B5_B0039 Cloning, genomic organization and expression analysis OF cellulase GENE from golden apple snail (pomacea canaliculata)

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Abstract: The full length cDNA encoding cellulase designated as EGX-Cl01 was cloned from stomach tissue of golden apple snail (*Pomacea canaliculata*) by Reverse Transcription-PCR (RT-PCR) and Rapid Amplification of cDNA End (RACE)-PCR. The complete cDNA was 1300 bp containing a 1188 bp open reading frame (ORF) encoding 395 amino acids. The calculated molecular mass of the mature protein is approximately 44 kDa. The deduced amino acid sequence of EGX-Cl01 showed 98% similarity to that of *Ampullaria crossean* EGX. By multiple sequence comparison of the deduced amino acid sequence of EGX with other known cellulase, the EGX in golden apple snail was regarded as a member of the glycosyl hydrolase family 10 (GHF10). The genomic organization of cellulase EGX-Cl01 gene was also isolated. The EGX-Cl01 gene spanned over 4937 bp containing 9 exons and 8 introns. All exon-intron boundaries conformed to the GT/AG rule. RT-PCR analysis from several ages of *P. canaliculata* revealed that EGX gene was not expressed in eggs but expressed in 1 and 7-day-old juvenile snails.

B5_B0044 POLYAMINE UPTAKE BY ACTIVE TRANSPORT INTO CYANOBACTERIUM *SYNECHOCYSTIS* SP. PCC 6803

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Abstract: The transport system for putrescine into a moderately salt tolerant *Synechocystis* sp. PCC 6803 is characterized by measuring the uptake of radioactively-labeled putrescine. Strong inhibition of putrescine uptake was caused by spermine and spermidine whereas only slight inhibition was observed by the addition of various amino acids. These results suggest that the transport system in *Synechocystis* sp. PCC 6803 is highly specific for polyamines. Putrescine transport is energy-dependent as evidenced by the inhibition by various metabolic inhibitors and ionophores.

B5-B0056 Study of optimum condition for pretreatment of agricultural crop residue for citric acid production by Aspergillus niger Yang no.2

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Abstract: Agricultural crops (rice straw, bagasse, corn and pineapple shell) were pretreated with 2 M acid (acetic acid, hydrochloric acid, phosphoric acid, sulfuric acid) or base (sodium hydroxide, potassium hydroxide) for 1-28 days at room temperature to determine the optimum condition for citric acid production by *Aspergillus niger* Yang no.2 upon culturing in SS medium. It was found that pineapple shell pretreated with acetic acid for 7 days provided the highest reducing sugar at 77.5 g/L as compared to other agricultural crops. The reducing sugar released from rice straw, bagasse and corn were between 8.8-76.2 g/L at different period of time (1-14 days) depending on types of the crops. Upon fermentation in the presence of *Aspergillus niger* Yang no.2, using the pretreated agricultural crops that gave the highest amount of reducing sugar, for 7 days at room temperature, the results showed that pineapple shell (5 g) pretreated with sodium hydroxide gave the highest amount of citric acid at 17.67 g/L on the 5th day of fermentation. The efficiency of citric acid production by *Aspergillus niger* Yang no.2 using pretreated agricultural crop was higher than those obtained from the non-treated ones. The highest amount of reducing sugar in the culture filtrate was found on the first day of the fermentation and gradually decreased as the time went by.

B5_B0059 BIOCHEMICAL AND MUTATION STUDIES OF THAI PATIENTS WITH MUCOPOLYSACCHARIDOSIS TYPE II: IDENTIFICATION OF 2 NEW MUTATIONS IN THE IDURONATE-2-SULFATASE GENE

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Abstract: Mucopolysaccharidosis II (Hunter Syndrome) is an x-linked recessively inherited disease caused by a deficiency of the enzyme iduronate-2 sulfatase (IDS, EC 3.1.6.13) which results in the lysosomal accumulation of dermatan sulfate and heparan sulfate. Two unrelated Thai Hunter syndrome patients had very low leukocyte enzyme activity was found in both of the patients. To detect IDS gene mutations, direct sequencing of IDS genomic amplicons was applied to the patients. Mutational analysis revealed 2 novel mutations. The first patient had the IVS2-1 G to A mutation which is a splicing mutation results in exon 3 skipping and cryptic splice site (first 44 base pairs of exon 3 removed). Both of them cause frameshift leading to truncated protein. The other patient had a deletion/ insertion in exon 6; c.720_731delGTTGTATCCCTT, c.719_

720insTTTCAGATGTTCTCCCCAG. The 12 base pairs deletion and 19 base pairs insertion cause frameshift start from codon 240 leading to truncated peptide 258 amino acid.

B5_B0061 MUTATIONS IN THE GENE ENCODING LYSOSOMAL GLUCOCEREBROSIDASE CAUSING GAUCHER DISEASE IN THAI PATIENTS

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Abstract: Gaucher disease, the most prevalent sphingolipid disorder, is a heterogeneous disease characterized by an impaired activity of the lysosomal glucocerebrosidase. This deficiency results in the accumulation of impaired hydrolysis of glucosylceramide in macrophages of the reticuloendothelial system. The molecular diagnosis of Gaucher disease is important for genotype/phenotype correlation, prenatal or early diagnosis and detection of carrier status. We recently examined two unrelated Thai families who have a deficiency of the lysosomal acid ß -glucosidase. The enzymatic activity was determined in cellular extracts of peripheral blood granulocytes by a fluorescent method using an artificial substrate (4-methyl-umbelliferyl ß-D-glycoside). The results showed extremely low activity of glucocerebrosidase enzyme. Polymerase chain reaction (PCR) molecular analysis was performed in DNA samples extracted from whole blood. Sequence analysis and restriction enzyme analysis of gene encoding glucocerebrosidase identified the mutation L444P in one family, while the other was a compound heterozygote with the mutations G377S and A456P. Correlation between genotype and phenotype will be discussed.

B5_B0069 Characterization of Structural Folding of Cyt2Aa2 Toxin in Intermediate State

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Abstract: Cyt2Aa2 is a 29-kDa cytolytic toxin produced by *Bacillus thuringiensis subsp. darmstadiensis*. The toxin is highly specific against the mid-gut cell of mosquito larvae. Our previous study has demonstrated that an observable intermediate state can be detected in the unfolding / refolding pathway. To extend an investigation, this study aims to characterize the general folding of intermediate structure of this toxin. The non-disruptive mutants, used as structural probes, were constructed by site-directed mutagenesis. The Φ values calculation was employed as a tool to elucidate the general folding of the intermediate state. The mutants were designed with amino acid substitution located on various sites of the protein secondary structure elements. The constructed mutants were characterized for their expression levels, solubility in carbonate buffer, mosquito-larvicidal activity, and hemolytic activity in comparison with those of wild type. The transitional free energy and activation energy of these mutants and wild type during the unfolding/ refolding processes were determined and used to calculate for the Φ-values on each mutated positions. These obtained values were discussed and related to the conformation of each structural position in an intermediate state

B5_B0070 Amino acid substitutions at selected positions affect activity of a 42 kDa PROTEIN FROM *Bacillus sphaericus* BINARY TOXIN

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Abstract: Mosquito larvicidal activity from highly active strains of *Bacillus sphaericus* is principally associated with parasporal crystal complex which is composed of BinA and BinB proteins with molecular masses of approximately 42 and 51 kDa proteins, respectively. Both components have been found to be necessary for toxicity against *Culex quinquefasciatus* larvae, indicating that these proteins act as a binary toxin. In this study, four amino acid residues of BinA component were substituted with alanine using site-directed mutagenesis technique. Structural characterization using intrinsic spectroscopy conspicuously revealed that there is no major conformational changes occurred in the mutant proteins. Toxicity assays against *C. quinquefasciatus* larvae revealed that the mutant R97A lost its activity whereas the mutants E98A, R101A and E114A showed significantly reduced activity. *In vitro* binding assays to determine interaction between BinA and BinB demonstrated that replacement of R101 by Alanine significantly reduced the interaction. Substitutions at R97, E98 and E114 did not affect this interaction. Although these mutations did not change the overall structure of the toxin, they could alter some properties of the toxin such as binding to the target proteins in the larval gut cells, insertion into the cell membrane and translocation into the cytosol.

B5_B0071 The Purification and Identification of Policosanol from Rice Bran Wax

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Abstract: Policosanol (PC) is a mixture of high molecular weight long chain aliphatic primary alcohols (C_{20}-C_{36}). Policosanol can be used to reduce platelet aggregation, endothelial damage, foam cell formation and cholesterol content in different tissues such as liver, heart and fatty tissue (1, 2). Normally commercial PC is extracted from sugar cane, wax and beeswax. In this research, policosanol was extracted and purified from rice bran wax, the by-product of rice bran oil refinery. Rice bran wax is saponified with 80% ethanolic potassium hydroxide (2 N) at reflux temperature for 2 hrs. PC was then extracted with hot toluene. The toluene extract mostly contained PC with minor contamination with free fatty acids. The carbon chain lengths of PC from rice bran wax were ranging from C_{22} to C_{36} (identified by gas chromatography). The predominant fatty alcohol was triacontanol (C_{30}) with 24.5% of total alcohols.

B5_B0072 Partial purification and some characterizations of laccase from Lentinus polychrous Lev.

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Abstract: Laccases (EC 1.10.3.2) are one of ligninolytic enzymes which have been investigated intensively in the white-rot fungi. Since these enzymes oxidize a broad range of substrates such as polyphenols, diamines and even some inorganic compounds, the enzymes have potential applications in fields such as pulping, synthetic dyes and polluted water detoxification. This investigation reported a partial purification and some characterizations of laccases from *Lentinus polychrous* Lev. The enzymes were extracted from cultured substrates with 0.1 M sodium acetate buffer, pH 4.5 (1:10 g:mL) for 1 hour. The purification procedures involved $(NH_4)_2SO_4$ fractionation, ion exchange chromatography on DEAE-cellulose, gel filtration on Superdex 200 HR, and polyacrylamide gel electrophoresis in both native and denature conditions. The partial purified enzymes had about 7.9-fold purification. When using ABTS as substrate, it showed an acidic optimum pH of 3.0, the optimum temperature of 55 °C. The enzyme showed a promised result in decolorization of synthetic dye RBBR at pH 4.0 and 30 °C. Under these conditions, the dye decolorization was about 66% within 3.5 hours. Therefore, other steps of purification should be added in order to obtain a pure enzyme for more characterizations and further study in a potential of other dye decolorizations.

B5_B0073 Decolourization of synthetic dyes by laccase from *Pleurotus sajor-caju*

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Abstract: Laccase, one of the ligninolytic enzyme systems, was extracted from spent mushroom compost of *Pleurotus sajor-caju*. The crude enzyme showed optimal conditions of pH 4.5 and temperature 45 °C when using ABTS as substrate. The influence of the enzyme on synthetic dyes degradation of 4 structural different dyes revealed that the optimal pH for degradation of Indigo carmine, Remazol brilliant blue R (RBBR), Bromophenol blue and Methyl red were 8.0, 7.0, 5.5, and 4.5, respectively. All dye degradation had similar optimal temperature at 30 °C. The best proportion of initial dye concentration per 0.1 U/mL of enzyme that yielded a highest degradation rate for Indigo carmine, RBBR, Bromophenol blue and Methyl red were 0.0075, 0.004 0.030 and 0.030 mg, respectively. In addition, the ability to degrade dyes also depended on enzyme concentration. The comparison of the highest transformation rate of dyes by the enzyme was Methyl red (96.4%) > RBBR (93.7%) > Bromophenol blue (28.8%) > Indigo carmine (20.1%) within 20 minutes under each optimal condition.

B5_B0077 Amino acids at the N-terminal are required for efficient expression and folding of a cytolytic toxin from *Bacillus thuringiensis*

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Abstract: Cyt toxin is a cytolytic δ-endotoxin produced by some strains of *Bacillus thuringiensis*. The protein is synthesised as protoxin in the form of crystalline inclusion which is inactive. It exhibits cytotoxic and haemolytic activity after proteolytic activation. Proteolytic processing removes about 33 and 22 amino acids at N- and C-termini, respectively, from the protoxin and releases the active toxin product about 23 kDa. To investigate the role of N- and C-terminal regions, we have constructed several N- and C-terminal truncated forms of Cyt2Aa2. The truncated and full-length proteins were also designed to express alone (non-fusion) and to be fused at N-terminal to GST or at C-terminal to GFP. Expression test in E. coli showed that non-fusion, GST-fusion and GFP-fusion of C-terminal truncated proteins were highly produced as inclusion bodies similar to that of the wild type. However, deletion at N-terminal or addition of other proteins to the N-terminal region dramatically decreased production of the toxin. Solubilization test in 50 mM Na_2CO_3 pH 10.5 plus 10 mM DTT revealed that non-fusion and GST-fusion forms of C-terminal truncated toxin inclusions were soluble and exhibited haemolytic activity after proteinase K activation. Results indicating that amino acids at N-terminal region of the protein might play important role during protein expression. Amino acids in this region might be required for the protein to fold into a correct conformation. Removal of the C-terminal tail of Cyt2Aa2 had little effect on protein expression and toxicity suggesting that C-terminal region might not play any role on protein folding or toxin activity. However, addition of a bulky group at C-terminal region could affect the crystal

formation, solubility, toxicity and haemolytic activity.

B5_B0080 Purification of an active protein in venom of Thai fire ant (*Solenopsis* sp.)

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Abstract: Red fire ant (Solenopsis sp.) is an insect with 3-5 mm body long and found in the tropical area. It is in order Hymenoptera, suborder Apocrita and family Formicidae. Its venom is injected from gland to stinger for preying. Report from USA showed that venom of *Solenopsis invicta* mainly composes of dialkyl piperidines causing allergic symptoms. Piperidines also effective agents against growth of many bacteria, such as *Streptococcus salivarius, S. pyogenes, S. equisimilis, S. faecalis, Staphylococcus epidermidis, S. aureus, Bacillus pulvifaciens, B. thuringientsis, Shigella flexneri* and *Salmonella typhiimurium*. Venom proteins show phospholipase and hyaluronidase activity to accelerate the allergic effects. This work is the first study of Thai fire ant venom. Venom about 0.01 microlitre is injected from gland at the end of metastoma to stinger. Analysis of crude venom using SDS-PAGE found that there are 5 major protein bands with 50.1, 36.3, 27.5, 25.1 and 19.0 kDa. After purification using gel filtration chromatography, protein with 26 kDa was purified. Its characters are under investigation.

B5_B0083 JUICE OF A THAI HERB SUPPRESSES INVASIVENESS OF CANCER CELLS

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Abstract: *Eclipta prostrata* Linn. is a herbal plant which has been used to treatment for liver diseases and possessed hepatoprotective activity against chemical induced liver-injury in animal models. The juice of *E. prostrate* Linn. showed significantly inhibited in vitro invasion of a human liver cancer cell line with low cytotoxic effect. We further investigated which steps of the cancer invasion process are inhibited by the juice, and also evaluated anti-metastatic potential of the juice. The *in vitro* invasion and migration assays were performed in modified Boyden chambers, and anti-proliferation was determined from survival cell numbers after treatment. Our results indicated that the juice inhibited cell migration step of the invasion process and did not affect cell adhesion of HCC-S102 cells. IC_{50} of the juice for inhibiting migration of cancer cell lines including HCC-S102 (liver), A549 (lung) and MDA-MB-231 (breast) were 31.3, 70.3 and 38.7 µg/ml, respectively. Whereas IC_{50} of the juice for inhibiting cell proliferation of HCC-S102, A549 and MDA-MB-231 were 616.7, 1,183.3 and 203.3 µg/ml, respectively. The IC_{50} values for inhibiting cell migration are lower than the IC_{50} values for inhibiting cell proliferation in all tested cell lines, suggesting that active components in the juice of *E. prostrata* possess selective inhibitory activity on cancer cell migration process, and have potential as anti-metastatic agent for cancer treatment.

B5-B0097 PRODUCTION AND CHARACTERIZATION OF MUTANT FORMS OF THAI ROSEWOOD β-GLUCOSIDASE

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Abstract: β-Glucosidases from different organisms exhibit diverse substrate specificities. Dalcochinase (a β-glucosidase from Thai rosewood) shows specificity for dalcochinin β-glucoside, while linamarase (a β-glucosidase from cassava) has specificity for linamarin. Dalcochinase is capable of catalyzing reverse hydrolysis, but modest in catalyzing transglucosylation. In contrast, linamarase is excellent in catalyzing transglucosylation, but poor in catalyzing reverse hydrolysis. In this project, we constructed 2 dalcochinase mutants, namely I185A and E455I, by replacing amino acid residues that are likely located in the aglycone binding site of dalcochinase with the corresponding residues of linamarase. Mutant enzymes were cloned and expressed in yeast Pichia pastoris, and purified from culture media. Both mutants are similar to wild-type dalcochinase as shown by SDS-PAGE, western blot and activity staining on non-denaturing PAGE. Comparison of hydrolytic activities of mutant and wild-type enzymes towards various substrates suggested that only I185 may be important for binding to dalcochinin β-glucoside and *p*-nitrophenyl β-glucoside.

B5_B0102 COMPARATIVE OF PROTEIN PATTERN: MEMBRANE, CYTOPLASMIC AND PERIPLASMIC FRACTION IN *APHANOTHECE HALOPHYTICA* UNDER NON-STRESS AND SALT STRESS CONDITIONS

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Abstract: Salt stress induced apparent proteins from all fractions, cytoplasmic, periplasmic, and membrane fraction as determine by non-denaturing polyacrylamide gel electrophoresis. Increasing the concentration of NaCl resulted in the enhancement of the intensity of protein band. Subsequently, sodium dodecyl sulfate polyacrylamide gel electrophoresis was studied. The highest intensity band was observed in cytoplasmic, periplasmic, and membrane fraction showing molecular mass of 32.0, 35.5, and 41.5 kDa, respectively. Membrane fraction showed highest choline binding activity which was strongly inhibited by glycine betaine, glycine betaine aldehyde, and carnitine, respectively.

B5_B0103 ORGANIC AND INORGANIC CONTENTS IN HALOTOLERANT CYANOBACTERIUM *APHANOTHECE HALOPHYTICA* UNDER NON-STRESS AND SALT STRESS CONDITIONS

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Abstract: A halotolerant cyanobacterium *Aphanothece halophytica* grown under various NaCl concentrations from 0.5 – 3.0 M and pH from 6.5 - 10.5 showed optimal NaCl concentration and optimal pH for cell growth at 0.5 M NaCl and pH 9.5, respectively. We examined the relationships between cell growth, cell size, intracellular solute, amino acid composition, and protein profiles as affected by salt stress. Cell growth was reduced when NaCl was increased while cell size was increased with high accumulation of glycine betaine. Ion contents Na^+, K^+, NH_4^+, and NO_3^- were not so much different under non stress and salt stress conditions. Amino acid glutamine was the major amino acid under both conditions and analysis showed that glutamine, aspartate, proline, and glutamate increased under salt stress condition.

B5_B0106 PROTEOMIC ANALYSIS OF THE INTERACTION BETWEEN WHITE SPOT SYNDROME VIRUS AND MUD CRABS (*Scylla serrata*).

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Abstract: White spot syndrome virus (WSSV) is a highly infectious pathogen for many crustacean species especially the penaeid shrimps. While the virus can result in high mortality and economic loss in the shrimp culture worldwide, the current treatment of the disease is still not effective against WSSV. Interestingly, the mud crab (*Scylla serata*) can be infected with WSSV without showing specific signs of the disease or mortality. Therefore the viral-host interaction between WSSV and *S. serata* is deserving for an investigation by proteomic approach. The extracted hemocytic proteins from crab samples with and without WSSV injection were comparatively analyzed at 6, 12 and 24 hour post infection The dynamic changes of protein expression between the healthy and WSSV infected groups were observed. Proteins with significant changes were excised from the 2-D gel and identified by mass spectrometry. The list of protein identification and their possible function is discussed. This information can provide an important clue for this specific viral-host interaction that might lead to the prevention and curing strategy of this viral disease for shrimp industry.

B5_B0107 SUBPROTEOMICS BASED UPON COMPARTMENTAL PROTEIN EXTRACTION IN CHOLANGIOCARCINOMA CELL LINE

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Abstract: Cholangiocarcinoma occurs with relatively high incidence in Thailand. HuCCA-1, a cell line model originated from Thai patients, is being used routinely in our laboratory to study anti-cancer agents from medicinal plants. Two-dimensional electrophoresis (2-DE) gel was used to study the differential protein expression in the cell line in the presence and absence of the compounds. In this study, prefractionation of the sample into specific cellular compartments: cytoplasmic, membrane, nuclear and cytoskeletal fractions, was employed. By using 2-DE gels and LC/MS/MS, we could identify some protein spots present only in one part. Peptidyl-prolyl cis-trans isomerase A, peroxiredoxin-2 and protein S100-A11 were found only in cytoplasmic part, while ATP synthase D chain, ATP synthase delta chain and cytochrome c oxidase polypeptide Va were found only in membrane part. This prefractionation method will be useful for studying protein expression in specific cellular compartments.

B5_B0109 Effect of amino acid substitutions in selected regions of the mosquito larvicidal binary toxin BinB from *Bacillus sphaericus*

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Abstract: The mosquito-larvicidal binary toxin produced by *Bacillus sphaericus* (*Bs*) is composed of BinB and BinA subunit, which have molecular masses of 51 and 42 kDa, respectively. Both proteins function together to kill mosquito larvae as binary toxin. BinB is proposed to act as specific receptor binding, whereas BinA is important for toxicity. To study the function of amino acids in 3 regions of BinB that are absent in BinA, 3 single mutations (S49A, N114A, F146A) and 2 block mutations ($_{111}$YLD$_{113}$=>$_{111}$AAA$_{113}$ and $_{115}$NNH$_{117}$=>$_{115}$AAA$_{117}$) were constructed. All mutant proteins were dominantly expressed as inclusion bodies similar to that of the wild type. Mosquito larvicidal activity assays against *Culex quinquefasciatus* larvae revealed that all mutant proteins showed similar 50% lethal concentration (LC_{50}) to that of the wild type. However, the mutant N114A yielded significantly lower LC_{95} comparing to the wild type. This result suggesting that substitution at this position may improve binding of the binary toxin to the target cells.

B5_B0110 Mutagenesis Study of Residues on the N- and C-Terminal Ends of Cyt2Aa2 Toxin

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Abstract: Cyt2Aa2 is a 29-kDa cytolytic toxin produced from *Bacillus thuringiensis* subsp. *darmstadiensis*. Its toxicity was found to be specifically against mosquito larvae and broad-range activity *in vitro*. To adopt an active toxin, this protein requires proteolytic processing to remove the N-and C- terminal fragments and yield the 25-kDa active form.This work aims to investigate the functional role of the amino acid residues located on the N-terminal (position 1-38) and the C-terminal (position 229-259) of Cyt2Aa2. Site-directed mutagenesis was employed to mutate the preliminarily selected residues at D39 and S229 which is the targeted site for proteinase-K processing. The mutants, D39L and S229Stop were constructed and then compared with wild type Cyt2Aa2. Both expressed mutants were well solubilized in the carbonate buffer pH 9.8. The expression level of D39L and S229stop were found to be higher and lower than that of the wild type respectively. The mosquito larvicidal and haemolytic activity of D39L was also found similar to that of wild type while S229stop showed a remarkable decrease of activity.

B5_B0111 Amino acids in αA and αC are Involed in specificity determinant of Cyt2Aa2

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Abstract: Cyt2Aa2 is a mosquito-larvicidal and haemolytic toxin produced by *Bacillus thuringiensis* subsp. *darmstadiensis*. Structural analysis suggests that amino acids in αA and αC should play a role in oligomerization step during pore formation. Seven residues in αA (A57L, A61C) and αC (S108C, V109A, M110A, L114A and I118A) were substituted. Expression test revealed that all mutants produced toxin inclusion similar to the wild type. Mutant A61C, S108C and V109A could be solubilized in 50 mM Na_2CO_3 pH 10.5. Whereas mutant I118A showed low solubility and M110A, L114A and A57L could not be solubilized in this buffer. Protease activation by chymotrypsin showed that only mutants A61C, S108C and V109A yielded the active fragment similar to that of the wild type. Mosquito larvicidal assays showed that mutant A61C protein was highly toxic to both *Culex quinquefasciatus* and *Aedes aegypti* larvae. The mutant proteins of S108C and V109A showed low toxicity againt *Culex quinquefasciatus* larvae but exhibited moderate activity against *Aedes aegypti* larvae. The mutant V109A showed high haemolysis activity similar to that of the wild type while the mutants A61C and S108C showed low haemolysis activity. Binding and oligomerization assays of the activated toxin on phosphatidylcholine liposomes revealed that only the mutant V109A could bind and form oligomers similar to that of the wild type. The mutants A61C and S108C showed reduced binding and oligomer formation. Results suggesting that amino acids in αA and αC could play important role for specific receptor binding. Replacement of amino acid in these regions could therefore affect specificity and toxicity of the toxin.

B5_B0112 CYSTEINE AT POSITION 161 OF BinB BINARY TOXIN FROM Bacillus sphaericus is essential for PROTEIN FOLDING AND BIOLOGICAL ACTIVITY.

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Abstract: Highly larvicidal strains of *Bacillus sphaericus* (Bs) produce parasporal crystal proteins which are composed of BinB (51 kDa) and BinA (42 kDa) during its sporulation. Both proteins function together to kill mosquito larvae or they act as binary toxin. It has been proposed that BinB is crucial for the regional binding to the specific receptor. The active core of BinB contains three Cysteine residues at positions 67, 161, and 241 that are highly conserved among various strains of Bs. In order to investigate the role of Cysteine residues on biological activity of the binary toxin, one of these three Cysteine residues, C161

was substituted with Alanine residues by site-directed mutagenesis. Substitution by Alanine at position 161 did not affect expression level and inclusion formation but highly reduced larvicidal activity. These results suggest that C161 may play an important role for protein folding or interaction with BinA or protein receptor on the larval gut cell membrane.

B5_B0114 COMPARATIVE STUDIES OF HEMOGLOBIN PHENOTYPES IN NATIVE CATTLE AND SWAMP BUFFALO BY ELECTROPHORESIS TECHNIQUE

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Abstract: Cellulose acetate electrophoresis was used to study the phenotypes of native cattle and swamp buffalo hemoglobins. Five phenotypes of native cattle hemoglobins, called Hb AA, Hb AB, Hb AC, Hb BB and Hb BC, were found. Three electrophoretically different Hbs were classified as Hb B (Hb fast), Hb A (Hb slow) and Hb C, which moved faster than Hb A but slower than Hb B. Two phenotypes of swamp buffalo hemoglobins, called Hb BB and Hb AB, were found by the same technique. Hb BB and Hb AB were the result of a combination of the Hb fast and the Hb slow at a ratio of 2:1 and 5:1, respectively. In comparison with the electrophoretic mobility from native cattle and swamp buffalo hemoglobins, it was found that the Hb fast of native cattle moved towards the anode faster than the Hb fast of swamp buffalo. Whereas the Hb slow of native cattle and swamp buffalo had a similar migration. Interestingly, Hb C of native cattle showed the same mobility as the Hb fast of swamp buffalo.

B5_B0121 COMPARISION OF MEMBRANE AND CYTOSOLIC PROTEINS IN DIFFERENT HUMAN HEPATOCELLULAR CARCINOMA CELL LINES BY PROTEOMICS

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Abstract: Hepatocellular carcinoma (HCC) is one of the most common cancers in Africa, China and Southeast Asia. HCC is the top cancer among men in Thailand. The diagnosis of HCC is based on the results of CAT scans or ultrasound scans. Blood alpha-fetoprotein is the only marker for the diagnosis of HCC. Most HCCs are detected late and are not suitable for curative treatment. We used the subproteomic approach to enriched in membrane proteins and in cytosolic proteins and studied the protein patterns of the Thai HCC-S102 compared to the HepG2 (hepatoblastoma carcinoma) and Alexander (a human HCC-derived line secreting HBsAg) cell lines by two-dimensional gel electrophoresis and LC/MS/MS. For membrane proteins, 7 were highly expressed in HCC-S102, 11 were highly expressed in HepG2 and only 3 were highly expressed in the Alexander cell line. For cytosolic proteins, 5 were highly expressed in HCC-S102, 2 were highly expressed in HepG2 and 6 were highly expressed in the Alexander cell lines. Carbamoyl phosphate synthase 1 was the only protein that fractionated in both membrane and cytosolic fractions of the Alexander

B5_B0122 Protein Enrichment to Study Differential Expression of Proteins from the Rhizomes of *Curcuma longa and Curcuma zedoaria Rosc.*

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Abstract: The genus Curcuma contains about 80 species of rhizomatous herbs belonging to the family Zingiberaceae. The rhizomes of this genus are extensively used as spices, food preservatives, coloring materials, cosmetics and medicines. Pharmacological studies on the rhizomes of *Curcuma longa and Curcuma zedoaria Rosc.* show anti-inflammatory, antispasmodic and neuroprotective activity. Two-dimensional gel electrophoresis was used to compare the proteins from rhizome extracts of these 2 plants. We found a low abundance of proteins at pH 5-10 and a high abundance of proteins at pH 3-5. Microscale solution-phase isoelectric focusing (Zoom) was employed to enrich the low abundance proteins in the pH range from 5.4-10 and separate the acidic group (3-5.4) of proteins as well. We performed comparative proteomic analyses of the 2 pH ranges of the proteins. The proteins were identified by LC/MS/MS. There were 4 spots of heat shock proteins (18.1 kDa class 1) with different pIs, glyceraldehydes-3-phosphate dehydrogenase and putative membrane associated salt-inducible protein highly expressed in *Curcuma zedoaria Rosc.*

B5_B0124 Structure and Functional Investigation of the Outer Layer Helices of Cyt2Aa2 Toxin by Proteolytic Site Engineering

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Abstract: Cytolytic toxin (Cyt2Aa2) is mosquito larvacidal delta-endotoxins that generated from *Bacillus thuringiensis* subsp. *darmstadiensis*. Cyt toxins are produced as the inclusions that have one β-sheet layer between two outer layers of α-helices. The larvacidal mechanisms of this toxin still not clear but there are two models have been proposed, pore-forming model and detergent-like model. From the previous study, some evident show that only the β-sheet can insert into the membrane to form the lytic pore while the α-helices cannot. This research project aims to systematically remove the two outer layers of helices A-B and C-D by introducing a tryptic site after helices A-B and helices C-D. The resulting toxins will be assessed for structural features, physiochemical property, including in vivo and in vitro activity.

B5_B0130 Identification and purification of bacteriocin secreted by lactic acid bacteria isolated from traditional Thai fermented food.

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Abstract: A total of 32,577 lactic acid bacteria were isolated from 30 Thai fermented food products and screened for bacteriocin production using direct plating method. 24 isolates from pickle vegetable, Nham, Plaa som fak and Kai plaa som were found to produce bacteriocins. Bacteriocins from 4 isolates were nisin and 3 isolates were Plantaricin W by PCR technique. All other bacteriocins were unknown. We chose NPB3 isolate from Nham for further study. This bacteriocin inhibited growth of many food-bone pathogenic bacteria including *Listeria monocytogenes*, *Pediococcus pentosaceus*, and *Enterococcus faecalis* and it was heat stable at 100 °C 10 min. NBP3 isolate was identified to be *Pediococcus pentosaceus* by 16S rDNA technique. This bacteriocin was purified to homogeneity by 3-step purification method: Hydrophobic chromatography; Cation exchange chromatography and by Reverse phase chromatography. Purified bacteriocin was found to have molecular mass of 4622.369 Da by MALDI –TOF mass spectrometry.

B5_B0131 ISOLATION AND CHARACTERIZATION OF GALECTIN-3 FROM HUMAN PAPILLARY THYROID CARCINOMA

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Abstract: Galectin-3, a β-galactoside binding lectin, is highly expressed in papillary thyroid carcinoma. Previously, we were not able to identify galectin-3 by protein staining after 1-DE or 2-DE, because of low abundance of this protein in the tissue. In this study, we identified and characterized a galectin-3 from the tissue of human papillary thyroid carcinoma by using α-lactose agarose affinity chromatography. Proteins eluted from the column were separated by SDS-PAGE, and antibody against galectin-3 was used in detection for galectin-3 in the fractions eluted from the column. Some protein bands from the lactose binding fraction were also selected for identification by LC/MS/MS mass spectrometry. Seven protein bands, with molecular weights ranging from 16 kDa to 31 kDa, were identified as galectin-3. However, only 4 bands bound to antibody raised against the N-terminus of galectin-3. These results suggest that galectin-3 can be enriched by this method.

B5_B0133 Establishment and Characterization of A Cholangiocarcinoma cell line (RMCCA) from A Thai patient.

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ABSTRACT:
AIM: To establish and characterize a new cell line derived from peripheral cholangiocarcinoma tissue of a Thai patient.
METHODS: The peripheral cholangiocarcinoma specimen surgically obtained from a Thai patient was aseptically processed by washing and mincing before culturing in Ham's F12 medium containing 10% fetal bovine serum. After 3 months, when the cell line has become homogeneous and stabilized, several features were investigated, including growth characteristics, immunofluorescence for cytokeratins, expression of tumor markers, chromosomal analysis by G-banding and multicolour fluorescence in situ hybridization (MFISH), *in vitro* migration and invasion characteristics.
RESULTS: The RMCCA-1 cell line has been established. These cells proliferated as a monolayer with a population doubling time of 48 hours. Immunocytochemistry showed positive staining for human cytokeratin 7 and AE-1/AE-3 verifying the biliary

epithelial origin. RMCCA-1 secreted carbohydrate antigen 19-9 (CA19-9) but not α-fetoprotein (AFP). RMCCA-1 exhibited a high level of *in vitro* migration. Chromosome analysis identified aneuploidy karyotypes.. The cell line exhibited a significant number of chromosomal aberrations as shown by mFISH and G-banding methods.
CONCLUSION: A new cell line derived from peripheral cholangiocarcinoma of a Thai patient has been established. This cell line shows *in vitro* invasiveness and a high degree of motility.

B5_B0139 RECOMBINANT EXPRESSION AND CHARACTERIZATION OF SERINE PROTEINASE HOMOLOGUE (SPH) FROM BLACK TIGER SHRIMP

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Abstract: A full-length cDNA of the serine proteinase homologue (SPH) of *Penaeus monodon* was identified by rapid amplification cDNA end (RACE) method. The complete cDNA sequence of 1,958 bp contains an open reading frame (ORF) of 1,572 bp encoded a 523 amino acid protein including a 19 amino acid signal peptide. The calculated molecular mass of the mature protein is 51.58 kDa with an estimated pI of 4.86. The expression of *P. monodon* SPH mRNA was determined in the hemocytes of *Vibrio harveyi*-injected shrimp by *in situ* hybridization. The results showed the induction of SPH transcript upon *V. harveyi* challenge. The catalytic domain of *P. monodon* SPH was expressed in bacteria system. Then, the recombinant protein was purified using the Ni column and S agarose column. The partially purified protein was used for preparation of a specific polyclonal antibody. This antibody will be further used to study SPH distribution in various shrimp tissues using immunohistochemistry. Finally, the function of SPH was investigated by RNA interference (RNAi). The results suggested that the shrimp SPH probably acts as a cofactor of the prophenoloxidase system.

B5_B0141 Study of the anti-oxidant property of four Thai plants

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Abstract: The purpose of this study was to determine the anti-oxidant property of methanol extract from 4 types of Thai vegetables and fruit: purple eggplant, cork wood flower, cork wood leave and white dragon fruit. It was found that methanol crude extract from cork wood leave showed the highest anti-oxidant property upon using DPPH (2,2'-diphenyl-1-picrylhydrazyl) as free radical. The IC_{50} of cork wood leave for DPPH radical is found to be 750 µg/mL. The amount of phenolic compound was also found highest in cork wood leave at 125.2 µg/mL.

B5_B0143 THE QUANTITATIVE PREDICTION OF LPS-NEUTRALIZATION ACTIVITY OF ANTIENDOTOXINS VIA ARTIFICIAL NEURAL NETWORK

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Abstract: The core structure and the vast array of substituent groups are essential towards the LPS neutralization activity. In order to develop a pharmacophoric model for this relationship, artificial neural network (ANN) implementing the back-propagation algorithm was utilized for the calculation of LPS neutralization activity also known as the 50% effective displacement (ED_{50}). The activity was modeled as a function of the NO inhibition and the computed molecular descriptors. The antiendotoxin dataset used in this study was taken from the literature. Results indicate that artificial neural networks gave good performance for the quantitative prediction of antiendotoxin activity as illustrated by the good correlation between predicted and experimental ED_{50} of $r = 0.955$ and the root mean square error (RMS) of 23.460. The ability to predict the activity of antiendotoxins *in silico* provides great potentials in the rational design of novel endotoxins with enhance neutralization activity.

B5_B0145 METALLO-BIOACTIVE COMPOUNDS AS SUPEROXIDE DISMUTASE MIMETICS

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Abstract: Superoxide dismutase (SOD) catalyses the dismutation of superoxide anion (O_2^-) and plays an important role in the protection of cells against oxygen toxicity. However, there are some major drawbacks associated with the usage of native enzymes as they cause immunological complications and penetration to target site. Thus, synthetic superoxide dismutase mimetics has successfully been prepared from metallobacitracin and metalloorotic acid with potency that rivals natural SOD. The effect of bacitracin and metallo-bacitracin on various microorganisms was assessed by antibiotic susceptibility testing. Moreover, molecular modeling and quantum chemical calculation of the metallobacitracin complex was performed to evaluate

the correlation of electrostatic charge of transition metal ions with the SOD activity. Similarly, the metallo-orotic acid (vitamin B13), exhibited interesting superoxide dismutase activity with IC_{50} of 150 µg/mL, which is approximately 714 U/mg. More in-depth study is under way in realizing the potential of developing metal complex based therapeutics.

B5_B0146 Site-directed Mutagenesis in the Aglycone Binding Pocket of Thai Rosewood Beta-Glucosidase

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Abstract: β-Glucosidases not only hydrolyze of β-glucosidic linkage, but some also catalyze reverse hydrolysis and transglucosylation. Dalcochinase (Thai rosewood β-glucosidase) was better for reverse hydrolysis, but poorer for transglucosylation, when compared with linamarase (cassava β-glucosidase). Both enzymes also exhibit specificities for their natural substrates (dalcochinin glucoside and linamarin, respectively). So they show differences in catalytic properties and substrate preferences, despite sharing 70% amino acid sequence identity. This research aims to identify key amino acid residues for function of dalcochinase by replacing the residues in the aglycone binding pocket of dalcochinase with the corresponding residues of linamarase (H253F and N323Q). Mutant enzymes were expressed by *Pichia pastoris* and purified. Both mutants appeared similar to wild-type dalcochinase as judged by SDS-PAGE, western blot and activity staining on non-denaturing PAGE. The decrease in relative hydrolytic activities of both mutants towards various substrates, compared with natural dalcochinase, suggested that both H253 and N323 may play important roles in determining substrate specificity and catalytic functions of dalcochinase.

B5_B0147 PREDICTION OF GFP SPECTRAL PROPERTIES USING ARTIFICIAL NEURAL NETWORK

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Abstract: In this study, we applied artificial neural network, implementing the back-propagation algorithm, for the prediction of the excitation and emission maxima of green fluorescent protein as a function of the quantum chemical descriptors. The data set comprising of 2 sets were collected from the literature. The first data set consisted of GFP color variants, while the second were composed of synthetic chromophores. The modeling of excitation and emission maxima gave good accuracy as observed from the correlation coefficient of 0.9. Results indicated that among different types of molecular descriptors, quantum chemical descriptors yielded the best correlation with experimental data. Furthermore, the protonation state of GFP chromophores were shown to be crucial toward the predictive performance. A comparative analysis with other multivariate methods indicated that artificial neural network was suitable for modeling the spectral properties of the chromophores. Furthermore, this approach demonstrates great potential for the design of chromophores with tailor-made spectral properties.

B5_B0148 Characterization of S_3 Subsite of Severe Acute Respiratory Syndrome Coronavirus Proteinase (SARS CoV M^{pro}) Based on Molecular Docking Method

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Abstract: Severe Acute Respiratory Syndrome Coronavirus Proteinase (SARS CoV M^{pro}) is a target enzyme for drug development of Severe Acute Respiratory Syndrome. This research study the active site region focus on S_3 subsite, which is region important for enzyme binding with substrate and inhibitor by using the molecular docking method. The methods, constructed the 20 structures of octapeptide substrates based on template H_2N-P_4-P_3-P_2-P_1-P_1'-P_2'-P_3'-P_4'-$CONH_2$ by varied on P_3-position with 20 types of amino acids, then evaluated the interaction energy by docking each octapeptide into the active site of enzyme performed by Autodock 3.0.5 with default parameters. Comparison the potential binding of octapeptide by considered on the binding energy, the lower of binding energy means a better of potential binding. The results showed that P_3 of the substrate substituted with the aliphatic hydrophobic group such as Ala, Val and Leu presented the lower of binding energy. On the other hand, P_3 as Lysine presented the lowest binding energy. The three dimension of molecular modeling showed the amino acid residues of enzyme, Leu-167 and Glu-166 were located around octapeptide P_3-Lys. The side chain of octapeptide P_3-Lys pointed toward to the side chain of Glu-166 of enzyme. The one of hydrogen bond occurred between P_3-Lys and Glu-166 by distance of 2.5 Å. The molecular surface of active site indicated that the location of S_3-subsite was the negative charge while the location nearby S_3 subsite thus S_4 and S_2 subsite were deep hydrophobic pocket.

B5_B0159 MECHANISM OF PORE FORMATION OF THE *Bacillus thuringiensis* Cry4Ba TOXIN

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Abstract: Bacillus thuringiensis Cry4Ba □-endotoxin is a membrane-pore-forming toxin that is specifically pathogenic to some disease-vector mosquito larvae. The toxins work by forming pores and causing cell lysis by largely unknown mechanisms. In this study, we show that the assembly of 65-kDa activated Cry4Ba toxin to an unstable olimeric intermediate occurs in solution. Toxin adsorption on a lipid monolayer at the air-water interface suggested that the binding of the Cry4Ba oligomer to lipid membrane is triggered by carbohydrate. In addition, the three dimensional model of a membrane-associated oligomeric form of the Cry4Ba toxin was determined by electron crystallography in DMPC bilayer membrane. The model reveals that the Cry4Ba toxin can form a trimeric propeller-like structure in association with the membrane.

B5_B0177 THE EFFECT OF CRUDE EXTRACTS FROM CURCUMA LONGA AND ANDROGRAPHIS PANICULATA ON OXIDATIVE STRESS IN BROILERS

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Abstract: The effect of crude extracts of *Curcuma longa* and *Andrographis paniculata* on oxidative stress in broiler was examined. Two hundred day-old chicks were divided into 4 groups receiving basal diet with 1 of the 4 different supplements; N: no supplement; P: 3 mg/kg prednisolone; CP: 3 mg/kg prednisolone and 0.05% *Curcuma longa*; AP: 3 mg/kg prednisolone and 0.1% *Andrographis paniculata*. Heterophil to lymphocyte (H/L) ratios and total antioxidant capacity, using ferric reducing ability of plasma (FRAP) assay were examined at 14, 21, and 28 days of age. Results suggested that 3 mg/kg prednisolone could successfully induce stress while the herb supplements could have beneficial effect in stress control in broilers. The herb supplements were also found to increase total antioxidant capacity. This might suggest that crude extracts of *Curcuma longa* and *Andrographis paniculata* could have a potential role in stress control and redox homeostasis in broilers.

B5_B0179 LOCALIZATION OF ANTI-LIPOPOLYSACCHARIDE FACTOR IN Penaeus monodon UPON Vibrio harveyi INFECTION AND ITS LPS-BINDING ACTIVITY

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Abstract: In the previous study, the recombinant anti-lipopolysaccharide factor (ALF) type3 (rALF*Pm*3) of *Penaeus monodon* has been shown to possess broad spectrum of antimicrobial activity against Gram-negative and Gram-positive bacteria, and also filamentous fungi. To elucidate its importance in shrimp immune system, we investigated its expression and distribution in shrimp. ALF*Pm*3, the most abundant isoform found in *P. monodon*, was selected for this study. Localization of ALF*Pm*3 transcripts in *Vibrio harveyi* infected shrimp tissues revealed that ALF*Pm*3 expressing haemocytes were distributed throughout the cepharothorax during the first phase of infection. Detection of ALF*Pm*3 protein with a specific antibody showed the distribution throughout the cepharothorax and the injection site of ALF*Pm*3 producing haemocytes in the first phase of infection. Its biological activity, the LPS-binding activity, was also examined and reported. Taken together, the crucial role of ALF in shrimp immunity was implicated.

B5-B0183 LIMONOID GLUCOSYLTRANSFERASE CONTENT IN CITRUS FRUITS

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Abstract: Limonoid glucosyltransferase is an enzyme catalysing limonin, bitter compound mostly found in unripen citrus fruits, to limonoid glucoside, non-bitter compound. The enzyme content was investigated in flesh, albido and most inner peel parts of 4 kinds of citrus fruits, namely, lime (*Citrus aurantifolia* Swing) cultivar Lemon, sweet orange (*Citrus sinensis* Osbeck) cultivar Kalewcheng, tangerine (*Citrus reticulate*) cultivar Sainampung and Kamphangpetch and pummelo (*Citrus grandis* Osb.) cultivar Kaoyai, Kaonampung and Tongdee, by measuring the enzyme activity at 30°C, pH 5.0, 7.0, and 9.0 and quantitating product, limonoid glucoside, by HPLC technique. The enzyme was found in the flesh parts of Lemon lime, Kalewcheng sweet orange and Sainampung tangerine, and also in the albido parts of Kaoyai and Tongdee pummeloes. Compared to all investigated parts of citrus fruits, the flesh part of Kalewcheng sweet orange and albido part of Tongdee

pummelo had highest amount (0.196 U/mg at pH 5.0 and 0.114 U/mg at pH 9.0).

B5_B0196 Amino acid substitution at the C-terminal region of BinA affects larvicidal activity of the binary toxin from *Bacillus sphaericus*

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Abstract: *Bacillus sphaericus* produces binary toxin that is specifically toxic to the larvae of some mosquito species e.g. *Culex spp.*, vector of filariasis and encephalitis and *Anopheles spp.*, vector of malaria. The binary toxin consists of 2 polypeptides called BinA (42 kDa) and BinB (51 kDa). Both proteins function together by BinB acts as specificity determinant whereas BinA acts as the toxic component. To identify regions that are important for the toxic action of BinA, 15 single-point mutations were generated by replacing selected residues by alanine. All mutants showed comparable expression level to that of the wild type. Mosquito larvicidal assays revealed that mutants E296A, R301A, E307A and R312A exhibited extremely low toxicity. Interestingly, all of these mutants are located at the C-terminal region. Our result indicating that this region plays important role during the toxic action possibly by acts as an enzymatic domain. Further investigations are underway to elucidate the molecular mechanism of this interesting toxin. Information obtained from our studies would be useful for many applications in the future.

B5_B0197 CHARACTERIZATION OF CRUSTIN GENES AND THEIR RECOMBINANT PROTEINS OF THE BLACK TIGER SHRIMP, Penaeus monodon

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Abstract: Expressed sequence tag analysis of hemocyte cDNA libraries from the black tiger shrimp revealed 46 transcripts of crustin which are homologues of an 11.5-kDa antibacterial peptide, carcinin. Analysis of these cDNA sequences yielded at least 6 different isoforms of this peptide. Two isoforms of crustin homologues are full length cDNAs, named crus*Pm*1 and crus*Pm*5. Each of them encodes a protein with a leader sequence, an amino-terminal rich in hydrophobic amino acid repeats and conserved 12 Cys residues. Eight of the Cys residues at the Carboxyl-terminal engage in a 4-disulfide core domain or whey acidic protein (WAP) domain, a putative antibacterial determinant. The phylogenetic analysis shows that crustins are mostly related to those proteins containing only one WAP domain, including carcinin, and single wap domain protein (SWD). The crusPm1 protein was recombinantly expressed *in vitro* in *E. coli*. Study of the antimicrobial activity of this recombinant protein demonstrated that crus*Pm*1 had the anti-microbial activity against only Gram-positive bacteria especially *Staphylococcus aureus* and *Streptococcus* iniae.

B5_B0202 Temperature effect on amount and activity of anti-oxidant of flavonoid extracted from Thai chiles.

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Abstract: The purpose of this study was to determine the effect of temperature on the amount and anti-oxidant property of flavonoid extracted by methanol and hexane from fresh and dried Thai chiles. It was found that 1.29-2.00 gm of flavonoid were obtained from 30 gm of both kinds of Thai chiles when extracted at 30-70°C for 2 hrs. Anti-oxidant property of these flavonoids was assayed using 0.12 mM DPPH as free radical. The IC_{50} of fresh Thai chiles was found to be in the range of 27.04-34.99 µg/mL while the IC_{50} of dried Thai chiles was found to be in the range of 29.66-34.45 µg/mL. The most potent of anti-oxidant activity of both fresh and dried Thai chiles was found at 60°C of extraction with IC_{50} 27.04 and 29.66 µg/mL, respectively. The IC_{50} of BHT used as standard anti-oxidant was found to be 27.96 µg/mL.

B5_B0203 COMPARATIVE PROTEOMICS PROFILE OF HCC-S102 AND SK-HEP1 CELL LINES

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Abstract: The SK-Hep-1 human cell line, derived from the ascitic fluid of a patient with adenocarcinoma of the liver, has been reported to be of hepatocellular carcinoma origin. However, in 1992, Heffelfinger and colleagues suggested that these cells are of endothelial origin after characterizing their morphology by electron microscopy and gene expression by northern blot analysis of total RNA. Since these cells have the ability to form tube-like structures, we are therefore considering whether SK-Hep-1 cells can be used as a model for *in vitro* angiogenesis. In order to confirm the endothelial characteristics of SK-Hep 1 cells, it is necessary to screen and show the presence of endothelial-specific proteins in these cells. Thus, we are screening

the global protein expression pattern of the SK-Hep-1 cell line, by using two-dimensional electrophoresis (2-DE), followed by liquid chromatography mass spectrometry. So far, 2-DE of the SK-Hep-1 cell line has been performed in pH range 3-10 and pH 6-11 but the resolution of gels still need improvement, so that endothelial-specific proteins have not yet been found. In the future work, we will perform subcellular extraction prior to 2-DE which can increase the resolution of detection.

B5_B0208 IDENTIFICATION OF GENES INVOLVED IN OSMOREGULATION OF THE BLACK TIGER SHRIMP *Penaeus monodon*.

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B5

Abstract: Osmoregulation is important for life cycle of shrimp. Understanding of this mechanism would be useful for production of broodstock and shrimp farming. In this study, mRNA differential display was performed to identify the differentially expressed genes in gill, epipodite and antennal gland of P. monodon reared at different salinity levels (3, 25 and 40 ppt). Six pairs of random and anchor primers were used to amplify cDNA. PCR profile comparison of different salinity levels showed 67 differential expressed cDNA fragments. Thirty-six, eighteen and thirteen fragments were obtained from gill, antennal gland and epipodite, respectively. The size of cDNA fragments was between 250 to 1,200 bp. Out of 67 fragments, 10 was cloned, sequenced and blasted against GenBank. These genes included ribosomal proteins L10 and 11 and several novel transcripts. The remaining fragments will be further cloned and sequenced. Specific primers will be designed for verification of differential expression using semi-quantitative PCR.

B5_B0209 ALPHA-MANNOSIDASE CONTENT IN VEGETABLE AND PLANT SEEDS AND THEIR PRELIMINARY PROPERTIES OF ALKYL-MANNOSIDE SYNTHESIS

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Abstract: α-Mannosidase, a glycosidase, could be used in carbohydrate engineering and oligo-mannoside synthesis. The enzyme activity measurement was done in vegetable and plant seeds (15 each) by using *p*-nitrophenyl-α-D-mannopyranoside as substrate at pH 5.0, 30°C. The results showed that only 8 kinds of seeds, i.e. stink beam, tangerine, purple bauhinia, Makhaa mong, green pakchoi, Chinese cabbage, Chinese radish and Ale Chinese, had high enzyme activity (>1.0 U/g fresh weight and >0.1 U/mg protein). These were used to synthesize the alkyl-mannoside with 9 alcohols at pH 5.0, 30°C for 1 hr. It was found that stink beam and tangerine seeds enzymes might not synthesize alkyl-mannoside. Ale Chinese and Chinese cabbage seeds enzymes could synthesize only alkyl-dimannosides whereas green pakchoi, Chinese radish, and purple bauhinia seeds enzymes could synthesize upto alkyl-trimannosides. Makha mong seed enzyme could produce upto alkyl-tetramannosides. It could be summarized that all 6 enzymes, except for stink beam and tangerine seeds, had the ability to accept alcohol with different carbon chain length and stereo-structure.

C1_C0001 DETERMINATION OF PESTICIDE RESIDUE IN VEGETABLE JUICE, FRUIT JUICE AND GREEN TEA SOLUTION IN CLOSED PACKAGE

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Abstract: Determination of pesticide residue in 25 closed-package samples of vegetable juice, fruit juice and green tea solution revealed pesticide residue in 20 samples. Pesticides that were frequently found were heptachlor and lindane. We found heptachlor 0.025-0.060 ppm in green tea and the amounts from 2 of 5 samples were over the permissible level. Lindane was also found at 0.005-0.014 ppm. Lindane is a nonpermitted pesticide. In apple juice, we found hepatachlor 0.040 ppm, lindane 0.007 ppm, aldrin 0.010 ppm which were within the allowable limit. In foreign carrot juice samples, we found heptachlor 0.030 ppm, o, p'-DDD 0.600 ppm and B-endosulphan 0.240 ppm. The amount of o, p'-DDD in foreign carrot juice was over the limit and B-endesulphan is a nonpermitted pesticide. We found that the Thai carrot juice consisted of heptachlor 0.020 ppm and G-chlordane 0.400 ppm. G-chlordan is also a nonpermitted pesticide. We found pesticide residue in grape juice that might be abamectin. We did not find any pesticide residue in orange juice. GC-μECD detector using Internal and External Standard, this method was used for identification and determination of pesticide residues. % Recovery was 99.2 and detection limit was 0.005 ppm, (AOAC, 2000). These results from our investigations should stimulate the Ministry of Public Health to be interested in controlling the use of pesticides in packaged juices and teas.

C1_C0006 DEVELOPMENT OF HOLLOW FIBER SUPPORTED LIQUID MEMBRANE MICROEXTRACTION WITH LIQUID CHROMATOGRAPHY-MASS SPECTROMETRY FOR THE DETERMINATION OF CHLORMEQUAT AND MEPIQUAT IN RICE

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Abstract: A simple hollow fiber supported liquid membrane microextraction technique was developed to simultaneously clean up and preconcentrate of two cationic plant growth regulators, chlormequat and mepiquat, in rice. The 70%v/v of di-(2-ethylhexyl) phosphoric acid in di-n-hexyl ether was filled in the pores of hollow-fiber membrane by capillary force. The analytes were extracted through the membrane pores and then back-extracted into a few microliters of an acceptor solution in the membrane lumen. Hydrophilic interaction liquid chromatography coupled with mass spectrometry was used to analyze both analytes in only a three-minute run without any ion-paring agent. The method detection limits are 4.9 μg/kg for chlormequat and 9.6 μg/kg for mepiquat. The relative standard deviations of 50 μg/kg spiked standard solutions in rice sample are 4.2 and 5.4% for chlormequat and mepiquat respectively. This proposed method required only a few microliter organic solvent resulted the environmentally-friendly process and also provided low cost per analysis due to the cheap hollow-fiber membrane.

C1_C0010 DETERMINATION OF ANTIOXIDANT CAPACITY OF PIKUL FRUIT EXTRACTS

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Abstract: Antioxidant capacities of the phenolic extracts from the mature green and ripe fruits of "Pikul" (Mimusops elengi) were determined by 2,2-diphenyl-1-picrylhydrazyl (DPPH) assay and 2,2'-azinobis-(3-ethylbenzothiazoline-6-sulphonic acid) (ABTS) assays. The results were expressed as gallic acid equivalents (GAE). Three different fractions of the phenolic extract from each stage of fruit designated as free phenolic acid (F1), soluble phenolic acid ester (F2) and insoluble phenolic acid ester (F3) have different strength of antioxidant capacities. From mature green fruit, F2 has the strongest antioxidant capacity followed by F3 and F1 while from the ripe fruit, similar strength of antioxidant capacities of the three fractions are obtained.

C1_C0011 QUANTITATIVE ANALYSIS STUDY OF CYSTEIN AMINO ACID BY VISIBLE SPECTROPHOTOMETRY

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Abstract: Cystein is one of an amino acid which effect on structure of protein. Since cystein contains a sensitive thiol group to form a chemical reaction. In this research, the appropriate condition for reaction between cystein and 5,5-dithiobis-2-nitrobenzoic (DTNB) was studied and studied factors that effect on analysis. This method was applied to analyse cystein content in milk sample. From the experiment, its revealed that mole ratio between cystein : DTNB was 2:1, at pH10, controlled temperature between 90 -100 °C. The product showed a yellow color complex which the absorbtion maximum at 412 nm. All cations except Ca^{2+} reduced the absorption of complex but carbonate, phosphate gave an additive on absorption. The processed milks were analysed cystein content using this reaction and showed that those milk contained free cystein11.50 – 19.13 ppm.

C1_C0019 Determination of Arsenic (III) to Arsenic (V) Species Ratio in Water.

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Abstract: Determination of the speciation of arsenic in natural water is important because the toxicological effect of arsenic depend on its chemical forms. Trivalent arsenic is about 25 – 60 times more toxic than oxidized pentavalent state and inorganic arsenic compounds are about 100 times more toxic than organic arsenic compounds. A procedure for the sequential determination of As(III) and As(V) base on direct UV absorbance detection at 192 nm following ion chromatographic separation was developed. As(III) and As(V) were detected at ppb levels the peak showed at retention time < 12 min using an eluent of gradient Na_2CO_3/$NaHCO_3$ with 100 µL sample loop for ion chromatographic separation. This method was suitable for determination of As(III) and As(V) ratio 1 : 20 in water sample collected in Ronpibun district, Nakhon si thammarat province.

C1_C0022 Construction of a device for detection of Acetone and Ethanol

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Abstract: Semiconductor is a material which possesses conductive properties between those of a metal conductor and an insulator. Nowadays, they are used as gas sensors using the variation in electrical conductivity of the metal oxides as the main basic principle. These properties can be utilized to detect NO_x, H_2, volatile organic compounds (VOC_s), SO_x, CO_2 and O_2 etc.The semiconductor of metal oxides demonstrate good sensitivity of detection, robustnees and withstanding at high temperature. The group of metal oxide such as SnO_2, TiO2 and ZnO can be used as the sensor heads. The device for the detection of acetone and ethanol was constructed, which consisted of a pack column, a chamber with a sensor head, 2 dc power supplies, a multimeter and a computer. A commercial available TGS 822 from Figaro Company Limited was used as a sensor head. An analytical column was coupled with the set up to enhance the capability for the separation of acetone and ethanol. The calibration graphs over the range of 10 to 160 mg/L were obtained for acetone with limit of detection (LOD) = 1.32 mg/L (R^2 = 0.9917, n =7) and for ethanol with LOD = 2.88 mg/L (R^2 = 0.9961, n = 7) respectively.

C1_C0023 DEVELOPMENT OF RADIOANALYTICAL TECHNIQUE FOR LEAD-210 IN SEDIMENT

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Abstract: Electrochemical method (spontaneous deposition) of polonium-210 on silver disc was developed. The temperature of 80±2 °C, rotational velocity of silver disc at 500 rpm, pH of solution at 0.7, and deposition time of 4 hrs were proved to be the optimum conditions as they gave the high recovery yield of polonium-210 deposited on disc. The deposition reaction was also completed within short deposition time. Polonium-210, a daughter product of lead-210, as known, is in secular equilibrium with their parent in sediment. Therefore, the above optimum conditions were used to determine radioactivity of lead-210 in sediment. Microwave and hot plate digestion were compared for its efficiently on sediment digestion; both methods gave no significantly different specific activity of lead-210. Hot plate digestion was then chosen and used on analysis of standard reference material; IAEA sediment 368. Specific activity of Pb-210 analyzed by developed analytical technique was 1.49+0.07 dpm/g in ranged of the certified specific activity of 1.39-1.63 dpm/g. The radio-analytical technique for lead-210 in sediment developed was then acceptable in terms of its precision and accuracy.

C1_C0029 DETERMINATION OF METHYLDOPA IN PHARMACEUTICAL FORMULATIONS BY FLOW INJECTION SPECTROPHOTOMETRY

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Abstract: A flow-injection spectrophotometric procedure is proposed for methyldopa determination in pharmaceutical preparations. It is based on formation of an orange-red product(measured at 476 nm) after complexation of methyldopa with 4-aminoantipyrine (4-AP) and potassium hexacyanoferrate(III). Under optimal conditions, Beer's law is obeyed over a concentration range of 5–50 mg l^{-1} methyldopa. Typical correlation between absorbance and the analyte (drug) concentration was 0.9998. Usual excipients used as additives in pharmaceuticals do not interfere with the proposed method. The analytical frequency was 180 h^{-1} and the relative standard deviation (R.S.D.) was ≤1.5% for sample solution containing 10 mg l^{-1} methyldopa (n = 11). The analytical results obtained in commercial formulations by applying the proposed FIA method were in good agreement with those obtained by using the official method.

C1_C0031 DETERMINATION OF RARE EARTH ELEMENTS IN YELLOW CAKE BY ICP-AES.

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Abstract: Determination of rare earth elements (REEs; La, Ce, Pr, Nd, Sm and Gd) in yellow cake (Ammonium diuranate) by inductively coupled plasma atomic emission spectrometry (ICP-AES) was interfered by uranium (U), major composition. The effect of U is to increase the quantity of REEs. In this work, the separation of U from REEs was investigated by anion exchange resin to avoid U interference. The optimum condition for U adsorption was studied at various HCl concentrations. It was found that U(VI) in 10 M HCl was the maximum adsorption by resin and REEs were not adsorbed. The determination of REEs in synthetic standard solution before and after separation by resin was performed. After treatment, the acceptable recoveries of REEs between 99% and 101% were obtained. Therefore, separation by anion exchange resin was successfully used to eliminate U from REEs before estimating by ICP-AES. The developed method was applied to analyze REEs in yellow cake obtained from monazite digestion process.

C1_C0043 Development of Passive Sampling Devices and Exposure Chamber for Determination of Formaldehyde Indoors

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Abstract: A diffusive passive sampler has been developed for determination of formaldehyde indoors. The sampling device consists of a polypropylene tube containing a cellulose filter treated with 1% $NaHSO_3$. The sampling device collects gaseous molecule, which diffuses through the membrane, and it is then trapped on an absorbent. After exposure, the filter is desorbed by DI water and analyzed by the chromotropic acid (CTA) method. Optimization and validation studies are conducted by put the sampling devices in the exposure chamber for 2 hours. Desired amount of formaldehyde vapor and water are applied into the chamber under the specified conditions. Reproducibility of detected concentration inside the chamber was acceptable, with relative standard deviations averaging 1.5 % and 0.03 ppm detection limit.

C1_C0044 IN-CAPILLARY DERIVATISATION AND CAPILLARY ZONE ELECTROPHORESIS FOR ANALYSIS OF METALS USING NITRO-PAPS AS DERIVATISING REAGENT

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Abstract: The feasibility of in-capillary derivatisation (ICD) and capillary zone electrophoresis (CZE) were investigated for the determination of four metals ions (Co(II), Cu(II), Ni(II) and Fe(II)). 2-(5-Nitro-2-pyridylazo)-5-[*N*-n-propyl-*N*-(3-sulfopropyl) amino]phenol (Nitro-PAPS) was used as derivatising reagent. The derivatisation was carried out inside the capillary. The strategies for in-capillary derivatisation include modes of derivatisation and types of reagent/sample introduction. The crucial electrophoretic parameters, including buffer pH, buffer concentration, organic modifier and applied voltage were optimised to provide good resolution. The analytical features obtained from in-capillary and pre-capillary derivatisations were compared. The scheme of in-capillary derivatisation is attractive and serves as alternative technique for metal analysis.

C1_C0047 SAMPLE PREPARATION AND ANALYSIS OF SUGARS IN RAW SUGAR

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Abstract: Acid hydrolysis was used as the sample preparation method for the analysis of sugars in raw sugar samples. The parameters affecting the acid hydrolysis of sucrose including concentration of hydrochloric acid, temperature and reaction time were studied. Sucrose was complete hydrolysed under the following conditions: 12 $molL^{-1}$ of hydrochloric acid, 80 °C and reaction time of 5 min. The hydrolysate was separated by ion chromatography using a CarboPac PA10 column and gradient elution of sodium hydroxide with direct detection by electrochemical detection. The recoveries of seven sugars were in the ranges of 88.76 to 105.24 in the raw sugar samples. The present method was successfully applied for the analysis of raw sugar samples from Mitr Phol factory.

C1_C0049 Application of micellar liquid chromatography with short column C18 to determine parabens in pharmaceutical and cosmetic products

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Abstract: In this research, guard column, Zorbax SB C18 was applied in replacement of expensive analytical column for studying of parabens separation such as methyl paraben (MP), ethyl paraben (EP), propyl paraben (PP) and butyl paraben (BP) in micellar liquid chromatography (MLC). This system was consisted of guard column Zorbax SB C18 (12.5 mm length, 4.6 mm i.d. and 5 µm) as an analytical column and sodium dodecyl sulfate (SDS) as mobile phase with DAD detection at 254 nm. The chromatographic behavior was considered and it was found that the reciprocal value of capacity factor was linear to micellar concentration. This proposed technique was applied to determine parabens in some hard gelatin capsules and cosmetic and the linearity of each paraben was studied in the range 0.1-120 µmol L^{-1}.

C1_C0050 Simple microfabrication of PDMS chip coupled with an amperometric detector for copper (II) monitoring

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Abstract: Simple PDMS microfluidic was coupled with amperometric detection was investigated for determination of copper(II). The 3D microfluidic device was fabricated from PDMS by a simple casting and moulding technique with 3 D cylindrical channel 100 µm. The signal of copper (II) was monitored by amperometric detection with glassy carbon working microelectrodes fixed in microfluidic device. The system was interfaced with microflow injection analysis supplying samples at 20 µL min^{-1} flow rate. The calibration graph was linear in the range 0.50 –2.0 µg mL^{-1} (R^2 0.995). The detection limit (3S/N) was 0.3µg mL^{-1}.

C1_C0051 PREPARATION AND CHARACTERIZATION OF TITANIUM DIOXIDE

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Abstract: Titanium dioxide was synthesized by sol-gel method. Titanium dioxide sols were prepared by the hydrolysis and condensation of titanium (IV) diisopropoxide bis (pentanedionate) in isopropanol and 1,3- propanediol. The titanium dioxide powders were calcined at 400, 500, 600, 700 and 800 °C and characterized by X-ray diffraction. The surface area was analyzed by Brunauer, Emmett and Teller (BET) method. The crystal structure and surface area of TiO_2 were affected by calcination temperature. At a calcination temperature of 400 °C, only anatase phase was observed. As calcination temperature was increased to 700 °C, the rutile phase became the major constituent of TiO_2. The surface area was decreased from 57.97 to 3.08 m^2g^{-1} when the calcination temperature were 400 °C and 800 °C, respectively.

C1_C0053 Improved flow injection method for determination of glucose in haemolymph of Cancer pagurus

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Abstract: A flow injection system with an immobilized glucose oxidase reactor and a double- beam, home-made spectrometer was improved to measure circulating glucose in the crab, *Cancer pagurus*. Glucose was oxidized in the reactor and the H_2O_2 generated was mixed with o-dianisidine to produce the brown color of oxidized o-dianisidine which was measured. This system provided a good accuracy and precision (% recoveries 96.9-102.0 and % RSD < 2). The calibration graph was linear in the range 0.1 – 1.0 mmol L^{-1} with R^2 0.999. The limit of detection (3S/N) was 0.01 mmol L^{-1}. This method was applied successfully with small amounts of sample consumption (< 500 µL) including sample preparation. Sample throughput was 30 h^{-1}.

C1_C0057 DETERMINATION OF GLYPHOSATE AND AMINOMETHYLPHOSPHONIC ACID IN WATER BY HOLLOW FIBER SUPPORTED LIQUID MEMBRANE MICROEXTRACTION FOLLOWED BY HIGH PERFORMANCE LIQUID CHROMATOGRAPHY AND POST-COLUMN DERIVATIZATION WITH FLUORESCENSE DETECTOR.

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Abstract: A hollow- fiber supported liquid membrane microextraction is suitable for the determination of the herbicide glyphosate and its main metabolite aminomethylphosphonic acid (AMPA). A solution of 0.2 M Aliquat 336, cationic carrier, in di-n-hexyl ether was used as the supported liquid in an over-night immersion time. A 20 µL of 1 M potassium chloride,

the acceptor phase, was filled in the membrane lumen. The membrane was immersed into a 20-mL pH 9 sample solution. After 60-minute vibration, the acceptor phase was analyzed by high- performance liquid chromatography with post-column derivatization. The enrichment factors of glyphosate and AMPA are 824 and 141, respectively. The method detection limits are 0.3 µg/L for glyphosate and 1.5 µg/L for AMPA. The percent relative standard deviations of glyphosate and AMPA (5 µg/L spiked solution) are 11.86% and 7.33%, respectively. This method shows very high enrichment, reliability, low cost and consumable organic solvent.

C1_C0058 SEPARATION OF POLYMER LATEX PARTICLES USING DIELECTROPHORETIC/GRAVITATIONAL FIELD-FLOW FRACTIONATION.

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Abstract: Separation of polymer latex beads using dielectrophoretic/gravitational field-flow fractionation (DEP/Gr-FFF) was studied. The separation is based on the balancing of the DEP and Gr forces on the particles. The former levitates the particles away from the channel wall whereas the later pulls the particles towards the wall. The particles studied were 10 µm diameter polystyrene (PS) latex (density 1.05 g/cm^3) and 8 µm diameter polymethylmethacrylate (PMMA) latex (density 1.19 g/cm^3). Thus the size was similar and the mass was almost identical. Separation was achieved on the basis of the chemical composition of the particles as the gravitational force was approximately equal for the two samples. The equilibrium height of the particles in the channel depends on the strength of the DEP field. To characterize the DEP/Gr-FFF system, the effect of the applied voltage and frequency of the DEP field was studied. The higher the applied voltage, the stronger the DEP force. The frequency also influenced the DEP force. For each material there is a crossover frequency at which the field direction changes, affecting the particle height. The influence of relaxation time and carrier flow rate were also investigated.

C1_C0059 Analysis of Tetracycline Antibiotics Residues in Meat by High Performance Liquid Chromatography

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Abstract: Sample preparation technique for the analysis of oxytetracycline (OTC), tetracycline (TC) and chlortetracycline in meat by high performance liquid chromatography with UV detector (HPLC-UV) was investigated. HPLC-UV conditions were optimized. At optimum conditions limits of detection for OTC, TC and CTC were 0.05 mgL^{-1} and 0.1 mgL^{-1}, respectively. The linear dynamic range was from 0.05 to 100 mgL^{-1} with a correlation coefficient greater than 0.99 and a relative standard deviation (%RSD) less than 4.0%.

C1_C0060 DETERMINATION OF TOTAL POLYPHENOLS IN SOME CHIANG RAI LEAF TEA PRODUCTS USING SPECTROPHOTOMETRIC METHOD.

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Abstract: Total polyphenols (TP) in some Chiang Rai leaf tea products were analysed by spectrophotometric method based on Folin-Ciocalteau's reaction. The TP contents in green, oolong and black tea products, produced at different degree of fermentation, were compared. The leaf tea samples included 12 samples of green tea, 11 samples of oolong tea, and 4 samples of black tea. Polyphenols react with W and Mo compounds in Folin-Ciocalteau reagent resulting in a blue complex. The absorption wavelength used was 739 nm. Calibration graphs were constructed using gallic acid as a standard solution. It was found that in average green tea samples contained higher TP content (8.75±2.04%wt) than oolong tea (7.47±2.24%wt) and black tea (3.98±2.11%wt) samples, respectively. It indicated that the degree of fermentation in tea manufacturing process could possibly affect the TP content in tea products. Green tea, less fermented tea, contained the highest amount of TP, whereas oolong and black teas, undergone higher degree of fermentation, contained less TP contents.

C1_C0061 Development of Sample Preparation Technique for Oxolinic acid residue in Shrimp.

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Abstract: Sample Preparation method for oxolinic acid residue in shrimp was investigated by high performance liquid chromatography with fluorescence detector. Two columns were used, Pinnacle II C18 (250×4.6 mm i.d., 5µm) and Alltima C18 (150×4.6 mm i.d., 3µm). HPLC-FLD and sample preparation conditions were optimized for best analysis performance. Sample preparation were carried out by ultrasonic extraction and solid phase extraction, supelclean LC-18 sorbent. The results showed that the detection limit was 0.2 µg L^{-1}. The linearity was 0.2 to 8,000 µg L^{-1} (r^2> 0.99) with the % RSD ≤ 4.0% at the optimum conditions.

C1_C0064 Electrochemical properties of copper (I) halides and substituted thiourea complexes

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Abstract: The complexes between copper(I) halides and *N,N'*-diphenylthiourea (dptu) have been investigated to compare the structure and behavior in solid state with those in solution. The halides under investigation include chloride, bromide and iodide. In the case of chloride complex, the oxidation of chloride disappears. Therefore, chloride ion forms the strongest bond with the metal hence the oxidation is inhibited. In contrast, bromide and iodide behave differently because,of the two peaks of halide and trihalide oxidations respectively, one peak disappears, leaving the oxidation peak that is due to halide oxidation which is shifted to more positive due to the bonding with the metal. In the solutions of all complexes, *N,N'*-diphenylthiourea (dptu) exhibits the same electrochemical behavior as in free ligand.

C1_C0066 Removal of Lead(II) by Using Silica Produced from Rice Husk Ash and Modified with 3-[2-(2-aminoethylamino)-ethylamino]-propyl-trimethoxy silane

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Abstract: Silica was extracted from rice husk ash (the content of silica to be 98.34 % w/w) and it was modified with 3-[2-(2-aminoethylamino)-ethylamino]-propyl-trimethoxy silane. The silica was characterized by FT-IR spectrum and showed the additional peak at wavenumber at 3372 cm^{-1} which corresponded to NH_2(stretching). It has been used to study of removal of lead(II) from wastewater with batch and column methods and measured by atomic absorption spectrometry. The results showed that the optimum pH ranges for quantitative removal of lead(II) and time required for equilibrium were 4.0-6.0 (pH) and 30 minute, respectively. After being applied the optimum condition founded from the research to obtain the maximum adsorptive capacity of lead(II) from batch and column methods by using Freundlich adsorption isotherm, we found that silica produced from rice husk ash and modified with with 3-[2-(2-aminoethylamino)-ethylamino]-propyl-trimethoxy silane had maximum adsorption of lead(II) at 86.84 and 88.23 $mg.g^{-1}$ for batch and column methods, respectively.

C1_C0068 Determination of Ascorbic acid in Fruit Juice by High Performance Liquid Chromatography

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Abstract: This study describes the HPLC method which used to determine the concentration of L-ascorbic acid (vitamin C) in the instant fruit juice sample and the instant fruit juice mixed with vegetable juice samples. The samples were collected from supermarkets and local suppliers by random sampling. The samples were added perchloric acid and diluted with 3 % (W/V) phosphoric acid. Then passed the dilution through 0.45 µm membrane syringe filter, injected into the HPLC. L-Ascorbic acid was separated on Hypersil ODS column at 0.5 mL/min using 5 mM NaH_2PO_4 in 0.30 % (W/V) phosphoric acid. The linear response to quantity of L-ascorbic acid is from 5 to 50 µg / mL was obtained (r^2 = 0.999) and the recovery were over 99 % and 98 % at 10 µg/mL and 20 µg/mL respectively. The LOD of the method was 0.10 µg/mL and specific enough to determined L-ascorbic acid in commercial fruit juice and mix juice samples.

C1_C0069 Speciation of trihalomethanes (THMs) in water by headspace/gas chromatographic technique.

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Abstract: A simple and rapid method for analysis of trihalomethanes (THMs) contaminated in water was investigated by headspace/gas chromatography with electron capture detector (HS/GC/ECD). GC/ECD and HS conditions were optimized for the best analysis performance. Using optimum HS/GC/ECD conditions the limits of detection were 0.23 µg L^{-1}, 0.07 µg L^{-1}, 0.02 µg L^{-1} and 0.03 µg L^{-1} for chloroform ($CHCl_3$), dichlorobromomethane ($CHCl_2Br$), dibromochloromethane ($CHClBr_2$) and bromoform ($CHBr_3$), respectively. The linear dynamic range of $CHCl_3$, $CHCl_2Br$, $CHClBr_2$ and $CHBr_3$ were 0.5-75 µg L^{-1}, 0.1-60 µg L^{-1}, 0.1-70 µg L^{-1} and 0.1-180 µg L^{-1}, respectively (r^2> 0.99) and relative standard deviation (%RSD) ≤ 4.0 %. The present method was successfully applied for the analysis of THMs contaminated in water.

C1_C0070 ANTIOXIDANT CAPACITY TESTS OF TEA BEVERAGES BY CYCLIC VOLTAMMETRY AND FERRIC REDUCING ANTIOXIDANT POWER ASSAY

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Abstract: Antioxidant capacities of commercial tea beverages were evaluated by electrochemical method, cyclic voltammetry

along with the ferric reducing antioxidant power (FRAP) assay. By cyclic voltammetry, oxidation of the antioxidant sample on a glassy carbon working electrode in phosphate buffer pH 7.0 was recorded. From cyclic voltammogram, the oxidation peak area was calibrated with that of standard (+)-catechin and the result was expressed as catechin equivalent antioxidant capacity (CEAC). Sequences of antioxidant capacities of various tea beverages obtained from the two methods exhibited the same trends with some minor exceptions. Therefore, cyclic voltammetry can be used as a rapid and simple method for estimating the antioxidant capacity compatible with the ferric reducing antioxidant power (FRAP) assay.

C1_C0071 Development of Gas Chromatographic Technique for Seafood Freshness Determination (Dimethylamine and Trimethylamine)

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Abstract: Dimethylamine(DMA) and trimethylamine (TMA) are volatile amines used as quality index of seafood freshness. Headspace (HS)/gas chromatography coupled with nitrogen phosphorus detector (GC-NPD) were used for DMA and TMA determination. Optimum conditions were studied such as flow rate of carrier gas (helium), column temperature, injector temperature and detector temperature. HP-FFAP, capillary column (25 m x 0.32 mm i.d. x 0.52 µm film thickness) was used to separate DMA and TMA. These provided the detection limit of DMA was 0.37 mgL^{-1} and TMA was 0.03 mgL^{-1}, the linear dynamic range of DMA was 5-200 mgL^{-1} and TMA were 0.05-7 mgL^{-1} and 7-17 mgL^{-1} (r^2>0.99). At optimum conditions good repeatability and relative standard deviation (%RSD≤4) were obtained. The advantages of this method are non-complicated sample preparation, without solvent, simple, rapid and low cost [1]. This developed technique has high sensitivity and selectivity it has a potential to apply for seafood freshness determination.

C1

C1_C0072 PRECONCENTRATION AND ULTRATRACE ANALYSIS OF MERCURY BASED ON TOTAL FLUORESCENCE QUENCHING BY SPECTRO FLUOROPHOTOMETRY

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Abstract: A simple, rapid and cheap method for preconcentration and determination of mercury has been developed. Mercury was complexed with diethyldithiocarbamate and extracted into a layer of perfluorooctanoic acid dissolved in lithium hydroxide. The extract was then determined by spectrofluorophotometry based on total quenching in fluorescence intensity of 1,10-phenanthroline and dichlorofluoresceln after Hg(II) binding. The fluorescence intensity was measured at λ 525 nm after excitation at λ 504 nm. Factors affecting on the fluorescence intensity were studied including pH and type of buffers, type and concentration of ligands and micellar media. It was found that the optimum conditions were 0.2 M acetate buffer (pH 4.5), 2.5×10^{-3} M 1,10-phenanthroline, 1% Triton X-100 and 7.3×10^{-5} M dichlorofluorescein. The results obtained were compared with those of FI-HG-AAS as reference method. The present method was applied to the ultratrace determination of mercury in drinking water, distilled spirit and wine samples.

C1_C0073 ON-LINE DERIVATIZATION DETERMINATION OF METAL IONS USING SEQUENTIAL INJECTION HIGH PERFORMANCE LIQUID CHROMATOGRAPHY

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Abstract: Sequential injection (SI) was coupled to high performance liquid chromatography (HPLC) for an on-line simple pre-column derivatization and determination of metal ions, including Co(II), Fe(II), Ni(II) and Cu(II). 2-(5-nitro-2-pyridylazo)-5-[N-propyl-N-(3-sulfopropyl)amino]phenol (nitro-PAPS) was used as a derivatizing reagent. The detection principle is spectrophotometry at 570 nm. Using the proposed SI-HPLC system, on-line derivatization and separation of four metals-nitro-PAPS complexes was achieved within 12 min. The developed method has been successfully applied for the determination of metal ions in various samples.

C1_C0076 ELEMENTAL SIZE CHARACTERIZATION OF COSMETIC PRODUCTS USING SEDIMENTATION FIELD-FLOW FRACTIONATION WITH INDUCTIVELY COUPLED PLASMA-MASS SPECTROMETRY

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Abstract: Titanium dioxide (TiO_2) and zinc oxide (ZnO) causing light reflection and scattering are inorganic UV filters. They are applied in cosmetics to protect UV radiation for human. In this work, the capability of sedimentation field-flow fractionation (SdFFF) to identify particle size of cosmetics was presented. Furthermore, sedimentation field-flow fractionation-inductively coupled plasma-mass spectrometry (SdFFF-ICP-MS) was proposed to study elemental (Ti and Zn) size distribution of

cosmetic product to investigate the quality control of cosmetic as function of TiO_2 and ZnO particle size.

C1_C0077 Determination of Gallic acid with Rhodanine by Reverse-Flow Injection Analysis.

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Absract: A reverse-flow injection system was constructed for gallic acid determination. Gallic acid was determined based on the formation of chromogen between gallic acid and rhodanine, forms a chromophore with λ_{max} 520 nm. The optimum conditions for determining of gallic acid were also investigated. The conditions obtained were 0.7% rhodanine, 0.5 M KOH, flow rate 2 ml/min, 50 µl injection loop and 450 cm mixing tubing length, respectively. The linear relationship between peak area and the concentration of gallic acid is obtained over the range 0.05-20 ppm with the detection limit of 0.05 ppm. The relative standard deviations was found to be in the ranges 2.09-3.93 % for 2, 5, 7 ppm of gallic acid (n = 10), respectively. The method has the advantages of simplicity and high sensitivity.

C1_0081 Comparative Study of Fluoride Sorption Between Fly Ash and Diatomite

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Abstract: Sorption of fluoride from aqueous solution using fly ash and diatomite were studied. Influences of calcinated temperature ranging between 500-900°C, contact time, material liquor ratio, initial concentration and sorption isotherm were also investigated. It was found that the calcinated temperature increased the efficiency of fluoride sorption of diatomite, but the efficiency was unaffected in fly ash. The sufficient time for fluoride sorption on both of fly ash and diatomite was 60 mins. It was revealed that the increase in material liquor ratio slightly affected the capacity of sorbents. The result also showed that the sorbed amount of fluoride on fly ash was higher than that on the diatomite in the range of fluoride concentration over 50 ppm. It was thus found that the capacity of fly ash was 5 folds of that of the diatomite at fluoride concentration of 300 ppm; at this concentration, the sorption capacity of diatomite was 71 µmol/g

C1_C0083 Determination of Carbon, Hydrogen, and Nitrogen in Biomass Fuels by Using an Elemental Gas-Chromatographic Analyzer.

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Abstract: Total contents of carbon, hydrogen, and nitrogen (CHN) in biomass samples were determined by using an elemental gas chromatographic analyzer with a thermal conductivity detector. The carbon, hydrogen and nitrogen contents in solid biomass samples varied from 39.48-48.81, 5.01-6.76, 0.01-2.65 percent respectively, and 44.38-76.70, 5.59-14.28, 0.0-4.93 percent respectively in various liquid biomass samples. Precision performed on three replicates for each sample were within 0.37 to 3.86 percent relative standard deviation. Reference materials acetanilide and benzoic acid were used as control standards for evaluate the accuracy of the method. This benzoic acid can also be used as nitrogen blank matrix materials to check the near zero point on calibration standards.

C1_C0085 MICROBIAL BIOSENSORS FOR MONITORING OF ORGANIC COMPOUNDS IN WASTEWATER

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Abstract: Microbial biosensor was used for the analysis of total organic compounds in wastewater. The detection was based on the degradation of organic compounds by mixed microbes and measured the reduction of oxygen during degradation process. The decreasing amount of oxygen was related to the concentration of organic compounds. Mixed microbes were collected from contaminated site and acclimated in artificial synthetic wastewater to obtain adapted microbes, which can degrade total organic compounds. Microbes were then entrapped in alginate gel and used in a flow injection system with oxygen electrode as a transducer. This microbial biosensor provided linearity between 30 and 640 mg l^{-1} with the limit of detection of 0.19 mg l^{-1}. The biosensor can be used continuously for 15 days. Microbial biosensor can also be used to detect a particular organic compound of interest, for example chlorophenol. In this case microbes were acclimated in liquid growth medium containing chlorophenol before using in biosensor system. The linearity was between 17.0 and 61.0 mg l^{-1} and limit of detection was 0.01 mg l^{-1}. This biosensor can be used up to 3 days and the analysis time was 30-60 min.

C1_C0086 Label-free Immunosensor based on Impedance Measurement

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Abstract: A label-free immunosensor using impedance measurement was investigated in a flow system. Antibody was immobilized on gold electrode surface via a self-assembled alkanethiol monolayer. When antigen bound to the antibody immobilized on the electrode, the impedance of the electrode-electrolyte interface increased. Antigen-antibody affinity binding of HSA and anti-HSA was used as a study model. Parameters affecting the performance were optimized. Under optimum conditions, a linear relationship between the impedance change and logarithm of HSA was obtained in a concentration range 1.0×10^{-15} to 1.0×10^{-9} M. After each measurement bound antigen was removed by acid solution which enable the electrode to be reused for more than 40 times.

C1_C0088 MICROBIAL BIOSENSORS FOR WASTEWATER MONITORING

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Abstract: Microbial biosensor was used for the analysis of total organic compounds in wastewater. The detection was based on the degradation of organic compounds by mixed microbes and measured the reduction of oxygen during degradation process. The decreasing amount of oxygen was related to the concentration of organic compounds. Mixed microbes were collected from contaminated site and acclimated in artificial synthetic wastewater to obtain adapted microbes, which can degrade total organic compounds. Microbes were then entrapped in alginate gel and used in a flow injection system with oxygen electrode as a transducer. This microbial biosensor provided linearity between 30 and 640 mg l^{-1} with the limit of detection of 0.19 mg l^{-1}. The biosensor can be used continuously for 15 days. Microbial biosensor can also be used to detect a particular organic compound of interest, for example chlorophenol. In this case microbes were acclimated in liquid growth medium containing chlorophenol before using in biosensor system. The linearity was between 17.0 and 61.0 mg l^{-1} and limit of detection was 0.01 mg l^{-1}. This biosensor can be used up to 3 days and the analysis time was 30-60 min.

C1_C0090 Development of Gas Diffusion Flow Injection Procedure for the Determination of Total Sulphide in Natural Waters

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Abstract: A gas diffusion flow injection spectrophotometric procedure (GD–FI) for the determination of sulfide in aqueous samples is described. The method involves the injection of standard sulfide and/or sample solution into a sulfuric acid donor stream, which was then transported to the gas diffusion unit. Hydrogen sulfide diffused through a hydrophobic membrane into a reagent stream containing N,N-dimethyl-phenylenediamine and ammonium ferric sulfate solution in the acceptor chamber. The reagent was then developed blue color for which the absorption was measured at 666 nm. Optimal experimental conditions for determination of sulfide were investigated. At 40 °C the linear detection range was found to be 2–12 mgl^{-1}. The relative standard deviation for replicate injection was found to be 3.29% for 8 mgl^{-1} of sulfide standard solution. The detection limit of 1 mgl^{-1} and percentage recovery was found to be in the range of 89.5–110.1% for n=3. The proposed GD-FI procedure was applied to the determination of sulfide in natural spring water and community wastewater samples.

C1_C0095 Label-free Immunosensor based on Impedance Measurement

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Abstract: A label-free immunosensor using impedance measurement was investigated in a flow system. Antibody was immobilized on gold electrode surface via a self-assembled alkanethiol monolayer. When antigen bound to the antibody immobilized on the electrode, the impedance of the electrode-electrolyte interface increased. Antigen-antibody affinity binding of HSA and anti-HSA was used as a study model. Parameters affecting the performance were optimized. Under optimum conditions, a linear relationship between the impedance change and logarithm of HSA was obtained in a concentration range 1.0×10^{-15} to 1.0×10^{-9} M. The detection limit was 1.0×10^{-15} M. After each measurement bound antigen was removed by acid solution which enable the electrode to be reused for more than 40 times.

C1_C0103 HPLC validation for assays of mangostin in crude mangosteen extract and throat spray preparation.

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Abstracts: The aim for this research was to validated a HPLC method for determination of mangostin in a mangosteen rind extract and a throat spray preparation. Chromatographic separation was carried out on Alltima® RP C-18 (5 µm, 4.6 x 250

mm) at room temperature using a mobile phase consisting of 5 % water in methanol at the flow rate of 1.5 mL/min. Peak area detection of mangostin and xanthone (internal standard) was performed with a UV detection at 319 nm. Calibration curves were tested for linearity giving coefficient of detection (r^2>0.998) that were higher than 0.998 in mangostin concentration range 25-125 µg/mL. The recovery of the added mangostin were in the range of 94.73- 98.39 % and 94.14 -99.87 % for crude extract and throat spray samples respectively. Satisfactory intra and inter - assay precision with a variation coefficient (CV) of < 3 % was obtained with this method. This validated method was proven for a rapid quantitation (10 min/sample) of mangostin in both crude extract and throat spray preparation of mangosteen.

C1_C0105 Determination of Phosphorus Contents in Soil Sample by using UBU-Phosphorus Test Kits

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Abstract: UBU-Phosphorus Test Kits was developed for determination of phosphorus contents in soil sample. The present test kits which was successfully modified is applicable for available Phosphorus in Bray II extracts. The working range was 0.0001- 0.0010 % w/w and sample throughput of 20 min/sample.

C1_C0112 ENANTIOMERIC SEPARATION OF MONO-SUBSTITUTED OF 1-PHENYLETHANOLS BY GAS CHROMATOGRAPHY USING DERIVATIZED CYCLODEXTRIN AS A STATIONARY PHASE

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Abstract: Enantiomers of mono-substituted derivatives of 1-phenylethanols with fluoro-, chloro-, bromo-, methyl-, trifluoromethyl-, methoxy-, nitro- and cyano- group at ortho-, meta- and para- position on the aromatic ring were separated by gas chromatography using hexakis(2,3-di-O-methyl-6-O-tert-butyldimethylsilyl)-α-cyclodextrin as a stationary phase. The results showed that all analytes could be enantioseparated except for 1-(4-methoxyphenyl)ethanol. Both position and type of substituent have a small influence towards the strength of interaction whereas the position of substituent on the aromatic ring greatly affects enantioseparation.

C1_C0115 ENANTIOMERIC SEPARATION OF EPOXIDES BY GAS CHROMATOGRA-PHY USING DERIVATIZED γ-CYCLODEXTRIN AS A STATIONARY PHASE

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Abstract: Mono-substituted derivatives of styrene oxide with fluoro-, chloro-, bromo-, methyl-, trifluoromethyl-, and nitro-group at *ortho-, meta-, and para-* position on the aromatic ring were separated by gas chromatography using octakis(2,3-di-O-acetyl-6-O-tert-butyldimethylsilyl)-γ-cyclodextrin as a stationary phase. The results indicated that position and type of substituent significantly affect the enantioseparation.

R = F, Cl, Br, CH_3, CF_3, NO_2

C1_C0117 USING SOLID PHASE EXTRACTION FOR PURIFICATION OF 1-HYDROXYPHENAZINE

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Abstract: Yellow antibiotic can be produced by *Pseudomonas aeruginosa* TISTR 781 when grown in King's A medium. Isolation and purification were firstly performed by both Amberlite XAD-16 resin column and subsequently solid phase extraction method. The type of sorbent was also studied, which the best cartridge for purification of phenazine is Chromabond® SiOH cartridge. For the reason that it can isolated in two pure bands. The result can be confirmed by TLC with dichloromethane-methanol mixture (1:1, v/v) as a developing solvent. As the study of chemical structure by spectroscopic techniques, yellow antibiotic isolated is1-hydroxyphenazine.

C1_C0118 APPLICATION OF PYOVERDIN II IN THE DETECTION OF LIPID PEROXIDATION IN MILK

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Abstract: Lipid peroxidation is a factor of quality of milk deterioration during the processing and storage. In this study, the application of pyoverdin II obtained from *Pseudomonas aeruginosa* TISTR 1467, was used to detect lipid peroxidation in milk samples. The effect was analyzed by malondialdehyde (MDA) using high-performance liquid chromatography (HPLC) with fluorescence detection, λ_{ex} at 532 nm and λ_{em} at 552 nm. The detection of MDA was carried out after derivatization by 2-thiobarbituric acid (TBA). The mobile phase was 10 mM phosphate buffer (pH 7.0) : methanol (60: 40, v/v) at a flow rate

of 0.8 mlmin^{-1}. A linearity relationship (r^2) between peak height and MDA concentration range of 0.0-5.0 µM was 0.9950. This method was applied to detect MDA in different type of milk samples and study to determine quality of milk. The results show that pyoverdin II can used detect MDA concentration in milk samples.

C1_C0119 SPECIATION ANALYSIS AND PRECONCENTRATION OF CHROMIUM USING CHEMICALLY MODIFIED SILICA

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Abstract: The sorption property of the chemically modified silica gel having amidoxime (phase A) and benzothiazolyl (phase B) was studied towards trivalent and hexavalent chromium. The determination of chromium was carried out on flame atomic absorption spectrometry (FAAS). For batch method, it was found that phase A adsorbed Cr(III) and Cr(VI) at 5-7 and 1-7 pH ranges, respectively. Whereas the optimum pH ranges onto phase B were 4-7 and 1-7 for Cr(III) and Cr(VI), respectively. In the column method, a mini-column (2.8 mm i.d.) packed 20 mg of phase A and another mini-column contained 50 mg of phase B were used for Cr(VI) and Cr(III) preconcentration, respectively. The results showed the optimum condition for preconcentration as follow : pH = 4, sample solution flow rate = 4 and 0.5 mL/min for Cr(VI) and Cr(III), respectively, sample volume = 100 mL, eluent = 10% H_2O_2 in 0.1 M

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C1_C0120 AMINO ACIDS ANALYSIS OF *Pseudomonas putida* SIDEROPHORE BY GAS CHROMATOGRAPHY/ MASS SPECTROMETRY

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Abstract: In this study, siderophore produced by *Pseudomonas putida* that isolated from soil in Ubon Ratchathani province was investigated. The siderophore was isolated by Amberlite XAD-4 resin column and then purified by Bio-Gel P-2 column. Determination of the purity of each siderophore fraction was carried out using RP-HPLC. It was shown that the siderophore obtained had been purified by this process. The amino acids in the siderophore structure were determined using GC/MS technique. The mixture of 12 standard amino acids was selected and analyzed. The optimum conditions for a short time analysis were studied. The initial GC oven temperature was 50 °C and then increased to 250 °C with ramp rate 30°Cmin^{-1} with a flow rate of carrier gas at 1 mLmin^{-1}. This analysis was achieved for these amino acid standards within 9 minutes. The siderophore sample was then determined. The results indicated that the siderophore sample was composed of four types of amino acids as L-Ornithine, L-Tyrosine, L-Phenylalanine and L-Lysine. Moreover, the chromophore of the siderophore structure was detected with this GC/MS analysis. The peptide sequence of the siderophore sample can be possibly proposed in two forms as follows: (Chr)-L-Phenylalanine-L-Lysine–L-Tyrosine-L-Ornithine or (Chr)-L-Lysine-L-Phenylalanine-L-Tyrosine-L-Ornithine.

C1_C0122 PREPARATION OF PEBBLES BASED ON CHEMILUMINESCENCE DETECTION

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Abstract: PEBBLE sensors (Probes Encapsulated by Biologically Localized Embedding) are nano-scale spherical devices consisting of sensor molecules entrapped in a chemically inert matrix. This protective coating eliminates interferences such as protein binding and/or organelle, which alter dye response. It also protects the living cell from the toxic sensing molecules while they are used in the intracellular. The sensor molecules usually used in PEBBLEs are fluorescence dry. The Fluorimetric technique is also used for detecting response. In this work, the PEBBLEs containing Mn(IV) based chemiluminescence detection were prepared by using the Sol-gel method. The prepared PEBBLEs were then characterized via suitable techniques and tested with standard folic acid. It was found that the PEBBLEs containing Mn(IV) was prepared successfully, and the responses from the prepared PEBBLEs were obtained while tested with standard folic acid without using exciting light.

C1_C0123 MATRIX REMOVAL AND ANALYTE PRECONCENTRATION FOR INDUCTIVELY COUPLED PLASMA SPECTROMETRIC DETECTION USING HOLLOW FIBER FLOW FILTRATION.

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Abstract: In inductively coupled plasma (ICP) spectrometric detection, high matrix concentration can cause spectral and non-spectral interferences. Hollow fiber membrane flow filtration (HF-FF) was investigated for simultaneous matrix removal and preconcentration for trace elements determination in high salt concentration such as Na^+, K^+, Ca^{2+} and Mg^{2+}. The analyte elements were complexed with polymeric complexing agent (polyethylene imine, PEI, Mw 750,000 Da) and the complex was introduced to the hollow fiber membrane. The opposing flow method (focusing method) was applied and the complexed

analytes, which is larger than the membrane pore size (6,000-30,000 Da), were concentrated, whereas free matrix ions were removed by filtering off through membrane. Operating parameters, including pH and PEI concentration for complex formation; focusing time and focusing point for analytical performance of HF-FF were examined. The developed system was applied for sea water and soil extracted in 1 M $Mg(NO_3)$ extractant (exchangeable phase) with satisfactory results.

C1_C0126 DETERMINATION OF WATER-SOLUBLE INORGANIC ARSENIC SPECIES IN EDIBLE PLANTS GROWN ON HIGH RISK CONTAMINATED-ARSENIC AREA AT RON PHIBUN DISTRICT NAKHORN SI THAMMARAT PROVINCE USING FLOW INJECTION-HYDRIDE GENERATION-ATOMIC ABSORPTION SPECTROMETRY

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Abstract: The determination of water-soluble inorganic arsenic species (As^{III} and As^{V}) in edible plants grown on arsenic-contaminated area was carried out by using flow injection-hydride generation-atomic absorption spectrometry (FI-HG-AAS). Arsenic in the samples was extracted by using deionized water. As^{III} and total As were determined under different conditions. As^{III} was selectively determined by using soft generation condition (i.e. low HCl concentration) whereas total As was determined after pre-reduction of As^{V} to As^{III} with a KI-ascorbic acid mixture. The As^{V} content was estimated by difference between both measurements. Limits of detection (LOD) for the determination of As^{III} and total As were 0.02 $\mu g l^{-1}$ and 0.03 $\mu g l^{-1}$, respectively. This method has been successfully used for the inorganic arsenic speciation in two types of edible plants including Lemongrass (*Cymbopogon citratus*) and Turmeric (*Curcuma Longa Linn.*). Arsenic contents were found to be 0.01 to 0.39 $\mu g g^{-1}$ and 0.06 to 0.21 $\mu g g^{-1}$ in Lemon grass, and from 0.02 to 0.33 $\mu g g^{-1}$ and 0.06 to 0.20 $\mu g g^{-1}$ in Turmeric for As^{III} and As^{V}, respectively.

C1_C0127 Electrochemical Oxidation Process for Mineralization of Solvent

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Abstract: A silver mediated electrochemical oxidations is a promising technique for the destruction of organic compounds. The destruction of 30%tributyl phosphate in dodecane in a nitric acid medium containing electrogenerated Ag(II) to carbon dioxide was studied by using a laboratory scale electrochemical oxidation cell. The electrolyte used in this system was 0.5 M $AgNO_3$ in the range of 3 - 7 M HNO_3, at operating temperatures of 60°C ± 5°C, under ultrasonic agitation and the output of a DC power supply at constant the current was 60 A, respectively. Electrolysis was carried out for 5 hours. The results show that, in silver mediated electrochemical oxidation method, destruction of 30%TBP/Dodecane was increased with increase of concentration of HNO_3.

C1_C0130 DEVELOPMENT OF CHEMICALLY MODIFIED CARBON PASTE ELECTRODE WITH GROUP OF XANTHONE COMPOUNDS FOR METALS DETERMINATION BY DIFFERENTIAL PULSE STRIPPING VOLTAMMETRY

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Abstract: A differential pulse anodic stripping voltammetric method was developed for the determination of Cu^{2+}, Cd^{2+}, Pb^{2+} and Hg^{2+} by using group of xanthone compounds (xanthone, xanthene, thioxanthone and acridone) and modified carbon paste electrode technique. The result shown that group of xanthone compounds is not suitable for quantitative analysis of these metals at studied condition.

C1_C0131 SIMPLE DESIGN OF JAM JAR EXPERIMENT FOR DETERMINATION OF CALCIUM CARBONATE IN CALCIUM SUPPLEMENT

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Abstract: Calcium is an essential nutrient for human. Calcium consumption is essential for bone and teeth development. Lack of calcium is harmful to health, for example it can cause osteoporosis [1]. In recent year, calcium supplement has been produced to prevent calcium deficiency disease. The form of Calcium supplement is calcium carbonate. Determination of calcium content can be carried out using titration [2] or flame atomic absorption techniques [3] but these techniques require steps of sample preparation.

This work proposes an application of jam jar as simple device for determination of calcium carbonate in calcium supplement. Sample containing calcium carbonate was decomposed by acidification and carbonate ion was transformed

to carbon dioxide. The liberated carbon dioxide was trapped into an indicator solution inside the jam jar. The change of the absorbance of the indicator, based on alteration of solution pH, was detected at wavelength 440 nm. The present method performed good linearity between absorbance and carbonate concentration. Results show that this system is applicable for determination of calcium carbonate in calcium supplementary tablet.

C1_C0133 OPTIMIZTION OF HEADSPACE SOLID-PHASE MICROEXTRACTION FOR THE ANALYSIS OF ORGANOPHOSPHORUS COMPOUNDS IN WATER SAMPLES

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Abstract: A headspace solid-phase microextraction (HS-SPME) and gas chromatography-mass spectrometry (GC-MS) methods for the analysis of organophosphorus compounds were investigated. Variables affecting the extraction were studied which included type of fiber, extraction temperature, extraction time and salt amount. The optimum conditions for solid-phase microextraction of organophosphorus compounds in water were extraction temperature at 70 °C for 30 min and 2 g sodium chloride. Extraction efficiencies of organophosphorus compounds in water were compared among using polydimethylsiloxane (100 µm PDMS), polydimethylsiloxane-divinylbenzene (65 µm PDMS-DVB) and divinylbenzene-carboxen-polydimethylsiloxane (50/30 µm DVB-CAR-PDMS) as extraction fiber. The optimised SPME procedures with the three fibers were successfully applied to the analysis of organophosphorus compounds in real water samples.

C1_C0134 "Jam jar experiment": an easy separation method for ethanol determination in pharmaceutical samples

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Abstract: *"Jam jar experiment"* is one of the separation techniques using evaporation concept of analyte to remove interferences. This experiment is easy and uses common equipments so it is suitable for undergraduate students' laboratory. Acidified dichromate reaction was applied for *"Jam-jar experiment"* to determination volatile ethanol in pharmaceutical samples. Liquid sample was placed into a used jam jar (small size). The smaller jar was placed inside a larger jam jar, containing the dichromate solution. The lid of the outside jar was closed tightly. According to the evaporation of ethanol from the sample and to the reaction between ethanol and dichromate, quantitative analysis of ethanol can be made by measuring the absorbance of the reaction product (590 nm.) Under the optimized experimental condition, the calibration curve was linear between 3 % (v/v) and 20% (v/v) with correlation coefficient of 0.999. Limit of detection (3 SD) was 0.7% (v/v). The easy and inexpensive experiment was succeeded to be enthusiastic students about learning with real application in stomachic mixture samples.

C1_C0135 CHROMATOGRAPHIC ANALYSIS FOR DETECTION OF CONSTITUENTS OF FIBER HEMP

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Abstract: In this work, thin-layer chromatography (TLC) and gas chromatography-mass spectrometry (GC-MS) techniques were used for the separation and identification of fiber hemp constituents. The proposed developing solvent for isolation of some components from fiber hemp extracts by TLC technique was toluene : n-hexane : diethylamine (25:10:1, v/v/v). Separation of these extracts was performed on the HP-5MS column (30 m x 0.25 mm i.d., film thickness 0.25 µm) and analytes were identified using mass spectrometer. It was found that the main constituents in these fiber hemps were cannabidiol (CBD), tetrahydrocannabinol (THC) and cannabinol (CBN).

C1_C0136 IDENTIFICATION OF FLAVONOIDS IN BRAN OF SOME THAI BLACK RICE CULTIVARS USING LIQUID CHROMATOGRAPHIC-TANDEM MASS SPECTROMETRIC TECHNIQUE

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Abstract: Liquid chromatography-Tandem mass spectrometry was used for analysis and identification of flavonoids in bran of some Thai black rice cultivars. The flavonoid components in rice bran were extracted by methanol prior to separation and analysis by liquid chromatograph equipped with a diode-array UV detector and a quadrupole mass spectrometer (HPLC-DAD-MS). A number of flavonoid components were identified based on their retention times, UV-VIS and mass spectra. Then, the tandem-MS technique was employed for structural identification of the target flavonoids. This technique provides the daughter ion mass spectra (MS/MS) having structural information based on the characteristic fragmentation pattern of flavonoids which is mainly the retro-Diels-Alder reaction pathways. Results revealed five flavonoid components in the rice bran extract including luteolin, isosakurametin, quercetin, geraldol, and diosmetin.

C1_C0138 Potentiometric-Flow Injection Analysis System for the Determination of Sorbic acid

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Abstract: The potentiometric-flow injection system for the determination of sorbic acid is proposed with simple design, ease of construction and low cost. An iodometric method for the determination of sorbic acid was described. The method was based on the quantitative reaction between sorbic acid and N-bromosuccinamide (NBS). A known excess of NBS was mixed to brominate sorbic acid, and the excess of NBS was then allowed to react with iodide to liberate iodine, which was subsequently measured with potentiometric method. The potentiometric-flow injection system consisting of potentiometric flow-through cell, injection valve, connector and computer software for data processing was build in-house. The ion meter consisting of a commercial ion selective electrode (ISE) of iodide and *Ag/AgCl* reference electrode was equipped with the computer for data processing. The concentration of reagents, temperature of heating coil, coil length, reagent flow rate and injection volume were studied for the optimum condition. It was found that the potentiometric response exhibits an almost linear of calibration up to 250 mg L^{-1} with a detection limit (S/N=3) of 0.1 mg L^{-1} and a relative standard deviation (RSD) of 1.4% (n=11). The proposed method is very feasible and simple and is therefore suitable for routine analysis of sorbic acid in beverage.

C1_C0139 Miniaturization and Microfabrication of Home-made Analytical Instrumentation for Environmental and Pharmaceutical Analyses

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Abstract: Various automated methods together with fabrication of home-made instrumentation/software involving miniaturization have been developed to achieve environmentally friendly methods. Initially normal flow injection analysis (nFIA) methods were developed for some heavy metal and anions determination including pharmaceutical analysis using spectrophotometric detection. Reverse flow injection analysis (rFIA) methods were also developed to save expensive reagents and for monitoring of some water quality parameters. The more efficient flow-based methods namely lab-on-valve (LOV), sequential injection analysis (SIA) and lab on PALM (LOP) have been developed using various detectors for environmental and pharmaceutical analysis. Recently, microfabrication of home-made instrumentation has been developed and used as the basis to the development of micro total analysis (μTAS) or lab-on-a-chip methods for determining a wide range of samples for example H_2O_2 in pure water, Fe, Zn, and Cu in natural water, Zn and benserazide in pharmaceuticals etc. Development of PEBBLE nanosensors and biosensors are also encountered.

C1_C0141 APPLICATION OF COMPREHENSIVE TWO-DIMENSIONAL GAS CHROMATOGRAPHY TO DIFFERENTIATION BETWEEN AROMATIC AND NON-AROMATIC RICE.

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Abstract: A development of chromatographic technique in order to use the separation profiles of total volatiles in rice grain to differentiate between aromatic and non aromatic rice has been investigated by using an automatic headspace extraction combined with a comprehensive two-dimensional gas chromatograph (GC×GC). Optimizations of the extraction parameters by headspace autosampler and separation conditions by comprehensive GC×GC were performed. Results showed some different between the separation profiles of total volatiles in aromatic and non aromatic rice grain. Additional analysis of the chromatographic data by principle component analysis (PCA) revealed the good applicability of the developed technique for differentiation of aromatic and non aromatic rice.

C1_C0142 APPLICATION FOR IODIDE ANALYSIS BY GAS CHROMATOGRAPHY-MASS SPECTROMETRY

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Abstract: A gas chromatography-mass spectrometry has been developed for determination of iodide (I^-) based on the oxidization of iodide to iodine (I_2) by 2-iodosobenzoate in the presence of phosphate buffer. Generated iodine is quantitatively reacted with derivatizing reagent, extracted into organic layer and then determined by gas chromatography with mass spectrometric detection. In this work, two derivatizing reagents were investigated and GC-MS condition was optimized to achieve the analytical performance. Application of the method was made to the determination of iodide in water samples.

C1_C0144 FLOW-INJECTION SPECTROPHOTOMETRIC DETERMINATION OF BENSERAZIDE IN PHARMACEUTICAL FORMULATIONS

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Abstract: A new, simple, rapid and accurate flow-injection spectrophotometric method is proposed for determination of benserazide in pharmaceutical preparations. It is based on formation of a yellow product (measured at 410.0 nm) after complexation of benserazide with molybdate. A standard or sample solution was injected into the molybdate reagent stream (flow rate of 2.0 ml min^{-1}). Under the optimum conditions, a linear calibration graph was obtained over the range of 0.5–320.0 mg l^{-1}. The detection limit (S/N = 3) and the limit of quantitative (S/N =10) were 0.15 and 0.5 mg l^{-1}, respectively. The relative standard deviation (%RSD) of the proposed method obtained from 11 replicate injections of 1.0 mg l^{-1} benserazide was 2.03%. The method was successfully applied to the determination of benserazide in commercial pharmaceutical formulations with the sampling rate of 100 h^{-1}.

C1_C0146 CHROMATOGRAPHIC DETERMINATION OF OXIDATIVE DAMAGE MARKERS IN THALASSEMIC PATIENTS

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Abstract: A HPLC method was developed for determination of oxidative damage marker, 8-hydroxy-2'-deoxyguanosine (8-OHdG), a DNA oxidative damage product, in thalassemic patients. In addition, some published GC/MS methods were also used to determine oxidative damage markers, *ortho*- and *meta*-tyrosine (the products of proteins oxidative damage) and F_2-isoprostanes or F_2-IsoPs (the products of lipids peroxidation). The results showed that all chromatographic methods used can be applied to determine all of the oxidative damage markers in very low levels. The significant elevation of all oxidative damage markers were found in thalassemic patients compared to healthy volunteers. This indicated that there are oxidative stress in thalassemic patients.

C1_C0148 NEW METHOD FOR DETECTION OF ARSENIC: APPLICATION TO PERVAPORATION FLOW INJECTION

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Abstract: We present a new method for chemiluminescence detection of arsine gas. The method has been developed using flow injection technique coupled to pervaporation (PV) unit. This chemiluminescence method is based on use of the catalytic activity of Cr(III) on the reaction between luminol and hydrogen peroxide. Cr (VI), as dichromate ion in the acceptor stream of the PV unit, is reduced to Cr(III) by arsine gas that is generated from the donor chamber of the unit. This work presents some applications of this new detection method for arsine in determination of As(III) in water, soil and sediment samples. Application for As (V) is also possible.

C1_C0154 SEQUENTIAL INJECTION SPECTROPHOTOMETRY FOR THE DETERMINATION OF TETRACYCLINES

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Abstract: Sequential injection (SI) spectrophotometry system was developed for the determination of tetracycline (TC) antibiotics. It is based on reactions of diazotized sulfanilic acid coupling with TC and treated with alkaline solution to result in colored product which was continuously monitored spectrophotometrically at 480 nm. Conditions for the SI-system were investigated. The proposed system was applied for determination TC, oxytetracycline (OTC) and chlortetracycline (CTC) in pharmaceutical preparations. They found to be 93-103 % label in the sample analyzed. Recoveries were found to be 94-100 %.

C1_C0158 PRELIMINARY STUDY OF QUANTITATIVE DETERMINATION OF IRON, ZINC, COPPER AND MANGANESE IN RICE SAMPLES BY ATOMIC ABSORPTION SPECTROPHOTOMETRY.

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Abstract: Determination of iron, zinc, copper and manganese in milled and brown rice samples were carried out using flame atomic absorption spectrophotometry. The samples were prepared by wet digestion with concentrated nitric acid and microwave solvent digestion oven, at the temperature of 120 °C for 30 minutes. It was found that concentrations of

iron, zinc, copper and manganese in studied samples range from ND to 25.03 mg.kg^{-1}, 11.80 to 23.89 mg.kg^{-1}, ND to 2.222 mg.kg^{-1} and 3.599 to 30.347 mg.kg^{-1}, respectively. The detection limits for analysis of iron, zinc, copper and manganese were 0.3992, 0.0220, 0.0396 and 0.0158 mg.L^{-1}, respectively, while their average percent recoveries were 99.22, 102.08, 91.99 and 97.40, respectively. This study has shown the variation of these 4 elements in different varieties of rice. It also indicated that the amounts of these elements in brown rice were higher than those in milled rice, and sufficient for human daily intake, however the contents of iron and copper in milled rice were lower than recommended values for human daily intake.

C1_C0169 Determination of lead in ice by stripping potentiometry.

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Abstract: The 400 µL matrix modifying solution was added to ice sample of total volume 30 mL in electrochemical cell. The modifying solution was 800 mg L^{-1} Hg(II) in 1.3 M hydrochloric acid. The working electrode was 3-mm i.d. glassy carbon disc, Ag/AgCl as reference electrode, and platinum rod as counter electrode. By using the stripping potentiometry, the sample solutions and standard solutions were electrolyzed for 3 minutes at -1.00 V. The peak potentials were around -0.38 to -0.41 V. The concentration of lead(II) standards were 0.1,1.0,3.0,7.0 and 9.0 ppb. The calibration plot of peak areas v.s. concentration of lead (II) standards with a correlation coefficient equal to 0.9998 was obtained. The relative standard deviation at 2.0 ppb was found to be 5.50%. The concentration range of lead(II) in ice samples were found between 0.22 - 0.25 µg L^{-1}.

C1_C0171 Analysis of standard Sudan I, Sudan II, Sudan III and Sudan IV using flow injection analysis coupled with amperometric detection.

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Abstract: Sudan I, II, III and IV are industrial dyes used in a variety of household products and other synthetic materials. Sudan dyes have been classified as category 3 carcinogens by the International Agency for Research on Cancer (IARC) because the Sudan dyes have a carcinogenic effect and a potential risk of genotoxicity. A number of analytical techniques have been developed, mostly involving high performance liquid chromatography (HPLC) combined with mass spectrometry. The electrooxidation properties of Sudan dyes were examined by cyclic voltammetry at glassy carbon (GC) electrode. Well-defined, irreversible peaks were obtained for the oxidation of all four Sudan dyes. This study described the effective method employed to examine optimum conditions for the rapid determination of Sudan dyes using flow injection analysis coupled with amperometric detection at glassy carbon (GC) electrode. A detection limit of 0.10, 0.11, 0.14 and 0.37 ppm and a limit of quantitative of 0.33, 0.38, 0.46 and 1.22 ppm were obtained from Sudan I, Sudan II, Sudan III and Sudan IV respectively. This developed method was applied for the simple and sensitive amperometric detection of the Sudan dyes.

C1_C0172 Determination of copper based on its catalytic effect on oxidation of dichlorofluorescein by hydrogen peroxide using flow-based technique

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Abstract: Analysis of copper (II) ion was studied in solution based on oxidation reaction of dichlorofluorescein by measuring fluorescent intensity of dichlorofluorescein in a basidic condition. Copper(II) ion is proposed as the catalyst in the oxidation of dichlorofluorescein by hydrogen peroxide. In this experiment, we concerned with the optimum parameters which have affects on the occurrence of reaction, such as pH, the concentration of dichlorofluorescein and the concentration of hydrogen peroxide. In order to get rapid and precision results, this reaction was investigated in flow injection analysis system and sequential injection analysis system. The results show that the calibration graph were linear from 0.005 to 0.08 mg l^{-1}. The system can tolerate iron (III) and zinc(II) ions at 10 and 1000 mg l^{-1} respectively.

C1_C0173 Effects of Potassium Chlorate on the Chemical Composition of Longan Fruit

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Abstract: Effects of potassium chlorate applied to longan tree through soil were investigated for the chemical composition of two types of longan fruit, namely Daw and Seechompoo. Longan fruit samples from both treated and untreated Longan trees with potassium chlorate were extracted with dichloromethane and polar solvents. The sample extracts were analyzed by gas chromatography-mass spectrometry (GC-MS) and liquid chromatography-mass spectrometry (LC-MS). Major compounds

detected in the Longan fruit samples from both treated and untreated with potassium chlorate are hydrocarbons, alcohols, esters, and terpenes with varying amounts but chlorine-containing compounds have not yet been detected in any of the samples investigated.

C1_C0176 APPLICATION OF FLOW FIELD-FLOW FRACTIONATION FOR ON-LINE MATRIX REMOVAL CONTINUOUS FLOW SEQUENTIAL EXTRACTION BEFORE INDUCTIVELY COUPLED PLASMA OPTICAL EMISSION SPECTROMETRY

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Abstract: Sequential extraction to fractionate metals and other elements in soil is a useful tool to evaluate their potential bioavailability and their mobility (1). For the inductively coupled plasma-optical emission (ICP-OES) spectrometric measurements, extracting reagents used in sequential extraction schemes and soil matrices can cause non-spectral and spectral interferences. Therefore, flow field-flow fractionation (FlFFF) was used for matrix removal from sample solutions before ICP-OES detections (2). In order to remove matrix form sample solution, large volume sample introduction was used to introduce the complexes between polyethyleneimine (PEI) (MWCO 25 kDa), which is a high molecular weight polymeric complexing agent (3), and analyte solution into the FlFFF channel. Matrix elements, which do not form complexes with PEI, permeated through the membrane (MWCO 1 kDa) and left the channel. The PEI-analyte complexes, however, still remain inside the channel owing to their higher molecular weight as compared to the molecular weight cut-off of the membrane used inside the FlFFF channel. Then, the sample is introduced directly to the ICP nebulizer for further elemental detection.

C1_C0180 SEQUENTIAL INJECTION ANALYSIS FOR FLUOROMETRIC DETERMINATION OF ALUMINIUM

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Abstract: This presentation reports a hydrogen phthalate salt to be proposed as a reagent for fluorometric determination of Al(III). Fluorometric spectral characteristics will be presented. Parameters such as pH, reagent concentrations and temperature, affecting the fluorometric spectrum for batchwise procedure will be discussed. Conditions for sequential injection system for the fluorometric determination of Al(III) will be briefed.

C1_C0181 Analysis of Carbofuran Parathion methyl and Pyrethroids Residues in strawberries by Capillary Electrophoresis

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ABSTRACT: This work describes a technique for the rapid, higher separation efficiency, shorter analysis times, and less consumption of expensive reagents and toxic solvents. In this study, capillary electrophoresis was used for analysis of carbofuran, parathion methyl and cypermethrin residues in strawberry fruits. The optimum conditions used for the analysis of carbofuran, parathion methyl and cypermethrin were: fused silica column 75 µm ID, 50 cm long, effective length 40.2 cm and column temperature 25 °C. The buffer electrolytes and applied voltage used were as follows: buffer electrolyte 5 mM sodium tetraborate containing 30 mM SDS pH 7.5, applied voltage 15 kV with UV detection at 205 nm; buffer electrolyte 5 mM sodium tetraborate containing 30 mM SDS pH 8.5, applied voltage 15 kV with UV detection at 254 nm and buffer electrolyte 5 mM sodium tetraborate containing 30 mM SDS pH 8, applied voltage 15 kV with UV detection at 254 nm for carbofuran, parathion methyl and cypermethrin respectively. The experiment was carried out by growing 4 plots of strawberry. The first – the third plots of strawberries were sprayed with carbofuran, parathion methyl and cypermethrin respectively. The fourth plot of strawberry is the control which was sprayed with water. After the harvest peroids : 1 hour, 1, 3, 5, 7, 10 and 14 days, the residues of carbofuran, parathion methyl and cypermethrin in each plot were determined by the proposed CE method.

Comparison was also made using the GC and HPLC there is no significant difference between the proposed CE method, HPLC and GC. The average recoveries of the three insecticides 99.20 %, 98.40 % and 97.33 %, the relative standard deviations 0.011 %, 0.097 % and 0.016 % and quantitation limits 0.076 µg/mL, 0.078 µg/mL and 0.016 µg/mL of carbofuran, parathion methyl and cypermethrin respectively.

C1_C0182 OPTIMIZATION OF HEADSPACE GC-MS FOR THE ANALYSIS OF VOLATILE ORGANIC COMPOUNDS IN WATER SAMPLES

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Abstract: Static headspace (HS) combined with gas chromatography (GC) and mass spectrometry (MS) was evaluated for the analysis of 13 volatile organic compounds (VOCs) in water samples. The separation of these compounds was performed on an HP-5MS capillary column of 30 length. The effects of GC and HS conditions on peak resolution and analysis time were demonstrated. The optimum conditions of HS were oven temperature 60 °C, vial equilibration time 10 min, pressurization time 0.6 min, loop fill time 0.1 min, loop equilibration time 0.15 min and injection time 0.1 min. HS extraction was carried out

above 10-ml water sample saturated with 20% sodium chloride in a 22-ml vial. This technique has been successfully applied to the analysis of 13 volatile organic compounds (VOCs) in water samples and the limit of detection has been found to be in the range from 0.1 to 0.3 ng ml^{-1}.

C1_C0184 Determination of Iron (III) in underground water by using reversed flow injection spectrophotometry

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Abstract: designed and fabricated for iron(III) determination. A 75 µL 0.004 $mol.L^{-1}$ methyldopa solution was injected into flowing stream of potassium hydrogen phthalate buffer pH 5.00 with the optimum flow rate of 2.5 $ml.min^{-1}$ and interacted with iron(III) with the optimum flow rate of 2.5 $ml.min^{-1}$, resulting in an intense green complex with a suitable absorption at 670 nm. Optimum conditions for determining iron (III) were investigated. A linear calibration graph over the range of 1.5-4.0 $mg.L^{-1}$ was obtained with the regressions equation of Y = 3.2192x + 2.343 (r^2 = 0.9995). The detection limit (3σ) of 5.2 x 10^{-2} $mg.L^{-1}$ and the R.S.D of 1.54 % (n = 11) with very rapid sampling rate of 96 h^{-1}

C1_C0185 SOLID-PHASE MICROEXTRACTION-GAS CHROMATOGRAPHY-MASS SPECTROMETRY FOR THE ANALYSIS OF VOLATILE COMPOUNDS IN SOME TOBACCO SAMPLES

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Abstract: Solid-phase microextraction (SPME) coupled to gas chromatography-mass spectrometry (GC-MS) was used for qualitative analysis of the volatile components in raw tobacco and four cigarette brands. Employing a 100 µm polydimethylsiloxane fiber, the SPME parameters included the effects of extracting temperature and addition of sodium chloride to samples. The optimum extraction condition was the extracting temperature of 70 °C within 15 minutes and 2 milliliter of 3M sodium chloride. The extracts were carried out using the DB-1 column and the Rtx-5MS column under the optimum condition: injection temperature and detector temperature at 230 °C and 230 °C, respectively, carrier gas flow rate of 1.0 ml/min and temperature program at 180 °C (5 min) to 250 °C (10 min) with program rate at 5 °C/min. The volatile components were analyzed using a gas chromatography-mass spectrometer. It was found that the main compounds (% peak area > 10%, evaluated from the sum of peak areas) were nicotine, neophytadien, menthol, benzyl benzoate and menthyl acetate. Additional compounds were found camphene, iso-menthyl acetate, triacetin, solanone, 5,9-undecadien-2-one and megastigmatrienone.

C1_C0186 Layer-by-layer polyelectrolyte coatings for microchip electrophoresis

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Abstract: The effect of layer-by-layer polyelectrolyte multilayer (PEM) coatings on the velocity, direction of electroosmotic flow (EOF) and separation efficiency of poly(dimethylsiloxane) (PDMS) microchips, was studied. Coated channels provided more stable EOF with respect to modified channels between pH 4 and 10. Comparison EOF measurements were made using different polyelectrolyte chemistries as well as different salt concentrations during polyelectrolyte deposition. It was found that the EOF from different coating methods was not significantly different in magnitude but the EOF for PEMs deposited in the absence of salt showed much greater reproducibility. Finally, different coatings were used to compare separation efficiencies on native and PEM-coated PDMS microchips. Coated microchips generated significantly more theoretical plates than similar uncoated chips.

C1_C0189 DEGRADATION OF POLY (METHYL METHACRYLATE) UNDER SUB- AND SUPERCRITICAL WATER CONDITIONS

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Abstract: Use of sub- and supercritical water is an interesting alternative method as a reaction medium for depolymerization reaction. In this research, a degradation of PMMA under such conditions were studied and the obtained results would be led to primary information for an alternative approach in the treatment and recycling of plastic wastes. The reaction was performed in static closed system by using a home-made reactor invented in our laboratory. The parameters of sub- and supercritical water extraction studied were temperature (250-400°C) and static time (15-60 min). A relationship of both parameters was investigated by using factorial design, resulting a linear correlation between the two factors. Maximum degradation of PMMA to MMA was obtained at a static time of 45 min at 350°C. A clean up and preconcentration step of PMMA was performed by using small-scale liquid-liquid extraction with dichloromethane and the degraded product was detected and quantified by GC -FID.

C1_C0190 APPLICATION OF SEDIMENTATION FIELD-FLOW FRACTIONATION FOR α-TOCOPHEROL ENCAPSULATED LIPOSOME.

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Abstract: Application of sedimentation field-flow fractionation (SdFFF) for the determination of the encapsulation efficiency of encapsulated α-tocopherol in liposome was investigated. Conceptually, encapsulated α-tocopherol and free α-tocopherol can be separated using SdFFF, by which free α-tocopherol elutes with void peak but the encapsulated α-tocopherol elutes later.

In preliminary study, the possibility of SdFFF for size characterization and size distribution of liposome, which was synthesized by phosphatidylcholine, was examined. The effect of divalent metal ions, Ca^{2+}, on the physicochemical properties of phosphatidylcholine (PC) liposome was investigated using TEM. The lamellarity of the PC liposome was altered by addition of Ca^{2+}.

C1_C0192 Determination of estrogenic activity based on yeast estrogen assay

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Abstract: A transformed yeast strain (*Saccharomyces cerevisiae* strain BJ3505) containing human estrogen receptor was used to assess the estrogenic activity of compounds with endocrine disrupting activity. Estrogenic compounds interact with a cloned estrogen receptor which induces transcription of the genes, resulting in the production of β-galactosidase. The more β-galactosidase activity the more estrogen-like activity in the sample. Estradiol and nonylphenol were chosen as targets to study the interaction with the hormone receptor. β-galactosidase activity of yeast transformants increased after incubating with various concentrations of estradiol and nonylphenol. These results indicate that yeast estrogen assay serves as a useful tool for detecting estrogenic activity of the compounds.

C1_C0196 A CLEAN-UP METHOD OF NITROSAMINES AFTER SUPERHEATED WATER EXTRACTION FROM FRANKFURTERS.

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Abstract: Nitrosamines are potent carcinogens found in foods, such as sausage, ham and bacon. A clean-up method after superheated water extraction (SWE) of selected volatile nitrosamines, namely nitrosodiethylamine (NDEA), nitrosopiperidine (NPIP) and nitrosopyrrolidine (NPYR), from frankfurters was developed. In our preliminary study, the superheated water extract was pre-concentrated and cleaned up by solid-phase extraction with either florisil or acid-treated silica gel as adsorbent. Although both adsorbents were efficiently removed lipid from the extract, with the use of the silica gel no nitrosamine peak was detected, as they were unstable under strong acidic condition. This was contrast to the detection of the extract clean-up by eluting florisil column with 30% ethyl ether /dichloromethane. The recoveries obtained for the SW extract spiked with standard nitrosamines and eluted on florisil column gave 85-97% for either NDEA or NPIP and approximately 58 % for NPYR.

C1_C0197 DETERMINATION OF DIMETHOATE AND MALATHION INSECTICIDE RESIDUES IN TANGERINES.

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Abstract: Dimethoate and malathion insecticides are organophosphate compounds which are used in the process of tangerines plantation and they might be residues in tangerine fruit. The purpose of this work is to determine their residues by usig organic solvent extraction and gas chromatography. A mixture of hexane and acetone at varions proportions is chosen for extraction study. The percent recoveries were between 80 and 115. The results show that, the quantities of dimethoate and malathion residues in tangerines were 0.02 mg/kg and not detected, respectively. Thus, the amounts of dimethoate and malathion residues are less than the maximum residue limits of Thai agricultural commodity and food standard.

C1_C0198 NANOPARTICLE-ELECTROCATALYSIS FOR ALCOHOL OXIDATION

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Abstract: Methanol oxidation at various electrodes have been extensively explored since it is one of the main reactions in

direct methanol fuel cells (DMFC). In this research, preliminary results demonstrate that platinum particles deposited on a boron-doped diamond electrode (BDD) under a potentiostatic condition can be used to catalytically oxidize methanol. This platinum-modified BDD shows higher activity toward the oxidation of methanol than the plain platinum electrode. Furthermore, we found the oxygen had effected to methanol oxidation. In addition, the stability of the modified surface and the effects of other metal additives will be discussed

C1_C0200 MICROCHIP CAPILLARY ELECTROPHORESIS WITH AMPEROMETRIC DETECTION FOR DETERMINATION OF TETRACYCLINE ANTIBIOTICS

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Abstract: A miniaturized analytical system, the microchip-based capillary electrophoresis (CE) system with electrochemical (EC) detection was developed for the amperometric detection of tetracycline antibiotics; tetracycline, oxytetracycline, chlortetracycline and doxycycline. That was also studied e with cyclic voltammetry as a function of the pH of supporting electrolyte solution at a gold electrod.The well-defined cyclic voltammogram, providing the highest peak current at 1.3 V versus Ag/AgCl, was obtained when using potassium dihydrogen phosphate solution at pH 5.0. Under optimum conditions for analysis in microchip, the analytes could be separated and detected in a 10 mM Phosphate buffer (pH 4.0-6.0) within 100 sec using a separation voltage of 2000 V and a detection voltage of 1.3 V. The results showed an efficient and rapid separation of compounds within a very short time of less than 95 sec.

C1_C0202 METHOD DEVELOPMENT FOR DETERMINATION OF IODIDE IN EGG USING MICRODIALYSIS SAMPLING AND FLOW INJECTION AMPEROMETRIC ANALYSIS.

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Abstract: A method for determination of iodide in egg using microdialysis sampling and flow injection amperometric analysis has been developed. Microdialysis is a sampling technique of small molecules from matrices containing large molecules based on the diffusion through a semi permeable membrane. In this work, a 10 cm hollow fiber membrane made of polysulfone was used as microdialysis membrane. A 60 mM phosphate buffer (pH 5) was used as perfusate. The dialysis time was 60 min. The flow rate was 0.34 ml/min. The iodide in dialysate was then determined by flow injection amperometric analysis with boron-doped diamond electrode (BDD). According to the hydrodynamic voltammetry study, the optimum voltage, which exhibited the maximum signal-to-background ratio (S/B) was 0.8 V. The linear dynamic range for iodide concentration of 0.1 to 25 ppm was achieved (r^2=0.9903). The detection limit as low as 12.5 ppb was obtained. The result for determination of iodide in egg using our method provided relative standard deviation of 13.5% (intra-day).

C1_C0203 FLOW INJECTION COUPLED WITH PULSED AMPEROMETRIC DETERMINATION OF β-AGONISTS IN PHARMACEUTICAL PRODUCTS USING BORON-DOPED DIAMOND THIN FILM ELECTRODE

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Abstract: This work describes the application of flow injection (FI) technique coupled with electrochemical detection for determination of some β-agonists, i.e., salbutamol, terbutaline, and clenbuterol, using boron-doped diamond (BDD) thin film electrode. BDD electrode was shown low background current and inert material. However, it showed some fouling from detection of the compounds using fixed-potential mode of amperometry. Pulsed amperometric detection (PAD) was developed and used to determine agonist compounds. Electrode surface was successfully cleaned and reactived using this mode. Linear working ranges were 0.5-100 (salbutamol), 1.0-100 (terbutaline) and 0.5-50 (clenbuterol) μM. The developed FI-PAD-BDD schemes were applied to successfully determine salbutamol and terbutaline in commercial pharmaceutical products. The methods were validated with a capillary electrophoresis method.

C1_C0205 AMPEROMETRIC DETERMINATION OF SULFITE IN WINES BY SEQUENTIAL INJECTION WITH BORON-DOPED DIAMOND ELECTRODE

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Abstract: A sequential injection system with amperometric detection using a boron-doped diamond electrode was developed for the determination of sulfite. A gas diffusion unit (GDU) was incorporated into the manifold to prevent interference from sample matrices for the electrochemical measurement. An acid solution of 1 M H_2SO_4 was mixed with the sample to generate the gaseous sulfur dioxide prior to its passage through the donor channel of the GDU. The sulfite species in a 0.1 M phosphate buffer solution pH 8 in the acceptor channel of the GDU was propel to the electrochemical detector and detected directly by the boron-doped diamond electrode at 0.1 V (versus Ag/AgCl). The method was applicable in the concentration range of 2.5 - 25 μM sulfite and the lower limits of detection was 1.0 μM. This methodology was applied to the determination sulfite in wines. The sample frequency was about 15 h^{-1}.

C1_C0206 RAPID SIMULTANEOUS DETERMINATION OF LACTIC ACID AND CITRIC ACID IN MILK POWDER BY ION CHROMATOGRAPHY.

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Abstract: A simple method has developed for simultaneous determination of lactic acid and citric acid in milk powder using anion-exchange column IonPac AS 16 column, automated potassium hydroxide eluent generator (EG 40) and suppressed conductivity detector. The potassium hydroxide gradient from 3 to 40 mM was used to elute both anions in 15 min. Good linearities are obtained between 1 to 60 ppm. Limit of detection (LOD) for this method was 0.20, 0.30 ppm for lactic acid and citric acid, respectively. Relative standard deviation (R.S.D) for lactic acid and citric acid (n=10) were 3.897, 7.092, respectively. The recoveries of lactic acid and citric acid were in range of 96.16 to 102.22 % and 88.23 to 96.37 % , respectively.

C1_C0213 SOLAR PHOTOCATALYTIC DEGRADATION OF TRIAZOPHOS IN AQEOUS TITANIUM DIOXIDE SUSPENSION: IDENTIFICATION OF INTERMEDIATES AND DEGRDATION PATHWAY

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Abstract: The solar photocatalytic degradation of triazophos in aqueous TiO_2 suspension has been mimicked in a photoreactor operating with artificial light flux. By monitoring the change in triazophos concentration as a function of irradiation time using HPLC-UV it has been found that the rate of disappearance of triazophos follows first order kinetics. The rate constant and $T_{1/2}$ were 0.146 ± 0.013 hr^{-1} and 4.76 ± 0.42 hr, respectively. Seventeen degradation products were identified using HPLC-UV, LC/MS, GC/MS and IC, and comparing with some commercially available authentic compounds. Transformation routes were proposed, one based on the initial oxidative cleavage of P=S bond to P=O bond, and the other one on initial cleavage of the ester P-O bonds.

C1_C0217 COMPOSITION MODIFICATION OF NANOCRYSTALLINE TiO_2 FILM ELECTRODE IN DYE-SENSITIZED SOLAR CELLS

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Abstract: One of the most important components of dye-sensitized solar cells (DSSC) is the dye-adsorbed nanocrystalline TiO_2 film electrode which affects the efficiency of DSSC. In this work, modification of TiO_2 electrode was studied by mixing the nanocrystalline TiO_2 (Degussa P25) with various amount of ZrO_2 and treating the mixtures with different concentrations of HNO_3. Between the modified electrode and the Pt-coated counter electrode was the composite solid electrolyte consisting of polyethylene oxide (PEO) filled with TiO_2 and a redox couple of KI and I_2. It was found that DSSC which constructed from 90:10 TiO_2:ZrO_2 treated with 10^{-3} M HNO_3 and the adsorbed $RuL_2(NCS)_2$ (N3) as a sensitizing dye showed the best performance. The DSSC generated a short-circuit current (I_{sc}) 5.40 mA, an open-circuit voltge (V_{oc}) 630 mV, fill factor (FF) 0.40 and the efficiency 1.35 %. In contrast, such modification showed no significant enhancement for DSSC fabricated with natural dye extract of Roselle as sensitizer. The DSSC fabricated with TiO_2 treated with 10^{-3} M HNO_3 and Roselle extract as sensitizer gave short-circuit current (I_{sc}) 0.58 mA, an open-circuit voltge (V_{oc}) 530 mV, fill factor (FF) 0.77 and the efficiency 0.20 %.

C1_C0223 PREPARATION OF SOLID ELECTROLYTES FOR DYE-SENSITIZED SOLAR CELLS.

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Abstract: The conversion efficiency of dye-sensitized solar cell (DSSC) using liquid electrolyte of the redox couple of I_3^-/I^- has reached 10%. However the drawback of liquid electrolyte is its leakage and evaporation. In this work, the solid electrolytes such as polyaniline, polypyrrole, CuSCN, CuI and composite poly(ethylene oxide) (PEO) were employed in the fabrication of DSSCs using Ruthenium complex (N3) and Roselle extract as sensitizing dye. It was found that the composite PEO:TiO_2:I_2:KI electrolyte gave the highest cell performance among the solid electrolytes studied. Furthermore, counter electrode of Ag, Au, C or Pt which also acts as a catalyst for the redox reaction was studied to find the most efficient counter electrode for the dye-sensitized solar cells fabricated with composite PEO:TiO_2:I_2:KI. The results showed that Pt gave the highest cell performance, compared to the cell with Ag, Au or C based counter electrode. DSSCs sensitized with N3 and Roselle dye gave short circuit current (I_{sc}) of 3.65 mA cm^{-2} and 0.46 mA cm^{-2}, open circuit voltage (V_{oc}) of 700 mV and 530 mV and energy conversion efficiency (η%) 0.77% and 0.19%, respectively at 100 mW cm^{-2} (AM 1.5).

C1_C0225 THE STUDY OF MATRIX EFFECT IN DETERMINATION OF CERIUM LANTHANUM AND NEODYMIUM IN MONAZITE ORE BY USING INDUCTIVELY COUPLED PLASMA ATOMIC EMISSION SPECTROMETER

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Abstract: The matrix effect in determination of cerium (Ce), lanthanum (La) and neodymium (Nd) which are rare earth elements in monazite phosphate-based ore containing U and Th by ICP technique was studied. Three sets of calibration curves used for the analysis were prepared from single standard rare earth element, mixed standard rare earth elements and monazite ore with addition of standard rare earth elements. The analysis was carried out using standard reference monazite as the sample. It was found that the results calculated from the monazite ore calibration curve were the closest value while the other results both showed higher values. This shows that matrix of the sample has some effect in the element determination with this technique.

C1_C0227 POLYANILINE BLENDED WITH POLYVINYL ALCOHOL FOR AMMONIA SENSING.

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Abstract: Conducting polyaniline (PAni) plays an important role as a sensor material for ammonia gas. In this work, blended polyaniline-polyvinyl alcohol (PAni-PVA) films for ammonia sensing were prepared because blended polymers have shown a lot of promise in terms of easy processing ability. In addition, the conductivity and stability of the blended film was improved by doping PAni and cross-linking PVA with citric acid. The conducting of PAni-PVA blended films on exposure to 100 ppm of ammonia gas was ranging from 20 to 340 nS depending on the amount of citric acid. Among those blended films, PAni-PVA with 1.2 g citric acid resulted the most excellent of ammonia gas sensing in term of conductance changing and responding time. When measuring ammonia gas in range 10 to 100 ppm, the changes of conductivity was well related to the concentration of ammonia gas. This aspect has been utilized in designing the ammonia sensor using this PAni-PVA blended film as a sensor material.

C1_C0230 A MICROFLUIDIC SYSTEM FOR THE EVALUATION OF ANTIOXIDANT CAPACITY BASED ON A PEROXYOXALATE CHEMILUMINESCENCE ASSAY

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Abstract: A microfluidic system incorporating chemiluminescence detection is reported as a new tool for measuring antioxidant capacity. The detection is based on a peroxyoxalate chemiluminescence (PO-CL) assay with 9,10-Bis (phenylethynyl)-anthracene (BPEA) as the fluorescent probe and hydrogen peroxide as the oxidant. Antioxidant plugs injected into the hydrogen peroxide stream result in an inhibition of the CL emission which can be quantified and correlated with antioxidant capacity. The PO-CL assay is performed in 800-□m-wide and 800-□m-deep microchannels on a poly (dimethylsiloxane) (PDMS) microchip. The PDMS microchip was sandwiched between two glass plates with the top plate comprising capillary reservoirs. Controlled injection of the antioxidant plugs is performed through an injection valve. Detection of chemiluminescence emission was firstly performed using an inverted fluorescence microscope equipped with a photomultiplier tube to optimize the system. Out of the tested plant-food based antioxidants, β-carotene was found to be the most efficient hydrogen peroxide scavenger (SA_{HP} of 3.27 x 10^{-3} μM^{-1}), followed by α-tocopherol (SA_{HP} of 2.36 x 10^{-3}

μM^{-1}) and quercetin (SA_{HP} of 0.31 x 10^{-3} μM^{-1}). While the reported method is inherently simple and rapid, excellent analytical performance is afforded in terms of sensitivity, dynamic range and precision, with RSD values typically below 1.5 %. We anticipate our microfluidic devices to be used for in-the-field antioxidant capacity screening of plant-sourced food and pharmaceutical supplements.

C1_C0231 DETERMINATION OF PHOSPHOLIPID FATTY ACIDS AS FATTY ACID METHYL ESTERS USING GAS CHROMATOGRAPHY.

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Abstract: Phospholipid fatty acids (PLFAs) have been used as key indicator for microbial lipid biomarker. PLFAs can be found in cell membrane of microorganisms which control passage of nutrients in and out of the cell. The PLFAs are not found in the storage lipids and decomposed rapidly after cell death because of cellular enzymes hydrolysis. Profiles of fatty acids derived from phospholipids components of the cellular membranes have been used to evaluated microbial biomass, microbial community structure and microbial diversity of microorganisms. This research aims to study an analytical method for the determination of PLFAs as fatty acid methyl esters (FAMEs) using gas chromatography equipped with flame ionization detector (GC-FID). Optimization of the analytical procedures including derivatization, saponification, extraction, and fractionation classes of lipids using solid phase extraction (SPE) are performed to obtain better separation and sensitivity.

C1_C0233 MEMBRANELESS GAS DIFFUSION UNIT: AN INNOVATION FOR SELECTIVE ANALYSIS OF VOLATILES BY FLOW SYSTEM

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Abstract: An innovation for gas diffusion technique has been made. A 'membraneless gas diffusion (MGD) unit' has been developed. Unlike conventional gas diffusion (GD) unit, this new designed unit allows selective analysis of volatiles without use of hydrophobic membrane. A flow injection (FI) method was developed by employing the MGD unit to determine ethanol, based on the reduction of dichromate to Cr (III) by ethanol vapor. Cr (III) is spectrophotometrically monitored. Results clearly demonstrated that the MGD unit was suitable for determination of ethanol in liquors. We also found that this MGD design makes the system more sensitive, as mass transfer is more efficient than that of GD, and thus, MGD can perfectly replace the membrane-based design.

C1_C0234 FAST EXTRACTION AND CLEAN-UP FOR TRACE ANALYSIS OF ORGANOCHLORINE PESTICIDES IN FRUIT JUICES BY GAS CHROMATOGRAPHY

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Abstract: Fast extraction and simple clean-up sample preparation has been developed for trace analysis of organochlorine pesticides (OCPs) in fruit juices employing a gas chromatography with an electron capture detector (GC-ECD). From preliminary studies, it was found that the suitable solvent for extraction of 5 OCPs; lindane, aldrin, dieldrin, β-endosulfan and p,p'-DDT. was hexane:acetone (2:1) while the efficient clean-up eluting solvent was hexane:dichloromethane (1:1). The linearity (r^2) is more than 0.99 except p,p'-DDT while %recoveries, %RSD were satisfied in the range of 96.03-102.48 and 3.16-6.73 respectively. LOD and LOQ were found to be in low level of mgL^{-1}. This developed method has proved to be a fast and simple sample preparation for the analysis of pesticdes residues.

C1_C0235 PREPARATION OF MONAZITE BY FUSION METHOD FOR RARE EARTHS ANALYSIS USING XRF TECHNIQUE.

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Abstract: Sample preparation as fusion method does not produce particle size effect and the result is perfectly homogeneous bead for XRF analysis. In this study, the preparation condition of monazite by fusion method was optimized. It was found that the correct lithium tetraborate (LiT) and lithium metaborate (LiM) flux ratio, sample to flux weight ratio including cooling time were required to obtain perfect glass bead. Rare earth element, Uranium and Thorium concentration determined by XRF in fused bead and pressed pellet were compared. It was found that elemental concentration obtained from both methods are not significant different at 95% confidential level.

C1_C0236 FLOW INJECTION SPECTROPHOTOMETRIC SYSTEM FOR THE DETERMINATION OF PARACETAMOL

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Abstract: A flow-injection spectrophotometric system is proposed for the determination of paracetamol in pharmaceutical formulations. The principle of the method is the reduction of Fe (III) to Fe (II) by paracetamol and mixed with a stream of 1,10-phenanthroline solutions. The orange-red coloured product compound was measured at 510 nm. The influence of several operating parameters was studied. The calibration curve was linear over the range 5.0-15.0 mg/L with a correlation coefficient of 0.9994. The relative standard deviation was 1.11% (n=11) for determining 7.0 mg/L. The detection limit was 0.69 mg/L based on three time the standard deviation of replicate measurements. The injection rate was 15 samples per hour. The proposed method has been applied to the determination of paracetamol in pharmaceutical preparations.

C1-C0238 THEORETICAL INVESTIGATION OF MULTIVARIATE CALIBRATION OF MIXED XYLENES VIA INFRARED SPECTRA

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Abstract: Fourier transform infrared (FTIR) spectroscopy for quantitative determination of *ortho*-, *meta*- and *para*-xylenes in mixtures of mixed xylenes was investigated. Multivariate calibrations such as Classical Least-Squares (CLS), Inverse Least-Squares (ILS), and Principal Component Regression (PCR) were applied to determine the concentrations of each component in the mixtures. In this study, the simulated infrared spectra were generated from the preset concentrations of the three components of xylene, and then yielded 32 spectra (i.e. 32 mixtures) and covered the range of analysis from 4,000 to 400 cm^{-1} in 4 cm^{-1} intervals. Of these 32 spectra, 22 spectra were used as the calibration set, and 10 spectra were reserved for test set. Calibration models were first built along the three calibration techniques and used to predict the concentrations of each component in the test set. The standard error of calibration (SEC) for CLS, ILS and PCR were 1.2006×10^{-7}, 3.3479×10^{-12} and 1.2020×10^{-7}, respectively, while the standard error of prediction (SEP) of each technique were 2.2372×10^{-7}, 3.8180×10^{-5} and 2.2324×10^{-7}, respectively.

C1_C0241 Valveless Injection Analysis: The Latest Generation of Flow-Based Techniques for Chemical Analysis

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Abstract: Since flow injection analysis (FIA) was first reported in 1974 by Ruzicka and Hansen [1], there have been tremendous of research papers published in journals of analytical chemistry concerning use of FIA as well as other flow based techniques. Following developments of FIA, Ruzicka and Marshall reported the second and the third generation of FIA, known as sequential injection analysis (SIA, since 1990) [2] and lab-on-valve (LOV, 2000) [3]. Between those reports of the SIA and LOV, Cerda's group reported their techniques called multisyringe flow injection analysis (MSFIA) [4]. Flow based chemists in the Far East, like Japan and Thailand, also developed and presented other generations of flow-based analysis. Itabashi (Japan, 2001), reported his all injection analysis (AIA) technique [5]. Two years ago, Grudpan's group, from Chiang Mai University reported the technique of lab at valve (LAV) in 2004 [6]. All of these reported techniques employ valves either as injection valves or as selection valve.

C1_C0242 DETERMINATION OF PHYTOCHELATIN COMPOUNDS IN PLANT BY HIGH PERFORMANCE LIQUID CHROMATOGRAPHY

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Abstract: Phytochelatin (PC) is an important compound of metal detoxification in plants. The main compound is glutathione which are combined from three amino acids of glycine, cysteine and glutamic acid. The purpose of PCs is considered as detoxification process of heavy metal by formation complexes with those compounds. The analysis of these compounds is preferably derivatised reaction for UV-Vis aborption.

This study focused on a chromatographic method using precolumn derivatization by 4-Dimethylaminoazobenzene-4-sulfonyl chloride (DABS-Cl) and 1-chloro-2, 4-dinitrobenzene (CDNB) which will react through thiol group. Parameters that affected deivatization were pH, reaction time, and derivatizing concentration. In addition, derivatization efficiency for GSH was compared between both agents. The detection limit of the analysis was 4.5 and 24.2 µg /L for CDNB and DABS-Cl, respectively.

C1_C0243 DETERMINATION OF ORGANOTIN COMPOUNDS USING GAS CHROMATOGRAPHY

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Abstract: Organotin compounds are widely organometallic used in many field of commercial (such as Antifouling paint, stabilizer for PVC, fungicides, etc.), its depend on the difference number of substituents. The toxicity of these compounds depend on the nature and the number of organic groups bond to the tin atom. The most toxic compounds are triorganotin, espicially uesd antifouling paint on ship and boats, when these compounds released to environment are effect to hindinng the growth and attachment a variety of organism around these area. In these studies, the derivatization method for determination organotin compounds are considerable, so the main of work is the derivatization method of organotin compounds (butyl- and phenyltins) using Grignard reagent (Hexyl magnesiumbromide) and sodium borohydride ($NaBH_4$), finally apply these methods for determine organotin compounds in sediment sample.

C1_C0245 FATTY ACIDS ANALYSIS BY HIGH PERFORMANCE LIQUID CHROMATOGRAPHY

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Abstract: Fatty acid profile can be used to identify the quality of environment by comparing the amount and type of fatty acids. Fatty acid has been used to gain information of the degree of contamination in soil by analysing their profile of phospholipids fatty acid (PLFA). Fatty acids are the major composition of PLFA, which are found in the membrane of all living cell. The determination of fatty acids by High Performance Liquid Chromatography (HPLC) offers high sensitivity and obtain more selectivity. Most fatty acids do not absorb UV radiation. Thus, derivatization by bonding with strong UV absorption species is necessary. Phenacyl bromide and naphthacyl bromide are derivatizing agents which are commonly used to prepare fatty acid derivative. These derivatives were separate on C18 column using mobile phase of methanol-water with UV detector. This method was developed for the determination of fatty acids, lauric acid, myristic acid, palmitic acid, stearic acid and arachidic acid in soil sample. The analytical procedures including extraction, fractionation, hydrolysis and derivatization, respectively.

C1_C0246 HEADSPACE GAS CHROMATOGRAPHY FOR BIOMASS GASES OF CO_2 AND CH_4 ANALYSIS IN SOIL

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Abstract: Biomass gases are carbon dioxide (CO_2) and methane (CH_4) gases generated by respiration process. These gases can be determined by Headspace Gas Chromatography (HS-GC) for gas phase injection system. In this study, HS-GC method was used to determine CO_2 and CH_4 gases in a sample. CO_2 and CH_4 gases were generated by chemical reaction for performing the optimum condition of the analysis and were also determined in soil samples correlation with soil contaminant.

C1_C0260 Pt-BASED NANOPARTICLES SYNTHESIS AND ELECTROCATALYTIC ACTIVITIES ON MODIFIED FTO: A MODEL ELECTRODE FOR PEMFC/DMFC

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Abstract: By chemical and electrochemical deposition, platinum and gold-platinum nanoparticles attached to fluorine doped tin oxide electrode (FTO). Platinum and gold nanoparticles were synthesized by hydrothermal reduction from hexachloropaltinic acid and gold (III) chloride with selected reducing reagents ($NaBH_4$, ascorbic acid and trisodium citrate). Three modification techniques to attach the nanoparticles on FTO electrode were demonstrated, including (i) p-PtNPs/FTO; by Direct potentiostatic deposition from aqueous solution of 13 mM H_2PtCl_6 (ii) PtNPs/FTO and Au-PtNPs/FTO; synthesized by electrochemical deposition from the nanoparticles precursors and (iii) In-PtNPs/FTO; fabricated by one-step immersion into the grown solution (a mixture of H_2PtCl_6 and ascorbic acid) of an in situ chemical reductive growth method on pretreated FTO surface. The size and size distribution of Pt and Au-Pt nanoparticles were obtained by transmission electron microscope (TEM). The cyclic voltammetric data were used to estimate the electrochemically surface-active area of Pt in hydrogen adsorption / desorption region on modified electrode and also to assess the electrocatalytic activities of Pt and Au-Pt on modified FTOs as model electrodes for PEMFC/DMFC, via Methanol oxidation.

C1_C0263 VOLTAMMETRIC TECHNIQUES FOR CHARACTERIZATION OF ANTIOXIDANT ACTIVITIES IN SELECTED NATURAL EXTRACTS

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Abstract: Voltammetry has been applied to investigate charge transfer characteristics and related antioxidant activities of L-ascorbic acid in various conditions by using glassy carbon electrode. The electrochemical data, anodic peak potential (E_{pa}) is useful for quick screening antioxidant properties in L-ascorbic acid and selected natural extracts. The comparative analysis of the activity of L-ascorbic acids, and some selected natural extracts (guava, tangerine, and kiwi juices) has been demonstrated.

C1_C0264 INFLUENCE OF PRECURSOR ON SYNTHESIS AND METAL SORPTION PROPERTIES OF SCHIFF'S BASE DOPED MESOPOROUS SILICA

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Abstract: This work is aimed at investigating the influence of precursor on synthesis and metal sorption properties of Schiff's base doped mesoporous silica. Three different silica precursors including tetraethoxysilane (TEOS), silica gel 60 and calcined mesoporous silica were used. Various Schiff's bases namely, salen, saltn and haen were used as doping molecule. The physical properties of the modified materials were examined using X-ray diffraction (XRD) technique, N_2 sorption analysis and scanning electron microscopy (SEM). The results suggested that the physical properties of modified silica were influenced by the types of silica precursor. The spherical particles of silica with good ordered mesopore structure and high surface area were obtained when the silica precursor was TEOS or calcined mesoporous silica. The sorption properties of the modified silica towards Fe(III) ions were also demonstrated. The salen doped mesoporous silica synthesized from calcined mesoporous had the maximum Fe(III) extractability which was 19.25 ± 0.36 mg/g.

C1_C0268 Determination of Chloroform Levels in Herbal Medicine Spirits using a Headspace Gas Chromatography method.

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Abstract: Determination of Chloroform Levels in Herbal Medicine Spirits using a Headspace Gas Chromatography with flame ionization detector. A GC capillary column (25 m in length, 0.32 mm in diameter and 0.52 □m in film thickness) was Ultra 2 Cross - Link 5% Phenyl Methyl Siloxane. The Extraction was done by using headspace technique. The study was carried out in the concentration range of 73.40 - 1174.40 mg/dm^3. The results showed that the relationship between concentration and peak area was linear with Correlation coefficient (*r*) of 0.9991. The value of precision and accuracy of the method ; the percentage relative standard deviation (%RSD) was 2.59 and the percent recovery (%R) range was 90.24 - 94.80. The limit of detection (LOD) was 11.91 mg/dm^3. The limit of quantitative (LOQ) was 39.70 mg/dm^3. The analysis of 23 samples of Herbal Medicine Spirits supply in Ubon Ratchathani. Chloroform was detected at the level less than 11.91 - 1068.12 mg/dm^3. The level of chloroform detected will be harmful to health after drinking certain Herbal Medicine Spirits.

C1_C0269 PRECONCENTRATION NEUTRON ACTIVATION ANALYIS (PNAA) OF IODINE IN CRMs

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Abstract: A simple pre-concentration neutron activation analysis (PNAA) has been developed for the determination of low levels Iodine in food samples. The method involves dissolution of the samples by microwave acid digestion. Dissolved iodine were then reduced to iodide with hydrazine sulfate, follow by co-precipitation with bismuth sulfide. The precipitate was then irradiated with epithermal neutron in the SLOWPOKE, Halifax, Canada. The gamma peak of I-128 at 443 keV was measured using a gamma spectrometer. It was found that the detection limit is 0.11 µg/g. The PNAA method was applied to food reference materials. Accuracy in term of percent error obtained by analyzing non fat milk powder (NIST-SRM 1549) and whole egg powder (NIST-RM 8435) were 20.7 % and 4.06 % respectively.

C1_C0270 ELEMENTAL ANALYSIS OF SILK CATERPILLARS

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Abstract: The amount of trace elements in silk caterpillars were analyzed by using instrumental neutron activation analysis (INAA) in corporation with ICP-AES. Since the silk caterpillars is becoming popular food items for Thai population especially in the northeastern part. The data obtained from the preliminary work will be useful for safety evaluation of silk caterpillars as food item. Trace elements studied include Al, As, Br, Ca, Cd, Cl, Cu, Hg, I, K, Mg, Mn, Na, Pb, S, Se and Zn. It resulted that the concentration of Ca, Cl, K and Mg in samples from Sakon Nakon Province were higher than Mukdahan Province, where

as Na and S contents were found higher in caterpillars from Mukdahan Province than Sakon Nakon Province. In addition, the contents of As, Cd, Cu, Hg, Pb and Se in these silk caterpillars were all within the maximum acceptable limit for food.

C1_C0271 THE DETERMINATION OF SELENIUM AND IODINE IN FOOD SAMPLE BY NUCLEAR ANALYTICAL TECHNIQUE

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Abstract: Selenium and Iodine content in 16 food samples were analyzed using Pseudo-Cyclic Instrumental Neutron Activation Analysis (PCINAA) and Epithermal Instrumental Neutron Activation Analysis (EINAA) in conjunction with compton suppression gamma spectrometer. Se and I were found between 0.209-4.325 microgram/gram and 0.090-4.219 microgram/gram, respectively. The detection limit of Se and I were 0.171-0.522 microgram/gram and 0.073-0.489 microgram/gram, respectively depending on the interfering elements in sample. Accuracy of measurements were evaluated by analyzing a number of standard reference materials: SRM 1566b(Oyster Tissue), SRM 1547(Peach Leaves), and SRM 8415(Whole Egg Powder). The average of Se and I were 7.07 percent and 8.80 percent, respectively.

C1_C0272 DETERMINATION OF AVERMECTINS IN COMMERCIAL FORMULATIONS USING MICROEMULSION ELECTROKINETIC CHROMATOGRAPHY

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Abstract: Microemulsion electrokinetic chromatography (MEEKC) was developed for quantitative analysis of avermectins, such as abamectin, doramectin and ivermectin, in commercial formulations, using the microemulsion buffer containing a 50 mM phosphate buffer at pH 2.5, 1.1% v/v n-octane as oil, 180 mM sodium dodecyl sulphate as surfactant, 890 mM 1-butanol as co-surfactant and 30% v/v ethanol as organic co-solvent. Applied voltage of -15 kV and temperature of 25 ^{o}C were used. Achieved baseline resolution was obtanied with R_s ~ 4.9 and analysis time within 25 min. High accuracy and precision of the method were obtained. The contents of avermectins in commercial formulations determined by MEEKC were found to be non-significant difference with those determined by high performance liquid chromatography (HPLC), using paired t-test analysis at 95% confidence interval of the mean. Therefore, MEEKC can be used an alternative method to HPLC for quantitative determination of avermectins, with shorter analysis time and less consumtion of orgaic solvents used in MEEKC than HPLC. This work has been publised in *Analytica Chemica Acta* 570 (2006) 8-14.

C1_C0276 BASIC RISK ASSESSMENT IN ANALYTICAL LABORATORY

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Abstract: Analytical laboratory is one of the chemicals source consumption that consumes small quantities of a wide variety of chemicals. Some of them are hazardous chemicals that may cause a serious problem on personal health with environment pollution. Risk assessment system in analytical laboratory should be developed and used as a tool for risk prevention and risk control for all laboratory operators. The basic risk assessment in analytical laboratory has been developed according to the standard practice. To evaluate the implementation of the basic risk assessment in analytical laboratory, 10 pilot analytical laboratories with 100 operators who work in the laboratories have been chosen. The designed basic risk assessment system in analytical laboratory consists of 3 main parts including workplace, laboratory operator, and personal protective equipment (PPE). The results of basic risk assessment in workplace showed 70 % meet a standard safety workplace, 100% have the safety management on chemical and hazardous waste, 90% have appropriated safety equipments in their laboratories and 70% have yearly preventive maintenance on safety equipments. The results of basic risk assessment in laboratory operator showed 100% of operators working on hazardous chemical and 90% knew all the hazards came from the chemical used, 70% used the suitable PPE for their work and 50% have their yearly medical check according to the hazard risk. The results of basic risk assessment in PPE showed 100 % of operator have appropriated PPE, but only 70 % used them for their work and 100 % of operators have already learned how to use PPE appropriately. The results from 36 % of operators who were not use PPE in their work is uncomfortable. The assessment results from the pilot laboratories showed the risk of analytical laboratory operator are in the middle level and operator working system is the main problem. From these results, Safety management division in Energy Environment safety and Health office (EESH), who take responsibility on Safety management in KMUTT will give a new campaign to promote PPE using and motivate all operator to use PPE according to safety standard compliance. The Implementation of basic risk assessment in analytical laboratory may help in evaluate safety system and safety concern for all operators. This assessment will gain safety awareness for all with the target of decreasing in accident and health risk. Moreover, this assessment will help to make safety for all who work in analytical laboratory.

C1_C0278 A COMPARISON OF RESULOTION IN MICROEMULSION ELECTROKINETIC CHROMATOGRAPHY AND MICELLAR ELECTROKINETIC CHROMATOGRAPHY: APPLICATION TO BISPHENOL-A-DIGLYCIDYL ETHER AND ITS DERIVATIVES

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Abstract: Much of previous work has been reported that microemulsion electrokinetic chromatography (MEEKC) provided better resolution of hydrophobic compounds than did micellar electrokinetic chromatography (MEKC). The aims of this work are to compare resolution in MEEKC and MEKC with suppressed electroosmosis, and to explain separation scales using our equation for resolution, $R_s = (\sqrt{N} / 4)(\alpha - 1)/(1 + k_2)$, where k is the retention factor, α the selectivity ($\alpha = k_2/k_1$ for $k_2 > k_1$), and N the average efficiency. The test analytes used are bisphenol-A-diglycidyl ether and its derivatives (BADGEs). MEKC was carried out using a pH 2.5 50 mM phosphate buffer containing sodium dodecyl sulphate (SDS) as surfactant and organic solvent, while MEEKC was carried out using a pH 2.5 50 mM phosphate buffer containing 1.0 %v/v *n*-octane as oil, sodium dodecyl sulphate (SDS) as surfactant, 890 mM 1-butanol as co-surfactant, and organic solvent. Improved resolution of BADGEs was obtained with increasing the concentration of organic solvent, such as acetonitrile, methanol or ethanol, from 20 to 30% v/v in MEEKC and MEKC, while the resolution slightly changed with SDS concentrations in a range of 100 to 180 mM. At given concentrations of SDS and organic solvent, MEEKC was found to give better resolution of BADGEs. This is because the values of k in MEEKC were obtained to be three to four times smaller than those in MEKC, ($R_s \propto 1/k$), due to weaker hydrophobic interaction in MEEKC, while slightly smaller values in N and α in MEEKC than MEKC were found.

C1_C0279 Prediction of Amylose Content of Milled Rice by Near-Infrared Reflectance Spectroscopy.

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Abstract: Using near-infrared reflectance spectroscopy (NIRS) to predict amylose content (AC) of indica type milled rice; 5 cultivars were Khaodawkmali105 (KDML105), RD15, Homsuphanburi (HSP), Pathumthani1 (PTN1) and Chainat1 (CNT1). Rice samples were and measured the spectra in wavelength region from 1100 nm to 2500 nm by NIRSystems 6500. Conducting the chemical analysis for AC of milled rice and used partial least squares regression (PLSR) to develop amylose calibration equation. It obtained has the value of R, SEC, SEP and RPD equal to 0.96, 1.69 %, 1.92 % and 3.11 respectively.

C2_C0003 SYNTHESIS AND CHARACTERIZATION OF [Co(acac^R)$_2$(L)]: UNEXPECTED OXIDATION OF A DIPHOSPHINE.

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Abstract: The reaction of [Co(acac^R)$_2$] {R = Ph (dbm), t-Bu (tmhd)} with chelating N-N or P-P ligands yields [Co(acac^R)$_2$(L)] either as monomers or coordination polymers. Characterization by IR and UV-Vis spectroscopy supports this formulation. Further insight is provided by X-ray crystallographic structures showing a cis-configuration of the β-diketonate ligands in the monomeric complex, [Co(dbm)$_2$(phen)] and a trans-configuration in [Co(dbm)$_2$(i-dppe-O$_2$)]$_n$. The latter complex represents the first example of diphosphine oxygenation by [Co(acac^R)$_2$].

C2_C0004 EFFECTS OF FLUORIDE, CHLORIDE AND HYDROXIDE IONS TO THE DEPROTONATION PROPERTIES OF 3,4-DICHLORO-2,5-DIAMIDO-SUBSTITUTED DIPYRROLIC DERIVATIVES: THE DFT STUDY.

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Abstract: The molecular structures of 1,3-phenylene-bis-(3,4-dichloro-5-phenylcarbamoyl-*1H*-pyrrole-2-carboxylic acid amide), **L^1**, 1,4-phenylene-bis-(3,4-dichloro-5-phenylcarbamoyl-*1H*-pyrrole-2-carboxylic acid amide), **L^2**, their deprotonated species and fluoride, chloride and hydroxide complexes were obtained by geometry optimizations using density functional theory (DFT) calculations. Energetics, thermodynamic properties and equilibrium constants of deprotonation processes of both compounds in the presence and absence of fluoride, chloride and hydroxide ions systems were computed at the B3LYP/6-31G(d) level with ZPVE correction. In gas phase, fluoride and hydroxide ions were able to form stable complexes with the deprotonated species of the compounds and finally the compounds became the free deprotonated forms (**L$^{1\,2-}$** and **L$^{2\,2-}$**). However, the chloride ions show preferring to form the dichloride complexes without any deprotonation processes of the compounds. The results are good agreement for their X-ray crystallographic structures.

C2_C0025 Urea/thiourea Based Chromoionophore Colorimetric Anion Sensors Using Urea/thiourea Based Chromoionophore

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Abstract: Colorimetric anion sensors of urea (1) and thiourea (2) derivatives were successfully synthesized from a coupling reaction between m-xylylenediamine and *p*-nitrophenylisocyanate or *p*-nitrophenylisothiocyanate, respectively. Both receptors were characterized by ^{1}H-NMR, Mass spectrometry (MS) and Elemental analysis (EA). Complexations of 1 and 2 with various anions, $H_2PO_4^-$, HSO_4^-, F^-, Cl^-, Br^-, I^- and NO_3^-, were investigated. The results from ^{1}H-NMR titration showed that the compound binds $H_2PO_4^-$ over other anions ($H_2PO_4^-$ >>Cl^- >>>NO_3^-, HSO_4^-, Br^-, I^-). Color change tests with various anions for chromogenic anion sensor resulted in selectivity of F^- over $H_2PO_4^-$, Cl^-, Br^-, I^- and NO_3^- in DMSO. A distinct color change was observed from light yellow to orange upon addition of F^- to the solution of 1 and 2 in DMSO. 1 and 2 can be applied as naked eye sensor for F^-.

C2_C0030 Studies on High Purity Silica from Rice Husks in Phitsanulok

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Abstract: In this research, high purity silica, which was obtained from rice husk in Phitsanulok province, was investigated. These samples were calcined at 500-900 °C for 4 hours. Silica in the calcined powder had been investigated as a function of calcination temperature by a X-ray diffraction technique. The obtained product was amorphous phase. The morphology of the calcined powder was determined by scanning electron microscopy (SEM). The result showed that particle was agglomerated and basically irregular in shape. The purity of silica powder was analysed by atomic absorption spectrophotometry. From the result, it was shown that the purity of this silica powder was 99.14-99.79 %.

C2_C0036 Spectrophotometric determination of the complex formation of the colored ligand curcumin and metal ions

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Abstract: The formation of complexes between the curcumin with Hg(II) and Cu(II) was studied in methanolic media by means of spectrophotometry. Owing to their highly colored property, curcumin solutions usually show an absorption band in the visible region. This absorption will disturbs investigation of the complex absorption if ligand and complex have the same absorption region and overlap. To solve this problem the ligand absorption is eliminated numerically to a base line. Consequently, the complex formation was studied using the continuous variation and mole-ratio methods. The resulting stoichiometry for curcumin to Hg(II) and Cu(II) from both methods were 1:1 and 2:1, respectively. Curcumin uses the β-diketone moiety as the binding site with metal ions. This is supported by comparing the reaction patterns of curcumin, acetylacetone, ferulic acid, and vanillin.

C2_C0041 SYNTHESIS OF CERIA POWDER FROM ORGANO-METALLIC COMPLEX VIA ONE POT PROCESS FOR AN APPLICATION AS AN ELECTROLYTE MEMBRANE IN SOLID OXIDE FUEL CELL

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Abstract: The organo-metallic complex of cerium was successfully prepared via the One Pot process. On the basis of mass spectroscopy, the complex was proposed to be monometallic species consisting of one TEA group per metal ion or a monometallic species consisting of one TEA group per metal ion and a nitrate group. The complex was converted to CeO_2 by sintering at 600, 800, and 1000°C for 2 h in air. Light yellowish colored powders were preliminary studied by XRD.

C2_C0042 Complexing Properties of Phenolic Diazacrown Ether Derivatives towards Lanthanide Metal Ions

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Abstract: Complexation between phenolic diazacrown ethers (1 and 2) and 11 lanthanide metal cations (La^{3+}, Ce^{3+}, Pr^{3+}, Nd^{3+}, Sm^{3+}, Eu^{3+}, Gd^{3+}, Tb^{3+}, Dy^{3+}, Ho^{3+} and Er^{3+}) has been studied in methanol using UV absorption spectrophotometry. All the systems studied showed both ML_2 and ML formation, except that of 2 with Sm^{3+} where only ML_2 complex was found. Both ligands formed the least and the most stable complexes with Ho^{3+} and Er^{3+}, respectively. Alkoxy derivative 1 possesses higher affinity for a given metal ion than does alkyl derivative 2. The variation in stability constants is also more obvious in complexes of 1. These could be ascribed to the presence of alkoxy donor groups, which should play an important role in the complexation process.

C2_C0054 APPLICATION OF NICKEL ALUMINATE AS A SOLID SUPPORT OF PALLADIUM CATALYST FOR HYDROGENATION REACTION IN MICROREACTOR

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Abstract: The organometallic complex prepared via one pot process from the reaction of nickel nitrate, aluminium hydroxide and triethanolamine can be used as a starting material or a precursor to prepare nickel aluminate spinel. The precursor was converted to nickel aluminate by pyrolyzing at 1000°C for 5 h. Nickel aluminate spinel as a solid support for hydrogenation reaction was preliminary studied by doping palladium salt in the precursor before sintering. In addition, the study of hydrogenation reaction in microreactor indicated that nickel aluminate prepared by this method can be used as a solid support for palladium as well as commerical Pd/carbon powder which was previously reported elsewhere.

C2_C0078 DEGRADATION OF METHYLENE BLUE BY IMMOBILIZED TITANIUM DIOXIDE

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Abstract: A new and effective method for the preparation of immobilized titanium dioxide (Immo-TiO_2) thin films is presented. This method is simple and low cost based on the use of commercials TiO_2 powder directly mixing with latex and distilled water. The characterization of surface morphology of both Immo-TiO_2 pure anatase (A) and Immo-TiO_2 degussa P25 (B) are monitored by scanning electron microscopy (SEM) technique. The results, (A) is shown small grains with dense structure and well surface coverage more than (B) are observed. Their photocatalytic activities are also evaluated using methylene blue (MB) as a model organic compound. The photocatalytic experiments demonstrated that the MB in aqueous solution is photodegraded by these Immo-TiO_2 under UV light irradiation. Comparing with commercials TiO_2 powder (pure anatase and degussa P25) it was found that the efficiencies of photocatalytic degradation of MB fall in the order : degussa P25 > pure anatase > A > B.

C2_C0079 VOLTAMMETRIC STUDY OF meso-TETRA(p-CARBOXYPHENYL) PORPHYRIN MODIFIED CARBON PASTE ELECTRODE AS A CHEMICAL SENSOR

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Abstract: Chemical modified electrode (CME) was prepared by incorporating meso-tetra(p-carboxyphenyl) porphyrin as the modifier in the carbon paste body and its responses to a number of metal ions were studied by cyclic voltammetry and differential pulse voltammetry. The fabricated CME showed a good promise as a copper ion sensor because the electrode reaction of Cu(II) ion appeared at much lower potential than other studied metal ions (e.g. Al(III), Cd(II), Co(II), Fe(III), Ni(II), Pb(II) and Zn(II)). Accumulation and stripping techniques coupled with changing electrolyte medium can enhance sensitivity and selectivity of this sensor.

C2_C0100 pH-DEPENDENT STRUCTURES OF MAGNESIUM(II) DICARBOXYLATE

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ABSTRACT: The coordination chemistry of magnesium(II) with cis-9,10-dihydro-9,10-ethanoanthracene dicarboxylate and *trans*-9,10-dihydro-9,10-ethanoanthracene dicarboxylate was investigated in different pH conditions. Magnesium(II) dicarboxylate complexes were characterized by X-ray crystallography, IR, TGA, DSC and CHN. Two main parts will be carried

out: (i) the comparison of crystal structures obtained at pH 1, 7 and 10 to study the pH-dependent structures of magnesium(II) dicarboxylate, and (ii) the determination of conformations by the DFT methods. The obtained crystal structures show that at pH 7 the complex is mostly stabilized by a network of H-bonds and van der Waals interactions in which Mg(II) ion is bound to six water molecules at the inner coordination and four water molecules at the outer coordination. At pH 10, the magnesium cation interacts directly with two carboxylate groups from different molecules and forms an indefinite polymeric network. At pH 1, the isomerization to *trans*-9,10-dihydro-9,10-ethanoanthracene dicarboxylic acid was formed and there were no magnesium(II) ions in the crystal structure.

C2_C0101 The Chemistry of Nickel-Catalyst complexes

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Abstract: Nickel-catalyst has been intensively used in the cross-coupling reaction. This work focuses on the synthesis of $[Ni(PPh_3)_2X_2]$ (X = Cl, Br, I and SCN), under nitrogen atmosphere, providing a better yield (68-90%) than the previous reports.[1] The reaction of $[Ni(PPh_3)_2X_2]$ with sodium nitrite leads to the substitution of one halide by NO, whereas, the reaction between $[Ni(\eta\text{-}C_5H_5)_2]$ and $[Ni(PPh_3)_2X_2]$ provides two mole fractions of $[Ni(PPh_3)X(\eta\text{-}C_5H_5)]$, compared with the starting materials. Both $[Ni(PPh_3)_2X(NO)]$ and $[Ni(PPh_3)X(\eta\text{-}C_5H_5)]$ are air-stable and have been characterized by IR, NMR and UV-Visible spectroscopy techniques. The electrochemisty and catalytic abilities of the synthesized nickel catalytic complexes are being investigated.

C2

C2_C0102 Effect of amount of Sb_2O_3 on properties of the manganese-soda-lime-lead-alumino-silicate glass

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Abstract: In this study, effect of amount of Sb_2O_3 on optical property of the manganese-soda-lime-lead-alumino-silicate glass was investigated by UV-visible absorption technique. It was found that the UV-visible absorption spectra and the oxidation number of manganese in glasses depended on the amount of Sb_2O_3. With an adding Sb_2O_3, manganese existing in the glass is colorless Mn (II). On the other hand, if the glass was prepared without an adding Sb_2O_3, manganese presenting is pink to purple colorant of Mn (III). These results may help us to develop better understanding on the color of manganese oxides in these glasses.

C2_C0104 Effect of Bi_2O_3, TiO_2, PbO_2 and BaO on properties of the cobalt-soda-lime-alumino-silicate glass

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Abstract: Effect of Bi_2O_3, TiO_2, PbO_2 and BaO on optical properties of the cobalt-soda-lime-alumino-silicate glass was investigated by UV-visible technique. It was found that the UVA transmittance of these glasses depended on type of an adding metal oxide. Efficiency of UVA protection of the glass doped with Bi_2O_3 is higher than TiO_2, PbO_2 and BaO, respectively. In addition, a characteristic visible-absorption spectra of these glasses did not significantly changed by addition of different a doped metal oxide as Bi_2O_3, TiO_2, PbO_2 and BaO.

C2_C0107 SYNTHESES AND STRUCTURES OF TWO ORGANIC-INORGANIC HYBRID ZINC VANADATES: [Znlm4]V2O6 and Zn(lm)(lm)-VO3

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Abstract: The hydrothermal crystallization reactions of Zn(OAc)2, V2O5, N2C3H5, and H2O at 110 °C for 2 day. We have synthesized two new zinc vanadates related with one-dimensional vanadium oxide chains of corner-sharing tetrahedra under varying concentration of N2C3H5. [Znlm4]V2O6, 1, which contain zinc coordination complex non-covalently linked through anionic infinite vanadium chains. Zn(lm)(lm)- VO3, 2, is built up from zigzag vanadium chains covalently bound {ZnN3O} tetrahedra which two lm- ligands as organic linker to another zinc site into network structure (shown in Fig).
Crystal data are as follows: 1, orthorhombic, space group Pbca with a = 20.659(2) Å, b = 9.767(1) Å, c = 9.836(1) Å, V = 1984.6(3) Å3, Z = 18, T = 100(2) K, Dcal = 2.005 Mg/m3, R(Rw)= 0.0245(0.0377); 2, triclinic, space group P-1 with a = 9.492(2) Å, b = 10.156(2) Å, c = 20.588(5) Å, α = 8.730(4)°, β = 84.974(5)°, γ = 87.099°, V = 1966.7(3) Å3, Z = 18, T = 100(2) K, Dcal = 2.422 Mg/m3, R(Rw)= 0.0823(0.1081). Infinite vanadium chains of 1 projection Layer structure of 2 projection

down (100) down (010)

C2_C0108 HYDROTHERMAL SYNTHESIS OF ORGANICALLY MODIFIED METAL VANADATE COMPOUNDS

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Abstract: Metal-organic hybrid materials are of interest for materials science. These materials combine metal and organic parts in the same structure leading to the possibility of designing structures and properties. Therefore, methods of synthesis for this type of material are valuable research. This work studies the synthesis of organically modified main group metal vanadate compounds using the hydrothermal synthesis technique. Main group metals used in this work are tin and arsenic. Organic modifiers used are diaminopropane, ethylenediamine, and piperazine. The products formed were characterized for organic part using FT-IR. Morphology, heavy element composition, and X-ray diffraction studies were done by SEM/EDX, and XRD, respectively. Synthesis parameters such as mole ratio of starting materials, pH, temperature, reaction time, and aging time play an important role to both chemical and physical properties of the products formed.

C2_C0124 Preparation AND characterization of MCM-41 and Al-MCM-41 from rice husk silica

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Abstract: Silica (SiO_2) was prepared from rice husk by refluxing with 3M hydrochloric solution at 60 °C for 3 h. The acid-leached husk was filtered, washed, dried and calcined at 500 °C for 6 h. The white ash powder was characterized by X-ray diffraction (XRD) and X-ray fluorescence (XRF). It was found that the ash contained of amorphous silica 98.5% and small amounts of inorganic compounds. After that the rice husk silica was used as silica source for the synthesis of MCM-41 by hydrothermal method and further modified by addition of aluminiun with Si/Al ratio of 100, 75, 50 and 25 to increase acidity with direct sol-gel methods. The MCM-41 and Al-MCM-41 were characterized by XRD, TEM, and TGA. The XRD peak intensity MCM-41 and Al-MCM-41 decreased with aluminum increased and MCM-41 showed an ordered structure characteristic of a regular hexagonal array.

C2_C0128 GREEN FABRICATION OF NANOPARTICLES ON CLEAR VERMICELLI.

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Abstract: The green method was developed for synthesis of silver and gold nanoparticles by using vermicelli as templates/ stabilizing agents and used β-D-glucose as reducing agent. The results illustrated the formation of silver and gold nanoparticles inside the vermicelli templates. The nanoparticles prepared in this way appear to be heterogeneous sizes. The UV/Vis spectroscopy, X-ray diffraction (XRD), transmission electron microscopy (TEM), and scanning electron microscopy (SEM) techniques were employed to systematically characterize Ag and Au nanoparticles synthesized.

C2_0145 Chelating ligands effect on Ni β-diketonate complexes

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Abstract: The reaction between [Ni(acac^R)$_2$](R = dbm and tmhd) and the chelating ligands (L-L = phen, 2,2′-bipy, dmae, dppe and dppm) yields a series of monomeric Ni(II) complexes, [Ni(acac^R)$_2$(L-L)]. The complexes have been characterized by CHN analysis, IR, UV-Vis and mass spectroscopy. X-ray structural studies of [Ni(dbm)$_2$(dmae)] and [Ni(dbm)$_2$(phen)] show that the nickel has an octahedral coordination geometry. In the structures the β-diketonate ligands exhibit a cis-arrangement, with the metal-diketonte chelate ring in a boat conformation.

C2_C0147 SYNTHESIS AND MOLECULAR STRUCTURE OF [Ru(Clazpy)$_2$phen](PF$_6$)$_2$.

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Abstract: The [Ru(Clazpy)$_2$phen](PF$_6$)$_2$ (Clazpy = 5-Chloro-2-(phenylazo) pyridine, phen = 1,10-phenanthroline) complex was synthesized by replacing two chlorides in [Ru(Clazpy)$_2$Cl$_2$] with phen in methanol. This complex was characterized by spectroscopy and the structure was confirmed by single-crystal X-ray diffraction technique. Result from X-ray data showed that the coordination geometry of ruthenium is distorted octahedral which was coordinated to six nitrogen atoms from one phen and two Clazpy ligands. The average bond distances of Ru-N(py) and Ru-N(azo) from Clazpy are shorter than Ru-N(py)

distances from phen. This indicated that Clazpy is a stronger π-acceptor than phen.

C2_C0155 EFFECT OF SUPERSATURATION AND POLYELECTROLYTE ON SODIUM BARIUM ARSENATE NONAHYDRATE PRECIPITATION

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Abstract: PEUF has been shown to be useful for removal of low concentration arsenic from drinking water. This process uses a cationic polyelectrolyte, PDADMAC, to form polyelectrolyte-arsenate complex. Then, ultrafiltration is used to separate the polyelectrolyte-arsenate complex and pure water. To make the PEUF process more economic, it is necessary to reuse the polyelectrolyte via an easy and inexpensive technique such as precipitation. The crystal properties such as morphology, size, and aggregation are significant parameters for precipitation process design. This research studies the effect of supersaturation and polyelectrolyte on sodium barium arsenate nonahydrate precipitation. Precipitation at different supersaturation and PDADMAC conditions results in changes of crystal properties of the product.

C2_C0165 SYNTHESIS OF THE [Ru(5mazpy)$_2$(azpy)](NO$_3$)$_2$.4H$_2$O COMPLEX AND BINDING TO DNA

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Abstract: The [Ru(5mazpy)$_2$azpy](NO$_3$)$_2$.4H$_2$O (5mazpy = 5-methyl-2-(phenylazo)pyridine, azpy = 2-(phenylazo)pyridine) has been synthesized and characterized by elemental analysis, IR and UV-Visible absorption spectroscopy. The interaction of this complex with calf thymus DNA was studied by spectroscopic method.

C2_C0175 Preparation of nano-LaCoO$_3$ perovskite by sol-gel methods: the Pechini and Schiff base complex

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Abstract: Nano-LaCoO$_3$ was prepared by sol-gel method using the Pechini (PC) and Schiff base (SB) complex. The resulting powders were characterized by fourier transform infrared spectroscopy (FTIR) and x-ray diffraction (XRD). The formation of monophase LaCoO$_3$ and the crystallite sizes of 12-13 nm took place upon calcination at 773 K for 8 hours. IR spectroscopy revealed the presence of Co–O bond typical of LaCoO$_3$ structure. DRIFTS study of the toluene oxidation on PC and SB-LaCoO$_3$ showed that the small-sized perovskites without impurity performed the best. LaCoO$_3$ prepared by sol-gel method using the Schiff base complex performed higher catalytic activity than that prepared by the Pechini.

C2_C0178 SYNTHESIS OF PORPHYRIN AND PYRIDYLPORPHYRIN METAL COMPLEXES

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Abstract: Tetraarylporphyrins carrying the 4-pyridyl (Py) and phenyl (P) groups at meso-positions have been synthesized and characterized by various spectroscopic methods. Among the porphyrins prepared 5,10,15,20-tetraphenylporphyrin (TPP) and 5-(4-pyridyl)-10,15,20-triphenyl porphyrin (MPyTPP) have shown to form complexes with many metal ions. These transition metal ion complexations were accomplished by the reactions of TPP and MPyTPP with acetate salts of Mn(II), Co(II), Ni(II), Cu(II), Zn(II), and chloride salt of Fe(III) in organic solvents, either chloroform or dimethylformamide. ^{1}H NMR measurements of all these synthesized metalloporphyrins revealed that a signal of internal N-H protons within the inner core of porphyrin rings at -2.80 ppm was absent, supporting the replacements of these protons by metal atoms. UV-Visible spectra showed that the four Q-bands of the free porphyrin base reduced to two peaks upon complexations. Finally, the corresponding molecular weight of the complexes were confirmed by MALDI TOF-MS technique.

C2_C0195 INFLUENCE OF TEMPLATE TYPE AND pH ON PROPERTIES OF NANOCRYSTALLITE ZSM-5

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Abstract: Influence of type of the templates and pH of gel on the synthesis of particle size and crystallite size of ZSM-5, MFI structure zeolite, was investigated. Tetrapro-pylammonium bromide and tetrapropylammonium hydroxide were used as templates in preparing ZSM-5 at the ratio of Si/Al in gel of 20 and pH of 10.5. The appropriate gel was

crystallized at 170°C for 4 days. The solid obtained was washed, dried overnight at 100°C, and finally calcined at 600°C for 12 h. XRD results of the calcined samples show little difference in crystallinity of ZSM-5. Using tetrapropyl ammonium hydroxide as template, the crystallinity of ZSM-5 is 80% of that using tetrapropylammonium bromide as template. SEM images show similar morphology of the zeolite samples but the significant decrease in particle size from 4.0 μm to 2.0 μm upon changing the template from tetrapropylammonium bromide to tetrapropyl ammonium hydroxide. With reducing the pH of gel in the range from 10.5 to 9.0, the particle size increases from 2 to 14.7 μm, respectively, and the crystallinity increases as well. By applying Scherer's equation to the most intense XRD peak, the crystallite size of ZSM-5 increases from 33 to 54 nm with decreasing the pH of gel from 10.5 to 9.0.

C2_C0204 LIGAND EXCHANGE REACTION OF COBALT(III) COMPLEX BY POLYETHYLENEIMINE

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Abstract: Ligand exchange reactions of cobalt(III) complex of five ligands, i.e. carbonate, oxalate, glycinate, water and ammonia, by polyethyleneimine (PEI) were investigated. It revealed that carbonate, oxalate and glycinate in the coordination sphere were substituted immediately by PEI, as indicated by color change of the solution, while ammine complex of cobalt(III) remained unchanged. The blue color of aquacobalt(III) complex was disappeared within 5 minutes in the presence of PEI, however, white precipitate was observed instead of red color of cobalt(III)-PEI complex solution. In addition, absorption spectra of each complex were also recorded. Since the absorbance of oxalatocobaltate(III) complex remained constant for at least 30 minutes, therefore, it was chosen as a reactant for the study of molar ratio of cobalt(III) to PEI and the effect of pH on absorption spectrum of PEI complex. The results indicated that cobalt(III) to PEI molar ratio was 9 : 1 which corresponded to 1 : 5 of cobalt(III) to calculated nitrogen atom. This suggested that mixed ligands of water and PEI were probably coordinated to cobalt(III). The change of pH in the basic range had no effect on the shape of cobalt(III)-PEI absorption spectrum.

C2_C0207 IMPACT OF ULTRASOUND IRRADIATED GEL ON PARTICLE SIZE OF ZEOLITE BETA

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Abstract: Zeolite beta was synthesized from a freshly prepared silica xerogel mixed with aluminium isopropoxide and a solution of tetraethylammonium hydroxide, followed by hydrothermal crystallization at 135°C for 3 days. Impact of ultrasound irradiation in the gel formation step on the particle size of zeolite beta was studied. The zeolite samples were characterized by X-ray powder diffraction, scanning electron microscopy, and nitrogen sorption analysis. From XRD data ultrasound irradiation at the gel formation step did not affect the structures and crystallinity of zeolite beta. SEM images show that all beta samples with ultrasound irradiation have smaller particle size than zeolite beta prepared without ultrasound irradiation. It is obvious that the ultrasound irradiation has significant effect on particle size of zeolite beta. The specific surface area of the beta samples with ultrasound irradiation was slightly greater than that of zeolite beta prepared without ultrasound irradiation.

C2_C0209 SYNTHESIS AND CHARACTERIZATION OF ZEOLITE Y FROM RICE HUSK SILICA

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Abstract: Silica (SiO_2) powder was prepared from rice husk (RH) by refluxing with hydrochloric (HCl) acid and calcination in air. The resulting white solid which was analyzed by X-ray fluorescence spectrometry (XRF) contained approximately 98% wt SiO_2. The obtained silica was converted to sodium silicate (Na_2SiO_3) and used as silica source for the hydrothermal syntheses of Linde Type Y zeolite (Y). In addition to RH silica, commercial sodium silicate was used as a silica source for the zeolite syntheses with similar procedure in order to compare the effect of starting material to the zeolites properties. Zeolites from both silica sources were characterized by X-ray diffractometer (XRD), Brunauer –Emmentt-Teller analyzer (BET), and scanning electron microscope (SEM). The formation of zeolite frameworks were confirmed by XRD showing similar spectrum to the reference standard. Surface area from BET analysis of the zeolite from RHS was 655.58 m^2/g, while that from the commercial silica was 400.25 m^2/g. SEM micrographs of the zeolite prepared from RHS source showed only crystalline shape, but the Y zeolites that prepared from commercial silica were observed in two types of particle shapes: octahedral with beveled edge and ball of wool. However, needle amorphous agglomerates are also observed. The particles size of Y zeolite prepared from rice husk silica was ~0.6-1 μm, while that from commercial silica was ~4-8 μm.

C2_C0210 HYDRO/SOLVOTHERMAL SYNTHESIS AND CHARACTERIZATION OF ORGANIC-INORGANIC HYBRID 2-D LAYERED MANGANESE VANADATES FRAMEWORKS: $[Mn_2(Im)_6V_4O_{12}]$ AND $[Mn_2(Im)_6(DMSO)_2V_4O_{12}]$

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Abstract: 2-D layered manganese-vanadate framework structures are described. The compound $\{Mn_2(Im)_8V_4O_{12}\}$ has been synthesized by hydrothermal reaction of V_2O_5, $Mn(OAc)_2$, imidazole, and H_2O, in a molar ratio 1:2:8:400 at 110°C for 5 days under autogeneous pressure. The material crystallizes in a tetragonal system with space group $P4_2/n$ (No. 86). The structure consists of $(V_4O_{12})^{4-}$ clusters covalently attached to four $\{Mn(Im)_4\}^{2+}$ moieties via bridging oxo groups. The frameworks are a layered architecture built from a cyclic tetramer of corner-sharing tetrahedral V_4O_{12} clusters interconnected by MnO_2N_4 octahedra. In the DMSO solvothermal synthesis one imidazole ligand on each Mn atom is replaced by a DMSO ligand to give $[Mn_2(Im)_6(DMSO)_2V_4O_{12}]$ which exhibits a similar 2-D framework structure built from the same cyclic tetramer of corner-sharing tetrahedral V_4O_{12} clusters interconnected by $Mn_2O_3N_3$ octahedral. The replacement of one equatorial imidazole on Mn(II) with a covalently coordinated DMSO results in a loss of symmetry (and space group symmetry) lowering the space group to $P2_1/n$ (No. 14). In both compounds, noncovalent interactions (N–H×××O, C–H×××O, and N–H×××π) between the layers play a significant role in stabilization of the crystal structure. Further characterization of the compounds by FTIR, SEM/EDX, PXRD, TGA, and elemental analysis are also described.

C2

C2_C0218 Dinuclear oxalato-bridged copper(II) complexes containing the di-2-pyridylamine chelate ligand : synthesis, spectroscopic characterization, crystal structure and magnetic properties

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Abstract: Four dinuclear Cu(II) complexes of formulae $\{Cu_2(dpyam)_2(\mu\text{-}C_2O_4)X_2\}$ (where X = Cl **1**, Br **2**), $[Cu_2(dpyam)_2(\mu\text{-}C_2O_4)(CF_3SO_3)_2]_n$ (**3**) and $[Cu_2(dpyam)_2(\mu\text{-}C_2O_4)((CH_3)_2NCOH)_2]I_2$ (**4**) (where dpyam = di-2-pyridylamine) have been synthesized and their spectroscopic and magnetic properties characterized. The structures of **1**, **2** and **4** are made up of the centrosymmetric dinuclear $[(Cu(dpyam)(X))_2(\mu\text{-}C_2O_4)]$ and $\{(Cu(dpyam)((CH_3)_2NCOH))_2(\mu\text{-}C_2O_4)\}I_2$ units with the square pyramidal Cu(II) environment for all three compounds (τ = 0.15 (**1**) and 0.00 (**4**)). Complex 3 contains chains of dimeric $[Cu_2(dpyam)_2(\mu\text{-}C_2O_4)(CF_3SO_3)_2]$ units linked by the triflate anions with an elongated octahedral Cu(II) environment. Two copper atoms in **1-4** are linked through a bis-didentate oxalate ligand. The magnetic susceptibility measurements in the temperature range 5 to 350 K revealed a very strong antiferromagnetic interaction between Cu(II) atoms with a singlet–triplet energy gap (J) of -274 and -342 cm^{-1}, for 1 and 3, respectively, in agreement with the coplanarity of the magnetic orbitals. The structural data are discussed in relation with the magnetic properties and compared to other related complexes.

C2_C0221 SYNTHESES AND CHARACTERIZATION OF COPPER (II) COMPLEXES OF AMIDINO-O-ALKYLUREA (aOau)

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Abstract: Copper (II) complexes of amino-*O*-alkylurea (aOau), $Cu(aOau)_nX_n$ (aOau = aOmu or aOeu (mu = methylurea and eu = ethylurea); X = Cl or Br; and n = 1 or 2) were prepared from the reactions between CuX_2 and cyanoguanidine (cnge) in the 1:1 and 1:2 molar ratios in methanol and ethanol. The obtained products were analyzed by spectroscopic methods (IR, UV-visible and MS) and CHN elemental analysis. From infrared spectra of products, it is not observed the characteristic peak of C≡N group in the region of 2209-2164 cm^{-1}, confirming that alcoholysis reactions occurred to yield aOau ligands. Furthermore, mass spectra of products showed the parent ion peaks at m/z = 179$[Cu(aOmu)\text{-}H^+]^+$, 193$[Cu(aOeu)\text{-}H^+]^+$, 296$[Cu(aOmu)_2\text{-}H^+]^+$, and 324$[Cu(aOeu)_2\text{-}H^+]^+$; and m/z = 117$[aOmuH]^+$, and 131$[aOeuH]^+$. Also, results from CHN analysis correspond to the theoretical values of the expected products. The blue $[Cu(aOau)X_2]$ and the purple $[Cu(aOau)_2]X_2$ complexes gave the d-d transition bands at wavelength ~675 nm (~14.81 kK) and ~520 nm (~19.23 kK), respectively.

C2_C0222 Structural Diversities and Electronic Properties of Bis- and Tris (1,10-phenanthroline) copper (II) complexes

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Abstract: The crystal structures of four new compounds containing bis and tris(1,10-phenanthroline)copper(II) complex units; $[Cu(phen)_3](S_4O_6)(S_8)$ (1), $[Cu(phen)_3](BF_4)_2$ (2), $[Cu(phen)_2(OS_2O_7)]$ (3) and $[Cu(phen)_2(FBF_3)](BF_4)$ (4) are determined crystallographically. In 1 and 2, the Cu(II) ion is octahedrally coordinated by the three phen ligands. As a consequence of the Jahn-Teller effect and vibronic coupling, the two axial Cu-N bonds are longer than the equatorial Cu-N bonds and the CuN_6 chromophores appear to be elongated rhombic octahedral with tetragonalities (Γ) of 0.892 for 1 and 0.886 for 2. Complexes 3 and 4 consist of mononuclear units, the 5-coordinate Cu(II) environment being distorted square pyramidal (τ = 0.31) for 3 and

distorted trigonal bipyramidal (τ = 0.66) for 4. The unidentate $S_2O_8^{2-}$ anion in 3 occupies the axial position, while the unidentate BF_4^- anion in 4 is coordinated in the trigonal plane. The molecular structures and their electronic properties including IR and EPR spectra are discussed and compared to other relevant complexes based on Jahn-Teller effect.

C2_C0224 The Cu(II)-di-2-pyridylamine-azide system: Synthesis, crystal structure and magnetic properties of $[Cu_2(dpyam)_2(N_3)_2(OXO)_2]$ (OXO = O_2CH^-, $O_2CCH_3^-$, $O_2CC_2H_5^-$)

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Abstract: The di- and trinuclear Cu(II) complexes $[Cu_2(dpyam)_2(\mu1,1\text{-}N_3)_2(O_2CH)_2]$ (1), $[Cu_2(dpyam)_2(\mu1,1\text{-}N_3)_2(O_2CCH_3)_2]$ (2), $[Cu_2(dpyam)_2(\mu1,1\text{-}N_3)_2(O_2CCH_2CH_3)_2]$ (3) and $[Cu_3(dpyam)_2(\mu1,1\text{-}N_3)_2(\mu\text{-}OCOCH_3)_2(\mu\text{-}OOCCH_3)_2].2H_2O$ (4) have been synthesized and characterized by crystallographic and spectroscopic methods. Complexes 1-3 consist of a dinuclear unit in which both Cu(II) ions are bridged by azido ligands, end-on bridged, whereas 4 is a trinuclear, triply-bridged by double acetato and single azido bridges. The magnetic properties have been measured in the range from 5 to 300 K and correlate with the molecular structures. Three complexes show a medium to weak ferromagnetic exchange interactions between the Cu(II) ions dominated by the bridging azido ligands, with a singlet-triplet splitting (J) of 63.3, 63.8 and 5.1 cm^{-1}, for complexes 1, 2 and 3, respectively. However, complex 4 revealed a weak antiferromagnetic with a J value of - 10.2 cm^{-1}.

C2_C0226 Synthesis and characterization of $Pr_2Ni_{1-x}Cu_xO_4$ (x=0.15, 0.3) and $Pr_2Ni_{1-x}Co_xO_4$ (x=0.1, 0.2, 0.3).

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Abstract: The K_2NiF_4-type compounds, $Pr_2Ni_{1-x}Cu_xO_4$ (x=0.15, 0.3) and $Pr_2Ni_{1-x}Co_xO_4$ (x=0.1, 0.2, 0.3) were synthesized by modified citrate and solid-state methods. Crystal structure and the morphology of perovskite membranes were investigated by X-ray diffraction (XRD) and scanning electron microscope (SEM).The XRD patterns show that these samples have K_2NiF_4-type structure. It is observed that Pr_6O_{11} phase increased with the increasing amount of metal (Cu, Co) at B site. It is shown that $Pr_2Ni_{1-x}Cu_xO_4$ and $Pr_2Ni_{1-x}Co_xO_4$ prepared by modified citrate method have less Pr_6O_{11} phase than those obtained by solid-state method. The SEM micrographs exhibited that the perovskite membranes prepared by modified citrate method have smaller grain size than those obtained by solid state method.

C2_C0232 SYNTHESIS AND CHARACTERIZATION OF $NiAl_2O_4$ VIA SOL-GEL PROCESS

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Abstract: Nickel aluminate spinel powders were prepared by a sol-gel method using nickel aluminate spinel precursor synthesized directly from the single-step reaction of inexpensive and readily available compounds: aluminium hydroxide, nickel acetate and triethanolamine. The optimal conditions for preparation of gel were 20.0 – 32.0 %(w/v) of the precursor, at pH of 7.0 and the concentration of 16.0 %(w/v), at pH of 8.0 in iso-propanol solvent at room temperature. Heat treatment of obtained gel at 1000°C for 5 h in air produced mixed phases of nickel aluminate spinel and nickel oxide which were confirmed by X-ray diffraction technique. From SEM and BET surface area analysis, it was found that $NiAl_2O_4$ powder surface is homogenous and has slightly different surface area as compared to that directly calcined spinel precursor.

C2_C0237 TWO ISOMORPHOUS NICKEL (II) COMPLEXES CONTAINING 4,4'-DIMETHYL-2,2'-BIPYRIDINE AND PHENANTROLINE LIGANDS

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Abstarct: Two compounds of formula $[Ni(dmbpy)_3]_2(BF_4)_4\times5H_2O$, **1**, (dmbpy = 4,4'-dimethyl-2,2'-bipyridine) and $[Ni(phen)_3]_2(ClO_4)_4\times2H_2O$, **2**, (phen = phenanthroline) have been prepared by hydrothermal method. Both compounds are crystallized in monoclinic system with space group Cc: **1** a = 27.257(5) Å, b = 11 121(2) Å, c = 27.483(5) Å, α = 90.00°, β = 109.837(4)°, γ = 90.00° and R = 0.0807; **2** a = 36.7619(16) Å, b = 15.7655(7) Å, c = 12.3202(5) Å, α = 90.00°, β = 102.9000(10)°, γ = 90.00° and R = 0.0594. The asymmetric unit consists of two molecules which have different absolute configurations. One is in delta (Δ) configuration and the other is in lambda (Λ) configuration. Nickel(II) complexes, **1** and **2**, consists of distorted octahedral moiety of $[Ni(dmbpy)_3]^{2+}$ and $[Ni(phen)_3]^{2+}$, respectively. Infrared spectra support the presences of both ligands and counter ions.