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Abstract: Chlorpyrifos, an organophosphorus insecticide commonly used as active ingredient in agricultural and urban pest control products, was reported to contain harmful effect on the health status of many aquatic invertebrates. Black Tiger Shrimp (*Peneaus monodon*), an important commercial species culturing extensively in agricultural areas, can be at risk by the chronic effect of this insecticide. To detect the exposure and early effect of sub-lethal concentration of chlorpyrifos to *P.monodon*, the molecular responses of the exposed shrimps were determined using mRNA DD-PCR. The experiment was conducted by exposing the shrimps with chlorpyrifos at the concentration of 0, 1, and, 10 µg/l. Then, RNA extraction and cDNA reverse transcription from the treated shrimps were carried out. DD-PCR was performed using 90 primer combinations (30 arbitrary primers and 3 oligo dT_{11}-N primers). A total of 36 differential displayed transcripts (24 up-regulated and 12 down-regulated) were obtained. Results from BLASTx analysis revealed that, of 13 transcripts, 5 transcripts were matched with genes reported in other animals which included phosphoglucomutase (1 transcript), nitrogen regulatory protein (1 transcript) and ubiquitin-like 7 (3 transcripts) while 8 transcripts were no match to any reported genes. The differential expression of these candidate genes following chlorpyrifos exposure indicates the possible use of these genes as biomarker of exposure to organophosphorus pesticide in *P. monodon*.

I_I0027 THEORETICAL STUDY OF ADSORPTION OF NITROSAMINE COMPOUNDS BY ZEOLITES

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Abstract: The study of adsorption of nitrosamine compounds by zeolites was performed by computational chemistry. The nitrosamine compounds consisting of nitrosamine (NA) and their derivatives such as N-methyl-N-nitrososamine (NMA), N-ethyl-N-nitrososamine (NEA), N,N-dimethyl-N-nitrosoamine (NDMA), N-ethyl-N-methyl-N-nitrosoamine (NEMA) and N,N-diethyl-N-nitrosoamine (NDEA) were adsorbed on H-ZSM-5. The geometrical structures of nitrosamine compounds and H-ZSM-5 have been obtained by geometry optimization using DFT/B3LYP/6-31G(d) and ONIOM(B3LYP/6-31G(d):AM1) level of theory. From the calculation, the structure of nitrosamine compounds which adsorbed on H-ZSM-5 was conducted by O-H bond at the adsorption site. The adsorption energy was increased by increasing the steric effect of the substituted groups. The thermodynamics properties show the adsorption processes to be exothermic, spontaneous and higher order.

I_I0029 PREPARATION AND CHARACTERIZATION OF ACTIVATED CARBON FROM *DENDROCALAMUS ASPER BACKER AND DENDROCALAMUS LATIFLORUS*

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Abstract: The objective of this work has conducted a research on the production of activated carbons from *Dendrocalamus Asper Backer* (DAB) and *Dendrocalamus Latiflorus* (DL) by chemical activation method. Activating parameters were carbonized temperature, breeds of bamboo (DAB and DL), ages of bamboos, activation reagents (H_3PO_4 and KOH), concentrations of activation reagents and activation times. The characterizations of activated carbon were studied by iodine number and scanning electron microscope (SEM). The 2-years DAB's activated carbon, obtained from the 85% H_3PO_4 activation for 4 hours, has the highest Iodine number (615.84 mg/g).

I_I0030 PREPARATION OF ACTIVATED CARBONS FROM *BAMBUSA ARUNDINACEA (RETZ) WILD* AND *GIGANTOCHLOA VERTICILIATA* BY PHOSPHORIC ACID AND POTASSIUM HYDROXIDE ACTIVATION FOR ADSORPTION OF IODINE

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Abstract: Activated carbons from *Bambusa arundinacea (Retz) Wild* (BAW) and *Gigantochloa verticiliata* (GV) were prepared through chemical processes using phosphoric acid and potassium hydroxide. Characteristics of activated carbons were studied by iodine number and scanning electron microscopy (SEM). Efficiency for activating BAW's charcoal with potassium hydroxide was higher than in case of phosphoric acid and the age of bamboos has an effect on the iodine number. Activation time and concentration of chemical reagents have minor effects on activated carbon's activities. Scanning electron micrographs showed that the external surface characteristics of the bamboos charcoal between before and after activation were not significant difference. In addition, the iodine number of one-year GV's activated carbon activated by 20% potassium hydroxide for 8 hours, commercial activated carbon and three-year BAW's activated carbon activated by 80% potassium hydroxide for 4 hours was 1,202.4, 708.08 and 199.31 mg/g, respectively.

I_I0031 ENVIRONMENTAL EFFECTS OF NANOPARTICLES: GENOTOXIC EFFECTS OF TITANIUM DIOXIDE ON INDUCTION OF MICRONUCLEUSE FORMATION IN THE SNAKE HEAD FISH CELL LINE

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Abstract: With the rising of nanomaterials or nanoparticles (NP) in commercial, to date few studies have investigated the toxicological and environmental effects of NP. Exposure to nanoparticle substances can be an important risk factor for human health. Mutagenicity tests represent a good method for genotoxic effect evaluation of environmental pollutants. Several studies have shown that fish micronuclei(MN) tests are sensitive enough to detect genotoxic agents in industrial water, In this work, we have measured MN and monitored nuclear abnormalities in the snake fish cells, with the aim to contribute to the comparative investigation of effects of TiO_2 nanoparticles(TiO_2-NP) and TiO_2 microparticles(TiO_2-MP). The differential sensitivity of fish cells to TiO_2-MP and TiO_2-NP was evaluated by exposing individuals of both species to different doses 1, 5, 10 and 50 for TiO_2-MP and 0.1, 0.5, 1, 5 and 10 for TiO_2-NP. The treatments are monitored over the period of 24, 48 and 72hr. We concluded that TiO_2-NP is more toxic to nuclear material, as it induced higher numbers of micronuclei. The data on increasing of genotoxicity in fish cells indicates a hazard of NP to environments and humans. The doses and the exposure period are important parameters. However, further studies with TiO_2 must be carried out using such as different dose and/or exposure period if we are to reach a better understanding.

I_I0032 Antibacterial effects of TiO_2 nanoparticles combine with UVA on *Letospira interrogans* serovar Canicola

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Abstract: TiO_2 nanoparticles (TiO_2-NP) combine with Ultraviolet-A (UVA) radiation were recently reported as the photocatalytic disinfection process. Our study is to investigate the antimicrobial effects of TiO_2-NP on *L. interrogans* serovar Canicola represented as pathogenic leptospires that cause leptospirosis. The bacteria were cultured and treated by TiO_2-NP, UVA radiation at variable time duration of 2, 6 and 24 hr with and without TiO_2-NP at 50 µg/~10^8cells-ml. The results show that samples with higher dose UVA (112.3 W-sec/cm^2) both with and without TiO_2-NP have higher antimicrobial effects resulting in the decrease in the growth and viability of bacteria when compared with those without UVA exposure. By immunoblotting method, Leptospiral antigen components about 21 and 48 kDa disappear when compared with non-exposed control. Only TiO_2 treatment alone does not significantly give any difference from the control (no treatment) samples. From our preliminary works, it may be concluded that the UVA play a major role on antimicrobial effects while the TiO_2-NP affect bacteria only when photocatalysis is occurred. Further studies with TiO_2-NP must be carried out using such as different doses and/or exposure periods if we want to reach a better understanding.

I_I0033 Recycle of Screen Printing Ink for Ceramic

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Abstract: The purposes of recycle of ceramic ink in screen printing are to study the process of screen ink recycle and to determine the effect of temperature and duration of pigments burning to the recycle ink qualities. The useable blue ink was dried by evaporation of solvent and burned at 300 °C 325 °C 350 °C 375 °C and 400 °C for 5 and 30 minutes. The burned pigment was observed, grinded and screen passing through 120 T mesh. Medium oil was then mixed with pigments for quality testing such as particle size, ink viscosity. Recycle ink was printed on transfer paper and transferred on ceramic using 760 °C. The ink film was measured of color (CIE L*a*b*) with spectrophotometer.

The results show that pigments was black burned when increasing temperature viscosity was around 11 poise and fineness of pigment particle after grinding was 7 microns which can be adjusted to be suitable for printing. After printing, L*a*b* color value on transfer paper was changed. With increasing burning temperature and duration, blue color was changed to green color and darker. However, color on ceramic was similarly blue. In addition, temperature 325 °C and duration 5 minutes was a suitable status for pigments burning, in order to mixed with medium for application for screen printing ink ceramic by using transfer paper.

I_I0034 QUANTITATIVES OF PHENOLIC COMPOUNDS IN TREATED PULP AND PAPER MILL WASTEWATER AFTER ADSORPTION BY ACTIVATED CARBON.

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Abstract: The water effluent after treatment with activated sludge of pulp and paper factory still has brown color because

of dissolution of lignin molecule. Lignin molecule contain the main component call phenolic compounds. These compounds are hard to degrade by biological treatment, so they make the color in the water effluent. This research study the adsorption of activated carbon made from rubber wood in reducing color, COD and the content of phenolic compounds. The experiment use the concentration of activated carbon in wastewater equal 0.02, 0.05, 0.10 and 0.20 % (W/V). The result show that the optimum condition is at 24 hour of adsorption time and 0.20 % of concentration. This condition can adsorb 80.6680% of color, 76.4583% of COD. GC-MS and GC are use to identify and quantitative the amount of phenolic compound before and after adsorption. The information from GC-MS and GC can explain the relationship between color adsorption and COD adsorption with each type of phenolic compounds in the molecular level.

I_I0035 Activated carbon from sawdust char by physical activation and chemical activation

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Abstract: The research studied about the production of activated carbon from agriculture waste. Sawdust char was used as the precursor for activation preparation. Activated carbon was prepared by physical and chemical activation. This process used CO_2 and KOH for activation. The result of this study found that the chemical activation was better than physical activation because KOH used in this process could go into the sawdust, so it developed the pores and help efficiency in adsorption. Activated carbon was activation by KOH, the BET surface area and micropore volume increased by temperature and impregnation ratio. Activated carbon was activated by KOH at impregnation ratio of KOH: sawdust (4:1) at 800 °C for 1 hour gave the respectively BET surface area and micropore volume equal at 1168.10 m^2/g and 0.5200 cm^3/g when compared with sawdust char before activation process value was 169.57 m^2/g and 0.1733 cm^3/g

I_I0036 UTILISATION OF LATEX SERUM FOR THE PRODUCTION OF *CHLORELLA*

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Abstract: The comparison of growth and biomass of *Chlorella* were carried out in 10 L flask using latex serum from latex processing factory effluent as fertilizer. Different ratios of latex serum between 1, 2, 3, 4, and 5 per cent by volume with 1.04 $\times 10^6$ cell/ml. initial cell density of *Chlorella* were applied to the experiment. Results showed that *Chlorella* reached to the maximum density within 5 days, and the final cell densities of the microalgae among treatments were 17.3 $\pm 1.30 \times 10^6$, 5.0$\pm$2.56 $\times 10^6$, 0.83 $\pm$.36 $\times 10^6$, 0.00$\pm$0.00 $\times 10^6$, and 0.63 $\pm 0.63 \times 10^6$cell/ml respectively. Biomass and growth rate of *Chlorella* when apply 1 percent of latex serum found to be significantly greater in all treatment ($p<0.05$). This result was further applied to mass cultivation of *Chlorella* at 1,000 L comparing with a group using chemical fertilizer. Growth rate and biomass of a batch used latex serum were still significantly higher than another ($p<0.05$), and the cultivation periods also delayed when using latex serum.

I_I0037 ELECTROCOAGULATION OF PALM OIL MILL'S EFFLUENT IN THE PRODUCTION OF NATURAL RUBBER ANTIOXIDANT

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Abstract: A new approach in the management of palm oil mill's effluent (POME) with an emphasis on giving added value to wastes was demonstrated in this study. Electrocoagulation (EC), an electrochemical technique used in water purification technology was employed to remove dissolved organic substances from the POME at the same time utilized the recovered substance as antioxidant for natural rubber. The presence of phenolic groups, a characteristic functional group of most antioxidants, was confirmed by the formation of black precipitate upon mixing POME with $FeCl_3$. Removal of these phenolic compounds was done by electrocoagulating (2.0 A, 4.6-8.1 V) a liter of POME using aluminum as electrodes for 6 hours. The process afforded a clear solution (pH=7.86) and a coagulum. Recovery of the phenolic compounds from the coagulum was done by dissolution with 7%HCl followed by solvent extraction with butanol. The dried residue from the butanol extract was further extracted with hexane using a Soxhlet to remove oils and waxes. The overall process afforded a yield of 17.1g/L POME. The antioxidant property of the isolate was confirmed by the decolorization of DPPH on the TLC plate using a spray method. The isolate was incorporated into a rubber mixture and its effects on the physico-mechanical properties of the rubber were evaluated and compared with the commercial antioxidant.

I_I0038 INFLUENCE OF HUMIC ACIDS ON SOLUBILISATION OF HEAVY METALS FROM CEMENT-BASED STABILISED CONTAMINATED SOIL

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Abstract: Humic acids (5% w/w) was added to heavy metals contaminated soil containing Cd, Cu, Cr, Ni, Pb, and Zn. The stabilization/solidification by Portland cement was done for humic acid added soil (S-HS) and original contaminated soil (S-OS). The solubilisation of the metals from both concretes was investigated at different pH of leachant ranging from 1-12. Regarding the dissolution of the metals in leachates from both materials, the results showed that the dissolution was mainly controlled by the pH at equilibrium. Leaching behaviors of the same metal from both materials were different. Cadmium, copper, nickel, and zinc were better dissolved form S-OS than S-HS. In acidic medium, chromium and lead had the similar leaching behavior as other metals, but in basic region their release from S-HS was greater than that from S-OS. Humic acids can reduce the dissolution of the metals.

I_I0039 VERMICOMPOSTING OF SYNTHETIC ORGANIC WASTE BY *Perionyx excavatus*

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Abstract: This research was to study the vermicomposting of organic waste by using P.excavatus. The experiment was divided into 3 parts, 1) study of effect of bulking agent in vermicomposting, 2) study of optimum ratio of organic waste/worm in vermicomposting, 3) study of optimum depth of organic waste for vermicomposting. The organic waste was added once at beginning of the experiment. The vermicomposing was maintained moisture contents at least 50%. The experiments period were 28 days. The result of the vermicomposting showed that worms were able to digest waste materials and volatile solids more rapidly than the composting. The result of the effect of worm quantity can be suggested that 200 grams of earthworm was able to digest rapidly the most of organic waste and volatile solids. The result of organic waste depth found that the suitable depth was 1 cm. The digestion rate was decreased with increasing the depth of organic waste.

I_I0040 THE ENVIRONMENTAL FACTORS AFFECTING HYDROGEN PRODUCTION FROM CASSAVA STARCH MANUFACTURING WASTEWATER BY CO-CULTURE OF ANAEROBIC SLUDGE AND

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Abstract: Bio-hydrogen production by fermentation is very promising method based on the low free energy and ability to consume organic substrate from wastewater. This research was conducted to investigate the effect of initial pH, light conditions, stirring condition, reducing agents, nitrogen and phosphorus levels on hydrogen production from cassava starch manufacturing wastewater by co-culture of anaerobic sludge and *Rhodospirillum rubrum*. Initial pH was effected on both hydrogen yield and specific hydrogen production. The illumination did not strongly affect on both of hydrogen yield and specific hydrogen production due to the beneficial effects of the light-dark cycle on nitrogenase. The mechanical stirring condition was enhanced the production of hydrogen. Both of *Enterobacter aerogenes* and L-cysteine was an effective to remove oxygen and generate anaerobic condition in the system. At nitrogen concentration rang 0.1-0.2 M showed the ability for capitalize on hydrogen production in the shorter lag time. An optimum rang of phosphorus level for hydrogen production from cassava manufacturing wastewater by co-culture of anaerobic sludge and *R. rubrum* was rang 0.02-0.04 M.

I_I0041 Treatment of COD from offset printing wastewater by agricultural wastes

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Abstract: The research was to study the efficiency of COD reduction from offset printing by agricultural wastes from comcob char, bagasse bottom ash and sawdust bottom ash. These adsorbents were compare with commercial activated carbon can reduce initial COD from 1,277 mg/l to 687 mg/l, 909 mg/l, 689 mg/l and 650 mg/, respectively. The adsorption properties of carbon products studied was COD adsorption capacity. From the results were 10.11, 7.43, 15.72 and 26.59 mg/g, respectively. The sawdust bottom ash was the highest adsorption capacity. Consequently, the efficiency of sawdust bottom ash increased by activation sawdust bottom ash with potassium hydroxide at impregnate ratio(1:1), 800 °C for 1 hour. The BET surface area increased from 169.57 m^2/g to 850 m^2/g could enhance COD reduction in wastewater.

I_I0042 NITRATE REMOVAL EFFICIENCY AND BACTERIAL DIVERSITY IN THE TUBULAR DENITRIFICATION REACTOR FOR THE INDOOR AQUACULTURE POND

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Abstract: Nitrate accumulated in an indoor shrimp pond containing 7,500 L of seawater was treated by denitrification process using the tubular denitrification reactor (TDNR). The prototype reactor was made of 48 m length PCV pipe with 2.5 cm in diameter and packed with plastic substrate (bioballs) for bacterial attachment. Methanol was supplied as a carbon source for denitrifying bacteria in the reactor. It was found that TDNR could reduce nitrate concentration from 33 mg-N/L to 9 mg-N/L in 55 days. The maximum nitrate removal rate was 4006.8 mg NO_3-N/day. Investigation of bacteria in TDNR using Gram's staining showed that the dominant bacteria were rod-shape and gram-negative. With PCR-DGGE analysis, DNA sequence of 16S rDNA suggested that three of dominant bacteria in TDNR were uncultured bacteria.

I_I0043 Potential of Organic Residues from Concentrated Latex, Fish Processing and Palm Oil Industries in the Preparation of Planting Materials for Garden Grass

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Abstract: Main nutrients, total nitrogen, total phosphorus and total potassium in organic residues or sludge in three different types of industries i.e. concentrated latex, fish processing and palm oil industries were investigated. The total nitrogen, total phosphorus and total potassium content in concentrated latex sludge were found at 1.02-2.53, 22.15-48.19 and 0.39-0.60, while those of fish processing factory sludge were found at 4.57, 2.57- 3.20 and 0.03-0.22 and those of palm decanter were found at 1.52, 0.26 - 0.74 and 0.35-0.52 %wt. by dry wt., respectively. Planting materials were prepared from mixing three types of those organic residues at different ratios and tested for their efficiency in garden grass, Nuan noi (in thai) or *Agrostis matrella* L., growing in order to replace using of ploughing soil. It was found that mixing of organic residues; concentrated latex sludge, fish processing sludge and palm oil factory decanter at 20:20:20 % wt. by wet wt. together with palm fiber and waste office paper at 20% each, could be used as planting material for growing garden grass with survival rate at more than 50% which better than control ploughing soil. The nutrients; total nitrogen, total phosphorus and total potassium content in that mixture were at 0.5, 1.7 and 1.1 %wt. by dry wt.

I_I0044 CUTTING FLUID WASTEWATER ADSORPTION BY MODIFIED CHITOSAN BEADS

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Abstract: Adsorption of cutting fluid wastewater was investigated in this work. Chitosan and chemical modified chitosan consist of benzoyl chitosan and quateramminated chitosan beads were chosen as adsorbents. Batch adsorption experiments were carried out as a function of type of adsorbents. The adsorption capacity of cutting fluid wastewater on benzoyl chitosan, chitosan and quateramminated chitosan were 62, 55 and 50 mg/g, respectively. The protonation of amine groups in chitosan, interaction between chitosan through hydrophobic chain was play a role in cutting fluid wastewater adsorption onto chitosan. While benzoyl chitosan and quateramminated chitosan based on binding affinity and electrostatic interaction. Fourier transform infrared spectroscopy and heat of combustion from bomb calorimeter confirmed that cutting fluid wastewater could adsorbed onto all adsorbents.

I_I0045 Degradation of heavy oil in seawater by mixed bacterial cultures

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Abstract: Heavy oil is a dense and viscous crude oil with high concentration of PAHs, asphaltenes, and resins. This study used mixed bacterial cultures consisting of *Sphingomonas* sp. ANI7a and *Thalassospira* sp. MAI8 for degradation of heavy oil. These bacteria were isolated from oil contaminated seawater collected in Japan and found that they can effectively degrade phenanthrene, a type of PAHs. Changes in oil components and number of bacteria populations during treatment were determined by TLC-FID and direct count techniques, respectively. Around 30% of total oil (initial 0.5% W/V) was degraded in seawater containing mixed bacteria and nutrients after 12 days. The amounts of saturates, aromatics, and resins fractions in this treatment were significantly lower than in seawater without mixed bacteria. Meanwhile, the mixed cultures could utilize only small fractions of heavy oil since bacterial number was slightly increased. The results suggested that more nutrients should be applied along with the mixed bacterial cultures for clean-up oil contaminated seawater.

I_I0046 Water Quality Management from Seafood Restaurant within Bangkhuntien Chaythaley District

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Abstract: Water quality monitoring seems essential to evaluate the pollution and to control the water quality. Surface water is the one that needs to control the water quality and evaluate the organic pollution. The qualitative indicator that uses for evaluate organic pollution is chemical oxygen demand (COD). To develop the simple, rapid and sufficiently precise method to use as the organic pollution indicator, many studied focused on absorbance measurement at 254 nm by using Ultraviolet Spectrophotometer. To choose the appropriated method as the organic pollution indicator, the correlation between COD and absorbance measurement at 254 nm (OD_{254}) had been studied on 107 surface water and 50 organic wastewater samples. In this study, the results showed COD of surface water and organic wastewater range 14 – 159 mg /L and 22 - 220 mg/L, when absorbance measurement at 254 nm (OD_{254}) range 0.14 - 0.99 and 0.13 - 1.40, respectively. The correlation coefficient (r^2) of the two methods were 0.83 and 0.92. When using the turbidity compensation by subtracting with OD_{546}, the correlation coefficient (r^2) showed 0.84 and 0.94. Using Ultraviolet Spectrophotometer at OD_{254} as the organic pollution indicators for surface water quality and organic wastewater monitoring have been concluded. To use the Ultraviolet Spectrophotometer at OD_{254} in the water quality monitoring for industrial pollution and wastewater treatment plant have been suggested for further studied.

I_I0048 The applications of natural zeolites for cadmium removal from sample water: Models on laboratory scale

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Abstract: Five natural zeolites found in the regions of Songkhla and Surathani provinces, Clinoptiolite, Mordenite, Willhensonite, Offretite and Ferrierite, have been applied to remove cadmium ions from sample water, on the basis of experimental models on laboratory scale. Clinoptiolite was used for preliminary study of the adsorption parameters. An hour adsorption time and 40 g/L of the ratio of zeolite per water sample are optimum adsorption parameters with an average cadmium removal efficiency of 91.68 %. The optimum adsorption conditions were then used for other four natural zeolites. The results show that the effective removal sequence can be listed as Offretite ≈ Clinoptiolite > Willhensonite > Mordenite > Ferrierite. Clinoptiolite, Offretite and Willhensonite are successfully used to reduce significantly cadmium from sample water with removal efficiency ranging from of 87-92%, respectively. Accordingly, the natural zeolites are recommendable adsorbents for highly cadmium removal of industrial wastewater with low cost of wastewater treatments and environmentally friendly chemical processes.

I_I0051 EVALUATING THE ENVIRONMENTAL QUALITY OF SALT DISTRIBUTION ON THE LOCAL SALT INDUSTRY

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Abstract: Saline water and soils were used to evaluate the environmental quality of salt distributions on the local salt industry in the Northeast, Thailand. The studied areas were covering Nong Khai, Udon Thani, Sakon Nakhon, Mahasarakham and Nakhon Ratchasima province. Chemical parameters, such as EC (electrical conductivity), TDS (total dissolved solid), pH and salinity surroundings the local salt industries of the evaporated salt and solar salt process were studied. The tests were done on site. According to waste brines and bitterns discarding to the local reservoirs, salt production sometimes affects the land contaminated with salinity. The EC of surface water in the creek, which located closed to the local salt productivity process was greater than 15,000 µS/cm. The TDS was more than 1,000 mg/L. The pH and salinity in the same areas presented in the range of 6.5-8.5 and 10-85 g/L, respectively. Some studied areas in Udon Thani and Nakhon Ratchasima which had a good care of the waste leakage to the surroundings can maintain their production and no infectivity of the salinity.

I_I0052 REMOVAL OF LEAD FROM WATER BY USING NATURAL ZEOITES

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Abstract: The removal of lead ion from diluted solutions by sorption on natural zeolites has been studied at laboratory scale. Four natural zeolites, mordenite, willhensonite, offretite and ferrierite, found in the regions of Songkhla and Surathani provinces were used. The results show that an hour adsorption time and 50 g/L as the ratio of zeolite usage per water sample volume are the optimum adsorption parameters at the intial solution concentrations of 0.6 ppm. 100% lead removal efficiency can be achieved in the adsorption systems of mordenite, offretite, and willhensonite. With regard to ferrierite, the removal efficiency is 86.8 %. Based on the preliminary study, it can be seen that the natural zeolites are effectively used for removing lead ion from

water. These findings are beneficial information for practical applications in industrial wastewater treatment with high efficiency and relatively low cost materials.

I_I0053 ADSORPTION OF COPPER ION ON NATURAL ZEOITES

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Abstract: Adsorption of copper ion from sample water has been investigated at laboratory scale by using natural zeolites. Natural zeolites as adsorbents used in this study are mordenite, willhensonite, offretite and ferrierite, found in the regions of Songkhla and Surathani provinces. The optimal adsorption conditions were firstly examined. The results reveal that the optimum adsorption parameters at the intial cuper concentrations of 2.5 ppm are an hour adsorption time and the ratio of zeolite usage per water sample volume with 50 g/L. The adsorption efficiency are 100%, 99.70%, 92.81% and 60.15% from the adsorption systems of mordenite, willhensonite, offretite and ferrierite, respectively. On the basis of the present study, it proves that the natural zeolites can significantly reduce copper from sample water on laboratory scale. Therefore, the obtained results can suggest that the use of the natural zeolites as an effective adsorbent with relatively low costs for copper treatment from industrial wastewater.

I_I0054 ADSORPTION CHARACTERISTICS OF AFLATOXIN B1 ON COMMERCIAL BENTONITES

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Abstract: The isothermal adsorption of aflatoxin B1 from aqueous solutions on some commercial bentonites at 25 °C have been investigated. The mixtures of 0.25 %w/v were shaken at 200 rpm for 24 hr. The concentrations of aflatoxin B1 solutions used were from 0.50 to 8.00 ppm. Adsorpted amounts of aflatoxin B1 were obtained from the determination of aflatoxin B1 concentration left in the solutions by UV-VIS spectrophotometry. Adsorption behavior of aflatoxin B1 could not applicable to Langmuir model and that mean non-monolayer adsorption approached. The experimental data could be better fit to modified Freundlich isothermal adsorption equation. For studied bentonites, adsorption isotherm plots were S-shaped that could be explained for multiple-site adsorption behaviors. The adsorption capacities were in a range of $1.61 \times 10^{-3} - 4.52 \times 10^{-3}$ mol/kg and the distribution constants were in a range of $2.52 \times 10^{5} - 3.60 \times 10^{5}$.

J1_J0002 VOLTAGE SAG DETECTION METHOD IN POWER DISTRIBUTION SYSTEMS FOR POWER QUALITY ISSUE

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Abstract: Nowadays, voltage disturbances have occurred in power system because of nonlinear loads, unsymmetrical load and faults. Therefore the detection technique is necessary and useful for improving the power system method. This paper presents the detection techniques of voltage sag that occurred in power system for improving the power quality. There are four types of detection method, namely rms, FFT, peak sequence analysis, dq detection method, and then these methods are compared.

J1_J0003 DESIGN AND PERFORMANCE ANALYSIS OF A PILOT-SCALE VACUUM FRYER

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Abstract: The objective of this work was to design and construct a pilot scale vacuum fryer operating as a batch for 2 kg pineapple chips. The main components of the equipment are 1) frying vessel, 2) preheated oil tank, 3) vacuum pump, 4) condenser, 5) immersion electric heater, 6) oil centrifugal system, and 7) transfer oil pump. The design was based on an energy balance in order to maintain the frying oil temperature at 80±5°C during the course of frying. The frying vessel was made of 4 mm thickness 304L stainless steel. A cylindrical shape elliptical head was designed to withstand the external pressure. The sizes of the vessel were 40 cm in diameter and 72 cm in height. The external jacket was filled with hot oil, which was heated by an immersion heater rated at 4.5 kW. The sample holder was equipped with a motor to get rid of excess oil by means of centrifugation. The preheated oil tank had a diameter of 30 cm with 68 cm in height. A rotary vane vacuum pump was used to reduce the pressure in the frying vessel to 60 mmHg. Shell & Tube heat exchanger was designed to condense vapor coming from the frying vessel. The performance test was carried out using frozen pineapple chips, which had an initial temperature of -20°C. It was found that the machine worked satisfactorily with the final product moisture content of 4.91±0.28 percent (d.b.) and oil content of 17.04±2.80 percent (w.b.) at 50 minutes frying time. In addition, the maximum temperature fluctuation was found to be in the range of ±10°C. The efficiency of the condenser in terms of trapped water was 97 percent.

J1_J0004 A STUDY OF COMPRESSIVE STRENGTH OF CONCRETE USING QUARRY DUST AS FINE AGGREGATE AND MIXING WITH ADMIXTURE TYPE E

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Abstract: This research is related to study the compressive strength of concrete using quarry dust as fine aggregate instead of sand. Ratio of cement: sand: rock is 1: 2: 4 (by weight) and at water-cement ratio (w/c) of 0.45. The admixture type E is added for increasing the compressive strength. Without using the admixture, it is found that the compressive strengths are 275, 260, 241 and 234 ksc for using quarry dust at 70%, 90%, 100% (sieve analysis) and 100% (not sieve analysis) respectively. When the admixture is added, the results of compressive strengths are 292, 287, 276 and 258 for 70%, 90%, 100% (sieve analysis) and 100% (not sieve analysis) of quarry dust respectively. Comparing the compressive strength at 28 days between concrete mixing with quarry dust and sand, the maximum compressive strength is 407 ksc for concrete mixing with 70% of quarry dust while the normal concrete has value of 348 ksc. From this research, the quarry dust could be used to replace sand in general concrete structures.

J1_J0005 USING RICE HUSK ASH FOR DEVELOPING STRENGTH OF ADOBE

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Abstract: This study aims to investigate the compressive strength and the bending strength (or Modulus of rupture) of the adobe brick mixing with rice husk ash. The rice husk ash is added by following contents: 0, 3, 6, 9, 12 and 15 by the total weight of the clay. In addition, the ratio of rice hulk is 1: 0.5 by volume of the clay and the water ratio is 1: 1 by weight of the clay. In testing process, the adobe bricks are cast in sizing of 10 × 15 × 30 cm and dried for 48 hours. After that, put the adobe bricks into the sun-dried environment for 14 days and 28 days. By the testing results at 28 days, the edge wise compressive strengths are 1.10, 1.15, 1.17, 1.34, 1.37 and 1.44 ksc, the flat wise compressive strengths are 0.96, 1.04, 1.02, 1.04, 1.09

and 1.08 ksc, the edge wise moduli of rupture are 0.76, 0.80, 0.73, 0.81, 0.74 and 0.85 ksc, the flat wise moduli of rupture are 0.81, 0.85, 0.90, 0.85, 0.90 and 0.89 ksc respectively. This research indicates that rice husk ash could be mixed in to adobe bricks for increasing the strengths.

J1_J0008 Effect of Screw Rotating Speed on the Properties of Poly lactic acid(PLA)/Organoclay Nanocomposites Prepared by a Twin Screw Extruder

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Abstract: This study analyzes the effect of different screw rotating speeds on the properties of nanocomposites prepared by melt compounding PLA with an organoclay in a co-rotating twin-screw extruder. Polyamide 12 was used as an additive. Two different screw rotating speeds, 65 rpm and 150 rpm, were used in this study. According to the tensile strength data, the Young's modulus and tensile strengths of the PLA/clay nanocomposites showed improvement at a screw rotating speed of 150 rpm. The d-spacing of PLA/PA12/Clay nanocomposites was independent of adding PA12. The size of the clay aggregates in the PLA/PA12/Clay nanocomposites is smaller than that of PLA/Clay. On the whole, the higher screw rotating speed (150 rpm) resulted in materials with better performance than the lower screw rotating speed (65 rpm) in a twin-screw extruder and the addition of PA12 showed the most improvement in the tensile strength and thermal stabilities.

J1_J0009 A GUIDELINE ON THE OPERATION OF AN ABSORPTION CHILLER WITH A CHILLED WATER STORAGE TANK

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Abstract: This objective of this research was to find a guideline on the operation of an absorption chiller (AC) with a chilled water storage system in the view of engineering and economics. The studied factory usually used continuously the energy for chilling in the form of chilled water and the thermal energy in the form of a vapor throughout a week. The operation time of the AC was divided into 3 periods: Monday to Friday, Saturday and Sunday in which energy was consumed differently. We compared the operations in 3 scenarios: A, B and C. It was discovered that AC running at mean load (Scenario C) was the optimum. Its payback period, internal rate of return and net present value were 4.89 years, 45.21% and 178.59 MBaht respectively.

J1_J0010 A LOW-POWER HIGH VOLTAGE 2 kV_{dc} DC SWITCHING POWER SUPPLY FOR OZONE TUBE

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Abstract: This paper presents a low-power high frequency high voltage DC switching power supply for ozone tube. The high voltage generating circuit is based on a flyback converter. The converter was designed to operate at 40 kHz switching frequency through a high frequency flyback transformer, a rectifier and filter circuits. The circuit is capable of producing up to 2 kV_{dc}. By adapting the highly nonuniform electric field to the electrode design of the ozone generator, one-hour operating yields the maximum ozone generating capacity of 30 mgO_3/hr.

J1_J0011 Lanthanum Separation by Batch Simulation of Continuous Countercurrent Liquid-Liquid Extraction

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Abstract: Lanthanum (La) was separated from rare earth nitrate solution in dilute nitric acid by the mixture (1.2 M TBP-0.3 M D2EHPA)/kerosene compared with 50%(1.8 M)TBP/kerosene. The separation was accomplished by batch simulation of 6-stage and 8-stage continuous countercurrent liquid-liquid extraction and the flow ratio of the solvent per feed solution (S/F) equaled to two. It was found that when the mixture of TBP and D2EHPA was applied as the extractant, the concentrations and the percentages of La in raffinate from stage-6 and stage-8 were high. Furthermore, %yield of La in raffinate was higher than %yield obtained when 50%TBP/kerosene was extractant. From 8-stage continuous countercurrent liquid-liquid extraction simulation, the purity of La output in raffinate is as high as 97.2% with %yield of 80.2%.

J1_J0013 A Preliminary Study of Preparing Biodegradable Film from Starch

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Abstract: In this research the optimum conditions to prepare films from corn and tapioca starch were determined. It was found that the suitable condition for obtaining gelatinized starch solutions was at temperature around 80-85°C and they were then dried at 100°C for 24 hours. Films from both corn and tapioca starch appeared homogeneous and suitable for utilization. To study the effect of glycerol used as a plasticizer on the properties of the film, starch was mixed with different amount of glycerol to obtain different mass ratio of starch to glycerol of 6:4, 7:3 and 8:2, respectively. As a result, for both types of starch, when increasing the amount of glycerol, both tensile strength and water absorbability of the film were decreased while film flexibility and water vapor permeability were increased. When comparing at the same glycerol content, it was found that the film allowing higher flux of water vapor and higher elongation percentage was from corn starch, whereas the film showing higher water absorption capacity and flexibility is from tapioca film showing higher water absorption capacity is from tapioca.

J1_J0014 ANALYSIS OF 2D FRACTURE MECHANICS PROBLEMS BY FINITE ELEMENT METHOD AND PHOTOELASTICITY TECHNIQE

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Abstract: Finite element method and photoelasticity technique are presented to predict stress and stress intensity factor for fracture mechanics problems. This paper first describes 2D fracture mechanics theory. Finite element formulations and Q8 element. The computational procedure and its boundary conditions are then represented. Photoelasticity theory and its procedure are described. The validated examples of both techniques are single edge crack plate tension problem and double edge crack plate tension problem. The solutions show the efficiency of finite element method and have a good agreement with the photoelasticity results.

J1_J0019 TRANSMISSION EXPANSION PLANNING WITH ECONOMIC DISPATCH CONSTRAINT

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Abstract: This paper presents a scenario analysis method for transmission expansion planning taking into account an economic dispatch constraint. The method involves postulating practical network topologies which are required in two optimization problems: economic dispatch and transmission investment. The methodology was tested with a 5-bus system. The study results show that a transmission connection scheme can be appropriately identified while satisfying the economic dispatch constraint.

J1_J0022 A STUDY OF COMPRESSIVE STRENGTH OF MORTAR MIXING FLYASH AND USING QUARRY DUST TO REPLACE SAND

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Abstract: This research studies the compressive strength of mortar for the case of without fly ash and 50% of fly ash replacing in cement. The fixed ratios, binding agent to fine aggregate and water to binding agent, are 1: 2.75 and 0.52 by weight respectively. The ratios of quarry dust that uses instead of sand are 0%, 10%, 20% and 30% respectively. Mold of size 5×5×5 cm is used. Cure the mortars in the water. Test the samples when curing at age of 7, 14, 21 and 28 days under ASTM standard. From the results, it is found that the compressive strength increases as age of mortar increases. When using 50% of fly ash, the compressive strength is very low. However the adding of quarry dust results in increasing of compressive strength for the both cases. The best ratio of quarry dust to fine aggregate is 30: 70. This research shows that there is a possibility in well using of quarry dust in concrete work.

J1_J0023 ELECTRICAL PROPERTY CHARACTERIZATION OF ELECTROLYTE MATERIALS IN SOLID OXIDE FUEL CELLS BY AC - IMPEDANCE SPECTROSCOPY

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Abstract: Yttria - Stabilized Zirconia (YSZ) is an important solid electrolyte used in Solid Oxide Fuel Cells (SOFC) due to its good electrical (0.1 siemens/cm at 1000°C) and mechanical properties. The electrical property of YSZ was measured using AC-Impedance Spectroscopy, in the temperature range of 275 – 600°C and over the frequency range of 0.05 – 10^7

Hz. From the impedance spectra, the bulk and grain boundary resistances of YSZ pellets were significantly influenced by the containing impurities and the sintering conditions. The impurities in the starting powder were analyzed using X-Ray Fluorescence Technique (XRF), while the microstructure was investigated using Scanning Electrons Microscope (SEM). The correlation between the electrical conductivity and sintering temperature from various electrolyte materials was developed. As a result, the AC-Impedance Spectroscopy technique in combination with microstructural investigation can be used to study the electrical property of YSZ effectively.

J1_J0024 SEAL LEAKAGE TEST STATION FOR SEALING MATERIAL IN SOLID OXIDE FUEL CELL

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บทคัดย่อ: ปัจจุบันประเทศต่างๆ ทั่วโลกประสบปัญหาด้านราคาน้ำมันเชื้อเพลิงที่เพิ่มสูงขึ้น ซึ่งราคาน้ำมันดิบเพิ่มสูงขึ้นเลยเส้นฐาน 70 ดอลลาร์ต่อบาร์เรล และมีแนวโน้มเพิ่มสูงถึง 80 ดอลลาร์ต่อบาเรล (กรุงเทพธุรกิจ 2 พ.ค 49) ส่งผลกระทบต่อการเจริญเติบโตทางเศรษฐกิจของประเทศโดยตรง เนื่องจากปัญหาทางการเมืองของประเทศผู้ผลิตน้ำมันในตะวันออกกลาง และน้ำมันซึ่งได้จากธรรมชาติกำลังจะหมดลง จึงได้มีการคิดค้นด้านเทคโนโลยีด้านพลังงานทดแทน คือ เซลล์เชื้อเพลิงแบบออกไซด์ของแข็ง กำเนิดกระแสไฟฟ้าโดยการเกิดปฏิกิริยาไฟฟ้าเคมีของแก๊สไฮโดรเจนและออกซิเจน เซลล์เชื้อเพลิงแบ่งเป็น 2 แบบ คือ แบบท่อและแบบแผ่น โดยแบบแผ่นมีประสิทธิภาพสูงกว่าแบบท่อ แต่มีปัญหาในการใช้งาน คือ เซลล์เชื้อเพลิงแบบแผ่นต้องใช้วัสดุป้องกันแก๊สรั่ว เพื่อป้องกันการผสมกันของแก๊สไฮโดรเจนกับแก๊สออกซิเจนที่อุณหภูมิสูง ในการพัฒนาวัสดุป้องกันแก๊สรั่วจึงได้สร้างอุปกรณ์ทดสอบการรั่ว เพื่อใช้ทดสอบอัตราการรั่วของวัสดุป้องกันแก๊สรั่ว โดยอ้างตามมาตรฐาน ASTM F 37 - 89 ซึ่งยังไม่มีขายสำเร็จรูปในท้องตลาด อุปกรณ์ทดสอบการรั่วแบ่งเป็น 2 ส่วนคือ หน้าแปลนทดสอบการรั่วและระบบทดสอบการรั่ว หน้าแปลนทดสอบการรั่วใช้ท่อเหล็กกล้าไร้สนิมเกรด 316 เชื่อมติดกับหน้าแปลนเหล็กกล้าไร้สนิมเกรด ZMG ระบบทดสอบการรั่วในส่วนที่เป็นท่อนำแก๊สใช้ท่อเหล็กกล้าไร้สนิมเกรด 316 และใช้สายยางแก๊สพีวีซีต่อแมนอมิเตอร์เข้ากับท่อนำแก๊สเหล็กกล้าไร้สนิมเกรด 316 พบว่าอัตราการรั่วของระบบมีค่าน้อยประมาณ 3.76×10^{-5} cm^3 / min cm

J1_J0025 NUCLEAR PULSE WAVE SHAPING WITH DSP DEVICE

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Abstract: Nuclear pulse wave shaper using Digital Signal Processing (DSP) device was developed, in order to obtain a low noise nuclear pulse signal. Referring to the model 2011 Canberra spectroscopy amplifier, the transfer function of its analog filter was analysed. Two techniques of the digital signal processor were designed according to the analysed transfer functions. The first; TMS320C31 DSP starter kit was used; and the second; PCI-1712 data acquisition card with MATLAB programming were performed and combined with the developed program for displaying the signal
waveform. The research results showed that the first technique with a DSP starter kit alone could not be correctly shaped pulse waveform due to the limitation of its performance. While the second technique could be shaped the pulse waveform in range of 1 μs to 4 μs continuously shaping time and the unipolar shaped pulse characteristics were similarly with the reference system. The count rate capability of over 10 kcps could be achieved.

J1_J0028 EXPERIMENTAL ON CONCRETE COLUMNS CONFINED WITH STEEL JACKETS SUBJECTED TO CONCENTRIC AXIAL COMPRESSION.

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Abstract: This paper presents the experimental results on the concrete columns and the concrete columns confined with steel jackets under concentric axial compression in order to study the compressive behaviors, modes of failure, and effects of the confinement. Twenty seven specimens were tested in this study. The square columns have the cross section of 150 x 150 mm and the length of 750 mm. The steel jackets have the dimensions of 150 x 150 mm with 3.2 and 4.5 mm thickness. From the tests, it was found that the confined columns with both thicknesses of the steel jackets had similar behaviors. At the beginning, the columns had linear behavior up to 80-90 % of their ultimate strength. After that, the axial shortening and lateral expansion of the columns were increased rapidly. The confined jackets were inflated until the failure of the columns. At the ultimate strength, the confined columns with steel jackets had the loads higher than those of the concrete columns in the range of 42 to 218 %. In addition, it was found that the confinement increased the ductility of the columns.

J1_J0003 STRESS ANALYSIS OF CONTACT PROBLEMS BY USING ADAPTIVE MESHES.

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Abstract: This paper presents stress analysis of contact problems by finite element method and adaptive meshes. Firstly, solid

mechanics theory and finite element formulations for contact problem are described. Then, adaptive remeshing technique is presented. The developed program is validated by two problems, contact between two cylinders problem and contact between rigid square and elastic foundation problem. The finite element solutions have a good agreement with the exact solution of both problems.

J1_J0034 Region of ± 0.5% tolerance in Helmholtz coils for magnetic calibration

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Abstract: Standard Magnetic Generator is the most necessary for magnetic calibration process. Many Instruments and sensors used in military, aviation, medication and various sorts of industry demand regular calibration however the number of metrology laboratories providing this service is still inadequate. Consequently, development of standard magnetic generators will affect many relevance organizations. In this research, Helmholtz coils, a selected type of magnetic standard source, is mathematically simulated to find a region of ± 0.5% tolerance of average magnetic field at the centre of coils or the region of ± 0.5% uncertainty of calibration. Information from this modeling will be the design parameters of real Helmholtz used as reference data for mathematical modeling for calibration and traceabllity.

J1_J0035 REMAVAL OF CARBOXYLIC GROUPS IN OIL PRODUCT FROM PYROLYSIS PROCESS OF *JATROPHA CURCAS* OIL

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Abstract: *Jatropha curcas* oil comprises mainly fatty acid molecules. When these molecules are pyrolyzed at high temperature, they will break down into a large number of carboxylic groups resided in the pyrolyzed oil product. When applying the pyrolyzed oil to the engine, it may deteriorate the combustion process and causes the corrosion of the engine. The objective of this work was to study the possibility of removal the carboxylic contents during the pyrolysis process, hence removal of carboxylic acids of end oil product. The pyrolysis of Jatropha oil was carried out at high temperature under vacuum. The pyrolyzed oil products obtained from the pyrolysis with and without Calcium Oxide were analyzed using GC/MS. The results showed can be removal in the carboxylic contents of the pyrolyzed oil product with a catalyst when compared to the pyrolyzed oil product without a catalyst. The pH paper test was also conducted and in good agreement with the results obtained from GC/MS.

J1_J0037 NUMERICAL INVESTIGATION OF CONFINED IMPINGING JET FLOW WITH REYNOLDS STRESS MODEL

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Abstract: In this research, the applications of the k-ε turbulent model and Reynolds stress model (RSM) for prediction of impinging jet flow characteristic are described. The results of predicted axial and radial velocity profiles are compared with the experimental data. The computations indicated that the results predicted by both turbulence models are in good agreement with the experiments but the RSM performs better agreement in comparison with the experimental data. Moreover, effects of grid independent on prediction are also reported.

J2_J0001 EVALUATION OF CONVECTIVE HEAT TRANSFER COEFFICIENT OF GREEN PEPPER DRYING UNDER NATURAL CONVECTION

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Abstract: In this paper, an experiment has been made to evaluate the convective heat transfer coefficient obtained by green pepper open sun drying (natural convection). Values of the constants, C and n were obtained by a linear regression analysis from experimental data determined. Based on the values of C and n convective heat transfer coefficient of green pepper drying was 6.28 W/m^2 °C.

The experimental conditions are Pr = 0.7 and $1.3 \times 10^2 < Gr < 4.43 \times 10^2$

J2_J0007 SIMULATION OF HEAT TRANSFER OF LIQUID FOOD IN A BELL SHAPE CONTAINER.

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Abstract: Transient temperature and velocity profiles of jelly liquid contained in a bell shape container were simulated during pasteurization process in order to study the movement of the slowest heating zone (SHZ). Navier-Stokes equations for a Newtonian fluid with varying density and viscosity as well as the energy equation were numerically solved using a commercial Computational Fluid Dynamics (CFD) package, FLUENT®. Natural convection showed a strong effect on the liquid flow patterns and the movement of the slowest heating zone. During heating for 1500 seconds the SHZ moved from the core of the container to the bottom and eventually stayed at a region, which is about 5-20 percent of the container height from the bottom and about 10-60 percent from the central line. The simulated temperatures at various locations were validated with the experimental data. The simulated results showed a good agreement with the observed data with an error of less than 1 percent.

J2_J0012 MATERIAL PROPERTIES IMPROVEMENT OF LANNA UMBRELLA PRODUCTS.

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Abstract: Nowadays, Lanna umbrella is increasingly developed by Bor Sang Group to obtain several designs and to expand the manufacture to an industrial scale. Owing to the unique characteristics and the beauty of the lanna umbrellas, several countries imported them in a rather large scale. However, the life-time of the beautiful umbrellas are limited by quality of the materials. All materials can be destroyed by mold fungus but bamboo can also be destroyed by insects. The general properties of the materials (Sa paper, raw cloth and artificial silk) for covering the umbrella structure don't readily reach good standard qualities in cases of waterproof, heat retardation and UV protection. Improvements of the quality of all materials are investigated to obtain the long-life Lanna Umbrella for general purposes. Attempts at investigation to improve the general properties of bamboos, Sa paper, raw cloths and artificial silk in terms of anti mold fungus, insect protection, waterproof, heat retardation and UV protection were made by treatment with chemical solutions and surface coating materials to achieve the more efficient Lanna Umbrella for general purposes. With respect to bamboo bars and pieces, it was found that the most suitable sample treatment conditions that provide the best anti mold fungal activity were soaking the bamboo bars in 1% vinegar or 1% detergent solution for 6 hours and soaking the bamboo pieces in 2% copper sulphate solution for 6 hours. When bamboo bars and pieces were soaked in a mixture consisting of shelldrite (1:60) and ROCIMA243 (1:120) the best anti insect activity of the treated bamboos was obtained. It was found that the raw cloths treated with 3% solution of wood charcoal ash extract for 6 hours provided the best anti mold fungal activity. With respect to the preservation of artificial silks by treating with the chemical solutions in the same manner as with raw cloths, it was found that they exhibited the very strong anti mold and fungal activity probably owing to the artificial silks provide insufficient nutrients for mold and fungi to grow. The materials for covering umbrellas were treated with various chemicals and surface coating materials to find out the most suitable substances to improve the properties of the materials in terms of waterproof, heat retardation and UV protection. Evaluation by Multiple Attribute Decision Making, the most suitable coating material for Sa papers and raw cloths was tin oxide gel followed by urethane (3:1) whereas that for artificial silk was 1% PMMA.

J2_J0015 A FABRICATED PZT ACOUSTIC EMISSION SENSOR FOR PIPELINE LEAKAGE MONITORING.

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Abstract: A fabricated acoustic emission (AE) sensor using lead zirconate titanate (PZT) and its application for pipeline leakage monitoring are presented. The experiment on pipeline test leak between the different pressure conditions and the sizes of cavity show that the fabricated PZT-AE sensor has a potential and can be detected the leakages in pipeline. Therefore, the proposed PZT-AE sensor offers an alternative for Non-destructive testing (NDT) particularly pipeline leakage monitoring applications.

J2_J0020 Modification of Pore Size of SBA-15 Mesoporous Silica Produced from Rice Husk Ash

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Abstract: The pore diameter of SBA-15 mesoporous silica synthesized from rice husk ash has been modified by using swelling

agents such as 1,3,5-trimethylbenzene (TMB), 2,3,4-trimethylpentane (TMP), tetrahexylammonium bromide (THB) and N,N-dimethyldecylamine (DMD). The hydrolysis-condensation temperature of 35°C and hydrothermal treatment temperature of 110°C are the optimum synthesis temperatures. The effects of swelling agents were investigated for expanding the SBA-15 pore diameter. The swelling effect can be arranged in order as follows: TMB > TMP > THB ≈ DMD. Maximum pore diameter of SBA-15 is approximately 31 nm when TMB was used as the swelling agent.

J2_J0021 THE POWER GENERATION BY BIOMASS GAS ENGINE FOR APPLICATION IN PRODUCTION PROCESS OF SMALL-SCALE COMMUNITY INDUSTRY

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Abstract: The aim of this research is to study the biomass gas engine system for power generation which is applied in the production process of small-scale community industry. Results showed that the system should be composed of Imbert-type gasifier of 1 m^3 with screw pressed for fuel feeding, cyclone, ash hopper, wet scrubber, volatile matter bank, gas cooling system, gas filter, gas engine of 1,425 cc and generator of 10 KWe. The used gasifier in this research is fixed bed downdraft and steam is used as an agent for gasification process of sawdust of rubber wood from wood processing industry in Phatthalung province.

J2_J0026 Development of physics experiment set controlled by microcontroller for data detection and calculation

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Abstract: Measurement in many of physics laboratory sets can not be done accuracy due to human being's error and his or her physical constraint. Time or period measurement is one of those problems. Detecting data by experimenter's eye and his finger to start and stop timer watch is not good practical approach especially for case that the time value is small. Microcontroller based circuit with appropriate sensors module matched with that experimental set have been developed for measuring time period automatically. This automation system has not been only designed for this purpose but also for other mean of measurements. By changing the proper sensors and software written for specified requirement will make this system be a general purpose data collecting system. Pendulum motion experiment was selected for testing its workability. To enhance this system's functions, data can be transferred to database in microcomputer for later calculation. Graphical report can be shown on monitor or printed on paper too.

J2_J0027 Electroforming Technique

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Abstract: Electroforming Technique is the forming of objects in 3 dimensions by using metal coating or plating technique on non-conductive materials such as wax work-piece. The work-piece is then heated to melt the wax from the original 3 dimensional metal-plated workpiece. The advantage of this technique is that the work obtained is more finely-detailed than that of the casting or molding, securing all the details of the original work. In addition, the work will be lighter in weight, saving many times the metal content required in the molding technique. With the principle required, the researching team has therefore conducted the study on the impact of electric current, plating time, the size of the work-piece, and the proper condition of electroforming technique, by using electric current in the range of 0.1-0.4A with the plating duration of 60-180 minutes and the sizes of the workpieces of 1.72 cm, 6.99 cm and 15.48 cm respectively. According to the study, it is found that the proper condition of electric current is 0.2A providing shiny and smooth surface with good cohesion in the workpiece. The longer the workpiece is subject to the plating; the higher the degrees of thickness, shininess, and smoothness are. When the electric current is increased, the thickness is increased along the edge than in the inner area of the workpiece; however, electric current exceeding 0.4A, contrary to the earlier outcome, results in matt, irregular and even burnt surface. The purpose of the study of this technology is to apply the knowledge gained to handicrafts and jewelry products in Thailand.

J2_J0029 THERMAL PERFORMANCE OF A SMALL SCALE SOLAR PHYSIC NUT DRYER

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Abstract: The purpose of this research is to investigate the thermal performance of a small scale solar physics nut dryer which is described in terms of drying air temperature, drying rate and drying time. Initial and final moisture contents were also investigated based upon the AOAC standard. It was found that the initial and moisture contents of the physic nut were about 32.06%db. and 5%db. respectively. Under typical ambient condition of Phattalung province, the drying air temperature was about 55 °C when the solar radiation intensity was about 700 W/m^2. Furthermore, the drying time was about 9 hr.

J2_J0031 Effect of Glossy and Matte Coating for Plain Paper on Inkjet Print Quality

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Abstract: The objectives of this study are 1) to produce glossy and matte coating materials for inkjet paper, 2) to study paper surface properties after coating, and 3) to compare the inkjet print qualities among plain paper, coated paper and commercial ink jet paper. Acrylic resin as a binder was mixed with polyvinyl alcohol for glossy coating, and mixed with fume silica for matte coating. Each 100-gram plain paper was coated using a bar coater with a film thickness of 4 µm and printed with an ink jet printer. The results showed that print qualities of coated paper were significantly better than that of plain paper. The glossy coated paper showed better coating adhesion, more sharpness, less color shift, and better ink rub resistance than did the matte coated paper. However, the matte coated paper indicated faster ink drying, more color saturation, more light fastness and higher print contrast. Compared with commercial inkjet paper, the matte coated paper had higher color saturation and less color shift, but longer ink drying time.

J2_J0032 PERFORMANCE STUDY OF SOLAR FORCED CONVECTION PADDY- DRYER

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Abstract: The research is aimed to study the performance of forced convection solar dryer for paddy drying in Phatthalung province. The results indicated that the system is continuous hot air flow rate. Paddy, Chai-nat 1, was successfully dried in developed system. The average hot air temperatures were 35 °C. Drying time was 8 hour for paddy drying from moisture content of 25 % d.b. to 5 % d.b. The efficiency of the whole unit obtained was 49 %. This drying technology is suitable for small-scale process of dried paddy in the southern area of Thailand.

J2_J0036 THERMAL PERFORMANCE A SOLAR ASSISTED ELECTRICAL CHILLI DRYER.

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Abstract: This research studies on thermal performance of hybrid dryer for chilli dryer. By a usage for a force-convection solar and an electrical dryer. It demonstrates that it is one of drying technologies suitable for drying chilli of small-scale process in southern areas. Four cases were investigated, namely, hybrid dryer as air recycling and no air recycling, solar dryer as air recycling and no air recycling, respectively. Experiments were set up in order to study of temperature, initial and final moisture contents, drying rate, and specific energy for chilli drying, at a fixed drying air temperature of 50°C. The results also revealed that the optimized drying rate in the first case. Drying time was 9 hours for reducing the moisture content from 109.42 %db. to 31.98 %db. The solar radiation intensity was found to be 500 W/m^2. Finally, the specific energy was 679 MJ/kgH_2O_{evap}.

K1_K0023 POPULARIZATION OF SCIENTIFIC DISCOURSE: COMMUNICATING HEALTH SCIENCE IN THAILAND

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Abstract: This paper explores an issue of science popularization in Thailand, gauging the effectiveness of texts and to find the guidelines that would enhance it. Sixty five articles on health science have been collected for analysis. Four major problematic textual features have been revealed: reiteration of known facts, oversimplification, excessive details with high degree of complexity and excessive usage of technical terminologies.

K2_K0001 Development of an Instructional Set for a Laboratory in Biology Course for First-Year Thai Science Student Teachers

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Abstract: The objectives of this case study research are (1) to study the instructor's regular practice and beliefs in teaching and learning in a Laboratory in Biology Course and investigate first year Thai science student teachers' biological concepts, the nature of science concepts, science process skills and attitudes towards biology after they have participated in the course, (2) to create the guiding principles to develop an instructional set based on a learner-centered approach for the Laboratory in Biology Course from the findings of the first objective of the study, the National Education Act, 1999, and a review of documents and related research reports, and (3) to develop an instructional set for the Laboratory in Biology Course for Thai science student teachers based on the guiding principles generated from the second objective. The research study was conducted from June 2003 to October 2005.

The findings revealed that the regular practice in the Laboratory in Biology Course was teacher-centered and emphasized the promotion of biological concepts. The participant instructor believed that science student teachers must have correct concepts before doing laboratory activities. After the science student teachers participated in the course, their biology concepts were mostly in form of partial understanding and alternative conceptions were found in every topic. The science student teachers' nature of science concepts were mostly appropriate. Most science student teachers had better skills in interpreting data and drawing a conclusion than identifying problems, formulating hypotheses, identifying variables and designing an experiment. Their attitudes towards biology were mainly found to be positive. From these findings, a consideration of the National Education Act, 1999 and a review of documents and related research reports, ten guiding principles for the development of an instructional set for the Laboratory in Biology Course based on a learner-centered approach were generated. The instructional set was comprised of an instructor manual, a student activity book and a student thinking book.

K2_K0002 TECHNICAL TEACHER SKILLS AND KNOWLEDGE DEVELOPMENT MODEL.

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K1

Abstract: The objective of this research is developing the technical teacher skills and knowledge model. The research procedure is divided into 2 stages : The fist stage is to studying the technical teacher skills and knowledge model through 114 population who are executives and instructors of Industrial Education Faculty from 4 institutes includes King Mongkut's University of Technology Thonburi, King Mongkut's Institute of Technology Ladkrabang, King Mongkut's Institute of Technology North Bangkok, and Rajamangala University of Technology. The subject is purposively from executives and instructors who have over 5 years experience in this field. Research instrument is a questionnaire concerning opinions toward the model. The research result is the new model. The second stage is prepared for model development and evaluation by developing model based upon the research result from the first stage. The model is afterward evaluated by 13 experts. Evaluation instrument is questions concerning the model. The research finding points out that the experts are consensus with the model in the first stage. The research result reveals the technical teacher skills and knowledge model consisting of self-management skills and knowledge, cooperative skills and knowledge, and technical skills and knowledge.

K2_K0004 AN APPLICATION OF THE LOCAL SCIENTIFIC WISDOM TO DEVELOP THE LEARNING RESOURCE ABOUT ELEPHANTS AT SURIN ELEPHANTS VILLAGE

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Abstract: The objectives of this research were:

1. to choose the knowledge resource by brainstorming and extract the knowledge, the local wisdom, and the local scientific lesson on Surin elephants from the findings of the 2004 research,
2. to apply them to the learning sets of Surin elephants, and
3. to experiment by using the learning sets in the knowledge resource, and to develop the sustainable knowledge resource in Surin elephants village continously.

The participants were a researcher team and students from Surindra Rajabhat University, teachers and students from three secondary schools and seven primary schools near by, and the inhabitants of Surin Elephants Village. The methods employed were brainstorming, in-depth interview, focus group discussion, workshops, experiment and research with the aim to try out the learning sets on the knowledge resource. It was found that:

1. Ajeing Buddhist temple was the suitable place for the knowledge resource and the laboratory for natural science.
2. The results of the knowledge extracts conformed with the local scientific lessons on Surin elephants from the findings of the 2004 research, in four units.
3. The application of this knowledge from the findings of the 2004 research, was varied in accordance with the from of learning process in each unit was the suitable for place in Ajeing Buddhist temple etc., tale, game and sheet of knowledge.
4. The learning sets were divided into twelve topics in the primary schools, and ten in the secondary schools.
5. In the higher education level, two research papers and two experiments were completed.
6. The results from using the learning sets showed that both teachers and students had better knowledge about Surin elephants. They achieved scientific skills. They realized the important of the knowledge resource in the temple. They were well aware of Surin elephants conservation. The teachers and the students were satisfied with these learning sets most.

K2_K0005 IMPROVING THE STUDENTS' SKILLS IN DRAWING THE FISCHER PROJECTION FORMULAS OF TWO-CHIRAL MOLECULES BY ILLUSTRATING THE 3D ANIMATION MOVIE OF THE FORMULA CONVERSION.

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Abstract: In the Stereochemistry experiment in Organic chemistry laboratory 2, the 3D animation movie was used to assist the illustration of the conversion of the wedge formula of two-chiral molecule into the Fischer projection formula. The students' learning skills in drawing the Fischer projection formulas from the corresponding wedged formulas were comparatively measured. The results of the measurements showed that the 3D animation movie helped 71.43 percent of the students to draw the Fischer projection rightly.

K2_K0006 Computer tools for science communication and education

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Abstract: This poster presentation in intended to help science educators learn about the instructional use of computer tools to promote problem-based science teaching and learning. The presentation will focus on the utilization of following computer tools in science and technical education and research,: "semantic tools" to represent knowledge, "modeling tools" to find and test relationship in complex system and to make predictions about mathematical, physical, biological, and environmental system, and "argumentation tools" to observe, model, and promote explanatory coherence of reasoning.

K2_K0009 Development of Molecular Models from Atoms in Molecules Theory

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Abstract: Molecular models based on Atoms in Molecules Theory were constructed in both X3D and real models for functional group demonstration. The molecular surface was iso-electron density at 0.01 au, and the surfaces that divided the molecule into functional groups were inter-atomic surfaced calculated by MORPHY. The real models were created from computer models by a rapid prototyping machine. These models will be employed as teaching and learning media about molecules in fundamental science curriculum by Institute for the Promotion of Teaching Science and Technology (IPST).

K2_K0010 Research and Development of Science Learning Unit on Biodiversity in Nong Han, Kumpawapi, Udon Thani for secondary and university levels

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Abstract: The objectives of this participatory action research were: to study community context, life styles and local wisdom concerning biodiversity in the Nong Han wetland, to construct new knowledge of local science on diversity and to develop the learning unit on diversity for secondary and university levels, and to extend this results of the study to other educational institutes. The duration of time was during November 2003-September 2004. Results of the study are as follow: community context, life styles and local wisdom showed that most local people were rice farmers, fishermen and agriculturalists. Most of them conserved local arts and culture as Candle Festival etc. Local science on biodiversity in this area was: biodiversity of birds were 107 species within 55 species of local birds, 52 species of migratory birds, water plants were 50 species, Fish were 44 species, phytoplankton were 90 species, zooplanktons were 37 species, and benthose and periphyton were 39 species. From this study, Learning units on biodiversity for secondary and university levels were constructed and they comprise: (1) Learning kits on biodiversity in the Nong Han wetland: water plants, fish and birds, (2) Instruction Manual on surveying natural habitats for secondary students on biodiversity of birds in the Nong Han wetland, Kumpawapi, (3) Instructional Material of birds, (4) Laboratory Directions for students on biodiversity of phytoplankton, zooplankton, water plants, fish, benthos and periphyton. The results of this study can be distributed to other 10 educational institutes in the Northeast of Thailand in terms of expanding the idea of studying local wisdom which brings about the fruitfulness of local community.

K2_K0011 ILLUSTRATING THE DIMENSIONS OF THE BONDING MOLECULAR ORBITALS OF ETHANE, ETHENE, AND ETHYNE BY USING THE 3D ANIMATION MOVIES.

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Abstract: In teaching Organic chemistry 1, the instructor developed the three 3D animation movies to illustrate the virtual models of the bonding molecular orbitals of the carbon-carbon bonds in the molecules of ethane, ethene, and ethyne. The created movies illustrated the dimensions around the bonding molecular orbitals. These computer assisted instruction (CAI) media could excite the students in class well.

K2_K0012 Development of Web-Based Instruction for a Hardware Computer course

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Abstract: The research aimed to develop a Web - Based Instruction (WBI) for the computer hardware lesson, which was a part of the subject *Information Technology* at Chiangrai Rajabhat University. Tools used for developing the system were Macromedia Dream Weaver MX as web editor for both HTML and PHP tags and commands and MySQL for data based management and PHP language. This program was divided into two sections: learner control and instructor control. In the first section, registered students were able to study the course content and play the millionaire game for earning the test scores. Lecturer could create his online subject material directly to the system and was able to check the test scores of individual student in the latter section. There were 200 undergraduate students participated in this system. The evaluation result revealed that the system has worked properly and met all the required functions.

K2_K0013 DEVELOPMENT OF ENVIRONMENTAL EDUCATION LEARNING MODEL TO ENHANCE KNOWLEDGE ATTITUDE AND BEHAVIOR ON WATER RESOURCES OF LOWER SECONDARY SCHOOL STUDENTS IN SAMUTSONGKRAM PROVINCE

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Abstract: This study is a research and development which aims to develop environmental education learning model to enhance students' knowledge, attitude and behavior on water resources. In this learning model, the content is integrated to environmental problems in the community, student – centered, and using inquiry based approach. The study's goals are to study and develop learning model to provide capacity building in environmental science for students, educators and communities, as well as to construct and strengthen educators' network in science and environmental education for life long learning. In addition this model will enhance knowledge, attitudes and behaviors about water resources of middle school

students who will be the key person for sustainable development in environmental education.

Five schools are involved in this study. Teachers in each school developed their own curricula for teaching their students with supports from the researcher team who acted as facilitators. Researchers act like mentors for supporting before, during and after learning model development. Small group discussions, school visits, trainings, seminars, workshops, demonstrations, and instructional materials supports were activities that provided for teachers who involved in this study. Five different learning models were developed according to teachers' plan. After implementation of their learning model on environmental education, t-test analysis was performed. Independent t - test was used for evaluate students' knowledge, attitude and behavior on water resources between students who participated and did not participate. The results show statistical significant difference on knowledge, attitude and behavior between students who participated in this study and control students (P=0.001). Students who participated had higher performance than students who did not participate. Thus, paired t – test was used for testing students' knowledge, attitude and behavior on water resources before and after attending teaching and learning by using developed learning models. The results show that after learning models implementations students had statistical significant higher overall knowledge, attitude and behavior than before (P=0.001).

K2_K0014 DEMONSTRATION APPARATUS OF ATOMIC FORCE MICROSCOPE FOR NANOSCIENCE STUDY

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Abstract: We have designed and invented the demonstration apparatus of Atomic Force Microscope (AFM), aiming to introduce high-school students into the nanoscopic-level forces. Our objective is to create something which can persuade them to have interest in the field of nanotechnology. This AFM demo kit is constructed from simple materials, available at street shops. The principle of the demonstration apparatus is not complicated and it is quite easy for K12 students to understand. However, the main basic principle of the real AFM is sill preserved in this AFM instruction kit. From the experiment, the image of surface is rather different from real substance. The height of substance will appear sharply. Image filter as a tool in MATLAB is employed to modify the image of the surface. So, the image of surface after using the filter is in agreement with real substance within 1 cm resolution.

K2_K0015 Development and Implementation of A Program for Primary Teacher Professional Development on Instruction of Nature of Science

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Abstract: This research is a study of development and implementation of a professional development program on lower primary school teachers' understanding and instructing of the Nature of Science (NOS). Case study and action research were employed as research method in the development and implementation of the program. This program was constructed based on prior understanding and instructing of NOS of four participant teachers found from case studies. It was found that before participants attended the program, they had mixed traditional and contemporary views of science, held partial understanding of science processes and process skills, and struggled in integrating and teaching conceptions of NOS explicitly in science classes. These primary data guided the program designing and development cooperating with consideration of Thai science standards documents, the effective teacher development model and approaches based on the social constructivist perspective, the explicit instructional approach for NOS, and content framework derived from NOS conceptual scheme and general agreed characteristics for NOS instruction. After the program has been audited and improved based on suggestions of experts in science education, it was implemented by researcher with the same participants who participated in the case studies. Action research method was used to find out program's effectiveness. From the implementation of the program, it was found both advantages and disadvantages which provided insight for the improvement of the program.

K2_K0016 COMPUTER ASSISTED INSTRUCTION (CAI) FOR MASS SPECTROMETRY

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Abstract: A computer assisted instruction program for mass spectrometry was developed by using Authorware 5.0, Adobe ImageStyler 1.0 and Adobe Photoshop 7.0. The contents included the basic theory, the instrumentation and the interpretation of mass spectra. The program was also provided examples, and exercises, with emphasis on mass spectra interpretation to determine the structure of unknown compounds and solutions for self study. The software improved the efficiency in learning and teaching this aspect of chemistry.

K2_K0017 REINFORCEMENT FOR THAI STUDENTS TO UNDERSTAND CONCEPTS IN PROTEIN PURIFICATION BY A VIRTUAL CLASS PROGRAMME TRANSLATED INTO THAI

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Abstract: Purification of protein from a complex mixture is an important step in biochemistry. A JavaScript simulation programme has been written by Andrew G. Booth in English to reinforce the concepts involved in protein purification for the second-year students in the University of Leeds, UK. This programme was not developed for self-learning; therefore, students need to have at least the concepts of protein purification before hand. In 2005, the newly written programme using Python was translated into various languages including the Thai one. The translation from the original into Thai, however, is constrained by differences between the characteristics of two languages such as structure and semantics. The first generation of Thai version was aimed to teach undergraduates, the same as that in the UK. However, most undergraduate students in Thailand learn only a few theories and carry out no experiment on protein purification. Therefore, a mixed population of postgraduates and undergraduates was taught with English-Thai programme. This bilingual programme could help Thai students to better learn the concepts of protein purification as determined by an overall favourable feedback towards this programme with a mean of 3.94. In the students' opinions, this programme can also help them to plan the protein purification experiments and future research. The Thai version has thus been used to be a concept guide in protein purification and has been taught at both undergraduate and postgraduate levels.

K2_K0018 The Conceptual Understanding of Light Refraction of Thai High School Students

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Abstract: This research shows the results of an investigation in conceptual understanding of light refraction of high school students in Bangkok. This is done by using the conceptual test which comprises of a series of open-ended questions. The results from the investigation show that the tendency of students misunderstandings in light reflection are the same for each high schools. Moreover, some of them can not apply the refraction principle for light phenomena. The results of this research are useful for the improvement of an appropriate teaching method. They can be used as a guide to design the apparatus and the learning process of refraction of light.

K2_K0019 The Use of Interactive Lecture Demonstrations in Force and Motion to Teach High School-level Physics in Thailand

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Abstract: This paper presents the results of an experiment using the microcomputer-based interactive lecture demonstrations (ILDs) to teach force and motion for 133 high-school students in Bangkok in the second semester of academic year 2004. To evaluate the effectiveness of the ILDs, the Force and Motion Conceptual Evaluation (FMCE), which was translated into Thai language, was administered to the students at the beginning and the end of the ILDs. The results indicated that, after using the ILDs, there was a 0.26 normalized gain in student's performance, while, by using lecture, there was 0.12 normalized gain in student's performance. In particular, there were very high gains in the topic of acceleration and Newton's third law. The study suggests that the ILDs can help high-school students develop conceptual understanding of force and motion.

K2_K0020 Investigation of students' Misconception in Direct Current

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Abstract: In this research, we will present the results of the study of misconception of direct current by using the Electric Circuits Concept Evalution (ECCE) with the first year students of Rajamankala University of Technology Bangkok. The ECCE standardized test, developed by Ron Thornton and David Sokoloff at Oregon University was used to test students' understanding in the concept of direct current. The translated version of the ECCE was used with Thai first year civil engineering students at Rajamankala University of Technology Bangkok.

The standardized test was used before and after the traditional teaching on the topic of direct current. The results show that many students have misconception in fundamental topics such as brightness of bulbs in parallel circuit, potential difference across the bulb in series circuit, and current through bulbs in complex circuit.

The analyzed results from the test show poor student performance. This indicates the need for new teaching method in the topic of currents to make student gain better understanding in the topics of the direct current.

K2_K0021 INTEGRATING HANDS-ON YEAST BIOCONTROL OF PLANT DISEASES IN BIOLOGY COURSE OF GRAD 11 CLASS

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Abstract: The knowledge of yeast biocontrol of anthracnose disease in chili fruits has been used to create a hands-on learning model for biology course in the topic of organism interrelationship of Grade 11 class. This aimed to enhance conceptual understanding, critical thinking ability and to evaluate the attitude of students toward hands-on biocontrol. Multiple choice test with reason explanation was used to assess the conceptual understanding and the ability to think critically of students was evaluated by holistic critical thinking scoring rubric constructed by Facione (1994). The results from t-test analysis indicated that the treated group (32 students) studying hands-on yeast biocontrol had higher conceptual understanding and critical thinking ability than the control group (31 students) taught by lecture only with significant differences at $P < 0.05$. Moreover, students of the treated group showed positive attitudes toward the learning model with most agreement in the case of hands-on biocontrol help them practice their scientific skill.

K2_K0024 SCORM 1.2 CONFORMANCE CONTENT: VELOCITY AND ACCELERATION

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ABSTRACT: The objectives of this study were (1) to develop SCORM 1.2 conformance e-learning content in physics on the topic of velocity and acceleration based on 85/85 efficiency criteria, (2) to compare the students' achievement prior to and after learning this e-learning content, (3) to determine the students' opinion on this E-Learning. The first group of sample consisted of 70 students of Burapha University, Chantaburi campus (selected by simple random sampling) and the second group consisted of 50 high school students from Chantaburi and Trad provinces (selected from students who have computer at home). Both groups were students in the second semester of the 2005 academic year. The instruments were the SCORM 1.2 Conformance e-learning content on the topic of velocity and acceleration, an achievement test, and a questionnaire on students' opinion toward the e-learning content. Statistics for data analysis includes E1/E2, mean, standard deviation, and T-test. The results showed that (1) the efficiency of the e-learning was at 85/85, (2) students' achievement after learning was increased significantly at the 0.05 level, and (3) this e-learning content is more interesting than the traditional method and it encourages learners to develop and improve their learning outcomes

K2_K0025 COMMUNITY EMPOWERMENT FROM THE COMPETENCY BASED STUDENT-CENTERED LEARNING MODEL

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Abstract: A competency based of student-centered learning module for community empowerment was developed within the course of the Clinical Microbiology and Immunology, Department of Clinical Microbiology, Faculty of Medical Technology, Mahidol University. The main objective of the module was to gain learning skills and competency development of the Medical Technology (MT) student to transfer general microbiology knowledge for the purpose of community health promotion. Learning based was set up into 3 platforms in the community of Klongmal, Sampran District, Nakhonprathom province. These included (i) Infectious disease knowledge for the community by the poster type; (ii) Microbes in daily life and food production involvement; and (iii) Demonstration of microscopic microbial examination and hand washing practice. All together, 50 residents of the Klongmai community, and 80 MT students were as the target group of this model. By after action, interview and questionnaire responding, 68.57% the MT student awared of the significant role playing of Medical Technologist for community health promotion. Among this, 55.71% gained their confidence to play part as a leader for empowerment team which was five fold increasing as compared to the pre-action survey. Meanwhile, a two fold increasing, 58.57% of MT student demonstrated their competence as an efficient team-worker.

K2_K0026 COLLECTION OF GEOLOGICAL SAMPLES FOR THE ROCK GARDEN MUSEUM

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Abstract: The Geological Museum of Geotechnology Department has been established since 2001. The purpose of this museum is to display and use as teaching and learning media for students and school teachers in the vicinity. The

small specimens are displayed in the museum, whereas the large ones are exhibited outside as the rock garden. The specimens were collected from various geological field trips and field works. These geological collections were identified and classified into 8 categories including volcanic rocks (1), mainly collected from Buriram; intrusion rocks (2) and metamorphic rocks (3), taken from Loei and Petchaboon; sedimentary rocks (4), collected from the Khorat Plateau in the Northeastern region; meteorites and tektites (5), basically found on gravel beds; fossils (6); gems, collected from (7) and economic minerals (8). The Museum and rock garden can serve as the education resources for earth science education.

K2_K0027 STUDENTS' UNDERSTANDING ON OPEN-ENDED QUESTIONS IN SOUND WAVE

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Abstract: This research presents students' performance on a series of open-ended questions in sound wave. The sample of this study is a group of 44 Matthayom six students who had learned sound wave. The questions in the test are a series of open-ended questions related to the principles of sound wave. The results show that many students have misconceptions on the principles of sound wave. The most common misconception is students' explanation on the relationship of speed, frequency and wavelength. They believe that the speed of sound depends on the frequency of vibration of the medium and also wavelength. Moreover, the results show that students use wave diagrams to describe the displacement of the medium causing them to believe that sound wave is a transverse wave.

K2_K0028 Teaching and Learning using Conceptual Change Perspectives to Promote Grade 10 Students' Understanding and Problem-Solving Skills of Stoichiometry

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Abstract: Stoichiometry is one of the most important topics in chemistry. The literature suggests that many students have difficulty in understanding and applying the stoichiometry concepts. In this work we identified Thai student conceptions for stoichiometry using a purpose designed questionnaire - the *Stoichiometry Concept Questionnaire*, and then we report the development of a series of stoichiometry learning units (SLUs) which seek to enhance students' understanding of, and problem-solving skills in, stoichiometry. Conceptual change theory was used as the theoretical based for the development of the units, in which we drew upon a situation analysis of students' understanding and problem-solving skills, along with observation of teaching and learning when designing the SLUs. The units were implemented by three volunteer teachers in three Grade 10 science classrooms from three different schools. The results of the evaluation suggest that the units offer an alternative for the teaching stoichiometry and helping students develop their understanding, and enhancing their problem-solving skills, of stoichiometry.

K2_K0029 SIMPLE DEMONSTRATION APPARATUS AND HANDS-ON ACTIVITY FOR CONSTRUCTING CONCEPTS OF SCANNING PROBE MICROSCOPES.

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Abstract: The simple demonstration apparatus were constructed and hands-on activity was set to improve in the concept of scanning probe microscope. The first activity, "attach me please", aims to demonstrate the moving atom by scanning tunneling microscopy (STM) with actual scaling. The cylinder with diameter of 50 cm was used to represent the tip with solenoid wired around soft iron at the tip edge. Sphere iron ball with diameter of 1 mm was employed as an atom and was shaking up and down as analog for thermal vibration. The second activity, "where is the surface?", aims to demonstrate the principle of STM by using model conducting surface covered by carbon powder. The ohmmeter connected to the metal bar and model surface was implemented to indicate the current through the carbon powder at constant height. The third one, "touch me with love", is a hands-on activity to help understanding on atomic force microscope (AFM). The participants drag the plastic and aluminum ruler with sharp bottom at the end through the various rough surfaces. Forty teachers from various fields participated and evaluated the activities. From the evaluation study, it was found that the demonstration apparatus and hands-on activity can enhance the understanding in the concept of scanning probe microscope at high level.

K2

K2_K0030 Investigation of Student Understanding Force and Motion Using Concentration Analysis

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Abstract: The objectives of this study have two folds -- 1) investigating students' basic understanding of force and motion and

2) employing the model analysis in evaluating multiple-choice test. The main instrument in studying conceptual understanding of mechanics is Force and Motion Conceptual Evaluation (FMCE). The FMCE test was administered to 746 engineering freshmen taking an introductory physics with calculus at Chiang Mai University. The first algorithm of model analysis, called the concentration analysis was used in evaluating student responses. The concentration factor for each question was obtained and plotted versus score on each question. Then each question was categorized according to the 3-level scheme in order to interpret overall student understanding. The results from the concentration analysis indicated that most students come into the physics classroom with a weak understanding about force and have misconceptions about force and momentum.

M_M0001 Characteristics and physical stability of nanoparticles entrapped with mineral water from various sources in Thailand

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Abstract: In this study, we investigated the characteristics and stability of nanoparticles entrapped with mineral water from various hot spring locations in Thailand comparing with distilled water (control). Sources of mineral water were selected which On-Luay (Sankamphaeng district), Pong Kum (Doi Saket district.) and Ranong Province, that contained high content of metals (such as Mg^{2+}, Ca^{2+}, and Na^{+}), which are useful for skin. Thirty six formulations of niosomes entrapped with mineral water were prepared by chloroform film method. The nanoparticles were composed of Tween 20, 60, 61, 80 and Span 20, 40, 60, 80 and 85 with cholesterol in the ratio of 1:1. The total concentration of the non-ionic surfactants and cholesterol was adjusted to 20 mM. The Particle size observed under the optical microscope was small unilamellar vesicle with the diameter range of 50-550 nm., which were the smaller than control (2.47-5.23μM)(n=12) significantly(P=0.05). The order of the particle sizes of Span 40<60<80<20< Tween 61<60<80<20 at 65.21±15.57, 93.66±18.86, 99.15±16.67, 170.02±38.03, 176.25±11.56, 186.67±90.89, 200.16±132.19 and 486.32±54.92 nm. respectively. Span 85 can not prepare niosomes because no film was obtained. Stability of niosomal formulations at condition 4°C, RT and 45°C was observed at initial 1, 2 and 3 months indicated that. Span 20, 40 and 60 showed the best stability because of less sedimentation and layer separation as well as the uncharge particle size observed under the optical microscope and Zeta Potential/Particle Sizer Nanoparticles entrapping with mineral water from Sankamphaeng gave the most stable with the less sedimentation and small particle size than other mineral water resources. Percentages of entrapment were investigated by separating niosome from unentrapped mineral water by Sephalose column and the Na^{+} contents which was used as a marker was determined by atomic absorption. Precent entrapment of Na^{+} were 84.95±14.32, 76.43±20.98 and 61.01±12.35% for Span 40, 60,and 20 respectively. Percent entrapment was decreased with times.

M_M0002 CHARACTERISTICS OF NANOPARTICLES ENTRAPPED WITH BIOACTIVE COMPOUNDS EXTRACTED FROM WASTES OF RICE BRAN OIL INDUSTRIES IN THAILAND

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Abstract: The objective of this study was to extract the bioactive compounds from wastes of rice bran oil industries in Thailand and entrap in nanoparticles (liposomes and niosomes) to be used as cosmetic raw materials, in order to increase the value of agricultural products and for the substitution of the import cosmetic raw materials. The selected 7 rice bran and rice bran oil samples from 2 factories were acid distillated rice bran oil (AT, AK), crude rice bran oil (CT, CK), refined rice bran oil (RK), defatted rice bran (DBT, DBK) and one sample of rice bran from Chiang Mai market was RBM. The 8 samples were extracted by 80% methanol with alkaline hydrolysis. The ferulic acid contents were analyzed by HPLC. The three rice bran samples (DBT, DBK and RBM) were extracted for phytic acid by dissolving in 2.4% hydrochloric acid. The phytic acid contents were determined by spectrophotometry according to AOAC standard method. The ferulic acid contents were found in AT, CT, AK, CK and RK and RBM samples at 4.01, 0.72, 3.52, 0.52, 1.47 and 1.79 g/100 g respectively, but not found in DBT and DBK samples. Amounts of phytic acid were found in DBT, DBK and RBM samples at 41.23, 64.39, 248.62 ug/g respectively. AT and RBM samples were selected to extract for ferulic acid and phytic acid respectively. The extracts at 5% was entrapped in liposomes and niosomes by chloroform film method with sonication. Three formulations of DPPC/CHOL, Tween61/CHOL and Span60/CHOL at 1:1 molar ratio were selected. Physical characteristics of pH, particle sizes and sedimentation were investigated. Tween61/CHOL at 1:1 molar ratio entrapped with the ferulic acid and phytic acid extracts showed the best physical stability with the particle sizes of 95.6 ± 23.8 nm and 92.1 ± 22.3 nm, respectively. This formulation will be used for further development of topical formulation.

M

M_M0003 PHYSIOLOGICAL AND PSYCHOLOGICAL EFFECTS OF ESSENTIAL OIL IN AROMATHERAPY MASSAGE

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Abstract: The aim of the study was to investigate the physiological and psychological effects of sweet orange oil (*Citrus sinensis*, Rutaceae) in healthy subjects after transdermal absorption. Thirty nine healthy volunteers participated in the experiments. Four physiological parameters, i.e. blood pressure, breathing rate, pulse rate, skin temperature were recorded. Psychological responses were assessed were assessed in terms of alertness, attentiveness, calmness, mood, relaxation, and vigor. Sweet orange oil caused significant decreases of breathing rate and pulse rate which indicate a decrease of autonomic arousal. At the emotional level, subjects in the sweet orange oil group rated themselves more cheerful and more

vigorous than subjects in the control group. This finding points towards an increase of psychological arousal.

M_M0004 FORMULATION OF CREAM BASE READILY FOR MIXING WITH VEGETABLE AND FRUIT EXTRACTS

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Abstract: Concentrated cream base readily for mixing with vegetable and fruit extracts was prepared using isopropyl isostearate as an oil phase, polyacrylate 13/polyisobutene/polysorbate 20 as an emulsifier, methyl paraben/propyl paraben as a preservative and distilled water as a water phase at a ratio of 15:3.5:1:40. An average viscosity and pH of the obtained concentrated cream base was 37,866.67 ± 11,477.08 cps and 6.87 ± 0.26, respectively. The concentrated cream base exhibited glossy look and milky white color. It was stable after 6 cycles of temperature cycling test. The concentrated cream base was readily to be mixed with vegetable or fruit extracts at a ratio of 3:2.

M_M0005 DEVELOPMENT OF A SKIN CARE PRODUCT FROM BAN-DUNG SALT MUD, UDONTHANI

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ABSTRACT: A skin care product from Ban-dung Salt Mud, Udonthani, was developed by collecting and processing the mud into dry powder. Chemical and microbiological tests of the product suggested that it passed the quality control in cosmetics in terms of heavy metals and microbes and contained certain levels of 7 essential minerals. Forty females, met the inclusion criteria, volunteered in the skin moisture and pH testing upon using the product with a double-blinded comparison to a commercial product. The average moisture and pH of the skin, measured 15 mins after application significantly increased with all age groups ($p<0.01$). All of the volunteers (100%) reported cooling sensation. Ban-dung Salt Mud could be potentially further developed as a source of raw materials of mud pack products for skin moisturizing and pH adjustment.

M_M0007 Protection of α-Lipoic acid and dihydrolipoic acid against intracellular mitochondrial reactive oxygen species)

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Abstract: Oxidative modification alters the function of proteins and plays an important role in the decline of cellular function during aging process. The mitochondria may be the primary cellular source and target of endogenous reactive oxygen species (ROS) as they are produced as a normal byproduct of the electron transport system. α-Lipoic acid (α-LA), naturally occurring compound, is present in all parts of the body as part of several multienzyme complexes involved in energy formation. It is reduced to dihydrolipoic acid (DHLA) in the pyruvate dehydrogenase complex. In this investigation, α-LA was extracted from Thai spinach (Spinacia oleracea) and characterized using LC-MS. DHLA was synthesis by reducing α-LA and characterized using ESI-MS. Intracellular free radical production was determined by using dichlorofluorescein (DCF) and dihydroethidium bromide (DHE), cell-permeable oxidation-sensitive probes. For quantitative analysis of ROS and $O_2^{\bullet-}$ formation, flow cytometry analysis was performed. The levels of $O_2^{\bullet-}$ and ROS in NHDF cells were significantly reduced in the systems treated with α-LA and DHLA. Interestingly, both α-LA and DHLA blocked mitochondrial ROS generation. Moreover, they also increased growth rate of normal dermal human skin fibroblast (NHDF). Therefore, α-LA and DHLA might be useful in products containing anti-free radical and stimulate cell renewal.

M-M0008 RAT SKIN TRANSDERMAL ABSORPTION OF AZELAIC ACID–CYCLODEXTRIN COMPLEXES

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Abstract: This study aimed to investigate the transdermal absorption of an aqueous solution of azelaic acid (AA) complexed with hydroxypropyl-β-cyclodextrin (HPβCD). Equimolar of AA and HPβCD complexes were prepared by physical mixture (PM), coevaporation (COE) and freeze-drying (FD). The complexes were characterized by infrared spectroscopy (IR), differential scanning calorimetry (DSC) and X-ray diffractometry (XRD). The AA contents were assayed by a HPLC. Transdermal absorption studies of AA, PM, COE and FD products across the full-thickness abdominal skin (the male Wistar rats) were conducted, using vertical Franz diffusion cells at 32 ±1°C. The donor compartment was filled with 2 ml of samples (10mM). An amount of 12 ml of pH 7.4 phosphate buffer saline (PBS) was put in the receiver chamber. After 4, 6, 8 and 12 h, the cells were withdrawn. The amount of AA in the stratum corneum (SC) was collected by stripping the skin, using 3M Scotch Magic™ tape. For AA in the viable epidermis and the dermis (VED), the whole skin was cut into small pieces, and AA was

extracted from the skin using methanol. Samples in methanol were derivatized and analyzed for AA by HPLC. From IR, DSC and XRD investigation, PM and COE methods gave partial inclusion complexes, whereas FD formed complete complexation. The fluxes (μg cm^{-2} h^{-1}, n=3) in SC, VED and receiver chamber were at 30.60±4.78, 28.27±6.16 and 6.03±2.31 μg cm^{-2} h^{-1} which were more than the uncomplexed which gave 22.06±3.24, 26.51±3.20 and 0.38±0.03 μg cm^{-2} h^{-1} respectively. This present study has suggested that AA complexed with HPβCD by the FD process gave not only the complete inclusion, but also improved the aqueous solubility of AA thereby increasing the permeation through skin. FD method might be the most proper process for the preparation of the complex in the development of AA for topical products.

N1-N0004 GROUNDWATER RECHARGE ASSESSMENT OF RIVER BASIN IN THAILAND

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Abstract: The total area of Thailand is about 513,115 km^2. Topographically, the country can be classified into 25 river basins (Royal Irrigation Department) and the country rocks comprised of Precambrian – Quaternary rocks (Department of Mineral Resources, 2001). These rock formations can be hydrogeologically classified into 9 units, as follows: Recent alluvial deposits, Younger terrace deposits, Older terrace deposits, Colluvial deposits, Limestone/Carbonate unit, Sedimentary rock unit, Metasedimentary and Metamorphic rock unit, Volcanic rock unit and Granitic unit. Recharge into each river basin will depend on rainfall, permeability of rock and influence of slope. Using average rainfall data during eighteen year period (1987-2004), designated infiltration factor and slope factor, it is found that the average recharge range from 0 - 570 mm/yr, or 0 - 12 percent of local annual rainfall. The calculated recharge is useful for future water management of each river basin.

N1_N0006 TROPOSPHERE ATMOSPHERIC OBSERVATION BY MIE SCATTERING LIDAR AT SRISAMRONG, SUKHOTHAI PROVINCE

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Abstract: In 1995–2004, Mie scattering lidar system was installed and developed at Srisamrong, Sukhothai province under the observatory for atmospheric radiation research founded by Thai and Japanese scientists. With the raw data collected in 2003-2004, the tropospheric atmosphere of this urban region was studied. In this work, the variation of vertical profiles of range corrected signals for distinct 2 months of December (winter) 2003 and March (summer) 2004 were performed. Further studies of related local parameters supporting this work have still been required for precise and reliable characterization of aerosol studies in our environmental atmospheres. Additionally, in the future we wish to utilize this tool for climatological research in Thailand.

N1_N0007 THE VERTICAL DISTRIBUTION OF OZONE OVER SONGKHLA, THAILAND.

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Abstract: The vertical distribution of ozone is a significant requirement in monitoring the atmospheric ozone layer. It can be measured by Ozone Sonde, ground-based Dobson or Brewer spectrophotometer and satellite-based instruments. In order to provide a data set of ozone profile over Songkhla the Umkehr measurements taken by the Brewer spectrophotometer No.120 authorized by the Meteorological Department during 2001-2003 and TOMKEHR software developed by the World Ozone Data Center in 1992 were used in this study.

The ozone profile calculated using TOMKEHR software expressed good agreement with those from SAGE II satellite and Malaysia Ozone Sonde measurements as for a latitudinal dependence. The vertical distribution of ozone over Songkhla was found that the height of maximum density is 26-28 km above the earth surface and its annual average concentration is approximately 4.70×10^{12} molecules/cm^3 in 2001, 4.90×10^{12} molecules/cm^3 in 2002 and 4.70×10^{12} molecules/cm^3 in 2003 respectively. There is no significant change in long term as a meaning of ozone depletion in tropical regions during these years, except that high value of the ozone at near surface has showed its role as a pollutant in urban site.

N1_N0008 Time variation of aerosol in Bangkok

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Abstract: From the time variation of aerosol in Bangkok using AERONET data at Chulalongkorn site during 2003 –2004 found that AOT were mostly high in summer and winter, low in rainy season. The comparison between the AOT and daytime average air temperature found that while AOT were greater than 0.4, the air temperature was greater than 33 °C in summer and decreased than 0.2 °C in winter. For rainy season, AOT were lower when rainfall was greater than 10 mm. In addition, the variation of AOT shown as a cycle mostly every 4-7 days and corresponding with the variation of air temperature. The Angstrom exponent values showed the fine mode particles with loading dominant in summer and winter, the volume size distribution showed on two modals with a fine mode more dominant than other. For the analysis of AOT and back-trajectory, revealed that there were the aerosols from China to Thailand.

N1_N0010 DAYTIME ESTIMATION OF THE HEAT BUDGET FROM ROUTINE METEOROLOGICAL DATA AT NON - IRRIGATED PADDY FIELD IN SUKHOTHAI, THAILAND

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Abstract: This paper is presented to find out the empirical model for hourly estimation of the surface heat budget from routine meteorological data during daytime in Thailand. The model is designed for paddy field, but it contains parameters which take account of the surface properties in general. The required input meteorological data are no more than the air temperature and relative humidity at screen height, single wind speed and total cloud cover. The output of the model is in terms of incoming solar radiation, net radiation, latent heat flux and sensible heat flux. For one year of observations at non-irrigated paddy field in Sukhothai, Thailand, we obtained satisfying results between observations and estimates. It appears that the root mean square error are σ = 105.7 W/m^2 for incoming solar radiation, σ = 68.1 W/m^2 for net radiation, σ = 83.0 W/m^2 for latent heat flux and 36.1 W/m^2 for sensible heat flux.

N1_N0011 The Observatory for Atmospheric Research at Phimai

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Abstract: The distribution of radiative energy mechanism is complicated in the Asian monsoon region with the monsoon circulation caused by the ocean-land contrast at the continental scale. There are numerical simulations, for example, indicating that upper and lower level clouds play the important but different roles in the energy flow on a continental scale. The effect of global warming due to greenhouse gas increasing is especially large and sensitive budget structure over land areas. Therefore, to understand the climate formation of this region, it is important to study the effect of clouds, water vapor and surface conditions on the radiative budget of this region. The high accuracy and temporal continuous instruments are need for radiative fluxes measurement and related ancillary quantities for this study. So, the Observatory for Atmospheric Radiation Research was constructed in the corporation between Thai and Japanese scientists under GAME-T project. The Observatory was located at Sri Samrong, Sukhothai, Thailand about 700 km., north of Bangkok. The Observatory contained some of equipments that can divide into 4 groups as below;

1. Water vapor observation group composed of Global Positioning System and Microwave radiometer or Water vapor radiometer.
2. Atmospheric radiation and surface meteorological component group composed of Upward and down looking Pyranometers and Pyrgeometers, Pyrheliometer, and automatic thermometer, barometer and anemometer.
3. Aerosol observation group, there are Sky and i-Sky radiometer and Lidar.
4. Wind Profiler to observe air parcel movement by Doppler RAdio Detection And Ranging or Doppler RADAR technique.

All of the instruments control by PC and working automatically. After the observation, data stored in the PC, download to computer server and transferred to the server at Chulalongkorn University. Because the observatory at Sri Samrong was too narrow for extensive field of research activities therefore, it was decided to move to Chaleamprakiat Royal Rain-making Research Center, Phi Mai, Nakhon Ratchasima in January 2005. The Observatory was renamed as "The Observatory for Atmospheric Research".

N1_N0012 AEROSL OPTICAL DEPTH OBTAINED BY MULTI-FILTER RADIOMETER (MFR-7)

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Abstract: Multi-filter Radiometer (MFR-7) has been installed at the Observatory for atmospheric radiation research at Sri Samrong, Sukhothai (17°09N, 099°51E) by the cooperation of Frontier Research Center for Global Change (FRCGC), Japan since 2002. This instrument is design to measure global, diffuse and direct solar irradiance. For this study, we apply direct irradiance data of 3 wavelengths (415, 500 and 985 nm.) from MFR-7, during January 2003 to investigate aerosol optical depth (AOD) by Beer-Lambert-Bouguer law ($I = I_o e^{-\tau a m}$). AOD was 0.68 – 0.31 at 500 nm at Sri Samrong site. Trajectory analysis has shown that higher AOD aerosol come from the west site of Sri Samrong observatory from mid to late of January. AOD was increase from early to late of January 2003.

N2-N0001 CERTAIN CHARACTERISTICS OF DICKITE FROM SARABURI, THAILAND

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Abstract: The characteristics of dickite samples from the deposit at Khao Cha-Om, Tambon Cha-Om, Amphoe Kaeng Khoi, Saraburi Province, Thailand were investigated. The techniques used include SEM, TEM, WD-XRF, XRD, FTIR and Raman microprobe. The samples show their cryptocrystalline habit exhibiting pseudo-hexagonal plates stacking together like books, variation in chemical composition as well as some varieties coexist with quartz.

N2_N0002 PALEOECOLOGICAL ANALYSIS OF MOLLUSCAN ASSEMBLAGES FROM BANGKOK CLAY IN SAMUT PRAKAN

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Abstract: Holocene deposit, Bangkok Clay in Bangkok central plain are well observed in the sandpit of Samut Prakan. Block sampling and NaTPb treatment of sample blocks had been carried out for the Paleoecological analysis of fossil molluscan assemblages. It reveals that only one cycle of transgression and regression is recognized in Bangkok Clay. The transgression is characterized by Veremolpa - Moerella Assemblage and the regression is characterized by Cryptonatica - Paphia Assemblages. The beginning of the transgression is also characterized by the brackish water molluscan assemblage.

N2_N0013 Uranium Contents Analysis in Soils at Pattani and Narathiwat Provinces with the Gamma Spectrometer

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Abstract: The Uranium contents in soil samples in Pattani and Narathiwat provinces were investigated. The global positioning system device was used to identify the location of the collected samples. All the collected samples were heated at 120°C for 20 hours before sieving by using 18 mesh sieve. Each soil sample of 100 gram with the particle size less than 1 mm was kept in a sealed plastic container for one month to reach the secular equilibrium. The gamma ray spectrometer was used to analyze the equivalent uranium content at the 1.76 MeV photopeak that emitted from Bi-214.

The result showed that the average uranium content in 46 locations of Pattani province at the 0 - 5 cm and 5 - 10 cm depth were 4.09±0.19 ppm and 5.11±0.20 ppm, respectively. For the Narathiwat province with 54 locations of collected sample sites, the analyzed uranium contents at the 0 - 5 cm and 5 - 10 cm depth were 4.53±0.20 ppm and 5.42 ±0.21 ppm, respectively. The uranium content contour was performed to identify some areas that may be harmful to human.

N2_N0014 EVALUATION OF THE TSUNAMI DISASTERS ON 26TH DECEMBER 2004 ALONG THE SHORELINE RANONG TO KHA LAC - LAMRU

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Abstract:The tsunami disasters along the shoreline from Ranong to Khao -Lak Lamru have been investigated totally, 5 times for 1 month in 2005. Principles for the Tsunami disasters observed and established in Japan are applicable to those in Thailand. In Thailand, the first wave was pulling waves. So many foreigners tried to go far out at sea. An after that, when the second pushing wave attacked the beach, nobody came back to the beach and died. Sumatra - Andaman earthquake is belonged to the APlate boundary type.@ So, on account of periodicity of the earthquake, next Tsunami is predictable. Cycles of the Tsunami are expected 60 to63 years. It is also important to study historical Tsunami disasters.

N4_N0005 A Survey of Ruditapes variegatus (Sowerby, 1852) at Kho Kham Yai, Sichang District, Chonburi Province

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Abstract: The distribution and population variation of Venus Clam Ruditapes variegatus (Fam. Venelidae) were studied at Kho Kham Yai, Sichang district, Chonburi province during May 2005 to April 2006. R. variegatus is normally found inhabiting in medium (0.25 - 0.50 mm) and course sand (0.50 - 1.00 mm). The highest and lowest population densities were found in June and November, respectively. The recruitment of the small clams (5-10 mm in shell length) took place from May to July and September. This study also reveal a relationship between percentage of organic content and density of R. variegatus ($r = -0.291$, $p < 0.05$).

O1_O0002 ATOMISTIC SIMULATION OF THE STRUCTURE OF AMORPHOUS POLYSTYRENE

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Abstract: A static, atomistically detailed model of dense, glassy polystyrene was simulated using molecular mechanics/ molecular dynamic hybrid method. Initial chain conformations which were generated using a Monte Carlo technique including periodic boundary conditions, were relaxed by potential energy minimization. Detailed analysis of the minimized structure indicated that intermolecular packing effects create a large variety of chain conformations different from the purely intramolecular ground states. The distribution of the torsion angles of the minimized structures did not show the expected behavior of the model compounds (dimer) indicating the intermolecular interaction dominate the local preferences. The systems are amorphous, exhibiting random coil behavior. The predict Hildebrand solubility parameter and Neutron/X-Ray structure factor are in reasonable agreement with the experimental values

O1_O0003 MOLECULAR DYNAMICS SIMULATION OF POLYETHYLENE OXIDE:POTASSIUM IODIDE ELECTROLYTES

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Abstract: Molecular dynamics simulations of pure tetraglyme, a model for amorphous PEO, and tetraglyme:potassium iodide (KI) complexes with an ether oxygen:K^+ ratio of 10:1 were performed at 400 K. Structural analyses were done to investigate PEO conformations, I^- and oxygens coordination by K^+. The mean-square radius of gyration shows that PEO chains become more compacted upon complexation with salt. Dihedral angle population density distributions for PEO chains show that the *trans* conformation is favored for C-O bonds while the more compact *gauche* conformation is favored for C-C bonds. Both bonds prefer less *trans* conformation enforced by coordination of adjacent oxygens to K^+. Diffusion coefficient for both K^+ and I^- were estimated from the mean square displacement. K^+ was found to diffuse slightly slower than I^- in PEO.

O1_O0006 THE STRUCTURE OF IRON-STARCH.

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Abstract: Iron is an essential element for metabolic processes in human body, such as oxygen carrier, DNA synthesis and electron transport. A human body needs iron approximately 10-20 mg per day. The persistent abnormality in iron balance leads to either iron deficiency anemia or hemosiderosis. The medication of iron deficiency disease normally uses iron complexes, oral iron-supplement or intravenous iron-supplement i.e. iron-polysaccharide, iron-dextran, iron-sucrose and ferrous gluconate. Even though, iron saccharide has been used for medication for more than 50 years, the structure of iron saccharide has not yet been clearly understood. In this work, the study on the structure of iron-starch samples were carried out. X-ray powder diffractograms showed that the as-prepared iron-starch samples were in amorphous phases. FT-IR spectra of iron-starch samples displayed the same band as one of iron-oxides, indicating that the core structure of the iron-starch samples was similar to iron-oxide. X-ray absorption spectroscopy (XAS) results showed that the only oxidation state iron(III) was found. Shifted of absorption edge at different energies with various types of starches, indicated different interactions of iron with starch.

O1_O0011 ANGLE-RESOLVED PHOTOEMISSION STUDY OF ENERGY-BAND STRUCTURE ON NICKEL (111)

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Abstract: This report provides new information on the bulk-energy-band structure of metallic Ni(111) using angle-resolved photoemission spectroscopy. On the basis of free-electron final-state model, we revealed bulk energy-band dispersions. The obtained bulk energy-band dispersions show a fair agreement with energy-band calculations using local density approximation (LDA) and beyond LDA. These analyses suggest the dynamical screening effect brought about by off-site as well as on-site electrons should be concerned to explain the appearance of satellite structures as well as the energy-band dispersions obtained here.

O1_O0018 AN INVESTIGATION OF CLEAN P-TYPE GALLIUM NITRIDE (0001) SURFACES USING SYNCHROTRON RADIATION FROM SIAM PHOTON SOURCE

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Abstract: p-GaN (0001) surfaces were treated with HCl, annealed at 550 °C for 10 munites and nitrogen-sputtered for 15 minutes. Auger electron spectroscopy (AES), synchrotron photoemission spectroscopy (PES) and low energy electron diffraction (LEED) were used to study surface cleanliness, electronic properties and surface structure of the p-GaN (0001) surfaces, respectively. Results obtained showed that treating the surface with HCl will leave chlorine and carbon on the surface. These contaminants were removed after annealing at 550 °C for 10 minutes but oxygen was found instead. Oxygen was removed by nitrogen-sputtering for 15 minutes. Clean surface was found to have (1x1) surface but did not improve the electronic structure as expected.

O1_O0019 OXIDATION STATE INVESTIGATION OF SULFUR IN NATURAL AND SYNTESIS GLOVE BY X-RAY ABSORPTION SPECTROSCOPY (XAS)

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Abstract: Rubber and products made from rubber are the first and foremost exported goods in Thailand. Several techniques have been used to improve the quality of rubber product but none can provide details about the chemical structure mainly the sulfur-crosslinks and oxidation states of sulfur within the rubber. Since sulfur is introduced during vulcanization process, understanding the local environment of sulfur atoms can lead to a better understanding about the elasticity of rubber product. X-ray absorption spectroscopy (XAS) is one of the powerful technique of synchrotron light application. It is the only technique to identify the chemical properties within the rubber products. XAS measurements were carried out using synchrotron radiation source at the Siam Photon Laboratory. This preliminary work, we was successful enough for distinguishing oxidation states of sulfur atom between natural and synthesis rubbers in vulcanization process.

O1_O0021 TRANSGENIC THALASSEMIA HEMOGLOBIN E FROM HUMANIZED MOUSE: X-RAY CRYSTALLOGRAPHIC AND FUNCTIONAL INVESTIGATION

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Abstract: Hemoglobin E (HbE), the most common β-thalassemic disease in Southeast Asia, is caused by a substitution of Glu by Lys at codon 26 of the β-globin gene. Clinically they are very heterogeneous in severity. Individuals homozygous HbE exhibit mild thalassemia, while the combination of HbE with a β-thalassemia mutation exhibit highly variable severity. A novel C57BL/6 Transgenic murine model of HbE were generated by S. Fucharoen's group with knock out mice that had deletions of the β-globin genes in order to create mice expressing chimeric hemoglobin ($mu\beta_2$: $hu\beta_2^E$). Evidently, human β^E-transgene can be expressed and functioned *in vivo*. The structural investigation of transgenic hemoglobin would eventually reveal the involved mechanism in atomic level leading to better understanding of thalassemic mouse model before the development for testing antisense therapy and some antioxidant drugs instead of testing in human.

O1_O0022 CRYSTAL STRUCTURE AND DIELECTRIC PROPERTIES OF A-SITE DOPED $(Bi_{1-x}Y_x)(MNb)O_7$ (M = Fe^{3+}, In^{3+}) Bi-PYROCHLORES

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Abstract: In this work, we investigate the local structure and associated dielectric properties of a family of Bi-based pyrochlore phases, namely $Bi_2(MNb)O_7$ (*M* = Fe^{3+} and In^{3+}) with a 1:1 *M*:Nb ratio on the pyrochlore *B* sites. At 1 MHz and room temperature, the dielectric constant of $Bi_2(FeNb)O_7$ (BFN) was found to be 100 while its dielectric loss was 0.007. For $Bi_2(InNb)O_7$ (BIN), under the same conditions, the corresponding dielectric constant was 133 and the dielectric loss 0.002, respectively. These results suggest this family of Bi-pyrochlore phases have potential for application as dielectric materials as well as expanding the options available to adjust the physical properties of current Bi-containing pyrochlore phases. A

composite $Bi_2Fe_{0.5}In_{0.5}NbO_7$ (BFIN) intermediate was also synthesized to optimize associated dielectric properties.

O2_O0001 *In vitro* permeation study of an extract of *Phyllanthus amarus* using shed scale of *Ophiophagus Hannah* as a barrier

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Abstract: *In vitro* permeation study of *Phyllanthus amarus* extract using shed snake scale as a barrier membrane, side-by-side diffusion cells with a controlled temperature at 32°C and UV spectrophotometric analysis at a λmax of 277 nm. After 4 h, permeants were observed in the receptor. Qualitative analysis by TLC showed several band colors under UV light at 254 and 366 nm. HPTLC of the permeants at 4 h gave 2 out of 8 peaks at Rf values of 0.42 and 0.72 with an extent of permeation of 2.4 and 0.25%, repectively. It is concluded that the extract of *P. amarus* could permeate the barrier and each component permeated differently.

O2_O0004 The effect of medicinal plant extracts on cytoplasmic membrane of multidrug resistant bacteria by flow cytometry

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Abstract: The *Dracaena loureiri* Gapnep., *Myristica fragrans* Houtt. and *Mansonia gagei* Drumm. were investigated for their abilities to enhance bacterial permeability by flow cytometry. This experiment exhibited enhancement of herb extracts to disrupt the cytoplasmic membrane of living bacterial cells. The membrane - impermeant nucleic acid stain of ethidium bromide of *Acinetobacter baumannii* and *Staphylococcus aureus* were tested by FACscan flow cytometry. The varied concentration of herb extracts were tested theirs ability to enhance permeability of multidrug resistant bacteria. The results indicated that herb extracts could promote intracellular accumulation of ethidium bromide in both strains of multidrug resistant bacteria. In the treatment of crude extracts to *Acinetobacter baumannii* the lowest concentration of *D. loureiri* Gapnep., *M. fragrans* Houtt. and *M. gagei* Drumm. that showed the brighter signal and uniformly fluorescent were 0.1, 0.05 and 5 mg/ml, respectively. Also, the treatment with 0.1 mg/ml of *D. loureiri* Gapnep or *M. fragrans* Houtt. enhanced bacterial permeability of ethidium bromide into cell membrane of MRSA.

O2_O0005 THAI MEDICINAL PLANT EXTRACTS POSSESSING ANTI-BACTERIAL ACTIVITY AGAINST CATFISH PATHOGENS, *AEROMONAS SOBRIA*

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Abstract: This research was to study the effect of Thai medicinal plant extracts against bacterial pathogens of catfish, *Aeromonas sobria*. Eighty-two samples both extracted in water and 75% ethanol derived from 41 species of Thai medicinal plants were tested by agar well diffusion assay. The water-extracted samples of pomegranate (*Punica granatum*), rose apple (*Eugenia javanica*), and Ma-kurn-kai (*Drypetes rexbughii*) exhibited the highest antibacterial activities, orderly. Their minimal inhibitory concentration (MIC) values were 6.25, 12.50, and 12.50 mg/ml, respectively. The minimal bactericidal concentration (MBC) values of all three extracts were at 12.50 mg/ml. The MBC/MIC values of these plant extracts indicated that they were bactericidal (≤4). The primary analyses of their active chemicals were carried out by TLC-bioautographic and TLC-chemical assays. The antibacterial components of *P. granatum* extract separated on TLC plate were classified in phenolic/flavonoid and steroid groups. Active components of *E. javanica* extract were tested positively to steroids and proantrocyanidins, while steroids were the active components of *D. rexbughii* extract.

O2_O0007 FORMULATION OF ANTIFUNGAL CREAM FROM *Impatiens balsamina* Linn.

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Abstract: The purpose of this study was to prepare an antifungal cream from *Impatiens balsamina* Linn (Ib). The dried leaves were macerated in methanol and the extract was reextracted with chloroform. The final extract was tested by agar diffusion method for its antifungal activity against *Trichopyton rubrum* and *Trichopyton mentagrophytes* and the optimum concentration to be used in Ib cream which was found to be 20%. Three formulations of 20% Ib creams were then prepared using the selected bases and tested for antifungal activity against the 2 organisms mentioned in comparison with the 2% ketoconazole cream available in the market. It was found that the three Ib creams possessed higher antifungal activity than the proprietary preparation. The results suggested the potential of ib cream to be further developed into an effective antifungal cream.

O2_O0008 The effects of crude extracted *Kaemferia parviflora* on human cholangiocarcinoma cells proliferation, metastasis and apoptosis

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Abstract: This study was aimed to investigate the anti-proliferation, anti-metastatic and apoptotic effects of the crude extracts from *K. parviflora* on human cholangiocarcinoma cell line. Firstly, cytotoxic effect and 50% inhibitory concentration (IC_{50}) were evaluated and determined by MTT assay. Then, the appropriated doses were selected for further investigation on anti-metastasis and induction of apoptosis, by transwell invasion and DAPI staining assays, respectively. The results shown that the cell viability of HuCCA-1 cells exposed to ethanol and hexane extracts were decreased in a dose-dependent manner and the 50% inhibitory concentrations (IC_{50}) values were 29.97 and 36.81 µg/ml, respectively. The selected low cytotoxic dose of each extracts slightly reduced HuCCA-1 invasion and the selected high cytotoxic dose induced nuclear fragmentation in the cells. Further study on mechanisms of metastasis inhibition and cell death induction by *K. parviflora* are underway.

O2_O0009 Antimicrobial property of the essential oil and crude extract from Patchouli leaves (*Pogostemon cablin*)

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Abstract: Concentration (MIC) of patchouli oil and crude patchouli extracts Agar diffusion method with 2 strains of *Propionibacterium acnes* and *Staphylococcus epidermidis*. It was found that the efficient inhibitory concentration for the previous 2 strains of patchouli oil in acne facial foam compared with Trichosan in the level of studying at 0.5% and 1.0%, respectively. The result showed that the MIC of patchouli oil and crude patchouli extracts that could inhibit the 2 strains was 64 mg/ml. The result also demonstrated that Trichosan with concentrations of 0.5% and 1.0% significantly showed better inhibition than acne facial foam containing patchouli oil. However, the concentration of patchouli oil at 0.5% and 1% in acne facial foam showed the efficiency to inhibit the microbial acne growth of 2 strains, *P. acnes* and *S. epidermidis*, followed by the standard. In addition, both concentrations of patchouli

O2_O0010 Determination of lipophilicity values of flavonoids using butanol-water system and calculation methods

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Abstract: This study aims to determine the lipophilicity of a series of flavonoids that the carbon atoms at different positions in ring A, B and C was substituted by hydroxyl, methoxyl group or hydrogen atom, by using butanol-buffered system and the concentration of flavonoid was analyzed with reverse phase HPLC. The pH of buffered solution was varied from 2 to 12. The ratio of flavonoid concentration in butanol to aqueous phase, the so-called partition (P) and log P represents the lipophilicicty values. Among compounds studied, catechin is the simplest in chemical structure and its log P values experimentally determined was equal to 0.38 ± 0.04. Experimental data suggested that the conjugation characteristics and hydroxyl substitution pattern were the most important determinants of log P of flavonoids. The log P values with respective to the chemical structure of compounds were analyzed and the numerical log P differences resulting from the various substitutions of as H, hydroxyl and methoxyl groups at various carbon positions of flavonoid nucleus was obtained. The log P values of flavonoids can be estimated from the expression: Log P = Log $P_{(catechin)}$ + ΔLog $P_{(ring\ A)}$ + ΔLog$P_{(ring\ B)}$ + ΔLog $P_{(ring\ C)}$. There is very good relation (Slope = 1.084 and R^2 = 1) between the calculated log P and experimental log P values in butanol/buffer systems. Using the log P expression can correctly predict the log P values of the flavonoids studied and other flavonoids in octanol/buffer.

O2_O0012 LACK OF GENOTOXIC ACTIVITY OF CURCUMA COMOSA EXTRACT ON MICRONUCLEUS FORMATION OF MOUSE BONE MARROW CELLS

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Abstract: *Curcuma comosa* Roxb.commonly known as Waan chak mod look, is widely used as in indigenous medicine in all regions of Thailand. In spite of its long use, there have been only few studies of its toxicity . Therefore, the present study aims to investigate the genotoxicity of *C. comosa* by using micronucleus assay in polychromatic erythrocyte (PCE) of mouse bone marrow. Male mice orally received the hexane extract of *C. comosa* at a dose of 250, 500 or 1000 mg /kgBW. At 24 and 48 hour after treatment, the animals were sacrificed and number of micronucleus were determined. Hexane extract at all doses had no effect on the micronucleus formation in the mice bone marrow cells at any time point when compared to the control ($p<0.05$).

In conclusion, hexane extract of *C. comosa* is lack of genotoxic effect as assumed by micronucleus test in PCE of

mouse bone marrow. However, at the very high dose, the extract did have cytotoxic effects on the cells.

O2_O0013 ACETYLCHOLINESTERASE INHIBITORS FROM *Feroniella lucida*

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Abstract: Nine furanocoumarins were isolated from the stems of *Feroniella lucida*. Three compounds are novel structures having an oxolane, oxane and oxepane moity. The overall structures and configuration were determinated by spectral method.[1] All compounds were tested for Acetylcholinesterase; five of which were active against the enzyme.

O2_O0014 ANTIOXIDANT XANTHONES FROM *Cratoxylum cochinchinense* (Lour.) Blume

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Abstract: Two new xanthones named cratoxylumxanthone A (**1**) and cratoxylumxanthone B (**2**) together with six known compounds: dulcisxanthone B (**3**) 2-geranyl-1,3,7-trihydroxy-4-(3-methylbut-2-enyl)xanthone (**4**), α-mangostin (**5**), β-mangostin (**6**), cochinchinone A (**7**) and garcinoneA (**8**) were isolated from *Cratoxylum cochinchinense* stems. The structure of new compounds were characterized by 1D and 2D NMR techniques. The isolated compounds showed free radical scavenging against DPPH and lipid peroxidation inhibition.

O2_O0015 ANTIRADICAL ACTIVITY OF VOLATILE OIL AND EXTRACT FROM THAI ZINGIBERACEOUS PLANTS.

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Abstract: The objective of this research was to study antiradical activity of extract and volatile oil from 5 kinds of Zingiberaceous plants: *Alpinia galanga* (L.) Willd, *Curcuma longa* Linn., *C. mangga* Val.& Zijp., *Zingiber montanum* (Koen.) Theilade, *Z. ottensii* Valeton. The extract was obtained by continuous extraction using 95% ethanol as solvent. The residue was extracted by reflux technique with water to obtained water extract. Volatile oil of these plants was prepared by hydrodistillation. For testing of antiradical activities, ABTS (2,2'-azinobis-(3-ethylbenzothiazoline-6-sulfonic acid) assay was used and compared with the activity of known antioxidant, Trolox (milligram of Trolox per gram of sample). Results indicated that the antiradical activity obtained from alcoholic extract of *C. longa*, volatile oil and water extract from *Z. montanum* showed highest activities of 187.543, 56.469, and 32.058 mg/g in each group respectively.

O2_O0016 VERIFICATION OF THAI TRADITIONAL MEDICINE BY CHEMINFORMATICS

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Abstract: In this study, a part of Thai traditional medicine was verified using a novel cheminformatics method. It was carried out by virtual screening on the structural database of Thai medicinal plants for anti-neuraminidase compounds. The screening procedure was a combined method of molecular docking and the scoring functions. After the candidates structures were obtained, traditional formulations were analyzed to see if the plants having these candidates were included in the formula. The results showed that few traditional formulations contain most of the potential herbs. This implied that there was a correlation between the Thai traditional knowledge and the results using cheminformatics.

O2_O0017 Investigation on Antimicrobial Activity of *Eclipta prostana* Linn.

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Abstract: *Eclipta prostana* Linn., a medicinal plant of family Compositae, has been used as antiflatulent, laxative, anti-venom and local anesthetic actions. The crude hexane extract was separated using repeated silica gel column afforded eight fractions (G1-G8) and stigmasterol together with a mixture of stigmasterol and β-sitosterol. The fractions were evaluated for antimicrobial activity using agar dilution method against 28 strains of microorganisms. The results showed that all the tested fractions (G1-G8) inhibited many microorganisms at concentration 64-256 µg/mL. Particularly, fractions G5 and G6 completely inhibited the growth of *C. diphtheriae* NCTC 10356 at 64 µg/mL

O2_O0020 *HYDNOCARPUS ILICIFOLIA* EXTRACTS FOR INHIBITION OF *FUSARIUM OXYSPORUM* AND *XANTHOMONAS CAMPESTRIS*

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Abstract: This research has the aim to extract active crudes from *Hydnocarpus ilicifolia* – the medicinal plant found in tremendous quantities on Nam-Sub hill, Kasetsart University at Si Racha campus – for inhibition of 2 categories of plant pathogenic organisms - *Fusarium oxysporum* - causing of Fusarium wilt and *Xanthomonas campestris* - causing of citrus canker. *Hydnocarpus ilicifolia* leaves were extracted with hexane, dichloromethane and ethanol by comparison of 2 methods - soxhlet extraction and ambient temperature extraction. Then the extracts were tested with *Fusarium oxysporum* and *Xanthomonas campestris* by disc diffusion. The results indicated that soxhlet dicholoromethane and ethanol extracts showed greater activity on *Fusarium oxysporum* than hexane extracts. Furthermore, soxhlet ethanol extract produced more efficient to inhibit *Xanthomonas campestris* than hexane and dichloromethane extracts. Whereas the ambient temperature ethanol extract produced more efficient to inhibit both of the organisms than their corresponding hexane and dichloromethane extracts. In addition, on the whole, the ambient temperature extracts showed greater activity than the soxhlet extracts.

O2_O0023 FLUORESCENCE RESONANCE ENERGY TRANSFER STUDY OF QUERCETIN AND QUERCETRIN INTERACTION WITH BOVINE SERUM ALBUMIN IN PHYSIOLOGICAL SOLUTION: DETERMINATION OF BINDING CONSTRANTS AND BINDING SITES

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Abstract: We sought to use bovine serum albumin (BSA) as a protein fluorescence probe system, coupling excited-state intermolecular FÖrster energy transfer and intramolecular proton transfer (PT). BSA contains tryptophan residues, which transfers its excitation energy to quercetin or quercetrin, an acceptor exhibiting excited-state intramolecular PT. We demonstrate such a coupling in BSA-quercetin and -quercetrin complexes, excited via the single intrinsic tryptophan. Analysis of spectroscopic data leads to the conclusion that two binding sites are involved in the brovine serum albumin–quercetin and quercetrin interaction. In physiological buffer pH 7.3 at 37°C, the molecules bound to the higher affinity binding site and to the lower affinity site, has the association constant of k_1 equal to 2.36×10^{-5} M^{-1} and 1.27×10^{-5} M^{-1} and k_2 equal to 4.2×10^{-6} M^{-1} and 3.22×10^{-5} M^{-1} for quercetin and quercetrin, respectively. These microscopic binding constants did not change when the reactions were performed in the same conditions at pH 4 but the complexes were dramatically decreased. This signified that the electrostatic interaction plays a major role in stabilizing complex.

O2_O0024 Screening of Thai Medicinal Plants for Antimalarial Activity

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Abstract: *Andrographis paniculata*, *Streblus asper*, *Abutilon indicum*, and *Heliotropium curassavicum* were selected for the study based on their ethnomedicinal values. Their crude extracts were screened for in vitro antimalarial activity against the chloroquine-resistant (K1) strains of *Plasmodium falciparum*. The crude extract of *A. paniculata* showed the most effective than other extracts. Four andrographolides (1-4) and flavonoid (5) isolated from the EtOAc crude extract of A. paniculata were also evaluated for their in vitro antimalarial activity. Andrographolide (1) and flavonoid (5) exhibited significant inhibition of *P. falciparum* growth with IC_{50} value of 5.96 and 2.03 μg/mL, respectively. Furthermore, in vivo antimalarial activity against *P. berghei* on ICR mice of andrographolide (1) were evaluated using Peters' 4-day test and it showed 30% parasitemia suppression at a dose of 50 mg/kg/day and 43 % at a dose of 100 mg/kg/day by intraperitoneal (ip) administration without any significant toxicity.

O2_O0025 *IN VIVO* IMMUNOMODULATING ACTIVITY OF WOOD EXTRACTS FROM *CLAUSENA EXCAVATA BURM. F.*

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Abstract: Immunomodulating effects in Balb/C mice of aqueous extract (CEHW) and the Thai folklore preparation (CEHF) of *Clausena excavata* Burm. f. were investigated. Haemagglutinating antibody (HA) titers at day 0, 7, 14, 21, 28 and 35 from the serum of animals fed or injected intraperitoneally with the extracts for 5 days were compared and evaluated for humoral mediated immunity (HMI). Footpad swelling test was used to determine delayed type hypersensitivity for cell mediated immunity (CMI). CEHW and CEHF injected intraperitoneally and administered orally exhibited the same maximum antibody

production of 1/800. Both extracts given orally reached the maximum antibody titer at day 7, which was 2 weeks faster than by intraperitoneal administration. However, antibody titers from CEHW injected intraperitoneally diminished without retaining whereas the CEHF retained for 1 week. Moreover, CEHW gave CMI response more than the CEHF. This study suggested the potential in vivo immunomodulating activities of extracts from *Clausena excavata* supporting our previous *in vitro* studies.

O2_O0026 Purification of polyphenols of Siamois® red wine and study of their efficacy of antiproliferative and apoptosis-inducing activity against erythromyelogenous leukemic and small cell lung carcinoma cell lines

วิภพ สุทธนะ, สมาน เดชสุภา, ไพบูลย์ เรืองพัฒนพงศ์, มนตรี ตังใจ, วินิจ ช้อยประเสริฐ, วรวรรณ ปรารมภ์, สมพงษ์ ครัปรี, สุชาติ โกทันย์ และ สำรี มันเขตต์กรณ์*

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Abstract: The chemical analysis and separation of polyphenols of Siamois® red wine and their potential inhibition of leukemic and small lung carcinoma cell growth were studied. The Siamois® red wine powder was composed of flavonoids, phenolic acids and proanthocyanidin and the total polyphenolic contents is 45% of dried weight powder. Quercetin (IC_{50}; K562 = 10 ± 0.8 µM and GLC4 = 22 ± 1.6 µM), quercetin glycoside (IC_{50}; K562 = 6 ± 1 µM and GLC4 = 8 ± 1 µM) and kaempferol (IC_{50}; K562 = 13.2 ± 0.8 µM and GLC4 = 20.6 ± 1.6 µM) were majority found. These molecules exhibited two fold of antiproliferative activity against MDR cells compared with their corresponding parental cells. The mixture of mamoa wood extract and Siamois® red wine show higher antiproliferative activity than Siamois® red wine alone. In addition, Siamois® red wine powder induces apoptosis in all cell lines and flavonoids were proposed as their active molecules by which mediate action at mitochondria of cells.

O2_O0027 FREEZE-DRIED WHITE KWAO KRUA (PUERARIA MIRIFICA) POWDER PROCESSING

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Abstract: White Kwao Krua (*Pueraria Mirifica*), one of the Thai medicinal herb, has been recognized for Thai folk medicine centuries for its remarkable health-enhancing properties and although known for specific application. Some of the main components, miroestrol and deoxymiroestrol, extracted from Kwao Krua have been shown to have estrogen like effects. Because of the components in Kwao Krua has substantial health benefits, its extracts are made by concentrating active ingredients from the rhizomes and used as ingredients in cosmetic and pharmaceutical industry. The White Kwao Krua powder which contains the high contents of active ingredients and the same properties of the fresh White Kwao Krua is in a great demand for stability with high quality. The freeze dried White Kwao Krua powder processing has been developed and implemented at the Production Services, Industrial Park, KMUTT. The preliminary results show one hundred kilograms of White Kwao Krua produced 9.6 kilograms of dried White Kwao Krua by using hot air oven. These dried products produced 1.48 kilograms of freeze dried White Kwao Krua powder. The quality of freeze dried White Kwao Krua has been analysed in active ingredient to compare with the fresh one. The results showed actives ingredients in freeze dried White Kwao Krua powder had the same quality as the fresh White Kwao Krua. The stability of the freeze dried powder is now on the process of stability test. The waste utilization and clean production on freeze-dried White Kwao Krua powder has been proposed for further study to make it feasible in commercial production.

O2_O0028 APPLICATION OF MEDICINAL PLANT EXTRACTS FOR ANTI - *PROPIONIBACTERIUM ACNES* ACTIVITY.

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Abstract: *Propionibacterium acnes* is an anaerobic bacteria found around skins and hair follicle areas. It is the causative agent of acne vulgaris or pimples. In this study the effect of 68 of 95% ethanolic and water extracted medicinal plants were tested for inhibitory effect on *P.acnes* by paper disc agar diffusion method. The bacterium was grown on brain heart infusion agar at 37°C under anaerobic condition for 5 days, then the inhibition zones were determined. The 95% ethanolic extracted fresh medicinal plant which include *Pluchea indica*, *Butea superba* and *Azadirachta indica*, as well as dry *Azadirachta indica*, *Garcinia mangotana* and *Pouzolzia pentandra* were found to exhibit high inhibitory effect against *P. acnes* with inhibition zone of 2.2, 2.07, 1.77, 1.70, 1.77 and 1.67 cms., respectively. In general, fresh and ethanolic extracted medicinal plant had higher inhibitory effect against the bacterium than the dry or water extracted plant.

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กระทรวงวิทยาศาสตร์และเทคโนโลยี

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ศูนย์พันธุวิศวกรรมและเทคโนโลยีชีวภาพแห่งชาติ

คณะกรรมการชุดต่างๆ ในการจัดงานประชุมวิชาการวิทยาศาสตร์และเทคโนโลยีแห่งประเทศไทยครั้งที่ 32

1. คณะกรรมการดำเนินงาน

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นางฤดีมล แสวงธรรม
กรรมการและผู้ช่วยเลขานุการ

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ดร วิชาญ ลิ่วกีรติกุล
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B. Biological Science

ประธานสาขา: ศ.ดร.ม.ร.ว.ชิษณุสรร สวัสดิวัตน์

B1: Biology, B2: Microbiology, B3: Genetics

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ประธานร่วม: ศ ดร ปรานอม จันทรโณทัย

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B4: Biotechnology, B5: Biochemistry

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C. Chemistry

ประธานสาขา: ศ.ดร.จำรัส ลิ้มตระกูล

C1: Analytical Chemistry

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ผศ.ดร.ดวงใจ นาคะปรีชา

ดร.วเรศ วีระสัย

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อาจารย์นิรันดร์ พงษ์พันธ์

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C3: Organic Chemistry

ประธานสาขา: รศ.ดร.ธีรยุทธ วิไลวัลย์

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C4: Physical Chemistry

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K. Science Communication and Education

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ประธานร่วม: ศ.ดร.วรรณทิพา รอดแรงค้า

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