequences of each primer were described as follows; (forward) FG_F: 5’-TCG GGA AGA GCT CCT ATG TA-3’ and (reverse) FG_R: 5’- ATT GAA GGG GAG AGG GTC CG-3’. These specific primers were tested for the specificity by attempting to amplify with *F. gigantica* and including all other adult flukes conducted in this study, and it was found that, 550 bp was generated in only *F. gigantica* specimen. Otherwise, they were also attempted to amplify with all 4 cercarial types found in this study and result revealed was, 550 bp was generated in only gymnophalus cercaria which can be confirmed that this cercarial type will develop to be *F. gigantica*. For phylogenetic analysis, *F. gigantica* collected from the north and northeast region were verified to be the same species while Vietnamese specimens, *Fasciola* sp.1 and *Fasciola* sp.2 were also classified as the same species. Furthermore, Thai *F. gigantic* and Vietnamese *Fasciola* sp. showed more closely related than others, while in this study, *F. hepatica* was separated away from its generic member. In accordance with the rumen flukes, *O. streptocoelium* and *O. dicranocoelium* showed more closely related than other rumen flukes species. For the promotion of academic interests, our research results were contributed to non-specific participants through the scientific exhibition of regional science week festival which hosted by Faculty of Science, Chiang Mai University during 18-20 August 2011. Multi presentation media including permanent slides of fluke specimens, poster presentation of research results, brochures and formalin-preserved parasite specimens were performed to contribute informative results to other people including teachers, staffs and multi-grad students of primary and secondary school. The result found that, our objectives and activities were progressed by resulting of well interaction and responsibilities among participants. This seems to be the good opportunity to makes the accession and exploitation of participants to academic interests for sustaining development in further.

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GENETIC DIVERSITY AND BIOCHEMICAL ACTIVITIES
TEST OF INDIGENOUS THAI VEGETABLES

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ABSTRACT

Survey and sampling of three indigenous Thai vegetables; Spondias pinnata Kurz. Selaginella argentea (Wall ex. Hook & Grew) Spring and Diplazium esculentum (Retz.) Swartz in the upper north of Thailand. Collected samples were used for study on the genetic diversity and biochemical activities tests. Morphological botanical characters and ecological included nutritional value were studied. The leaf samples were analyzed for DNA fingerprinting to determine genetic diversity. As well as the vegetable extracts were used for testing the biochemical effects. The results revealed that ecology and habitat of each species were similar. For the morphological and botanical characters of Spondias pinnata Kurz. such as stems and leaves characters were similar while the fruits were different. Fruit size was varied from small to large. Four forms of fruits shape were found as wide elliptic, highround, ovate and obovate. While the Selaginella argentea (Wall ex. Hook & Grew) Spring and Diplazium esculentum (Retz.) Swartz were similar on morphological and botanical. The nutritional value of vegetables was analyzed. The results found that the Spondias pinnata Kurz. fruits were high in vitamin C, calcium, sodium and the total antioxidant. Whereas the young leaves were high in calcium, phosphorus, potassium and the total antioxidant. For the Selaginella argentea (Wall ex. Hook & Grew) Spring and Diplazium esculentum (Retz.) Swartz were found high in calcium, phosphorus and potassium. For DNA fingerprinting analysis, ISSR technique was used to identify three indigenous Thai vegetables. The result revealed that 18 accessions of Spondias pinnata Kurz. were analyzed by 7 primers, 85.62% were polymorphic bands. The similarity coefficient was ranged from 0.55-0.87 and the cophenetic correlation was 0.76609, which indicated that high levels of genetic variation in the populations. For Selaginella argentea (Wall ex. Hook & Grew) Spring, 12 accessions were analyzed by twelve primers, 74.10% were polymorphic bands. The similarity coefficient was ranged from 0.55-0.98 and
the cophenetic correlation was 0.98197 which indicated that low level of the genetic diversity in the populations. While 12 accessions of *Diplazium esculentum* (Retz.) Swartz were analyzed by 3 primers, 77.96% were polymorphic bands. The similarity coefficient was ranged from 0.46-0.97 and the cophenetic correlation was 0.89544. The level of genetic diversity in the populations was relatively low. From this analysis it was concluded that three vegetable species collected from different areas showed genetic variation despite their similar appearance. For the biochemical activities tests, the methanolic extract of vegetable fern (Mae Hong Son) showed the strongest cytotoxic activity on HT-29 (IC50 = 1.69 mg/ml), while the water extract and methanolic extract of vegetable fern (Chiang Mai) showed the strongest cytotoxic activity on HL-60 (IC50 = 1.69 mg/ml), the both extract were stronger than irinothecan, a positive control drug. According to the morphological changes, the growth of HL-60 tested which 8 plant extracts showed slower obviously. The number of normal shape HL-60 was decreased within 6 hours. For the growth rate of HT-29, at 2 mg/ml within 6 hours were decreased with two vegetable fern extracts (Mae Hong Son and Chiang Mai) while the other two plants extracts were not. However, apoptotic bodies or single large vesicle and DNA fragmentation (the important characteristic of apoptotic cell) were not observed from both HT-29 and HL-60 which treated with all 8 plant extracts.

Supported by Science and Technology Research Institute, Chiang Mai University.
IDENTIFICATION AND DEVELOPMENT OF MOLECULAR DNA MARKERS FOR MUSCLE DRIP LOSS IN COMMERCIAL PIGS

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ABSTRACT

This study aimed to identify and develop molecular DNA markers for muscle drip loss in commercial pigs. The association of drip loss among target genes: Ryanodine receptor (RYR), Protein kinase, AMP-activated, gamma 3 non-catalytic subunit (PRKAG3), Insulin-like growth factor 2 (IGF2) and Leptin (LEP) were found that there was no association between DNA molecular marker of LEP and drip loss in Duroc and crossbred (Large White × Landrace × Duroc). IGF2 gene was associated with drip loss in crossbred, PRKAG3 was associated with drip loss in Duroc, and RYR gene was associated with drip loss in both Duroc and crossbred. In addition, the researchers studied the results of combination with 2 DNA molecular markers on drip loss, found that LEP × IGF2 genes and LEP × RYR genes was associated with drip loss in crossbred. LEP × PRKAG3 genes was associated with drip loss in Duroc. Moreover IGF2 × PRKAG3, IGF2 × RYR genes and PRKAG3 × RYR genes was associated with drip loss in both Duroc and crossbed.

Supported by Science and Technology Research Institute, Chiang Mai University.
ABSTRACT

This study aimed to extract and produce isoflavones from fermented soybean or biobean. The extracted isoflavones stability was also studied. Five kinds of solvent were used in isoflavones extraction: water, ethanol, methanol, acetone and acetonitrile. Acetone extraction had the highest content of isoflavones in form of glucosides (daidzin, genistin and glycitin) and aglycones (daidzein, genistein and glycitein) of 0.56 and 18.46 mg/100g wet weight, respectively. Extraction with acetonitrile, methanol, ethanol and water had lower contents of isoflavones. However, ethanol was chosen as extraction solvent in the further study since it was safe for health. In process of extraction, the extract had strong ammonia odour due to soy protein digestion by Bacillus spp. during fermentation. So, isoflavones contents in form of glucosides in part of germ, cotyledon and hull of soybeans Chiang Mai variety (raw soybean) were studied. It was found that germ had significantly higher isoflavones content than cotyledon and hull. When comparing of isoflavones contents among 3 varieties of raw soygerm: Chiang Mai 1, Chiang Mai 60 and Tadang, the results showed that the germ of Tadang variety had the highest amount of isoflavones in form of glucosides of 1,082.93 mg/100g. Therefore, the germ of Tadang variety was used as raw material for isoflavones production. When isoflavones as aglycones in crude extract from fermented soygerm with ethanol was determined, its concentration was 170.34 mg/100g wet weight of fermented germ, which was 72.93% of isoflavones content as aglycones in fermented soygerm (233.58 mg/100g wet weight). After that, ethanol was separated from crude extract by evaporation at 175 mbar and 40°C. Then, 3 drying processes of isoflavones extract: hot air drying, spray drying and freezed drying were studied. The result showed that freezed drying was suitable drying process with the yield of 5.55%. The amount of isoflavones as total aglycones was 3,414.80 mg/100g dry weight of isoflavones extract powder which comprised of daidzein, genistein and glycine of 2,371.32, 486.96 and 556.52 mg/100g dry weight, respectively. The stability of isoflavones extract powder in accelerated condition at 5, 15, 25, 35 and 45°C were performed. The results showed that isoflavones extract powder had the longest shelf life was 20 months and 15 days at 35°C.

Supported by Science and Technology Research Institute, Chiang Mai University.
ABSTRACT

Nowadays, natural resources of energy have been dramatically reduced while demand for energy is still high resulting in the continuous increase of fuel oil price. Hence, alternative energy has gained more intention. One of the most interesting alternative energy is hydrogen gas. Presently, most of hydrogen gas is produced from water splitting. Due to the fact that microbes can produce hydrogen gas, therefore, this project was aimed to isolate and screen for bacteria capable of producing hydrogen gas. Two hundred and sixty nine samples from nature were used for isolation. There were 241 bacterial isolates found. When these bacteria were further evaluated their ability to produce gas by culturing in deep tube agar, only 36 bacterial isolates were able to produce gas. Later, these 36 isolates were determined their ability to ignite and it was found that 5 bacterial isolates produced combustible gas. Therefore, these bacterial isolates would be further studied their physical and biochemical properties in order to estimate their potential as hydrogen gas producer in the future.

Supported by Science and Technology Research Institute, Chiang Mai University.
SEISMIC EVALUATION OF HISTORIC PAGODA IN CHIANG MAI CITY FOR PROPER PREPAREDNESS AND RENOVATION

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ABSTRACT

This research is mainly aimed to study the seismic performance and strengthening method of pagoda in Chiangmai. The pagoda of Wat Phra That Doi Suthep was selected as a representative for the case study. This is due to the geometrical shape representing most of pagodas in Chiangmai and also his reputation. The study adopted the finite element analysis with 3D solid element to simulate the seismic performance. Three different ground motion characteristics were used in the analysis, i.e. 1. Earthquake at the pagoda (regardless of fault location), 2. Nearest source earthquake and 3. the most incredible earthquake. First, database for the past earthquake records were searched considering similar geological conditions. Then, the obtained earthquake ground motions were matched to the earthquake magnitude considering the earthquake response spectrum in the area according to the Department of Public Works and Town & Country Planning-DPT, -Design Standard for Earthquake Resistant Buildings, Bangkok, Thailand. The analyses under the three matched ground motions have shown similar motion in which the top of the pagoda was damaged by over-tensioning. The maximum tensile stress is 0.33 MPa while the allowable stress is 0.27 MPa. In the other hand, the maximum compressive stress is 0.44 MPa at the outer surface of the base which is lower than the allowable compressive stress of 2.68 MPa. Hence, analysis of retrofitted top part pagoda by using composite carbon-glass fiber reinforced polymer (FRP) were made. The result found that the maximum tension at the brick was reduced by about 33% from 0.33 MPa to 0.20 MPa, which is less than the allowable tensile stress. The retrofitting method gives slightly higher compressive stress increasing from 0.44 MPa to 0.46 MPa, but it is still less than the allowable compressive stress. The tension in the composite carbon-glass fiber is only 0.08% of the ultimate tensile strength. In conclusion, using carbon-glass fiber reinforced polymer (FRP) can be an effective method for strengthening pagoda for seismic resistance. However, using carbon fiber having higher modulus of elasticity can lead to higher brick tensile stress. This is due to the higher modulus induces higher force with equally displaced body.

Supported by Science and Technology Research Institute, Chiang Mai University.
A STUDY ON ARCHITECTURAL AND CULTURAL RESOURCES IN NAN MUNICIPALITY AREA FOR DEVELOPING POTENTIALITY OF COMMUNITY BASED TOURISM

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ABSTRACT

The study aims to establish the comprehensive architectural and cultural database in Nan municipality area, and evaluate their condition, location and potentiality for tourism purpose according to the readiness of socio-economic conditions of each community in order to develop community based tourism. The research will encourage member of each community to show their cultural resources in the ordinary way of their living to the visitors following the carrying capacity of each community.
FORMATION AND TRANSFORMATION OF KAO HONG MARKET TOWN, SUPHANBURI, THAILAND

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ABSTRACT

This research aims to clarify the formation of market towns along the channel network in the Central Plains of Thailand, planning and development process of market towns and spatial organization of their architecture, shophouses, by raising Kaohong Market town as a case study. Due to the rapid development of capitalism in the country and convenience of transportation and travel by roads, Kaohong Market turned into quite living place. However, boom of tourism during last several years has made Kaohong Market shifts into the lively market town again. Whatever the development or rehabilitation of physical or socio-economic standards to the market, Kao Hong Market should be geared to self-sustained community in the long run, as the market used to be in the past.
GUIDELINES FOR BUILDING THE URBAN LANDSCAPE
IN AMPHUR KHUN YUAM AND MAESARIENG FOR
PROMOTING TOURISM IN MAEHONGSON PROVINCE

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ABSTRACT

The research deals with two resources founded in the existing locations of Amphur Khun Yuam and Amphur Maesariang to create good landscape for the sites corresponding to provincial and local development plans for sustainable use in tourism. The first site is in the city of Khun Yuam where the architectural, cultural and natural elements can be developed for making a unique townscape. The research made surveys of location and distribution of natural and architectural – cultural elements in the city area, and then evaluated their potentiality as elements for making townscape according to the concept of the image of the city. The second is at the natural reserved area outside the city of Maesariang. The fossils were found at the site surrounded by natural forest and distinctive geological features. The objective is to develop the site of these abundance natural resources into the learning center within beautiful natural landscape. The study made designs for new facilities and planning for building the natural landscape for the whole site.

Supported by the Thailand Research Fund.
CAMT JAVA NEWS AGGREGATOR

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ABSTRACT

The communication and awareness within an organization is very important presently. If any organization is lack of good communication and effective, it may lead to the organization’s growing slowly. College of Arts, Media and Technology (CAMT) is the academic institutions that focus on teaching and academic services. It recognizes the importance of communication within an organization. Thus, the CAMT research team created a system called CAMT Java News Aggregator (CJNA) to collect and distribute information to staffs working in college of Art, Media and Technology. The CJNA aims to collect information from a central data collection and distribute the information to CAMT staffs in proper way. This research studies have focused on the users satisfaction through CJNA application, which use technologies of JAVA, XML and RSS feed to collect and distribute information through the system. Furthermore, the research will gather data and information based on qualitative research to create new knowledge for the innovation of CAMT development in the future.
ENABLING KNOWLEDGE CREATION IN A UNIVERSITY BUSINESS INCUBATOR: NEW PRODUCT DEVELOPMENT IN THE CREATIVE SECTOR

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ABSTRACT

Abstract: Creating new knowledge within a university business incubation environment is important for new product development in the creative sector. Knowledge creation is recognized as a key strategy for gaining national competitive advantage. During the incubation process, industry expert are required to assist entrepreneurs in creating new products. This paper focuses on the critical processes that affect new product development in the creative sector for small and medium enterprises (SMEs) in Northern Thailand. In particular, the research aims to understand how experts’ incentives enhance their contribution and best efforts in a university incubation project. The study is based on a case study developed at the College of Arts, Media and Technology (CAMT), Chiang Mai University (CMU) with support from the Thai government’s Office of Small and Medium Enterprises Promotion (OSMEP). Observations were conducted on 17 creative economy products. Results show that experts will effectively externalize their tacit knowledge when they foresee their own business opportunities from the outcome of the products created, and may engage some of their own business opportunities, and/or mitigate innovation or new product development risks. Another key finding illustrates that experts will internalize explicit knowledge created during an incubation process to advance their business or professional career.
LEARNING STRENGTHENING SYSTEM OF URBAN COMMUNITY

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ABSTRACT

Learning strengthening system have significantly developed and increased the quality of life of community’s members and brought about sustainable productivities of the urban community. The objectives of this study are to explain learning style, factors supporting the learning strengthening and members’ collaboration of urban community, as well as to analyze learning strengthening system of urban community. The case study was chosen from one community of Srivichai Subdistrict (khwang) “chumchon Tantawan”. This community got highest level award “3 stars” of Village and Urban Community Fund Project year 2004” from the evaluation of fund management and self-reliance to strengthen sustainable community development. The community was also successful in The Baan Mankong Collective Housing Program (“Secure housing” in Thai) that was launched by the Thai government in January 2003, as part of its efforts to address the housing problems of poorest urban citizens in Thai cities. The program channels government funds, in the form of infrastructure subsidies and soft housing and land loans, directly to poor communities, which plan and carry out improvements to their housing, environment, basic services and tenure security; and manage the budget themselves. This community has continuously done the Small Medium and Large (SML) Project on activities about party rental equipment that can help its member to earn more income and sustain in job. The professional development projects for women and elderly such as recycle project were promoted etc. The approaches of this study are participation and knowledge management of community and others official members. Qualitative methods with content analysis are used in observation participatory with leaders, committee and officer. Quantitative study is applied by distributing questionnaires to 207 samplings. The conducted study reveals that the learning style of community was based on participation in forms of monthly meeting, groups meeting and direct contact with the head zone and sometimes learning with community scholars. Factors of learning strengthening include community structure and roles, relationship of members, leadership, mind-set, community network and principle. These factors were input factors of community learning system while learning style were the process factors of the system that encourages the development of activities. The final loop is the evaluation and knowledge system for community development.
THE MANAGEMENT AND THE INFORMATION TECHNOLOGY WORKFORCE REQUIRED TO SUPPORT THE FUTURE INDUSTRIAL OF LUMPHUN PROVINCE

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ABSTRACT

This research aims to comprehend knowledge, skills and favorable qualifications of the students in the major of Modern Management and Information Technology, hoping to be able to response to the industry demand. The results of the this study will enhance pedagogical preparation for co-operational study program. This study uses the samples from the representatives of the entrepreneur which has been in our co-operational study program with our faculty. The questionnaires was distributed to 20 firms in Lumphun and 19 of questionnaires has been returned. The result of the study found that the knowledge among MMIT students is only the basic theoretical knowledge, which results in the the planning in training program for skills required by firms. In skill requirement, the firms expects students to be able to develop basic application program. The firms, in addition, requires Enterprise Resource Planning Training as ERP has been widespread in the firms. In qualification of firm aspect, the research team summarize into 3 aspects which are i) competency in self-management, ii)competency in workload management, iii)competency in information technology. The demand for MMIT graduate exists sustainable; however, affected by global economic status, politics, and natural disasters.
A SURVEY OF SATISFACTION AND QUALITY OF PUBLIC SERVICES: A CASE STUDY OF LAMPHUN PROVINCIAL ADMINISTRATION ORGANIZATION

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ABSTRACT

The purpose of this research is to determine the satisfactory level of the people who use the public service and the quality of the service of Lamphun Provincial Administrative Organization and to propose the measure to improve the effectiveness of the public service for Lamphun Provincial Administrative Organization. This research collected the questionnaire from people who use the service in 8 Districts in Lamphun province. This research evaluated in 3 areas of study; the process, the service staffs and the facilities. Seven hundreds forty samples were selected from the people who use the service of Lamphun Provincial Administrative Organization by cluster sampling method. The evaluation shown that the sample population who use the service has the overall satisfactory level of the service quality at very satisfy with average score (X) = 3.59 which is 78.60%. Among the 3 areas of study, the service staffs have the most satisfactory level followed by facilities and the service process. For the 3 service duties evaluated in this study; academic service, sport facilities service and narcotics prevention and control, the sample population is most satisfied with academic service with average score (X) = 4.07 which is 81.40%, followed by sport facilities service and then the narcotics prevention and control. This study has shown that the sample population has minimum acknowledgment of the role and the services implementation done by Lamphun Provincial Administrative Organization. The improvement in public relation and giving information to the people including online services as well as internal knowledge management to develop the potential of the working staffs has been proposed. For the 3 service duties, the public participation is to be strongly encouraged especially for the narcotics prevention and control duty which is a major problem of the nation and need the public participation in order for this to work efficiently. Lamphun Provincial Administrative Organization is anticipated to provide continuous financial support for narcotics prevention and control duty to the people network working in the community.

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ENCycloPEDIA OF Lan NA LITERATURE

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ABSTRACT

The Encyclopedia of Lan Na Literature is part of a research project entitled, “Lan Na Literature: Its Uniqueness, Wisdom and Values”. It is the first Encyclopedia of Lan Na Literature ever attempted. Its objective is to collect and create an archive of local literature in a systematic form. The work was carried out through the collaboration of 19 scholars who studied and prepared the semantics of Lan Na literature. The literary works consist of those in printed form as well as palm leaf and traditional paper manuscripts for a total of 311 literary tales or stories. They cover a diverse range of Lan Na literature, including chronicles, history, Buddhism, moral instruction, emotions, rituals, and customary laws for a total of 255 titles. In addition, there are 56 Paññāsa Jātaka tales or stories of the previous lives of the Bodhisattva, found at Wat Sungmen and other monasteries in Phrae Province. The synopsis of each title features its name, category, author/copier, year of compiling/copying, type of the script used, place and year of publication, compositional form (prose or poetry), and summary of the text. All are considered fundamental and profound contributions to the study of Lan Na literature.
THE EVALUATION PROJECT OF LAMPHUN PROVINCIAL ADMINISTRATIVE ORGANIZATION DEVELOPMENT PLAN 2011

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ABSTRACT

The Lamphun Provincial Administrative Organization has managed, under the Regulations of the Ministry of Interior, to monitor and evaluate the Local Government Organization Development (2005). Social Research Institute, non-profit organization of Chiang Mai University, was assigned to handle this project. Social Research Institute had monitored and evaluated the project using 8 standard criteria’s from Ministry of Interior and CIPP Model. The monitoring results found that the total 288 projects, which were stipulated to be completed within 3 years plan (year 2011 - 2013), but 308 projects were brought forward to include in fiscal year 2011 total budget of 300 million Baht. But only 271.6 million Baht were expended (90.54%). The expended budget has been varied to discount transfer, Increment transfer, and New accrued. The results of this evaluation also found that Lamphun Provincial Administrative Organization has ability in managing to implement the development strategies successfully. The projects were conformed to the problems areas and could direct response to people needs as well as to the strategies and policies of Lamphun Province. This evaluation has also found that the delays and some changes of the projects caused from the lack of thoroughly understand of people’s needs and problems. Therefore, the suggestions are the organization database improvement to support the working strategies in organization, further more to deeply study the needs and problems of the people in order to avoid the repetition of delays and changes. Considering the development of IT (Information Technology), should to improve the organization management and to better communicate to the target audience.

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EVALUATING THE LEARNING STATE OF SMALL AND MEDIUM SIZED ORGANIZATIONS IN THE UPPER NORTHERN PART OF THAILAND

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ABSTRACT

This research purposed on evaluating the learning state of small and medium sized organizations in the upper northern part of Thailand. The sample composed of 381 owners or managers of small and medium sized enterprises (SMEs) in the upper northern part of Thailand. The data collected questionnaires, which consisted of personal demographic information, amplified Dimensions of the Learning Organization Questionnaire (DLOQ), and problems & recommendations, have been developed and moderately modified from the prefabricated Dimensions of the Learning Organization Questionnaire (DLOQ) of Marsick and Watkins. Various statistic techniques, inferential statistics, percentage, frequency, mean, independent-samples t-test, and one-way ANOVA are cautiously selected as the most efficient means in data analyzing process. The results showed that majority gender of the respondents was male, aged between 31-40 years old, with marriage status and graduated from bachelor’s degree. Most of them were sole proprietorship, operated their organizations in Chiang Mai that had more than 1 million baht startup cost and 1-10 staffs in size. Their organizations had been administrated by decentralized policy and in business for 1-5 years with monthly income more than 300,001THB. The fringe benefit offered to employees was social security. The perception of the owners, according to the findings, towards learning state of small and medium- sized organizations in the upper northern part of Thailand, based on learning organization theory by the DLOQ, had an average value 4.12 for all aspects. The results can be ranged from the highest to the lowest means as followed; promoting intra-collaboration and team learning, reinforcing continuous learning opportunities, encouraging inquiries and discussions, sustaining the interaction between organization and its environment, introducing an effective leadership model for enhancing the acquisition of knowledge, delegating individual empowerment that complied with the organization vision, and generating system in obtaining and interchanging learning knowledge.

Funded by the Faculty of Business Administration.
KNOWLEDGE AND UNDERSTANDING OF NORTHERN REGION ACCOUNTANTS IN TAXABLE PROFIT CALCULATION PRINCIPLE OF SMALL AND MEDIUM ENTERPRISES

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ABSTRACT

The purposes of this study are (1) to study knowledge and understanding of northern region accountants in principle of taxable profit calculation for small and medium enterprises, (2) to compare the knowledge and understanding of Northern region accountants in principle of taxable profit calculation for small and medium enterprises among bookkeepers, independent accountants, and professional accountants who work with office services, (3) to study problems of Northern region accountants in calculation of taxable profit for small and medium enterprises and (4) to study relationship between knowledge and understanding and problems of northern region accountants in calculation of taxable profit for small and medium enterprises. The scope of this study is to adapt accounting profit on the income tax return for companies or juristic partnerships (P.N.D. 50) under section 65 and section 65 bis and ter of the revenue code and tax laws related to calculation of taxable profit for small and medium enterprises. In this study, data was collected from northern region accountants who registered with the Department of Business Development by using questionnaires. These accountants were employed as bookkeepers, independent accountants, and professional accountants who work with office services. The questionnaires were sent by mail survey to 370 samples. Most accountants were female and had completed bachelor degree with experience in accounting for more than 15 years. Most of them were responsible for taxable income and corporate tax calculation as well as completion of income tax return form for companies or juristic partnerships (P.N.D. 50) in previous year. The results showed that accountants had knowledge and understanding in general at low level especially in the issue of revenues granted income tax exemptions deducted as an itemized deduction on the accounting profit and the issue of privileges under investment promotion schemes. In addition, when comparing the level of knowledge and understanding about the principle of taxable profit calculation among bookkeepers, independent accountants, and professional accountants
who work with office services, the results revealed that these three groups had different level of knowledge and understanding with statistically significant of 0.05 in the issue on the revenue treated as revenue under the revenue code which are added as an itemized addition on the accounting profit, the issue on expense which are deductible at a greater amount deducted as an itemized deduction on the accounting profit and the issue on contributions to public charities, expenses for education sports. The problems of northern region accountants in taxable profit calculation for small and medium enterprises were that they had problems concerning preparing and calculating taxable at high level. The top three problems were: 1) the accountants had limited knowledge and understanding in this matter but do not understanding in other topics, 2) unlike accountants in Bangkok, the northern region ones did not get free training or knowledge development in tax issues, and 3) the cost for attending seminar was so high. Moreover, it can be found that there was no relationship between the knowledge and understanding and the problems of northern region accountants in principle of taxable profit calculation for small and medium enterprises with significant of 0.05. Therefore, the result of this study would be useful for all concerned authorities such as the Revenue Department which is responsible for supervision of tax, and the Department of Business Development which is responsible for oversee the ongoing development of knowledge for accountants. These authorities should provide knowledge to bookkeepers in regional areas continuously and disseminate knowledge about tax privileges under investment promotion schemes to small and medium entrepreneurs. This will help them in submitting economical and accurate tax form. It can also be found that, the accountants had low level of knowledge and understanding about taxable tax benefit for small and medium enterprises, especially in the issue of privileges under investment promotion schemes, the issue of revenues granted income tax exemptions, the issue of expense which are deductible at a greater amount, and so on.
ABSTRACT

The research entitled “measuring habit level of business administration students in public university and private university by applying the Seven Habits of Highly Effective People Principle” was conducted by collecting data from 400 fourth-year students studying in faculty of business administration from public and private universities in Chiangmai. Data was equally collected from 200 students from public universities and 200 students from private universities. The study found that most of the respondents were female, 22 years old, and had their GPAs between 2.50 - 2.99. In addition, most of the respondents had 2 siblings, lived with their father and mother who currently work as merchants/business owners. The majorities of the respondents had less than 5 close friends and never worked/earned extra income in the past 6 months. They never initiated/led student’s activities but voluntarily attended student’s activities. Also, most of them never heard of Habits of Highly Effective People. The study revealed that the respondents had the highest average habit score in Habit 7- Sharpen the Saw, followed by Habit 1- Be Proactive, Habit 5- Seek First to Understand, Then to be Understood, Habit 4- Think Win/Win, The Emotional Bank Account, Life Balance, Habit 2- Begin with the End in Mind, Habit 6- Synergize, and Habit 3- Put First Things First respectively. When comparing habit scores between two types of university, the study found that, for some habits, the average habit score of students from public universities statistically differed from that of the students from private universities, at 95% confidence interval, which were Habit 1- Be Proactive, Habit 3- Put First Things First, Habit 4- Think Win/Win, Habit 6- Synergize, and Habit 7- Sharpen the Saw. When comparing habit scores between two genders, the study revealed that for some habits, the average habit score of male students were statistically different from that of female students, at 95% confidence interval, which were Life Balance and Habit 5- Seek First to Understand. In addition, the study found that age had no relationship with habit level. In terms of GPA, Habit 3- Put First Things First had linear relationship with GPA, which means that students with high GPA tends to have high level of Habit 3 and students with low GPA tends to have low level of Habit 3.
PERCEPTION AND NEEDS OF MANAGEMENT ACCOUNTING OF SMES ENTREPRENEURS IN UPPER NORTH REGION

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ABSTRACT

This research is conducted to study perception and needs of management accounting of SMEs entrepreneurs in upper north region, the relationship between SMEs entrepreneurs’ perception and needs; and the differences of perception and needs of management accounting between small enterprise entrepreneurs and medium enterprise entrepreneurs. Data were collected from 422 of SMEs entrepreneurs in upper north of Thailand via questionnaires. The collected data were analyzed by descriptive statistics such as frequency, percentage, mean and standard deviation. Correlation coefficient was used to analyze the relationship between SMEs entrepreneurs’ perception and needs. T-test was used to analyze the differences of perception and needs of management accounting between small enterprise entrepreneurs and medium enterprise entrepreneurs. The result of this research reveals that SMEs entrepreneurs are aware of overall management accounting for planning, controlling and decision making at a moderate level. Meanwhile, the needs of overall management accounting were high. The perception of management accounting of SMEs entrepreneur in upper north region has a direct variation relationship with the needs of management accounting. Moreover, perception and needs of medium enterprise entrepreneurs are significantly different from those of small enterprise entrepreneurs.
RELATIONSHIP BETWEEN STOCK PRICE AND FINANCIAL RATIOS OF TRANSPORTATION AND LOGISTICS COMPANIES LISTED ON THE STOCK EXCHANGE OF THAILAND

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ABSTRACT

The purpose of this research was to study the relationship between the price of common stock and the financial ratios of transportation and logistics companies listed on the stock exchange of Thailand. This study is useful for investors to make the decision about investing in the stock exchange by analyzing the relationship between the financial ratio and the price of common stock. Furthermore, it is useful for businesses in the field of transportation and logistics, as this research provides information about accounting factors which affect the change of price of common stock in companies. The research gained the data from (1) the closing price of common stock of each company from the 1st of April 2006 to the 31st of March 2011, and (2) annual financial statements from 2005 to 2009, then calculated the financial ratios and analyzed the relationship between the price of common stock from 16 transportation and logistics companies by using Multiple Regression Analysis Method. The financial ratios used for analyzing the relationship between prices of common stock in this research consisted of debt to equity ratio, return on assets, return on equity, earning per shares, price to earnings per shares ratio and book value per share. The research found that there is a relationship between debt to equity ratio, return on equity, earning per shares and book value per share at 95 percent confidence or p > 0.05.
SMEs SENTIMENT INDEX FOR THE 1st – 4th QUARTERS OF 2011 OF MAJOR INDUSTRIES IN CHIANG MAI PROVINCE

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ABSTRACT

Small and Medium Enterprises (SMEs) played an important role in economy including Chiang Mai economy. These SMEs underwent the critical problem in accessing to information that could be relevant and important in decision making. Business Warning Center (BWC) Northern Branch, therefore, conducted the survey to collect the data and to construct the sentiment index with hoping that the index would benefit these SMEs. The index was presented in six aspects: net profit, sales, cost of goods and services, labor hiring, investment, and production or operation capacity. The data of the study were collected from the samples of 400 SMEs in six major industries of Chiang Mai province including hand-weaving cloth, wood handicraft, processed agricultural product, vehicle maintenance, food and beverage, and tourist accommodation. The samples were collected quarterly by quota sampling and by using questionnaire. The data were processed and the sentiment index was calculated. The index could be employed as the 3-month ahead prediction based on the current month at which the data were collected. The time series of the sentiment index revealed the trend. The quarterly index and the trend then could be used as an indicator in the Early Warning System (EWS) for the SMEs. The main result showed that overall confidence level of SMEs in Chiang Mai Province towards their business increased from the third quarter of 2011. This implied that SMEs expected their businesses to turn up in the last quarter (the forth quarter) of this year. Economic factors believed to strongly affect these SMEs were economic situation and the purchasing power, market competition, and cost of goods and services.

Funded by the Faculty of Business Administration, Chiang Mai University.
THE EVALUATION OF E-LEARNING SYSTEM

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ABSTRACT

The research entitled the evaluation of E-learning system of Faculty of Business Administration, Chiang Mai University was conducted using 2 sets of data, from student survey and instructor interview. The study found that the majority of the respondents aged between 21-22 years old, was studying in year 3 and 4, with their GPA between 2.50 - 3.49. Most of their family possessed notebooks and desktop computers. The respondents mostly used computers at home or dormitory. Their main purposes of using were to watch movies and listen to the music, followed by to do the assignment, search for information, communicate and follow the news. Results from factor analysis revealed that student’s evaluation of e-learning consisted of 6 factors, namely: Learner attitudes, System tools, Course content, On-line content, System quality, and Technical quality. The Cronbach's alpha of these factors exceeded 0.5 When considering the measurement items of each factors, the study found that for System quality, on average, all of the measurement items were rated as agreeable. For Technical quality, on average, all of the measurement items were rated neutral. While the measurement items for the rest of the E-learning evaluation factors was the mix of agreeable and neutral rating. The analysis of the difference in perception towards E-learning system of Faculty of Business Administration, among students in various years and within different GPA group, indicated that the respondents in year 2, 3, and 4 did not have different perceptions towards Course content and Technical quality. On the contrary, the respondents in different year of study had different perceptions towards Learner attitudes, System tools, On-line content, and System quality. In addition, the study found that the respondents in different years did not have different satisfaction level towards E-learning. When classified the respondents into 5 groups based on their GPA, the study also found that student with their GPA below 2.00, between 2.00-2.49, between 2.50-2.99, between 3.00-3.49, and higher than 3.50 did not have different perceptions towards Learner attitude, Course content, On-line content, System quality, and Technical quality. However, their perceptions towards System tools differed. In addition, the respondents in various GPA groups did not have different satisfaction level towards E-learning. From the analysis of the effect of 6 dimensions, namely, Learner attitudes, System tools, Course content, On-line
content, System quality, and Technical quality on Satisfactions towards E-learning system of Faculty of Business Administration, we found that Course content was the most influent factor, followed by Learner attitudes and System quality respectively. In addition, the results from instructor’s interviews revealed that most instructors used E-learning to upload course materials and distribute information to students. Most of them agreed that E-learning was useful in teaching/learning as the supplementary allowing the instructor to easily communicate with students. However, the students must be trained and motivated for more usage. In addition, the E-learning system should be modified to make it easier to use and more efficient such as integrating with the Faculty’s email system to closely track student usage. Enhancing system performance with exam database, test/quiz scoring, student tracking, and monitoring currently-enrolled student in each semester was also recommended.
THE OPINIONS OF STUDENTS IN CHIANG MAI TOWARDS WORKING WITH SMALL AND MEDIUM SIZED ENTERPRISES

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ABSTRACT

The research entitled “The opinions of students in Chiang Mai towards working with small and medium sized enterprises” had 2 objectives. Firstly, it intended to examine opinions of students in Chiang Mai towards various job factors between SMEs and large enterprises. Secondly, it aimed to examine importance of job factors affecting job choice of students in Chiang Mai. Data was collected, using questionnaires, from students in their senior year currently studying at 4 universities. Questionnaires were distributed to 200 students from each university, resulting in 800 samples. The study found that respondents would seek for a job after graduation. More preferably, they would like to work in Chiang Mai with large enterprises. The result from factor analysis revealed that students’ opinions towards working with large enterprises consisted of 11 factors as well as those with SMEs, namely: pay, fringe benefits, working conditions, managerial relationships, long-term career prospects, responsibilities given, involvement in decision-making, marketability, job security, social responsibility, and interests. The factor with the highest average perception score towards working with SMEs was managerial relationships while the factor with the lowest average perception score was pay. For large enterprises, the factor with the highest average perception score was long-term career prospects while the factor with the lowest average perception score was involvement in decision making. The study also found that students’ perception score towards working with SMEs and those towards working with large enterprises were different in all of 11 factors. The average student’s perception scores in 9 factors for large enterprises were higher than those of SMEs. Only 2 factors, involvement in decision-making and managerial relationships, had the average student’s perception scores for SMEs higher than those of large. In addition, the study revealed that students’ perceptions significantly differ between students of various university types, genders, and fields of study, at 95% confidence interval. Based on ranking score, the study found that pay was the factor that mostly influenced students’ job choice, which was not varied by university types, genders and fields of study. Factor that least influenced students’ job choice was social responsibilities, which was not varied by university types and fields of study. However, it was different in male and female students. The factor that least affected male students’ job choice was social responsibilities and the factor that least affected female students’ job choice was involvement in decision making.

Funded by the Faculty of Business Administration.
USAGE OF APPLICATION SOFTWARE AND INFORMATION TECHNOLOGY IN ACCOUNTING TASKS OF PUBLIC COMPANY LIMITED

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ABSTRACT

The objective of this research is to explore the usage of application software and information technology in accounting tasks of Thailand’s public companies. The study methodology gathered data from heads of accounting departments from Thailand public companies listed on Stock Exchange of Thailand (SET) by mailed-questionnaire. The scope of the study was specific to listed company classified by SET in three major industrials which are Agricultural and Argo-Industrial, Industrial Products, and Consumer Products which is comprised of 151 companies. The 151 questionnaire packages were sent by mail for 2 rounds in order to stimulate the prospected participants to answer the questionnaire. At the end of survey period, a total of 54 completed questionnaires were returned which produced the 35.76 response rate for this study. Results from the survey showed that the majority of heads of accounting department in Thailand public companies are women aged above 41 years-old and have work experience in the field for more than 10 years. The majority of participant companies use personal computers (PC) and Notebooks as common computer hardware in the accounting department. The peripheral devices such as Monotone Laser printer, impacted printer and ink-jet printer are common used in accounting department whereas digitizer is not commonly used in the department. Optical Character Recognition (OCR) is not found being use as the input device of accounting department. Office Software Suite is the most popular application software being used in accounting department especially spreadsheet program e.g. MS Excel, Lotus. Internet and Intranet is commonly used in the accounting department. The study result in the usage of application software and information technology in 4 major accounting cycles shows that: the companies use the application software and information focused in the processes involved with the process of receiving goods, recording account payable transactions, making a payments to suppliers and fixed assets involved transactions such as asset records and depreciation transaction records in the expenditure cycle; in revenue cycle, the companies are using software application and information technology to record and manage sale and account receivable data in financial accounting aspect rather than account management aspects; in conversion cycle, the companies are using the application software and information technology mainly in collecting production cost. While in the general ledger cycle it was found that all companies are using the application software and information technology to handle every activities of the cycle.

Funded by the Faculty of Business Administration.
ABSTRACT

The objectives of this work are: (1) to study the supply side of employment market for old aged people, i.e. old aged government officials who are looking for employment after their retirement and who are still capable of working; (2) to study the demand side of employment market for old aged people, i.e. agencies /organizations with specific conditions or characteristics and therefore can employ retired government officials to work for them; (3) to devise possible and appropriate mechanisms of income generating program for old aged people; and (4) to recommend these mechanisms to the Chiang Mai Labor Office, Ministry of Labor to be used in promoting employment after retirement among old aged government officials. The sample of this study is comprised of two groups. The supply side group consists of 480 government officials who are at least 50 years old. Of this group 152 are civil servant officials, 181 are public administration and security officials, and 147 are education officials. The demand side group of the sample consists of 253 employment agencies and is divided into two subgroups. The first subgroup is comprised of 150 profit seeking business enterprises and 36 community, co-op and SMEs enterprises. The second subgroup is comprised of non-profit seeking enterprises, 59 are government agencies and 8 are of private foundations/associations. The results on the supply side reveal that 49.58% of the sample of 480 would like to seek employment after retirement. To make their free time more useful is the most reason given for them wanting to work after retirement. The next most cited reason is to make their available knowledge and skill more useful. Among those who would like to be employed after retirement, independent type of work is the most wanted, followed by passing on their knowledge or experiences type of work such as teacher, counselor, and community leader. For
those who would like to work for income, monthly salary type of work is most wanted, followed by work with hourly or daily wage. For those who would like to be employed but do not expect to earn income give the reason of wanting to put their knowledge and experiences to help community/society rather than being idle as the most important reason for them wanting to work after retirement. The welfare benefits related to work most wanted is provision of transportation between home and work place. The majority of those who would like to work after retirement also see that their ability in public relations should be of good level, with fair ability in using computer and its related programs, fair ability in using English language, but the experiences in their specific fields should be of good level. The results on the demand side of the employment market show that 24.90% of the 253 agencies in the sample would like to employ old aged people. Their employment policies for old aged people are quite various such as extending working life to those employees who are currently employed in their business and hiring retired government officials to work in their business. For non income earnings employment policies, most are in the form of consultant work / working as board member or resource person as well as participating in various activities so their knowledge and experiences can be transferred to other participants. On the study of demand and supply consistency of the employment market using matrix table technique, the results of the analysis show that the demand for old aged employment is not well matched with its supply at all. In other words, the number of old aged government officials who would like to find employment after their retirement is much greater than the number of employment those various agencies would like offer. The areas of employment in which the demand and supply of old aged government officials are found to be quite well matched are counseling work, community leader, lecturer/speaker, professional employment, and work in government sector. The areas of employment in which demand and supply of old aged employment is not well matched as there is great demand but less supply include the areas that require specific expertise such as book editing, board member, driver, selling insurance policy, and direct sale personnel. The areas in which old aged government officials would like to be employed, but there is no demand from various agencies include member of local organizations, local fund member, farmers’ leader, village head, construction contractor, special tutor/lecturer, auditor, clerical worker, agricultural employment, technical and artistic work, and employment in tourism industry.

On policy implementing mechanism, income generating program for old aged people may be in three forms as the following.

(1) Scenario 1: This policy implementing mechanism is for old aged government officials who do have the potential and willingness to engage in employment with work conditions that are consistent with the demand, employment generating mechanism is to organize for the two sides, i.e. the agencies/entrepreneurs and old aged government officials, to meet.
(2) Scenario 2: This policy mechanism is for those old aged people who do have the potential but their specified work conditions are not in accordance with the agencies/entrepreneurs’ demand. The mechanism for this case is to organize trainings on investment and entrepreneurship, as well as to allocate special credit for old aged people to borrow and to invest in projects that are suitable for them. For those old aged people with good knowledge and experiences and are willing to work for the society/community, local organizations may have important role to play in creating employment for this group such as appointing them as community’s consultants, local wise-persons, brain bank participants, teachers, or local resource persons. For those old aged people who would like to work in the private sector, the mechanism is to create cooperation between the Ministry of Labor, the Ministry of Finance, and the Ministry of Commerce to jointly implement a policy encouraging private business to employ more old aged people by giving them economic incentives. The incentives may be in the form of special tax reduction, easier access to credit sources, special rights to participate in trade activities organized by the public sector such as trade exhibitions and fairs at both national and international levels, and access to other related government services.

(3) Scenario 3: For those old aged government officials who have no potential but would like to find employment with employment conditions that are consistent with those of the demand. The mechanism to create employment is for the Ministry of Labor to organize trainings to develop special skills in the areas that do match with the agencies/entrepreneurs’ demand.

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DRIVING PATTERNS TO ESTABLISH THE FINANCIAL COMMUNITY GROUP IN THE FORM OF SUFFICIENCY ECONOMY

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ABSTRACT

The objectives of this research were to actuate the formation of community monetary fund groups in the rural areas and to synthesize the outcomes of such formation in terms of economic impacts at micro and macro levels. The research was conducted in Mae Taeng District area in Chiang Mai Province. The promotion and support attempts had led to the formation of a One Baht a Day Truthful Welfare Fund in Mae Taeng District which began its operation in saving activity on May 1, 2010 with 337 pioneer members. The Fund is committed according to the rules to give welfare a payment to its members. In case of persecution, the mother will receive 500 baht for child delivery per time and newborn will get 500 baht gift. In case of old age, the member who turns 60 years old will get monthly pension at the rate varying with the length of memberships. In case the member becoming the handicapped, he will receive a monthly welfare payment for no less than 100 baht. In case of sickness, the Fund members will be entitled to assistance money at the rate varying with the length of membership for his/her stay in hospital/infirmary for no more than 12 nights per year. In case of death, the Fund will provide the one time funeral assistance money at the rate varying with the length of membership. The monitoring and assessment of the performance of the Community Monetary Fund indicated that the Fund would be above to survive for five years only, since the financial balance at the end of year 1 would be about 37,055 baht which would become negative at -91,333 baht at the end of year 6. The analysis on the impacts of community monetary fund establishment on micro level impacts can be concluded that the establishment of community monetary group or organization is prone to high risk because any failures if take place in the group or organization’ s operation will cause the suffering to those members who put there saving in the community fund. Furthermore, the poor management and administrations of the fund without neither governance nor transparency will likely lead to various disputes in the community. The macro level impacts mean the impacts on the general public have not yet been in full operation to cover all aspects of life cycle welfare. At this initial stage
of policy implementation, the main government assistance involves the promotion for the community fund establishment, the allocation of budget, the advice from implementing agencies in terms of pre-determined rules and regulations for the community to follow and run such saving and welfare fund group/ organization. Taking into account the reality at micro level at which many element of this type of organization have not yet got the state support, one can expect that this policy effort will be attended by such overall consequences as the waste of budgetary money, the waste of time for unfertile operation, the development of undesirable situations, leading eventually to degraded livelihood and socio- economic condition in the community and other general socio – economic problems.
ECONOMIC PROBLEM AND STATUS OF THE SECOND GENERATION OF MIGRANTS FROM MYANMAR (2nd GBIs)

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ABSTRACT

The objectives of this research were 1) to examine the economic livelihood of those 2nd GBIs who live in Thailand in the aspects of occupation, income, expenditure, living conditions as well as their economic problems 2) to gain the understanding on the economic implications of employment of 2nd GBIs on the Thai society so as to identify the ways to deal with the problems, and 3) to devise and propose appropriate policy recommendations for relevant Thai government agencies concerning 2nd GBIs affairs. The 2nd GBIs is defined to include the first and a half generation and the second generation of Burmese immigrants to Thailand. Specifically, the 1st and a half GBIs is defined as those Burmese nationals who accompanied their Burmese parents to live in Thailand when they were at the time of migration under 15 years old while the 2nd GBIs means the children born in Thailand to the Burmese parents who were immigrants to Thailand. Consequently, the 2nd GBI labors will be those offspring of Burmese immigrants who are over 15 years old and get employment. This research endeavor was integrative in nature combining both quantitative and qualitative investigations. It was conducted in the provinces of Chiang Mai, Tak, Samut Sakhon, and Ranong interviewing 400 samples of 2nd GBIs and 100 samples of business operators in the economic sub-sectors involving services, crop and livestock farming, construction, domestic works, fishery and processing enterprises. On economic living conditions, the study found the differences in housing mode. The 1st GBI workers in general had no burden neither finding place to live nor paying housing rent since they could stay in places provided by their employers or live in the construction sites. Meanwhile most 2nd GBI workers had to find their own living places otherwise they could live with their Burmese parents in the immigrant labor communities. On education, the 2nd GBIs appeared to have access to primary schooling but only few of them gained access to higher level education.

In terms of work conditions, the 2nd GBI labors worked more than 26 days a month and more than 8 hours per day while they got such welfare provisions as housing, meals, hospitalization, and travel with no coverage at all for their child
schooling nor child welfare. On the change of job, most 2nd GBI labors were found that once they got employment in one place they would not leave for other jobs. Their average wage rate was 176.28 baht per day higher than that of the 1st GBI labors who got 159.70 baht daily on the average. However, the difference in wage earning was not significant for the main reason that the employers did not care whether the workers were of 1st or 2nd GBI labor category. The 2nd GBI workers received 4,382 baht average monthly income per head, with minimum at 1,200 baht per month and maximum at 20,000 baht per month. In terms of household, their average monthly family income was 12,000 baht. They spent averagely 2,544 baht per month for personal expenses thus had money surplus for saving, indicative of their living standard to be comparable to those of the Thai urban poor and the overall Thai poor people. The 2nd GBI workers sent relatively small portion of their earnings to their home country as remittance, implying that the Thai economy will be benefited from their spending in Thailand which would further help generate employment and income for Thai labors as well as for Thailand. The study related to business operators found that fishery and seafood processing industry wanted to employ immigrant labors more than other types of economic sub-sector. In general the jobs offered to immigrant labors would be subordinate or waged worker. To work in the capacity of head of a work unit like in the position of foreman, the 2nd GBI workers had to have long time working experience with the employers, exhibit honest behavior, be dependable/reliable for the employers, and capable of communicating with other immigrant labors. Most business establishments provided welfare benefits to immigrant labors in the forms of hospitalization, meals, lodging, other things like free uniforms and annual physical check-up, as well as travel expenses and bonus. Most businesses also compiled with the migrant registration system to ensure the legal employment of migrant workers and to help the migrant workers get their rightful ID cards to avoid problems with police and prevent inspection. Most business operators expressed their desire to employ migrant labors in the future because they had to depend on the latter to perform heavy and filthy/unpleasant works that Thai labors avoid especially the works in fishery processing industry. Employment of cheaper migrant workers although could help save input costs, the employers often faced problems from hiring them such as inefficient labor performance; migrant workers’ personal behaviors namely stealing, extramarital affairs, dishonesty, work-jumping, etc. Other problems included migrant workers’ preference to find new jobs, employer’s commitment to provide welfare benefits, and poor health conditions of migrant workers from communicable diseases and alcohol addiction. Although there exist problems in various dimensions, the 2nd GBI workers according to this study perceived their difficulties as trivial thus feeling content with their living in
Thailand while the business operators still expressed their need to use immigrant labors. It is also expected that there will be the increase in demand for labors in various production sectors of Thai economy and the future shortage of Thai labors has to be compensated by foreign unskilled labor for production expansion. The 2nd GBI workers are considered to be the group having more opportunities to work in Thailand than other recent migrant groups. Therefore, it is recommended that the Thai public sector develop a data base system concerning background and statuses of those 2nd GBI workers who wish to acquire Thai citizenship lawfully, and that rules and regulations be established involving workplace and living conditions of the 2nd GBI labors. Support should also be provided to improve their labor skills to higher standard levels, and to allow wider opportunities for them to obtain education. Social security, health care, and livelihood systems should be as well established for these migrant workers. The Thai government should creat incentives like tax reduction and financial support for business operators to employ the 2nd GBI workers. Additional advice includes the establishment of special economic zone for business investment in labor-intensive industry to absorb the 2nd GBI labors. Business operators should pay more attention to using the 2nd GBI labors as they possess human quality and capability higher than their 1st generation counterpart. Meanwhile NGOs and/or humanitarian foundations should increase their roles in driving and urging the general public’s recognition of the 2nd GBI workers’ importance. On the part of the 2nd GBI workers themselves, they should give cooperation in providing genuine personal and employment information, study and claim their rights being the 2nd GBI labors from the Thai government and their employers, and pursue education and skill/capacity development to enhance their work performance.
THE DEVELOPMENT OF SUFFICIENCY ECONOMY PHILOSOPHY BY ACTIVITY MODEL AND COMMUNITY NETWORK

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ABSTRACT

The objectives of this research were to 1) introduce sufficiency economy philosophy for a concrete application through community participatory learning process, 2) develop advanced sufficiency economy based community emphasizing sufficiency at the network level, 3) enhance the potentiality and competitive capacity of local community on the basis of sufficiency, and 4) expand the scope of economic activity network for the local community on the basis of sufficiency. The study was conducted in Baan Pong 3 village in Tambon Inthakin, Mae Taeng District, Chiang Mai Province. Baan Pong 3 community still keep their traditional way of rural Thai society's life featured by reciprocity, kinship relation, and temple which is Wat Baan Pong as well as “The Three-Generation Center” in the present case being the center of community spirits and activities. The “Three-Generation Center”, particularly, functions to promote the building of relationship among community population in the young, working and old age groups by organizing common activities for their harmonious relationship and promoting the local cultural conservation. Baan Pong 3 community is considered to possess essential “capitals” for sustainable development. The physical and infrastructural capital is seen in the use of high-technology equipment, residential building (for professional employment), and financial fund group. The human capital is contributed by people in three generations: young, working, and old age group. The social capital is generated from the community’s friendship relationship, community strength and grouping, and the support from local government agencies in various forms. The natural and environmental capital is reflected by the diverse forming activities concerning horticulture agronomy, vegetable cultivation, livestock raising, the forest area, the scenic and tourist attraction places, as well as objects and sites of historical and archeological significance. The availability of these capitals is likely to facilitate the advanced development emphasizing sufficiency in the economic cooperation network level. The research team had conducted the analysis on the potentiality of six interest groups in Baan Pong 3 community which had been
driven to follow the sufficiency economy philosophy namely 1) the youth group 2) village health volunteer group 3) farmers group 4) the elderly group 5) housewives’ group and 6) truthful village saving for community welfare group, and it found that in general perspective the community did undertake various economic according to the sufficiency economy principle. Regarding the stage of advance in sufficiency economy philosophy application, Bann Pong 3 was considered to be at the second level, being advanced sufficiency economy with emphasis on Sufficiency of group or organization level. Because of the disadvantageous locational position of the community being quite remote from market and targeted customer; and the fact that most community members are elderly and preoccupied with their main economic activities, marketing has become a major local problem. With farm outputs having no market outlets nor marketing agent, the community did organize public discussion to drive the upgrading of sufficiency economy to the third level which is defined by an advanced sufficiency economy emphasize sufficiency at network level such that the network will play the role in driving marketing activities while the community will take the roles of owners of input factors and producers. Within the market do main covering input factor owners, producers, consumers, market, and distribution outlets, the relevant group member of Baan Pong 3 appeared to have good intra – community connection but they had problem linking their business activities with markets outside the community. It is imperative to explore for the ways to have linkage with external markets to enable the efficient utilization of the community’s capitals. In the trial efforts for the development of potentiality and the promotion for creation of community network at Baan Pong 3 at Tambon Inthakin, Mae Taeng District, Chiang Mai Province, the involved community members, development workers, and the research team determined to set the objective of implementation to push for the establishment of network and networking in the areas of 1) sufficiency economy, 2) production and marketing of OTOP merchandized items, and 3) community financial institution. From the brainstorming session, it was revealed that members of various interest groups in Baan Pong 3 community had the desire to develop their occupational undertaking in various different natures depending on the group’s expertise and they commonly wanted to develop appropriate activities for community development. From the study visits, it was found that Tambon Don Kaew community in Mae Rim District of Chiang Mai had been engaged in diverse economic activities. There existed marketing problems from producing not enough to fill the market demand in cotton bag, camphor stuffed doll, and coiled bamboo work product lines. Apparently, primary marketing problem of Don Kaew community can be mutually beneficial with that of Baan Pong 3 if the proposed idea can be put into action by training Bann Pong 3 community members to produce the handicrafts for Don
Kaew community to market and this can lead to a sustainable business relationship. The research team provided assistance to supplement the knowledge for the community members to learn how to push the sustainable development by organizing a training sessions and workshop on “Writing business plans and Carrying out business in sufficiency way” which resulted in the submission of 7 business plans by the different interest groups as follows:

1) Business plan for coiled bamboo works production by the elderly group.
2) Business plan for producing paper flower used in cremation by the elderly group.
3) Business plan for producing camphor-filled dolls by the elderly group.
4) Business plan for producing tea-leave filled pillow and cotton bag by housewives’ group.
5) Business plan for producing Chinese steamed buns by housewives’ group.
6) Business plan for project on household garbage sorting and project on garbage value addition for building livable community by the public health volunteer’ group in cooperation with the youth group.
7) Business plan for the project on frog raising in livestock condominium by farmers’ group.

In each business plan, the indicators of the training success were also reported. After the training, business plans were formulated to carry out production and marketing trials locally until the outcomes were satisfactory before the Bann Pong 3 community’s sending the products to its network alliance namely the Tambon Don Kaew community for marketing. The trail efforts to elevate the primary sufficiency level provided the results suggesting that it is highly feasible to raise the sufficiency economy level to the third level defined by an advanced sufficiency economy emphasizing sufficiency at the network level.
THE SYNTHESIS OF SUFFICIENCY ECONOMY
PHILOSOPHY’S KNOWLEDGE FOR COMMUNITY
DEVELOPMENT

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ABSTRACT

The objectives of this research were to 1) synthesize the theoretical and the practical elements of sufficiency economy with rational combinations to get the appropriate form for use in various local rural communities, 2) develop the Sufficiency Index as criteria to assess the degree of people’s application of sufficiency economy philosophy in their daily life, 3) conduct the test of efficacy of the designed Sufficiency Index. Synthesizing the knowledge about the forms of sufficiency economy in theoretical domain was based on literature review and research works related to sufficiency economy. The concluded result was that the form of sufficiency economy in theory comprises the three principles of moderation, reasonableness and resilience and the two conditions of knowledge and morality. The synthesis of information to identify the practical model for appropriate application of sufficiency economy in different rural communities was conducted after analysis of various case studies and it arrived at the conclusion concerning the use of the three principles and the two conditions of sufficiency economy in different dimensions. The development of Sufficiency Index was intended to get the criteria to assess the degree of people’s application of sufficiency economy in practice. The research team has developed the index for various dimensions as follows: 1) The economic dimension comprising 6 indicators. 2) The social dimension comprising 3 indicators. 3) The cultural dimension comprising 3 indicators. 4) The environmental dimension comprising 3 indicators: 5) The learning dimension, comprising 3 indicators: The test on introducing sufficiency economy philosophy for application in daily life was conducted with the village community at Baan Pong 3, Mae Taen District, Chiang Mai Province. This rural community includes 128 household with 382 population, in which 16.49% are elderly persons. Most community members completed primary education, engaged in general wage employment and farming. Their major agricultural products are rice, Longan, soybean, yard-long beans, maize and cattle. The assessment on the extent of sufficiency economy philosophy application in Baan Pong 3 community
revealed that the community members exhibited the balance in following the sufficiency economy concepts at high level. When distinguished into different dimensions, the sufficiency economy philosophy was followed most prevalently by the villagers in social and environmental dimensions, relatively extensively in economic and cultural dimensions, and moderately in the learning aspect.
KNOWLEDGE MANAGEMENT STRATEGIES FOR PROMOTION OF THAI VALUE AWARENESS TO LEARNERS IN HIGHLAND COMMUNITIES

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ABSTRACT

The development of good citizenship in highland communities is based on a study of the socialization process which, in turn, leads to sustainable awareness of Thai value. The key strategies comprise 1) a development of curriculums and workshops to promote such awareness in accordance with democratic ways and through a group process and provision of training for learners to establish fundamental skills of Thai value, 2) a creation of networking among public and private sectors and main authorities of the Ministry of Education in national education management which requires networking collaboration with concerned government authorities, local administrative organizations, and private organizations to promote Thai value, and 3) education of Thai value in families and community learning centers in the context of the learners’ communities. These three key strategies serve as driven force in knowledge management for promotion of Thai value to learners in highland communities.
DEVELOPMENT OF ONLINE LEARNING IN ART AND CULTURE KNOWLEDGE, FACULTY OF FINE ARTS, CHIANG MAI UNIVERSITY

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ABSTRACT

The purposes of the research on Development of Online Learning in Art and Culture Knowledge, Faculty of Fine Arts, Chiang Mai University were to: 1. Study of the need of Art and Culture Knowledge in the Faculty of Fine Arts, Chiang Mai University. 2. Analyze the elements of art and culture website. 3. Determine the effectiveness of online learning media on art and culture knowledge. The methodology of this research was to survey and to analyze the art and culture data of fine arts faculty, from the secondary source such as teaching materials, articles and report in the fine art library and from the primary source such as the art experts in fine arts faculty. After the data collecting, the researcher had surveyed and analyzed the target group needs by 500 questionnaires and analyzed the design of 5 art and culture websites to summarize the website design concept. Then the researcher had conducted to develop and design the website interface and also convert the collected data to digital files and input the files to the website. And then the website was evaluated by 30 samples of target group. The result of evaluation was shown that the online learning system in art and culture knowledge was effective. And it also can be a good reference and inspiration for other art and design projects.
TA–LUNG OF MODERN TECHNOLOGY

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ABSTRACT

The creation of an art piece based on traditions from the Southern part of Thailand fused with modern day technology, especially the computer. The uniqueness of the piece lies in the presentation of the story through crafted leather sheet characters that are animated from behind a screen that separates them from the audience, a light source is shone from the back casting the shadows of the characters onto the screen. The story that is narrated through the movement of shadows, instead of being viewed from a screen, is viewed instead through the computer screen. This form of art is termed mixed media art, utilizing materials including rubber, computer screen, wood, light bulb, for instance. This piece is named Ta-Lung of Modern Technology.
THE POSSIBILITY OF CREATING NONTOXIC ETCHING

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ABSTRACT

The study of the possibility in creating nontoxic etching is related with the study of technique in electric etching by producing the model for electronic etching from the equipment easily found inside the country and compare the procedure, time and the result of electronic etching when create printmaking in each technique. The result reveals that the possibility in creating nontoxic electronic etching is not complicated and need only cheap tools. The equipment is available in the country. The researcher has experimented electronic etching and it provides the clear lines on the plate. The stronger electronic current and the longer period of the etching are, the clearer the lines appear on the plate. The electronic etching is the new innovation that brings the possible alternations in etching techniques that can be instead of the traditional ways of etching.
THE HUMAN RIGHTS LAW PRINCIPLES IN THE OFFICIAL RESOLUTIONS AND REPORTS OF THE UNITED NATIONS

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ABSTRACT

The Human Rights Law recently are in Thai people attention because it could be use as tools for protect their rights but the inconvenience truth is whether principles are legal-bided or not. The Research tries to extracts the Human Rights Law Principles in the official United Nations’ resolutions and reports because those documents are legal and official. The research illustrates both Content of Rights perspective and Procedure of Rights perspective. The Utility of the research is to support the ones who try to use Human Rights law for protecting their rights, promoting civil movement and Academic purpose because there are not comprehensive legal Human Rights Law Principles Literature in Thai ever.
THE PROBLEMS OF EVERY DAY-LIFE LEGAL SUFFERING
EXPERIENCE FROM PEOPLE AND THE GUIDELINE TO
RESOLVE PROBLEMS BY BASIC LEGAL PRINCIPLE

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ABSTRACT

Learning and Teaching of Introduction to Law Subject (Law101) have been
candoned upon lecturers and texts which were normally published in the market.
However, the contents and scope of teachings is not relevant with learners’ interests.
After researching on the homework articles written by students for more than
2,000 copies, the results showed significant proves of those assumptions. Since,
the improvement of the Law101 Subject must undertake by analyzing Course
Syllabuses and books of those who teach on this subject and then fulfillment with
the Quantities & Qualitative research methodology on student experience which
describes through the Homework Articles. The product of this research will
be benefit to the development of teaching & learning on the Subject (Law101).
Moreover, it would be useful for the one who need a guideline to resolve every day-
life legal problems.
BEST PRACTICES IN STRATEGIC PLANNING PROCESS OF SUTHEP TAMBON MUNICIPALITY THROUGH THAILAND QUALITY AWARD

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ABSTRACT

The objective of this study was to examine the best practice in the process of strategic development planning of Suthep sub-district Municipal. Data collection was conducted through interviews, consultation on the related documents and adoption of the Best practice of Total Quality Award criteria. The results of study revealed that as a prominent local organization, Suthep sub-district municipal has been recognized in pursuance of 1) Best practice at sub-process level on organization formation for establishment in strategic development planning as the best in selection of qualified experts and community representatives 2) Best practice at sub-processes level on Supportive Committee Meeting in Public Hearing and People needs survey, entitled for the best practice in information management of Organization’s and Community’s in the area. 3) Best practice at sub-process level in organizing People Forum for study a draft of strategic development plan. The Best Practice was awarded on coordination and appropriate design in each area. And 4) Best practice at sub-process level in Meeting on study a draft of strategic development plan proposed by Supportive Committee and Chair of Community Committee. The Best Practice was awarded on giving a chance to specified vision, value, culture, strategic rank and knowledge transfer in SWOT analysis of Suthep municipal district and administrate area. Key Success Factors of the best practice in the process of strategic development planning of Suthep sub-district Municipal were divided in two parts: internal factors were Leader Vision and People orientation and external factors were flexibility of rules and power of community.
ROLE AND METHOD OF AUSTRALIAN FOREIGN AID: CASE STUDY OF AUSAID AND AID ON PUBLIC HEALTH IN THAILAND

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ABSTRACT

Australian government has launched Official Development Assistance (ODA) to Thailand in several matters especially in HIV/AIDS treatment and research programs namely “Thai Australian Collaboration in HIV Nutrition” (TACHIN), and “HIV Netherlands-Australia-Thailand Research Collaboration” (HIV-NAT). Currently The TACHIN is ramified to be “Laos-Thai-Australian Collaboration in HIV Nutrition” (LTACHIN) in which Thailand has been still the hub for Australian aid to the Mekong sub-region. For HIV-NAT, the lesson learnt from Australian assistance to HIV/AIDS researches would be beneficial to Thailand as an upcoming international donor. There are 2 major techniques for Australian ODA in HIV/AIDS to Thailand; 1) Forming partnership between the Australian Agency for International Development (AusAID) and related Australian agencies from both public and private sectors including specialized Non-Governmental Organizations (NGOs) conducted in the TACHIN. After 2007; moreover, a consortium was created between AusAID and NGOs in recipient country for the LTACHIN. 2) Building Connection between involving actors, the Netherlands-Australia-Thailand, as in case of the HIV-NAT. However, there is no financial aid from AusAID is granted to this program since its activities are focus on clinical and laboratory practices as well as anti-HIV medicine experiments in human beings that is a significantly sensitive issue in Australia. On aid policy formulation, AusAID has its strength in scrutinized processes with many involving actors. The consortium is also a good system because it is composed of various experts who have been more skillful and specialized than politicians and public servants. Complexity of the consortium, on the other hand, has also become weakness since it makes the procedure unnecessary longer and complicated. In addition, the selection criteria for the consortium's members are also responsive to the public because the government is always questioned why it chooses one or not. For the aid programs in Thailand, AusAID implementation sounds proper because it mainly pursues coordination among specialists that mostly concentrate technically. Because of its attention in specialists collaboration; likewise, AusAID evaluation methods are generally effective. Nevertheless, the involvement of outside-agency evaluators to the programs makes sometime conflicting ideas among HIV/AIDS specialist agencies and the AusAID since their interests and priorities might be different.

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THE CHANGES OF WORKING PROCEDURES AND PUBLIC SERVICE DELIVERY PROCESS OF REGIONAL PUBLIC ORGANIZATIONS IN CHIANG MAI PROVINCE TO COMPLY WITH THE POLICY ON CITIZEN-CENTERED GOVERNANCE

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ABSTRACT

This research, “The Changes of Working Procedures and Public Service Delivery Process of Regional Public Organizations in Chiang Mai Province to Comply with the Policy on Citizen-Centered Governance”, aimed to: (1) study the strategic planning development process of the Thai public organizations and its implementation; (2) study factors affecting the citizen-centered governance policy implementation of regional public organizations in Chiang Mai Province; (3) study the changes of working procedures and public service delivery process, paradigm, culture, and value of public officials in response to the citizen-centered governance policy; (4) offer recommendations to the Thai public organizations in order to adjust working procedures, public service delivery and government official’s value; and (5) utilize the research results in the teaching and learning in the course of Public Administration study. Qualitative research methods, including the examination of documentary evidences, the survey research of 37 regional public organizations, and the interviews of 18 key informants, were used in this research. The findings revealed that: 1. Following the governance reform in 2002, the Thai public sector has employed the Result-based Management in its new public administration form. According to this reform, the Thai Government and the public organizations have to formulate their four-year strategic plan as well as annual action plan in order to request for the budget from the central government. In addition, each central public agency has to sign performance pledge that will be used to evaluate its performance in order to get incentive from the Government. Therefore, after the governance reform in 2002, the Thai public agencies have to set up clear goals and indicators in their public administration. In addition, each central public agency has to sign performance pledge that will be used to evaluate its performance in order to get incentive from the Government. Therefore, after the governance reform in 2002, the Thai public agencies have to set up clear goals and indicators in their public administration. 2. After the formulation of a four-year strategic plan, the central public agency will disseminate strategic issues, goals and indicators as a strategy map to its field offices. Field offices in regional area will implement these strategic issues as programs and projects. 3. Regional public organization in Chiang Mai Province has been responsible for implementing strategic issues set by central
public agency. Thus, the regional public organization will have to formulate its annual action plan and adjust its working process and public service delivery with the supports from the central public agency in terms of resources and technology. Furthermore, the regional public organization will improve its working process and public service delivery in order to meet its customer satisfaction since all public agencies will be evaluated their performance using Balance Scorecard in the second dimension (i.e. quality of public service). This improvement includes setting projects to adjust paradigm, culture, and values of its staff in order to improve public service delivery quality. It can be said that this change of public organization has clearer goals than the adjustments in the past. 4. The implementation of the citizen-centered governance project has been in accordance with the four-year strategic plan of the of regional public organization in Chiang Mai Province which will improve public service delivery process and solving people's problem. 5. Even though human resource is an important factor for public administration and public service delivery; members of staff, especially temporary staff who have been assigned to work closely with customers, did not have the opportunity to attend training program. This was due to the public organizations did not have sufficient budget and regulations for professional development.

Supported by Faculty of Political Science and Public Administration, Chiang Mai University, Fiscal Year 2009.
THE POLITICAL PARTICIPATION OF PEOPLE IN NONGHIENG COMMUNITY, NGAO DISTRICT, LAMPANG PROVINCE

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ABSTRACT

The purpose of this study was threefold as follows: 1) To study the nature and form of the political participation in Nonghieng Community, Ngao District, Lampang Province. 2) To study the factors which have caused such political participation 3) To study the impact of the nature and form of political participation on politics at local and national level. The method used in this inquiry was the qualitative research, composing of three techniques: documentary analysis, indept interview and observation. The focus group was selected and classified into six groups according to generation, gender, education and occupation. However, this research could interview especially on the population of the third and fourth generation. The following findings were: 1. The socio – economic development by state policy and capitalism system have effected on political realm. The late generations of villages have more participated in politics at both local and national level. And also the form of the political participation trended to be active and autonomous. 2. The experiences of politics at local level have relation with national level. The villages have learned the principle and practice of democracy from national level. Furthermore, they have brought to adapt in their community.
THE STUDY OF BEST PRACTICE IN DISABLED WELFARE MANAGEMENT OF MUANGKAENPATTANA MUNICIPALITY, MAETANG DISTRICT, CHIANG MAI PROVINCE

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ABSTRACT

The Study of Best Practice in Disabled Welfare Management of Muanekaenpattana Municipality, Maetang District, Chiang Mai Province has three objectives: (1) to apply Thailand Quality Awards (TQA) into the study of disabled welfare management of local authority (2) to study the characteristics of disabled welfare implementation process of municipality and (3) to study key success factors of disabled welfare management. The researcher selected the Healthcare Integration for Disabled in Community Process as case study. The study found that the Healthcare Integration for Disabled in Community Process is sub-process of Healthcare and Sport Process Management and Social Welfare and Community Development Process Management in value chain of this organization. The study revealed that there are three main processes in the project including (1) project preparing process (2) home visit process and (3) project evaluation process. Best practice found in home visit process that can be sub-divided into (2.1) selected community for project implementation (2.2) prepared for home visit (2.3) visited disabled home (2.4) divided groups of disabled and (2.5) registered new disabled. The study revealed key success factors including (1) internal factors including (1.1) leadership, (1.2) action plan formulation, (1.3) patients focus, (1.4) knowledge management and innovation, (1.5) workforce focus and (1.6) process management, (2) external factors compose of (2.1) stakeholders and (2.2) law, state policy and disabled’s rights promotion. Lesson for local organization is networking can help local authority to improve disabled welfare management from traditional type to community participation. Lesson learns for researcher including (1) local authority has potential to develop innovation and (2) network management.

Supported by Public Policy Studies Institute, Chiang Mai University.
TRANSFER OF BASIC EDUCATION INSTITUTE TO LOCAL GOVERNMENT ORGANIZATION

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ABSTRACT

The purpose of this study were 1) To study the process of transfer of basic education institutes to local government organizations 2) To study the factors which affect the transfer of basic education institutions to local government organizations and 3) To recommend the procedure of the transfer of basic education institutions to local government organizations. The workshop for this study was conducted by 24 members from involved organizations e.g. local government, provincial education office, Chiang Mai University and etc. The method of documentary analysis concerning the transfer of basic Education Institute to local government organization was used in this study. The finding was concluded as the following information: 1. The Thailand Constitution in year 1997 which the decentralization was announced and led the local government to manage their own education system based on the readiness, the appropriation and the needs of the locals. Conditionally, the local government will be assessed on many factors e.g. the experience of educational participation, the educational management planning, the organization management, the budget management, the appropriate type of education in each area and the opinions of the locals in the area. Moreover, the revenue, the organization structure, the advisory committees and the personnel management will be concerned too. 2. This study was found the problems that the educational person for example the teachers and executives are allowed to do a double vote when the decision about educational transfer needs to be made. Therefore, the educational transfer can be done or not will depend on the agreement of this majority group. Moreover, the educational institute will be cut off all supports from the central. Moreover, the educational personnel cannot adjust themselves and lack of understanding to the working culture of the local government. 3. The recommendations after the study are 1) Appropriate approach concerned on future development and voluntary transfer should be focused by the associated agencies. 2) The guideline of academic cooperation and evaluation should be monitored.
and cleared for the further collaboration and assignment. 3) The regulations for facilitating the management should be amended. 4) The personnel training should be conducted for the further understanding and development. 5) Others supports e.g. medical welfare should be concerned. 6) Political participation especially for policy setting should be involved by the local people.

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