temperatures, and times to find the data for kinetic of cyclization. The cyclized products were characterized by ^{1}H- and ^{13}C-NMR spectroscopies. The degree of cyclization was estimated from ^{1}H-NMR spectrum. The kinetic of cyclization was investigated. It was found that the degree of cyclization in DPNR was as a function of cyclization conditions. The rate constant (k) was 200 (s^{-1}) at 100°C based on 94% of regression. In addition, the activation energy of cyclization in DPNR latex was 147.66 kJ/mol.

E_E0011 INFLUENCE OF DWELL TIME ON LEAD ZIRCONATE TITANATE.

Chompoonuch Puchmark
Department of Physics, Faculty of Science, Naresuan University, Phitsanulok, Thailand.
E-mail: kungmic2002@yahoo.com, Fax: (6655)261000-4#3501

Abstract: The effect of dwell time on physical properties and microstructure of lead zirconate titanate ceramics ($Pb(Zr_{0.52}Ti_{0.48})O_3$: PZT) were prepared by conventional mixed oxide method. The optimum temperature for calcinations the formation of phase pure perovskite was found to be about 750 °C for 2 h with heating rate of 10 °C/min. Phase formation was examined by X-ray diffraction (XRD). The sintering procedures were carried out at 1150 and 1200 °C for 2, 4 and 6 h with heating rate of 5 °C/min. The result shown that densification and average grain sizes of PZT ceramics increased with dwell time.

E_E0012 TRIBOLOGICAL PROPERTIES OF GAMMA-TiAl WITH 800-1,000 °C NITRIDATION

Kittichai Sopunna[1], Titipun Thongtem[2] ,Michael McNallan[3] and Somchai Thongtem[2]
1 : Faculty of Science and Technology, Sakon Nakhon Rajabhat University, Sakon Nakhon 47000, Thailand.
2 : Faculty of Science, Chiang Mai University, Chiang Mai 50200, Thailand.
3 : Department of CME (M/C : 246), College of Engineering, University of Illinois at Chicago, Chicago, IL 60607-7023, U.S.A.
E-mail: ksopunna@yahoo.com, sthongtem@hotmail.com

Abstract: Ti-47Al-2Nb-2Cr(MJ12) alloy was nitrided in purified ammonia for 1 - 10 h at a temperature range of 800 - 1,000 °C. The maximum Knoop hardness(HK) value was 2.1 times of the non-nitrided alloys. The wear rate and friction coefficient were significantly reduced by the nitridation process. Wear resistance of nitrided alloys increased by two orders of magnitude after nitridation compared to the corresponding alloy without nitridation.

E_E0013 RESEARCH ON RUBBER ADDITIVES AIMED AT DECREASING THE VOLUME OF FOREIGN IMPORT

Apirak Payaka[1], Weerachai Phutdhawong[1], Waya Sengpracha[2*]
[1] Department of Chemistry, Faculty of Science, Maejo University, Sansai, Chiang Mai, 50290
[2] Department of Chemistry, Faculty of Science, Silpakorn University, Nakhonpathom, 73000
Email: waya.sengpracha@gmail.com

Abstract: Natural rubber industries continue to growth worldwide and the rubber chemicals demand increases annually. These chemicals account for rubber accelerators and antioxidants. None of these chemicals are produced in Thailand, and are all imported from overseas which resulted to a higher cost of rubber products. In this research, the syntheses of these accelerators (ZDEC, ZEBC, and ZMBT) was studied the optimum mole ratios of reactants to obtain high yields of these accelerators. The structures of the synthetic accelerators were characterized using spectroscopic techniques and X-ray crystallography. The physio-mechanical properties of the rubber prepared from the synthetic accelerators and the imported accelerators were also reported.

E_E0014 MELT FLOW INDICES OF POLYCARBONATES AND EFFECT OF SOME ADDITIVES

Tipparat Khudno, Waratchaya Tamanit, and Nitat Jira-arun *
* Department of Industrial Chemistry, Faculty of Science, Chiang Mai University, Chiang Mai 50200, Thailand
Author of correspondence, E- mail address: scici003@chiangmai.ac.th

Abstract: Melt flow index (MFI) of polymer is an important property for choosing the suitable processing method for that polymer. The objective of this research was to find the melt flow indices of polycarbonate pellets and polycarbonate from compact disc. The variables studied were load weight, percentages of two types of polycarbonate, and percentages of two additives used that were calcium carbonate and tapioca starch. The percentage of two types of additives used were in the range of 40 % by weight. From the experiments carried out at 230 °C and the load weight of 3.8 kg, it was found that MFI of polycarbonate pellets was 3.26 g/10 min while that of compact disc polycarbonate was 10.59 g/10 min. For the effect of load weights, it was found that the melt flow indices of polycarbonates tended to increase linearly when the load weight increased. For the effect of percentages of two types of polymers, the melt flow indices increased when the percentages of polycarbonate from compact disc increased. For the effect of percentages of two additives added, it was found that, in general, the melt flow indices tended to decrease when the percentages of additives increased.

E_E0015 SYNTHESIS AND DYE-SENSITIZED SOLAR CELL PERFORMANCE OF HIGH SURFACE AREA NANOSHEET TiO_2.

Sorapong Pavasupree[1,2], Supachai Ngamsinlapasathian[2], Yoshikazu Suzuki[2], and Susumu Yoshikawa[2]
[1] Department of Materials and Metallurgical Engineering, Faculty of Engineering, Rajamangala University of Technology Thanyaburi, Klong 6, Pathumthani, Thailand.

E-mail: sorapongp@yahoo.com, Fax: (662)549-3483
[2] Institute of Advanced Energy, Kyoto University, Uji, Kyoto, 611-0011, Japan.

Abstract: High surface area nanosheet TiO_2 with mesoporous structure were synthesized by hydrothermal method at 130 °C for 12 h. The samples characterized by XRD, SEM, TEM, SAED, and BET surface area. The nanosheet structure was slightly curved and approximately 50-100 nm in width and several nanometers in thickness. The as-synthesized nanosheet TiO_2 had average pore diameter about 3-4 nm. The BET surface area and pore volume of the sample were about 642 m^2/g and 0.774 cm^3/g, respectively. The nanosheet structure after calcinations were changed into nanorods/nanoparticles composite with anatase TiO_2 structure at 300-500 °C (10-15 nm in rods diameter and about 5-10 nm in particles diameter). The solar energy conversion efficiency (□) of the cell using nanorods/nanoparticles TiO_2 (from the nanosheet calcined at 450 °C for 2 h) with mesoporous structure was about 7.08 % with Jsc of 16.35 mA/cm^2, Voc of 0.703 V and ff of 0.627; while □ of the cell using commercial TiO_2 nanoparticles (P-25) reached 5.82 % with Jsc of 12.74 mA/cm^2, Voc of 0.704V and ff of 0.649.

E_E0016 MULLITE SYNTHESIS FROM WASTE

Siriporn Boonpa[1], Siriporn Larpkiattaworn[2], Pinsuda Viravathana[1]
[1] Department of Chemistry, Faculty of Science, Kasetsart University, Bangkok 10903, Thailand
[2] Thailand Institute of Scientific and Technological Research, Bangkok 10900, Thailand

Abstract: Synthesis of mullite from waste can be processed by milling aluminium hydroxide from industry waste and silica gel extracted from rice husk ash via the chemical method. Then dried and sintered at 1200, 1300, 1350, 1400 and 1500°C. The phase of sintered mullites were characterized by x-ray diffraction (XRD). The XRD pattern showed the mullite phase at the sintering temperature of 1300°C and the mullite phase increased when increasing the sintering temperature. Beside the mullite phase, the products were contaminated with the alumina phase in corundum form and the silica phase in cristobalite form.

E_E0017 A SIMPLE SYNTHESIS METHOD AND DYE-SENSITIZED SOLAR CELL PERFORMANCE OF MESOPOROUS ANATASE TiO_2 NANOPOWDERS

Ratchada Teparak[1], Sorapong Pavasupree[1, 2]
[1] Department of Materials and Metallurgical Engineering, Faculty of Engineering, Rajamangala University of Technology Thanyaburi, Klong 6, Pathumthani, Thailand.
E-mail: sorapongp@yahoo.com, Fax: (662)549-3483
[2] Institute of Advanced Energy, Kyoto University, Uji, Kyoto, 611-0011, Japan.

Abstract: Mesoporous anatase TiO_2 nanopowder was synthesized by hydrothermal method at 130 °C for 12 h. The samples characterized by XRD, SEM, TEM, SAED, HRTEM, and BET surface area. The as-synthesized sample with narrow pore size distribution had average pore diameter about 3-4 nm. The specific BET surface area of the as-synthesized sample was about 180 m^2/g, higher than the previous works (ref. 5-6, 80 m^2/g) about 2 times. Mesoporous anatase TiO_2 nanopowders (prepared by this study) showed higher photocatalytic activity than the nanorods TiO_2 (prepared as ref. 3), nanofibers TiO_2 (prepared as ref. 1-2), mesoporous TiO_2 (prepared as ref. 5-6), and commercial TiO_2 nanoparticles (P-25, JRC-01, and JRC-03). The solar energy conversion efficiency (□) of the cell using the mesoporous anatase TiO_2 was about 6.30 % with Jsc of 13.28 mA/cm^2, Voc of 0.702 V and ff of 0.676; while □ of the cell using P-25 reached 5.82 % with Jsc of 12.74 mA/cm^2, Voc of 0.704 V and ff of 0.649.

E_E0018 INVESTIGATION INTO THE PROPERTIES OF POLYPROPYLENE BLENDED WITH NATURAL RUBBER

Chuntip Kumpuantip, Suttipan Pavasupree, Jakrawut Tansura and Wattanasak Sawedtasakrawpan
Department of Materials and Metallurgical Engineering, Faculty of Engineering, Rajamangala University of Technology Thanyaburi, Klong 6, Pathumthani, Thailand
E-mail:chuntip_k@rmut.ac.th, Fax: (662)549-3483

Abstract: This research purposed to investigate the properties of the polymer blends between propylene (PP) and natural rubber (NR). The natural rubbers (NR) grade STR20 was blended with the polypropylene block copolymer (POLENE 2500H) and the polypropylene random copolymer (POLENE 3200H) in various components between 0 to 60 % by weights. The NR and PP were blended by the two-roll mill after that the blends were compressed by using the compression molding machine. The physical properties, mechanical properties and morphology of the blends were investigated. It was found that the there was no effect of the NR on the density of the polymer blends. The elastic modulus and tensile strength of the polymer blends were decreased when the NR contents were increased. The non-homogeneous between of NR and PP phase were observed by using SEM techniques. The hardness of the polymer blends slightly decreased with the NR contents.

E_E0019 PERVAPORATION SEPARATION OF ETHANOL/WATER MIXTURES USING NATURAL RUBBER-POLY(ACRYLIC ACID) SEMI-INTERPENETRATING POLYMER NETWORK MEMBRANES

Nuchjarin Kongchana, Paveena Khansawai, Choosak Poonsawat, Chaiwat Ruksakulpiwat, Sittipong Amnuaypanich
Department of Chemistry, Faculty of Science, Khonkaen University, Khon Kaen 40002, Thailand.

Abstract: A series of natural rubber (NR) - poly(acrylic acid) (PAA) semi-interpenetrating polymer network (semi-IPN) membranes were prepared. The swelling behavior of these membranes in ethanol-water solutions and their pervaporation

separation were investigated. The degree of swelling increasing with increasing PAA content and the gel content decreasing. These hydrophobic-hydrophilic membranes were used for pervaporation separation of ethanol-water mixture. The permeate flux and separation factors were determined over a wide range of ethanol concentration in the feed mixture and for various temperatures. It was found that NR-PAA semi-IPN membranes had water sorption selectivity between between 0.71 and 78.12, respectively, depending on the feed composition and PAA content in NR-PAA semi-IPN membranes.

E_E0020 Effects of Vulcanization Temperature on the Properties of Zeolite Filled Natural Rubber

Montip Lawsuriyonta and Chuntip Kumnuantip
Department of Materials and Metallurgical Engineering, Faculty of Engineering, Rajamangala University of Technology Thanyaburi, Klong 6, Pathumthani, Thailand
E-mail: montip_l@rmut.ac.th, chuntip_k@rmut.ac.th, Fax: (662)549-3483

Abstract: This research purposed to investigate the effects of vulcanization temperature and zeolite loading on the NR vulcanisate properties. The natural rubber (NR) grade STR20 was used in this study. The NR was loaded with zeolite in various components between 0 to 200 phr. The NR and zeolite were compounded by the two-roll mill after that they were vulcanized in the compression molding machine on 140 °C and 160 °C. The physical and mechanical properties were investigated. The results under the tested conditions suggested that, there was no effect of the vulcanization temperature on the physical and mechanical properties of the vulcanisates. The 140 °C vulcanization temperature exhibited more effective of the zeolite as flame retardant in the natural rubber than the 160 °C vulcanization temperature.

E_E0021 POWDER INJECTION MOULDING OF WC-Co HARDMETAL USING A PEG/PMMA BINDER

Nutthita Chuankrerkkul[1], Hywel A. Davies[2] and Peter F. Messer[2]
[1] Metallurgy and Materials Science Research Institute, Chulalongkorn University, Soi Chula 12, Phayathai Road, Bangkok 10330, Thailand.
E-mail: nutthita@hotmail.com
[2] Department of Engineering Materials, University of Sheffield, Mappin Street, Sheffield, S1 3JD, United Kingdom.

Abstract: Powder injection moulding (PIM) involves several steps, including feedstock preparation by mixing the powder with a removable binder, injection moulding of the mixture, debinding and sintering. A binder system, which comprises a major fraction of polyethyleneglycol (PEG) and a minor fraction of a very finely dispersed polymethylmethacrylate (PMMA), has been applied for tungsten carbide (WC) - cobalt (Co) hardmetal powders. PEG can be removed rapidly by water leaching and PMMA is removed by subsequent pyrolysis when the components are ramped up to the sintering temperature. In this work, studies have been made to gain an understanding of how the binder constituents interact with the WC and Co. The development of feedstock formulations and of the process parameters for a successful injection moulding and to achieve high density have been investigated. The present study has demonstrated that the binder can be employed for the production of WC-Co components by PIM process. The maximum density achieved thus far is 97% of the theoretical value.

E_E0022 Effects of Film Morphologies on Efficiency of Organic Light Emitting Diode (OLED) Devices

Sawanya Janput[1], Nongluck Houngkamhang[1], Rakchart Traiphol[1*], Toemsak Srikhirin[2], Teerakiat Kerdcharoen[2], Tanakorn Osotchan[2]
[1] Department of Chemistry, Faculty of Science, Naresuan University, Phitsanulok 65000, Thailand and [2]Department of Physics, Faculty of Science, Mahidol University and Center of Nanoscience and Nanotechnology, Faculty of Science, Mahidol University, Rama 6 Road, Ratchathewi, Bangkok 10400, Thailand
* Corresponding author e-mail: rakchartt@nu.ac.th

Abstract: Our research investigates the efficiency of OLED devices fabricated by using poly[2-methoxy, 5-(2'-ethylhexoxy)-*p*-phenylene vinylene] (MEH-PPV) as an emitting layer. Morphologies of the polymer films are controlled by using different solvents. We have found that preparation of the film by using solution in chloroform provides quite smooth surface. In contrast, the films prepared by using solutions in toluene and pyridine exhibit surfaces with relatively high roughness. This is attributed to the collapse of the polymeric chains in these solutions. The efficiency of the OLED devices, fabricated by using the solutions in these solvents, is compared by means of current-voltage curve, luminescence intensity as well as electroluminescence spectra. The results indicate that film morphology is an important factor affecting properties of OLED devices.

E_E0023 Effects of Solvents on Morphologies and Photophysics of Thin Films of Conjugated Polymer

Nongluck Houngkamhang, Sawanya Janput, Nipaphat Charoenthai, Rakchart Traiphol*
Department of Chemistry, Faculty of Science, Naresuan University, Phitsanulok 65000, Thailand
*Corresponding author e-mail: rakchartt@nu.ac.th

Abstract: This research investigates the morphology and photophysics of thin films of poly[2-methoxy, 5-(2'-ethylhexoxy)-*p*-phenylene vinylene] (MEH-PPV) by utilizing a combination of atomic force microscopy (AFM) and fluorescence spectroscopy. The conformation of isolated chains and interchain aggregation of MEH-PPV in solutions are controlled by tuning local polymer-solvent interactions. The main chain is extended in chloroform while it adopts collapsed conformation in toluene and pyridine. The interchain aggregation is induced by addition of a poor solvent, cyclohexane, into the polymer solutions of these solvents. The degree of aggregation is controlled by adjusting ratio of the added poor solvent. Films prepared by self-assembling from these solutions exhibit varieties of surface morphologies, which is correlated to chain conformation in solutions. The

measurements of photoluminescence of these films indicate that individual chain conformation affects photophysics of the films.

E_E0024 THE EFFECT OF SINTERING ON TL PROPERTIES OF LIF SINGLE CRYSTALS.

Associated Professor Jintana Laopaiboon,
Associated Professor Raewat Laopaiboon, Miss. Lumpoon Ooxoon.
Physics Department, Faculty of Science, Ubon Rajathanee University,34190,Thailand.

Abstract: The glow curve structure and sensitivity of low purity LIF (Riedel-de Haen) single crystal, grown by Bridgeman-Stockbager technique with various sintering temperatures were investigated for the improvement of glow curve structure and sensitivity of TL detector. It was found that low purity of single crystal show TL glow curve with 2 peaks, 150 and 300 °C. For 300-800°C sample sintering , peak 300°C decreased by increasing the sintering temperature until eliminated at 750°C. The optimum sintering temperature was 750°C for 6 hr., show the stable main glow peak and highest sensitivity. The repeatability of 5 time by 240°C 10 min. pre-irradiation annealing before expose X-ray dose measurement show the standard deviation less than 16 % for 6 detectors . This presented that sintered low purity and undoped LIF single crsytal can be used for radiation protection dosimetry applications.

E_E0025 SYNTHESIS OF COPOLYURETHANE-UREAS CONTAINING NICKEL AND ZINC 4,4´-DIHYDROXYSALTRIEN COMPLEXES IN THE PRESENCE OF DIALCOHOLS OR DIAMINES

Prakaywan Tachaprasertporn[1], Nuanphan Chantarasiri[2]
[1] Program of Petrochemistry and Polymer Science, Faculty of Science, Chulalongkorn University, Bangkok 10330, Thailand. e-mail address: pukka_cool@hotmail.com
[2] Supramolecular Chemistry Research Unit, Department of Chemistry, Faculty of Science, Chulalongkorn University, Bangkok 10330, Thailand.

Abstract: Synthesis of copolyurethane-ureas containing nickel and zinc 4,4´-dihydroxysaltrien complexes in the presence of dialcohols or diamines were done by polymerization of 4,4´-dihydroxysaltrien metal complexes (ML,Where M = Zn and Ni) 4,4´- methylenebis(phenyl isocyanate) (MDI) and various diamines or diols. The diamines used were methylenedianiline and hexamethylenediamine. The diols employed were bisphenol A and 1,6-hexanediol. Dibutyltin dilaurate (DBTDL) was used as a catalyst. The polymers were characterized by using IR, NMR, solubility and viscosity measurement. Thermal properties were determined by thermogravimetric analysis (TGA) and differential scanning calorimetry (DSC). Flammability of polymers was studied by measuring limiting oxygen index (LOI). It was found that copolyurethane-ureas showed high thermal stability and good solubility.

E_E0026 KINETIC STUDIES OF THE RING-OPENING BULK POLYMERIZATION OF å–CAPROLACTONE BY DILATOMETRY

Achara Kleawkla, Robert Molloy, Wimol Naksata, Winita Punyodom
Biomedical Polymers Technology Unit, Department of Chemistry, Faculty of Science, Chiang Mai University, Chiang Mai, Thailand 50200.
E-mail address: achara_kleawkla@yahoo.co.uk

Abstract: Dilatometry is the technique most often used for studying the kinetics of polymerization by following the volume change which accompanies polymer formation. In this work, the kinetics of the ring-opening bulk polymerization of å-caprolactone at 140 °C using 0.1 mol % stannous hexoxide as a novel initiator were studied. After a prolonged induction period, the results showed a close adherence to first-order kinetics with respect to monomer with a first-order rate constant, k_1, of 4.00×10^{-2} min^{-1}.

E_E0027 THE PREPARATION OF CARBON BLACK MASTERBATCH FROM LATEX STATE USING FIELD LATEX

Jaran Phumnok, Suwit Madsaw, Kasuma Hinawaharna
Rubber and Polymer Technology Department, Science and Technology Faculty,
Songkhla Rajabhat University, Songkhla, THAILAND;
Email address: jaran@skru.ac.th

Abstract: In this reseach, the preparation of carbon black masterbatch rubber from latex state by field latex using was studied. The effect of coagulant type on carbon black masterbatch rubber's preparation and its properties was investigated. The result was show that the formic acid can coagulate the mixing of carbon black and field latex better than the calcium chloride solution that are the concentration of formic acid less than the concentration of calcium chloride solution and yield the shorter coagulation time. The 35% formic acid concentration and 5 minute can completely coagulate the oil and field latex mixing. The carbon black masterbatch which coagulated by formic acid yield the difference torque, scorch time, vulcanization time, modulus tensile strength and elongation at break better than calcium chloride solution using. In comparison, the rubber compound was prepared from the latex state carbon black masterbatch to compare with the rubber compound which prepared from dry state, the results was found that the energy consumption in mixing step of the rubber compound using latex state carbon black masterbatch less than the rubber compound from dry state. While the rubber from two method give very close physical properties.

E_E0029 DEVELOPMENT A MULTISCALE MOLECULAR MODELING METHOD TO STUDY POLYMERIC MATERIALS : POLYETHYLENE OXIDE SYSTEM

Visit Vao-soongnern*
School of Chemistry and Laboratory of Computational and Applied Polymer Science (LCAPS), Institute of Science, Suranaree University of Technology, Nakhon Ratchasima, Thailand. E-mail: visit@sut.ac.th, Fax: 04-4224-185

Abstract: The development of computational methods for predicting structures and properties of polymers from chemical constitution calls for hierarchical strategies, capable of addressing the broad spectra of length and time scales governing the behavior of these materials. This work present a recently developed strategy that has used a method where an atomistic chain is mapped onto a coarse-grained model and then reverse-mapped back to a fully atomistic system. Polyethylene oxide (PEO) model which each bead represents series of linked vectors connecting the CH_2CH_2 and CH_2O units was constructed. Interaction energies were derived from the Rotational Isomeric State (RIS) model of PEO in which the statistical weights was parameterized from an *ab initio* quantum chemistry calculation. A bulk simulation is performed with a dynamic Monte Carlo procedure to equilibrate the structure. Then, energy minimization was performed, thereby generating an off-lattice replica in continuous space. Properties include material cohesive energy densities, radial distribution, conformational distribution and Neutron scattering curves were reported. Most calculated properties are comparable to reported experimental values.

E_E0030 Growth of $Na_xCo_2O_4$ Whisker Crystals by Annealing Method

Tosawat Seetawan[1], Ken Kurosaki[2], Shinsuke Yamanaka[2]
[1] Program of Physics, Sakon Nakhon Rajabhat University, 680 Nitayo Road, Muang District, Sakon Nakhon 47000, Thailand
[2] Division of Sustainable Energy and Environmental Engineering, Graduate School of Engineering, Osaka University, 2-1 Yamadaoka, Suita, Osaka 565-0871, Japan

Abstract: The $Na_xCo_2O_4$ whisker crystals were grown from the pellet samples by annealing at high temperature in air. The phases of the whiskers correspond to the peaks of $NaCo_2O_4$ standard (JCPDS cards number 73-0133). The average chemical compositions of the whiskers are $Na_{1.0}Co_{2.0}O_{4+\delta}$. The $Na_{1.0}Co_{2.0}O_{4+\delta}$ whiskers are 50 μm at the widest, reach lengths of as much as 1.0 mm and 1.0-10.0 μm in thickness. Microstructural observations indicates that the growth points of the whiskers are their bases.

E_E0031 HYDROGEL PREPARED FROM RADIATION-INDUCED CROSSLINKING OF CARBOXYMETHYL STARCH

Kasinee Hemvichian, Phiriyatorn Suwanmala, Wannee Srinuttrakul and Manit Sonsuk
Chemistry and Material Science Research Program, Office of Atoms for Peace, 16 Vibhavadi Rangsit Road, Chatuchak, Bangkok, 10900 Thailand
E-mail: kasineeh@yahoo.com

Abstract: Cassava starch (CS) was chemically modified by sodium monochloroacetate (SMCA) to yield carboxymethyl starch (CMS). The degree of substitution (DS) increased with increasing percentage of SMCA. The aqueous solution of CMS was irradiated and underwent radiation-induced cross-linking, resulting in a cross-linked CMS (XLCMS) hydrogel. The swelling ratio and the gel fraction of the obtained hydrogels were determined. The results indicated that the optimum condition for obtaining hydrogels with desirable properties is irradiation at low dose. At higher doses, the gel fraction tends to diminish, due to the domination of degradation over cross-linking.

E_E0032 Preservation of Natural Rubber Latex Using Ammonia, Zinc Diethyl Dithiocarbamate and soap 1* 1

Saovanee Kovuttikulrangsie, Nattapong Nithi-U-thai1 and Pikul Kongkawl
Department of Rubber Technology and Polymer Science, Technology, Prince of Songkla University, Pattani. 90400 Thailand; e-mail address: ksaovane@bunga.pn.psu.ac.th

Abstract: The commercial preserved of natural rubber latex with 0.20% NH_3 and 0.025% TMTD/ZnO was found that TMTD has an N-nitrosamies compound can caused cancer. Therefore, Zinc diethyldithiocarbamate (ZDC) together with 0.20% NH_3 and three different types of soaps (Potassium laurate, Sodium lauryl sulphate and Struktol LB219) were reserved to used instead. It was found that latex preserve with 0.20% NH_3 and 0.10% ZDC can be used to preserve natural rubber field latex as well as long as preserve with 0.40%. NH_3. VFA number was also a very small increase as increasing amount of ZDC. Adding 0.05% Sodium lauryl sulphate into latex preserve with 0.20% NH_3 and 0.10% ZDC was found to give the lowest VFA number. Increasing ZDC from 0.10% to 0.15% into latex preserved with 0.2% NH_3 and 0.05% of soap (Potassium laurate, Sodium lauryl sulphate or Struktol LB219) was found the latex can be kept as long as commercial latex preserved with 0.20% NH_3 and 0.025% TMTD/ZnO.

E_E0033 EFFECT OF TYPES OF METAL ION SALT ON ELECTRICAL CONDUCTIVITY OF CHLOROPHYLLIN/ CARBOXYMETHYL CHITIN AND CHLOROPHYLLIN/ CARBOXYMETHYL CHITOSAN

Tuspon Thanpitcha[1], Anuvat Sirivat[1], Alexander M. Jamieson[2], Ratana Rujiravanit[1]
[1] Conductive and Electroactive Polymers Research Unit, The Petroleum and Petrochemical College, Chulalongkorn University, Bangkok 10330, Thailand
[2] Department of Macromolecular Science, Case Western Reserve University, Ohio, USA
E-mail address: ratana.r@chula.ac.th

Abstract: The aims of the present work are to prepare and investigate the effect of types of metal ion salt on electrical property of the chlorophyllin/carboxymethyl chitin (chlorophyllin/CM-chitin) and chlorophyllin/carboxymethyl chitosan (Chlorophyllin/CM-chitosan) blend films. The chlorophyllin/CM-chitin and chlorophyllin/CM-chitosan blend films were prepared by solution casting. The smooth flexible and homogeneous blend films were obtained with 50 wt% chlorophyllin in CM-chitin based-matrix and 30 wt% chlorophyllin in CM-chitosan based-matrix. For the electrical property, the CM-chitosan film exhibited higher electrical conductivity than CM-chitin film due to the higher content of amino polar group in CM-chitosan and the electrical conductivity became increase with increasing the chlorophyllin content. With the addition of various types of metal ion salt in the blend films. The mono-valence metal ion exhibited the higher electrical conductivity than the di- and tri-valence metal ion due to the higher ion mobility.

E_E0034 Modification of palm oil meal for being filler in natural rubber

Jatupom Jaiboon, Orasa Patarapaiboolchai
[1] Polymer Science Program, Faculty of Science, Prince of Songkla University, Songkla 90110, Thailand

Abstract: Modification of palm oil meals mesocarp (palm oil slude, POS) and kernel (palm kernel meal, PKM) by chemical surface treatment with alkali, acid coated, silane and peroxide treatment are studied to be filler in natural rubber (STR20) compound on vulcanize and physical properties by varying content (0-50 phr) and size of palm oil meal (80,100 and 120 mesh or 177, 149 and 125 micron, respectively). It was found that size, palm oil meal loaded and modification treatment have influences on vulcanizing time and physical properties of rubber compound. That is smaller particle of palm oil meals shows higher physical properties and slower cure time than bigger particle size. However, the more amount of oil palm meal loaded, the decrease in physical properties will be. In other words, it was found that using silane treatment gives slower cure time than other treatments. While, alkali and peroxide treatment show higher tensile strength than other treatments, acid coated treatment shows lowest physical properties. When considering types of palm oil meals, it shows that mesocarp (POS) has slightly higher physical properties than kernel (PKM). When the optima of filler loaded cannot be more than 30 phr at 120 mesh size in order to keep optimized properties.

E_E0035 PHYSICAL PROPERTIES OF LONGAN SHELL – PHENOL FORMALDEHYDE COMPRESSED SHEETS

Linda Thiraphattaraphun*, Nisa Kunapongsiri, Monthana Sangkapan
Department of Packaging Technology, Faculty of Agro-Industry, Chiang Mai University, Chiangmai, Thailand.
* E-mail: linda_cmu@hotmail.com

Abstract: Longan shell is agricultural residues that abundant availability in northern of Thailand. In this research, longan shell is used substitute wood-based raw materials to produce longan shell-phenol formaldehyde (PF) compressed sheets for used as particleboard. Longan shell was prepared in powder 40 and 70 mesh in sizes. PF was used as the binder and pressed by hot compression molding. Physical properties of longan shell-PF compressed sheets were determined. The results show that longan shell-PF compressed sheets have high density level in both 40 and 70 mesh longan shell. Moisture content and water absorption of compressed sheets with 40 mesh longan shell are higher than 70 mesh longan shell. While, thickness swell of compressed sheets with 40 mesh longan shell is less than 70 mesh longan shell.

E_E0036 Preparation and Properties of Natural Rubber/Cassava Starch Blends

Yanyong Loiha and Saisamorn Lumlong
Department of Chemistry, Faculty of Science, Ubon ratchathani University, Thailand, 34190

Abstract: Natural rubber (NR)/starch blends were prepared directly by mixing natural latex and cassava starch paste. Starch paste contained glycerol as a plasticizer for starch. The results showed that the blend exhibited the highest tensile strength and elongation at break with starch content of 2.5 phr. Tensile strength and elongation at break decreased by increasing starch content due to the agglomeration of starch particles agglomerated at high starch content. For glycerol, the optimum content was 25% w/w of starch. The elongation at break was found to be decreased with increasing glycerol content. The optimum ratio of latex/starch paste was 80/20 %w/w and the tensile strength and elongation at break of this blend composition were higher than that of pure rubber. The mechanical properties seemed to decrease by increasing starch portion in the blends.

E_E0037 Preparation and Characterization of Cellulose Acetate from Agricultural by-products

Arreerat Mattpha, Wilairat Wongthep, Bounleuam Sodahak, and Saisamorn Lumlong
Department of Chemistry, Faculty of Science, Ubon Ratchathani University, Thailand, 34190

Abstract: Cellulose acetate has been used in many applications such as membrane, fiber and matrix for polymer composites. Cellulose and cellulose acetate can be prepared from agricultural by-products such as banana stem, rice straw, baggasse and corncop. In this work, we compared the methods that converted cellulose to cellulose acetate: homogeneous and heterogeneous acetylation. Two conditions in heterogeneous acetylation were studied. Moreover, we studied the effect of cellulose particle on acetylation reaction. Cellulose acetate can be prepared by heterogeneous acetylation. On the other hand, the product of homogeneous acetylation cannot be characterized due to gel effect. The cellulose particle size of

180-300 μm gave the highest yield. Cellulose from the other agricultural by-products can be also converted to cellulose acetate. However, Cellulose acetate film from banana stem showed the best physical properties.

E_E0038 INVESTIGATION THE PROPERTIES OF LOW DENSITY POLYETHYLENE BLENED WITH TAPIOCA STRACH

Amnouay Larpkasemsuk
Department of Materials and Metallurgical Engineering, Faculty of Engineering, Rajamangala University of Technology Thanyaburi, Klong 6, Pathumthani, Thailand Tel : (662)549-3484-5, Fax: (662)549-3483

Abstract: This research purposed to investigate the properties of the polymer blend between low density polyethylene (LDPE) and tapioca starch. The LDPE was blended with tapioca starch in various contents from 0 to 20 phr by the high speed mixture. The blended also was compounded with iron stearate as lubricant by the two roll mill. After that the blended was extruded by the extrusion blowing machine. Melt flow index (MFI), density, tensile properties and water absorption of the polymer blend were investigated. It was found that the MFI and tensile strength decreased with starch contents increasing. The density slightly increased with the starch contents. The water absorption of the polymer blend increase by the starch content increasing.

E_E0039 Preparation and Characterization of Poly(hydroxamic acid) Chelating Resin from PMA-grafted-Starch via Gamma Radiation

Phiriyatorn Suwanmala[1], Kasinee Hemvichain[2], and Manit Sonsuk*
[1,2] Chemistry and Material Science Research Program Office of Atoms for Peace, Bangkok 10900 Thailand

Abstract: Polymeric chelating resins containing hydroxamic acid functional group was synthesized from graft copolymer between poly(methyl acrylate) (PMA) and cassava starch. The PMA-g-Starch copolymer was prepared by radiation-induced copolymerization. The optimum conditions for grafting were studied in terms of % grafting efficiency, % grafting, % total conversion, and % homopolymer. Conversion of the ester groups present in PMA-g-Starch copolymer into hydroxamic acid was carried out by treatment with hydroxylamine in the presence of alkaline solution. The presence of hydroxamic acid groups was preliminary confirmed by the formation of dark purple color when the chelating resin was mixed with vanadium ions. The poly(hydroxamic acid) chelating resin was also characterized by FTIR, TGA, and DSC.

E_E0040 PREPARATION OF NATURAL RUBBER ROOFING MATERIALS

Piyaporn Suanchan[1], Natinee Lopattananont[1], Azizon Kaesaman[1], Wae-asae Waehamad[2]
[1] Department of Rubber Technology and Polymer Science,
[2] Department of Science, Faculty of Science and Technology, Prince of Songkla University, Pattani 94000, Thailand. whasan@bunga.pn.psu.ac.th

Abstract: The natural rubber roofing material was prepared by various blend ratios between ethylene propylene diene rubber (EPDM) compound and natural rubber (NR) compound. It was found that the 60/40 blend ratio of EPDM/NR gave the superior heat ageing resistance. The prevulcanized EPDM compound was used in the process. It was prepared by heating EPDM compound in a hot air oven at 100 °C for 1 hr. Moreover, the addition of 5 phr butadiene rubber as a compatibilizer in the blend was revealed by Scanning electron microscope (SEM) that butadiene rubber (BR) caused the NR domain dispersed uniformly in the EPDM phase. As a result, the improvement of mechanical properties as well as aging resistance was appreciable.

E_E0041 Preparing Natural Rubber Foam via Talalay Process I : Freezing of Natural Rubber Foam

Witharn Pansiriwirote, Nattapong Nithi-Uthai, Saovanee Kovuttikulrangsie, Adisai Rungvichaniwat
Department of Rubber Technology and Polymer Science, University, Pattani 94000, Thailand. nnattopo@bunga.pn.psu.ac.th

Abstract: Method of making of latex foam rubber was developed for many years. Latex foam was also risen in application. In this paper, we studied freezing natural rubber foam which is a required step Talalay process. The influence of freezing time and freezing temperature on low ammonia latex viscosity were studies. It was found that the latex viscosity increasing of freezing time while latex temperature were decreased. The freezing time of 30 minutes gave the best viscosity for foaming (400 centipoise). The effect of initial freezing temperature of latex foam rubber on freezing rate was also investigated. We found that the initial freezing temperature decreased, rate of freezing increased.

E_E0042 Water sorption selectivity from of Ethanol/ Water Mixtures of Natural Rubber-Polyvinyl alcohol Semi-Interpenetrating Polymer Network Membranes

Ukkadate Moonart, Sittipong Amnuaypanich, Choosak Poonsawat, Chaiwat Ruksakulpiwat
Department of Chemistry, Faculty of Science, Khonkaen University. Khon Kaen 40002.Thailand.

Abstract: Natural Rubber-Polyvinyl alcohol Semi-Interpenetrating Polymer Network Membranes were prepared by using maleic acid as a crosslinking agent,and the crosslink times were3 h at 70°C .The swelling behavior and water sorption selectivity in ethanol-water solution were investigated by HPLC and DSC. Moreover, the amount of bound water by the membrane was examined. The degree of swelling and sorption selectivity of water increasing with increasing PVA content in membrane .The bound water .also increased with PVA content in the membrane.

E_E0043 Preparing Natural Rubber Foam via Talalay Process II : Carbondioxide Gel

Kavichat Katuengngan, Nattapong Nithi-Uthai, Saovanee Kovuttikulrangsie, Adisai Rungvichaniwat
Department of Rubber Technology and Polymer Science,
University, Pattani 94000, Thailand. nnattapo@bunga.pn.psu.ac.th

Abstract: The natural rubber latex foam product are used in many applications which offer different properties depended on applications. The most common Dunlop process can not give a desirable efficiency for producing low density latex foam. Therefore, Talalay process which used carbondioxide gas to coagulated foam is prefered. In this work, the natural rubber latex compounds are foamed, and the foam is then frozen in a refrigerator for 30, 40 and 50 minutes, followed by introduction of carbondioxide gas. Influence of pressures and immersion time ware investigated. It was found that the coagulation foam layer increased with increasing pressures as well as immersion longer freezing time also increase the layer which foam gelled.

E_E0044 FABRICATION OF MULTILAYER FILM ON SILICON SURFACE-TETHERED POLY(ACRYLIC ACID) BRUSHES

Sudarat Pookboonmee[1], Nuttha Thongchul[2], Voravee P. Hoven[3]*
[1] Program in Petrochemistry and Polymer Science, Faculty of Science, Chulalongkorn University, Bangkok 10330, Thailand,
[2] Institute of Biotechnology and Genetic Engineering, Chulalongkorn University, Bangkok 10330, Thailand,
[3] Organic Synthesis Research Unit, Department of Chemistry, Faculty of Science, Chulalongkorn University, Bangkok 10330, Thailand. Tel: +66-2218-7627 ext 102, Fax: +66-2218-7598,
E-mail address: vipavee.p@chula.ac.th

Abstract: Silicon surface-tethered poly(acrylic acid) (PAA) brushes was prepared by surface-initiated atom transfer radical polymerization (ATRP) of tert-butyl acrylate (tBA) followed by acid hydrolysis. The silicon surface carrying PAA brushes was used as a substrate for layer-by-layer assembly of selected polyelectrolytes, chitosan, poly(acrylic acid), and carboxyl-terminated polydiacetylene vesicles (PDA-COOH) to generate multilayer films. It was demonstrated that the thickness of each individual layer and multilayer varied in proportion to the thickness of the PAA brushes. The contact angle data suggested that the assembled multilayer film was stratified. An increment of up to 10 nm in thickness of the individual layer can be achieved under an appropriate adsorption condition. This approach offers a great benefit for applications which require fabrication of stable nanometer-thick film without having to use many cycles of deposition.

E_E0045 Synthesis of Poly (vinyl acetate)-grafted- Natural Rubber membranes

Phikun Ratphonsan, Choosak Poonsawat, Sittipong Amnuaypanich, Paveena Khansawai
Department of Chemistry, Factory of Science, Khon Kaen University, Khon Kaen, 40002, Thailand.

Abstract: Grafting of Poly (vinyl acetate;PVAc) on Natural Rubber(NR) was obtained by emulsion polymerization method. It was found that the maximum grafting efficiency was 59.60% obtained at 0.8% mol of initiator at 40 mol% of VAc. Grafting efficiency improved as VAc was increased. The grafting of PVAc on NR was confirmed by FTIR and DSC. The grafted NR membrane was found to swell well in acetone but not in water. The swelling degree of grafted membrane increased as grafting efficiency increased.

E_E0046 HEXANE CONVERSION USING METAL-MORDENITE CATALYSTS.

Pisit Jantarasuwan[1], Wimonrat Trakarnpruk[2]
[1] Program of Petrochemistry and Polymer Science, Faculty of Science, Chulalongkorn University, Bangkok 10330. Email: apocalip_noom@chula.ac.th
[2] Green Chemistry Research Unit, Program of Petrochemistry and Polymer Science, Faculty of Science, Chulalongkorn University, Bangkok 10330. Email: wimonrat.t@chula.ac.th

Abstract: Mordenite (SiO_2/Al_2O_3 = 90) was loaded with transition metals: Pt and Pd. Different loading methods include impregnation and ion exchange. Other additional metals (with various amounts): Ga and Zn were also added and compare catalytic activity. Pt/Ga/MOR, Pd/Ga/MOR, Pt/Zn/MOR, Pd/Zn/MOR were characterized by XRD, IR, TPD and BET. They were used to catalyze the conversion of n-hexane as a model compound at different condition: temperature range 300-450°C, weight hourly space velocity, time on stream and amount of catalyst. Liquid and gaseous product distribution were determined by GC and GC/MS. From the experimental results, the catalytic activities of Pt and Pd catalysts were comparable. The gallium and zinc have some influence on the conversion and selectivity. Additionally, it was found that the amount and method of addition of potassium (in order to adjust the acidity of the mordenite) affected the product distribution. Mixture of these catalysts with other materials (Al_2O_3, ZrO_2 and other metal oxides) were also investigated.

E_E0047 HYDROTALCITE BASE CATALYSTS FOR BIODIESEL PRODUCTION

Tanawat Tittabutr[1], Wimonrat Trakarnpruk[2]
[1] Program of Petrochemistry and Polymer Science, Faculty of Science, Chulalongkorn University, Phyathai Road, Bangkok 10330, Thailand.
[2] Green Chemistry Research Unit, Department of Chemistry, Faculty of Science, Chulalongkorn University, Phyathai Road, Bangkok 10330, Thailand.
E-mail: wimonrat.t@chula.ac.th, E-mail: tanawat1900@hotmail.com,

Abstract: Transesterification of tributyrin as model compound of triglyceride in vegetable oils to methyl butanoate is studied using heterogeneous catalysts to overcome the problem of catalyst separation and soap formation occurred in the homogeneous catalysis. The solid base catalysts were prepared and investigated their catalytic activity. They include hydrotalcite (calcined and rehydrated ones), hydrotalcite loaded with alkali and alkaline earth metals, MgO loaded with metals and other mixed metal oxides. All catalysts were characterized with XRD, IR and BET. The optimum reaction condition was determined by varying influencing parameters: molar ratio of tributyrin to methanol, reaction time, amount of catalyst. The conversion was calculated from GC result and the products were identified with GC-MS. The catalysts show good activity (> 76%) and can be reused. The metal loaded catalysts show enhanced activity. This catalytic system was also applied to palm oil to produce biodiesel.

E_E0048 PREPARATION OF NANO-SILICA FROM RICE HULLS

Patompong CHANANIL and Ekaphan SWATSITANG
Department of Physics, Faculty of Science, Khonkaen University KhonKaen 40002, Thailand

Abstract: Silica nanoparticles were prepared by thermal decomposition of refluxed rice hulls (1N,HCl) of various sizes (0.25, 0.5, 1.0 and 1.4mm) in O_2 99.98% with flow rate of 1.5 ml/min for 3 h. at 600, 700, 800 and 900 °C for each size. All the heat treated samples were found to be white ash. XRD results indicated that the white ashes were amorphous silica with particle's size of approximately 50-150 nm. SEM micrographs showed silica diameter of about 20-200 nm. The diameter of sample burnt in O_2 99.98% 1.5 ml/min at temperature of 800 °C for 3 h. was around 20-100 nm.

E_E0049 EFFECT OF ADDITIVES AND PARTICLE SIZE ON THE POROSITY OF ALUMINA

Tanikan Thongchai[1], Suthum Srilomsak[2], Siriporn Larpkiattaworn[3]
[1] School of Ceramic Engineering, Suranaree University of Technology Nakhon Ratchasima 30000, Thailand
[2] Thailand Institute of Scientific and Technological Research.

Abstract: The effect of additives and particle size on the porosity and pore size of sintered alumina (Al_2O_3) was studied in this research. Carboxymethyl Cellulose (CMC), Polyvinyl Alcohol (PVA) and Polyethylene Glycol (PEG) were used as additives by varying each of them for the content of 1.5, 3 and 6% by Al_2O_3 weight. The Al_2O_3 particle sizes were varied at 0.7 µm, 5 µm, the mixture of 0.7 µm (50 wt%) and 5 µm (50 wt%) and the mixture of 5 µm (50 wt%) and 58 µm (50 wt%). The mixture was then extruded, dried and sintered at 1500° C. The sintered samples were measured porosity and pore size. It was found that particle size is the most important factor affecting porosity and pore size, sample prepared from the mixture of 5 µm (50 wt%), 58 µm (50 wt%) Al_2O_3, and CMC (6% by Al_2O_3 weight) resulted in the biggest pore size of 2.7 µm and 60% porosity. The type and amount of additive affected the porosity of sintered Al_2O_3. Sample prepared from CMC resulted in higher porosity compared to sample prepared from PVA and PEG at the same amount.

E

E_E0050 THERMOPLASTIC NATURAL RUBBER FOAM

Watcharapong SaeTae, Chonlada Lewis, and Wirach Taweepeeda
Polymer Science Program, Faculty of Science, Prince of Songkla University, Songkla 90112, Thailand

Abstract: Thermoplastic natural rubber (TPNR) was prepared using dynamic vulcanized process of natural rubber (NR) with dicumylperoxide (DCP). The small particles of dynamically vulcanized NR are dispersed in low density polyethylene (LDPE) matrix. The foaming of TPNR was studied in this research using azodicarbonamide (ADC) as the chemical blowing agent. The relationship between foam density and concentration of blowing agent as well as the amount of ZnO as the kicker agent were also investigated. We observed that the blending of LDPE and NR at the ratio of 40/60 gives highest tensile properties and the hardness of TPNR foam is increased with increasing LDPE component whereas the elongation at break is decreased. The addition of epoxidized natural rubber (ENR) improves the physical properties of the TPNR foam and the resistance of the cellular product to thermal collapse.

E_E0051 Influence of Parafinic Oil on Properties of Thermoplastic Vulcanizates Based on ENR/PP Blends: Effect of blend ratios on mechanical properties.

Anuwat Worlee[1], Charoen Nakason[1], Azizon Kesaman[1] and Kannika Sahakaro[1]
[1] Department of Rubber and Polymer Technology, Faculty of Science and Technology, Prince of Songkla University, Pattani 94000, Thailand

Abstract: Preparation of TPVs based on ENR/PP blends at various blend ratios of ENR/PP (i.e., 25/75, 40/60, 50/50, 60/40 and 75/25) with using Ph-PP at a level of 5% by weight of PP as compatibilizer. Various oil concentrations (i.e., 15, 25, 30, 35, 40, 45, 50 and 75 phr) were studied. We found that the trend of decreasing tensile strength with increasing oil concentrations. The trend of increasing elongation at break with increasing oil concentrations in the blend with extent that the presence of 30 phr and above it which is lower. Furthermore, the trend of decreasing tension set with increasing oil concentrations. Influence of blend ratios of TPVs were also studied. We found that the trend of increasing tensile strength and tension set with increasing the level of PP in the blend. The trend of increasing elongation at break with increasing the level of PP in the blends at lower proportion of PP (≤60%).

E_E0052 SURFACE DEGRADATION OF POLY (ETHYLENE TEREPHTHALATE) INDUCED BY UV-EVANESCENT FIELD

Ekgapon Chutchawalkulchai[1], Sanong Ekgasit[2]
[1] Program of Petrochemistry and Polymer Science, Faculty of Science, Chulalongkorn University, Bangkok 10330, Thailand
E-mail: mac.chula@gmail.com
[2] Sensor Research Unit, Department of Chemistry, Faculty of Science, Chulalongkorn University, Bangkok 10330, Thailand
Telephone (662) 218-7585, Fax (662) 254-1309
E-mail: Sanong.E@chula.ac.th

Abstract: Poly (ethylene terephthalate), PET is a commercial polymer, which is applied for many industries, such as textile, food and automotive industries. However, PET is hydrophobic, thus it is not appropriate for some applications. Surface degradation induced by UV-evanescent is a novel technique, that can induced surface degradation and initiate hydrophilic species (carboxylic and hydroxyl groups) on the surface. The surface modification of PET under novel technique is initiated under the UV-attenuated total reflection (UV-ATR). The chemical changes on the surface can be characterized by attenuated total reflection fourier transform infrared (ATR FT-IR) spectroscopy. Since the change occurs only in the surface region (approximately 70-100 nm from the surface), mechanical properties and other bulk properties of the PET are expected to be unchanged.

E_E0053 ULTRASONIC STUDIES OF COPPER-ALUMINOBOROSILICATE GLASSES

Raewat Laopaiboon[1,3], Jintana Laopaiboon[1,3], Suwat Pabchanda[2,3] and Wichean Piwbang[3]
[1] Department of Physics, Faculty of Science,Ubon Rajathanee University, 34190
[2] Department of Chemistry, Faculty of Science,Ubon Rajathanee University, 34190
[3] Glass Technology Excellent Center, Faculty of Science, Ubon Rajathanee University, 34190

Abstract: The Ultrasonic velocity and attenuation coefficient have been measured at the frequency 4 MHz and at room temperature using pulse echo technique.The elastic properties; longitudinal modulus, shear modulus, Young's modulus, bluk modulus and Poission's ratio are found to be rather sensitive to the glass composition.The obtained was showed that the properties of glasses were decreased when increasing the amount of PbO_2.

E_E0054 STRUCTURAL MODIFICATION OF KAOLINITE ACCELERATED BY ULTRASONIC WAVE

Piyarat Trakuljivisuth, Siwaporn Meejoo
Department of Chemistry, Faculty of Science, Mahidol University, Rama VI Rd., Bangkok, Thailand
E-mail : scsmj@mahidol.ac.th, u4605129@student.ac.th, Fax: (662)354-7151

Abstract: Kaolinite is well known as non-expandable clay which is of layered silicate structure with relatively strong hydrogen bonding between hydroxyl and oxygen surfaces that, consequently, inhibits the intercalation of water or ethylene glycol molecules into the clay. This research focuses on intercalation of organic guest molecules into kaolinite to produce an organo-clay which is very important intermediate for polymer nanocomposite syntheses. Dimethyl sulfoxide (DMSO) was used as an organic precursor and two different intercalation methods were carried out, stirring and ultrasonic wave irradiation. By these processes, kaolinite was structurally modified and the d-spacing of the clay became greater than 7.2 Å. Our study represents that ultrasonic wave promisingly accelerated the intercalation process of DMSO into kaolinite, for which the process took only nine hours to complete ,in comparison to a few days completion by stirring method. The DMSO/kaolinite was further used to prepare polyvinyl alcohol/kaolinite composite by replacing of the interlayer DMSO molecules with the polymeric molecules. Powder X-ray diffraction was mainly used to investigate the structural modification of kaolinite.

E_E0055 PREPARATION OF SILVER NANO-PARTICLE POWDERS BY TITRATION TO PRECIPITATION PROCESS

Wandee Onreabroy[1], Supanee Limsuwan[1], Samart Kongtaweelert[2], Tanakan Ongkeaw[1], Tada Nakorloy[1], and Pichet Limsuwan[1]
[1] Department of Physics, King Mongkut's University of Technology Thonburi, Bangkok 10140, Thailand
E-mail:opticslaser@yahoo.com,Tel:02-872-5253,02-470-8868,Fax:02-872-5254
[2] Department of Chemistry, King Mongkut's Institute of Technology Ladkrabang, Bangkok 10520, Thailand

Abstract: Silver nano powders were prepared by titration to precipitation process whereby silver nitrate ($AgNO_3$) was dissolved in 2-propanol ($CH_3CH(OH)CH_3$), hydrogen peroxide (H_2O_2) and nitric acid (HNO_3) mixed solution in ratio 25:5:70 %v/v respectively. The mixed solution was titrated with ammonium (NH_4OH 30%v/v solution) until the precipitation was completed. The thermal degradation of precipitated powders were analyzed by thermo gravimetric analyzer (TGA). From the result of thermo-gram, it was shown that the thermal differential of formation and degradation of oxide compound occurred at the temperatures range 154°C to 237°C and at 240°C to 360°C, respectively. The precipitant powders were calcined at 100°C to 500°C. The purification and crystallization of calcined powders were characterized by X-ray diffraction technique. The scanning electron microscopes (SEM) were used to study microstructure of fine silver powders. From the XRD pattern, it was shown that high purification silver with cubic structure and narrow particle size distribution with average particle size of 53 nm was obtained at 400°C for 2 hours. The average particle size was lead to increase when increasing the calcining temperature.

E_E0056 THE EFFECT OF THE MOLECULAR WEIGHTS OF POLYVINYL PYRROLIDONE ADDITIVE ON PURE WATER FLUX AND PROTEIN RETENTION OF POLYSULFONE HOLLOW FIBER MEMBRANE

Weeradech Kiratitanavit[2], Ramida Vithoonsaritsilp[1], Bralee Chettanasena[1], Thongchai Suanwiang[2], Wirunya Keawwattana[1], Chutima Eamchotchawalit[2]

[1] Industrial Chemistry Program, Department of Chemistry, Faculty of Science, Kasetsart University

[2] Materials Technology Department, Thailand Institute of Scientific and Technological Research (TISTR), 196 Phahonyothin Rd., Chatuchak, Bangkok 10900, Thailand

Abstract: The effect of the molecular weight of polyvinyl pyrrolidone (PVP) on the hollow fiber membrane properties was studied in this research. Four molecular weights of PVP which are 10,000 (K15), 40,000 (K30), 360,000 (K90) and 1,300,000 (1300K) were chosen to prepare hollow fiber membrane via phase inversion technique by using solution spinning machine. The composition of polymer solution to prepare the membrane was polysulfone, PVP, propylene glycol as processing aid additive and N-methyl-2- pyrrolidone (NMP) as solvent with a mass ratio of 19 : 2 : 4 : 75. The comparison between the various PVP molecular weight doped in membrane and non-doped PVP membrane on system solution viscosity, fiber diamension, pore size at membrane surface, pure water flux from 1-3 bar and protein retention of 2 protein molecular sizes, 35,000 for pepsin and 67,000 for Bovine serum albumin (BSA) was investigated. The result shows that the molecular weight of PVP had effect on the membrane properties. The viscosity of polymer solution increase with molecular weight of PVP while the fiber thickness and membrane pore size decreased with molecular weight of PVP. The pore size of membranes with PVP was smaller than that of membrane without PVP about 1.5 times. The pure water flux of PVP doped in membrane was decrease sighnificanted with increasing molecular weight of PVP. However the protein retention especially BSA of PVP added in membranes was higher than PVP-free membrane.

E_E0057 Synthesis of Nickel Microtube by Metal Reduction Method

Thitikorn Boonkoom, Apisit Songsasen

Department of Chemistry, Faculty of Science, Kasetsart University, Bangkok, Thailand.

Abstract: This experiment studies about the synthesis of nickel microtube via metal reduction route and the effect of factors such as reducing metal, complexing ligand, concentration of nickel solution, stirring rate, and stirring time. The complexes of nickel were reduced by reducing metal and stirred at room temperature. The products were determined by scanning electron microscope (SEM) and transmission electron microscope (TEM). This method can be used to synthesize nickel microtube in the diameter range of 3-26 micrometers.The factors which have effect on the synthesis are reducing metal, ligand, concentration of nickel solution, stirring rate.

E_E0058 PREPARATION AND PROPERTIES OF POLYSULFONE HOLLOW FIBER MEMBRANE FOR SUGARCANE JUICE ULTRAFILTRATION

Sirorat Tungsatitporn[1], Chutima Eamchotchawalit[2], Varaporn Tanrattanakul[1]

[1] Polymer Science Program, Faculty of Science, Prince of Songkla University, Hadyai, Songkla, Thailand. E-mail: varaporn.t@psu.ac.th, Fax: +66-74-446-925

[2] Thailand Institute of Scientific and Technological Research, Phahonyothin Rd., Chatuchak, Bangkok, Thailand.

Abstract: Polysulfone (PSF) hollow fiber membrane was prepared by using a hollow fiber spinning machine. Water was used as a bore liquid and an external coagulant. PSF was dissolved in N-methyl 1-2-pyrrolidone. Pore forming agents were triacetin, 1,2-propanediol and polyvinyl pyrrolidone (PVP). Five compositions were prepared. PSF hollow fiber membrane was coated with glycerol in order to prevent collapsing of micropores. Water flux and sugarcane juice filtration were tested by using a homemade cross-flow ultrafiltration machine. The pressure was applied in the range of 1 - 3 bar (100 - 300 kPa). Dope solution viscosity falls in the range of 1,000 - 1,600 mPa.s. The membrane shows molecular weight cutoff about 67,000 Da. Water flux of the samples is in the range of 53 - 114 $L.m^{-2}.h^{-1}.bar^{-1}$. The percentage of brix in permeate is slightly lower than feed (< 5%) and permeate is much clearer than fresh sugarcane juice. The turbidity of permeate are 99% improved. Membrane morphology and tensile properties were investigated.

E_E0059 DESIGN AND PREPARATION OF SYNTHETIC HYDROGELS BASED ON 2-ACRYLAMIDO-2-METHYLPROPANE SULFONIC ACID (AMPS) AND ITS SODIUM SALT (Na-AMPS) FOR BIOMEDICAL USE AS WOUND DRESSINGS

Chinanat Wittayaprapakorn, Robert Molloy, Kanarat Nalampang, and Nantarat Suebsanit

Biomedical Polymers Technology Unit, Department of Chemistry, Faculty of Science, Chiang Mai University, Chiang Mai 50200 Tel. 053-943406, Fax 053-892277

E-mail: Chinanatw@hotmail.com

Abstract: This research is concerned with the design and preparation of synthetic hydrogels for biomedical use as wound dressings. Crosslinked polymers of 2-acrylamido-2-methylpropane sulfonic acid (AMPS) and its sodium salt (Na-AMPS) were prepared via free radical polymerization in aqueous solution using redox initiation. Ethylene glycol dimethacrylate (EGDM) was used as the crosslinker. Different crosslinker percentages of 1-3% mol/mol monomer and various AMPS and Na-AMPS monomer concentrations of between 30-50% w/v were employed to prepare crosslinked hydrogels with different crosslink densities. The results showed that the hydrogel sheets formed from the higher AMPS and Na-AMPS concentrations of 40 and 50% w/v were uniform and coherent whereas those from the 30% w/v concentration were weak and sticky. The water

absorption properties of the hydrogel sheets were studied at room temperature. It was found that their initial rates of water absorption were very fast and reached their equilibrium water content (EWC) within 10 mins. The % crosslinker had little effect on the EWC of the hydrogel sheets at the same monomer content, for both AMPS and Na-AMPS, but did have a significant effect on the mechanical properties. The hydrated hydrogel sheets became weaker (i.e., lower tear strength) as the % crosslinker was increased.

E_E0060 CONTROL OF ALUMINIUM AT TETRAHEDRAL SITES IN MESOPOROUS MCM-41 STRUCTURE

Jinda Songninluck[1], Aticha Chaisuwan*[2], Oravan Sanguanruang[2]

[1] Program of Petrochemistry and Polymer Science, Faculty of Science, Chulalongkorn University, Bangkok 10330, Thailand. E-mail: koy_jinda@hotmail.com

[2] Materials Chemistry and Catalysis Research Unit, Department of Chemistry, Faculty of Science, Chulalongkorn University, Bangkok 10330, Thailand.

Abstract: MCM-41 is non-acidic mesoporous crystalline silica. Addition of aluminum to the framework has been attempted to increase the acidity which is necessarily required for acidic catalysts. The reversible migration of aluminum from tetrahedral sites to octahedral sites was usually found after calcination of the as-synthesized samples. To diminish such a problem, a novel synthesis method was proposed in this work. Colloidal silica was used as silica source to form a gel containing SiO_2:0.3 $6Na_2O$:0.025Al_2O_3:0.25CTABr: 80H_2O with Si/Al ratio of 20. The gel with a required composition was transferred in a stainless vessel lined with Teflon and heated in an oven at 100°C for 2 days before pH adjustment to 9-10, and further heated at 125°C for 6 days with daily pH adjustment by acetic acid solution. To remove the organic template from the as-synthesized samples, the samples were calcined in air at 540°C. The solid products obtained were treated with an aqueous solution of ammonium chloride with different concentrations to find the optimal concentration. The results from X-ray powder diffraction, scanning electron microscopic and nitrogen adsorption techniques shows highly order structure of MCM-41. Treatment of the calcined samples via ammonium ion exchange has a strong effect on the crystallinity and ratio of tetrahedral to octahedral Al of Al-MCM-41. The optimal concentration for ammonium solution is 0.03 M providing the highest ratio of tetrahedral to octahedral Al. In the presence of ammonium ions, migration of aluminum from octahedral sites to tetrahedral sites was enhanced. This implies the increase of acidity of Al-MCM-41 after the treatment with ammonium ion exchange.

E_E0061 The Hydrothermal Synthesis and Characterization of MCM-22 zeolite.

Narumol Kerdsa[1], Daungamol Nuntasri[2]

[1] Program of Petrochemistry and Polymer Science, Faculty of Science, Chulalongkorn University, Bangkok 10330, Thailand. E-mail: Narumol.Ke@Student.Chula.ac.th

[2] Materials Chemistry and Catalysis Research Unit, Department of Chemistry, Faculty of Science, Chulalongkorn University, Bangkok 10330, Thailand.
E-mail: duangamol.n@chula.ac.th

Abstract: MCM-22 (IZA code MWW) is a microporous material which crystallizes as thin sheets or plates and has a unique crystal structure. The MWW framework topology is comprised of two independent pore systems. One of these pore systems is defined by two dimensional sinusoidal channels, which maintain an effective 10-membered rings (10 MR) diameter throughout the structure. The other channel is comprised of large supercages, is defined by 12-membered rings (12 MR). MCM-22 zeolite is prepared by hydrothermal synthesis. It was synthesized using hexamethyleneimine as a structure directing agent (SDA) and SiO_2/Al_2O_3 ratio is 30. The prepared sample is characterized by XRD, SEM, ^{27}Al NMR, and ICP-AES. The results indicate that the layer of MCM-22 sample condense to form a fully connected zeolite framework upon calcinations. The particles are small and aggregate of sheet to form structure. The SiO_2/Al_2O_3 ratio of the product is measured by ICP-AES that is 22.

E_E0062 Properties of BISMUTH TELLURIDE BASED alloy prepared by mechanical alloying and subsequent HOT PRESSING

Supranee Lao-ubol, Siriwan Onjun, and Chutima Eamchotchawalit
Material Technology Department, Thailand Institute of Scientific and Technological Research, 196 Paholyothin Road, Bangkok, Thailand
E-mail: chutima@tistr.or.th, Fax: (662)579-7728

Abstract: *p*-type $Bi_{0.48}Sb_{1.52}Te_3$ and *n*-type $Bi(Se_{0.1}Te_{2.9})_3$ powder were prepared via bulk mechanical alloying plus subsequent hot pressing method. *p*-type $Bi_{0.48}Sb_{1.52}Te_3$ and *n*-type $Bi(Se_{0.1}Te_{0.9})_3$ solid solution phase appeared after 24 h milling time. Relative density of *p*- and *n*- type alloy increased with increasing the milling time and hot pressing temperature. The Seebeck coefficient is obtained as 225 μV. K^{-1} from p-type with hot pressing at 450°C, 5 Ton for 3 h and 207 μV. K^{-1} from n-type when hot pressing at 550°C, 5 Ton for 3 h.

E_E0063 Synthesis and magnetic properties of carbon-encapsulated iron nanoparticles.

P. Sartprasert*, P. Singjai
Nanomaterials Research Unit, Department of Physics, Faculty of Science, Chiang Mai University, Chiang Mai, 50200, Thailand
*Corresponding author. Tel. +66 53 941922 ext.610 fax: +66 53 892271
E-mail address: choco066@hotmail.com

Abstract: In this research, carbon-encapsulated iron nanoparticles were synthesized by an infusion chemical vapor deposition

method. The structure and phase change of the as-grown products were characterized by using X-ray diffractometer, scanning electron microscope and vibrating sample magnetometer. It was found that the mean core diameter and the graphite-layer thickness were in the range of 40-120 nm and 30-80 nm, respectively. The particles were composed of Fe, FeC, Fe_3C and C. The measurements of the hysteresis loops show the saturation magnetization and coercivity of 34 emu/g and 290 Oe, respectively. The carbon-encapsulated iron nanoparticles have a ferromagnetic property and a carbon coating for protecting the iron nanoparticles against oxidation.

E_E0064 DEGRADATION OF HIGH DENSITY POLYETHYLENE AND POLYPROPYLENE USING ZSM-5/Al-HMS COMPOSITE

Rangson Katsutath[1], Aticha Chaisuwan[*2], Soamwadee Chaiarnansujarit[*2]
[1] Program of Petrochemistry and Polymer science, Faculty of Science, Chulalongkorn University, Bangkok 10330, Thailand. E-mail: katsutath@yahoo.com.
[*2] Materials Chemistry and Catalysis Research Unit, Department of Chemistry, Faculty of Science, Chulalongkorn University, Bangkok 10330, Thailand.

Abstract: Composite of microporous and mesoporous material has been studied as catalyst in the degradation of high density polyethylene (HDPE) and polypropylene (PP). Microporous ZSM-5 with the Si/Al mole ratio in gel of 40 and mesoporus Al-HMS with the Si/Al mole ratio in gel of 60 were physically mixed with in the compositional weight ratio of 1:1. The degradation of plastics was performed at temperature range of 350-450°C for 30 min, in N_2 atmospheric pressure by batch operation where the ratio of catalysts to polymer is 10% by weight. It was found that the optimal temperature for degradation HDPE and PP is 400°C. More than 97 wt% yields of gas and liquid products were obtained with higher liquid content at 400°C. At ratio of catalyst to polymer were at 10 wt%, HDPE degrades produced higher liquid yield than other ratios.

E_E0065 PORE CHARATERISTIC OF ALUMINA FORMED BY DIE PRESSING

Parawee Chaono1, Siriporn Larpkrattaworn[1]
[1] Department of Material technology, Thailand Institute of scientific and technological Research (TISTR), Bangkok 10900, Thailand

Abstract: Porous alumina was prepared by mixing 10 and 20% of polyvinyl alcohol (PVA) in alumina powder (Al_2O_3). The mixed powder was formed to pellet by die pressing at 1000 and 1500 kg/cm^2. The green pellets were sintered at 1400, 1450 and 1500°C for 2 hours soaking time. After sintering, the samples were measured density, porosity, and water absorption by using Archimedes's method. Microstructure of sintered sample was also observed by using scanning electron microscope (SEM). It was found that amount of PVA is more important factor affecting on sample porosity forming pressure. The significant change of porosity due to amount of PV and forming pressure was observed at high temperature. Using low forming pressure could not significantly increase porosity especially at low sintering temperature.

E_E0066 EFFECT OF NATURAL RUBBER CONTENT ON MORPHOLOGY AND MECHANICAL PROPERTIES OF STARCH-BASED FOAM

Chaivapruk Katepetch[1], Ratana Rujiravanit[1], Rathanawan Magaraphan[1]
[1] The Petroleum and Petrochemical College, Chulalongkorn University, Bangkok 10330, Thailand
E-mail: ratana.r@chula.ac.th, Fax: (662)215-4459

Abstract: The aims of this work are to prepare and investigate the effect of natural rubber content on the morphology and mechanical properties of starch-based foam. The starch-based foams were prepared by baking a mixture of starch, natural rubber latex and other ingredients in a hot mold. The obtained rigid foam product was characterized by scanning electron microscope (SEM) and universal testing machine in order to investigate the morphology and the mechanical properties of starch-based foam product, respectively. With the addition of natural rubber latex, the density of the foam increased with the increase of natural rubber content. The flexural strength of the starch-based foam increased, approximately 86 %, with increasing the natural rubber content up to 26.67 wt%.

E_E0067 VIBRO-MILLING SYNTHESIS, FORMATION AND CHARACTERIZATION OF LEAD ZIRCONATE NANOPOWDERS VIA VIBRO-MILLING TECHNIQUE

Orawan Khamman[1], Rattikorn Yimnirun[1], Yongyut Laosiritaworn[1] and Supon Ananta[1]
[1] Department of Physics, Faculty of Science, Chiang Mai University, Chiang Mai 50200, Thailand

Abstract: Lead zirconate ($PbZrO_3$) is an antiferroelectric material at room temperature, which is reported to be a good alternative material for high energy storage devices and transducers [1,2]. In order to achieve dense ceramics with good electrical properties, fine powders of perovskite phase with minimized degree of particle agglomeration are needed as starting materials. Thus, in this work, effect of calcination condition on phase formation and particle size of $PbZrO_3$ powders synthesized by a solid-state reaction with different vibro-milling times was investigated. Samples were characterized using TG-DTA, XRD, SEM, TEM and EDX techniques. It was found that the optimized firing temperature for single phase of $PbZrO_3$ was lower when longer milling times were applied. An average particle size of 50 nm was achieved at 25 h of vibro-milling. However, on continuation of milling to 30 h, the particle size was found to increase due to agglomeration.

E_E0068 CONVERSION OF THE HYDROXYAPATITE FROM STAG HORN CORAL.

Upsorn Boonyang[1] and Sutatip Siripaisarnpipat[2]
Department of Chemistry, Faculty of Science, Kasetsart University, PO Box 1011 Kasetsart Chatujak Bangkok 10903, Thailand,
[1] E-mail:g4784020@ku.ac.th [2]E-mail:fsclsts@ku.ac.th

Abstract: This study aims to convert the stag horn coral (*Acropora Formosa*) to the hydroxyapatite (HAp) by hydrothermal reaction. The coral powder with equal quantities of phosphate and water were placed in an autoclave. The reaction temperature and volume of water were fixed at 250°C and 30 cm^3, respectively. For periods of time varying from 8 to 12 h. The product was analysed using X-ray diffraction analysis (XRD), Fourier Transform infrared spectroscopy (FTIR) and Raman spectroscopy. Imaging of HAp synthesized using a scanning electron microscopy (SEM). The results have demonstrated that HAp has been successfully synthesized by hydrothermal treatment from the stag horn coral at 250°C for 8 h.

E_E0069 Enhancing aeration performance OF epdm Air-DIFFUSER by SURFACE CHLORINATION

Pinsupha Petiraksakul[1], Yodsakorn Unkham[1]
[1] Department of Materials Technology, Faculty of Science, Ramkhamhaeng University, Humark, Bangkapi, Bangkok 10240, Thailand.
E-mail: p_petiraksakul@yahoo.com, Tel/Fax: (662)319-4387

Abstract: Ethylene propylene diene monomer (EPDM) is widely used as air diffusers to produce coarse air-bubbles for wastewater treatment. The production of fine bubble for EDPM air-diffuser leading to an increase in aeration efficiency by surface chlorination has been studied. Characterization of the treated surfaces was carried out using air-bubble-size measurements, scanning electron microscopy (SEM), contact-angle measurements, hardness determination and tensile testing technique. Surface free energy of all samples was also examined to understand wettability of chlorinated-EPDM diffusers. The levels of chlorination increased with chlorination duration and available chlorine concentrations. Chlorinated EPDM gave a higher surface free energy than non-chlorinated EPDM resulting to a reduction in air-bubble diameters (from 2.19 mm to 1.29 mm.) and an improvement in aeration efficiency. Surface roughness was also observed on chlorinated samples. However, tensile strength and elongation-at-break of the samples were decreased with increased chlorination time and chlorine concentration. Hardness and modulus of elasticity were also increased in comparison with non-chlorinated-EPDM, due to a lack of flexibility. The chlorination duration of 6 days and chlorine concentration of 15 %w/w were the optimum conditions for surface chlorination of EPDM air-diffuser.

E_E0070 Molecular Characteristic of Ant Silk and Spider Silk Studied by ATR FT-IR Microspectroscopy

Chaweewan Sapcharoenkun[1] and Sanong Ekgasit[2]
[1] Department of Chemistry, Faculty of Science, Chulalongkorn University, Bangkok 10330,Thailand.
E-mail:wowja@hotmail.com, Tel: (622)218-7585
[2] Sensor Research Unit, Department of Chemistry, Faculty of Science, Chulalongkorn University, Bangkok 10330, Thailand

Abstract: Recent studies of molecular characteristic of spider silk have been interested by many scientists in many aspects such as the structure, chemical composition, crystalline index and mechanical property. In contrast, only few studies of ant silk have been found. Ants are interesting in a delicate nest construction and a long lifetime of a nest up to ten years. Currently, we are interested in molecular characteristics of ant silk and spider silk, specifically their strength and toughness. They are compared by ATR FT-IR Microspectroscopy. This study found that spider silk is different from ant silk. Since spider silk has structure as high β-sheet, spider silk is more crystalline than ant silk. So spider silk is stronger and tougher than ant silk.

E_E0071 EFFECT OF ALUMINIUM OXIDE ON PROPERTIES OF LEAD-FREE HIGH REFRACTIVE INDEX GLASS PREPARED FROM LOCAL SAND

Pisutti Dararutana[1,2,3] Jirapan Dutchaneephet[2] Anupat Pornsen[2,5] and Narin Sirikulrat[2,4]
[1] The Chemical Department Royal Thai Army, Bangkok, 10900 Thailand
[2] The Glass and Glass Products Research and Development Laboratory, Institute for Research and Development Science and Technology, Chiang Mai University, Chiang Mai 50200 Thailand
[3] The Graduated School of Chiang Mai University, Chiang Mai, 50200 Thailand
[4] Department of Physics, Faculty of Science, Chiang Mai University, Chiang Mai 50200 Thailand
[5] Maejo University, Chiang Mai 50000 Thailand
E-mail: pisutti@ hotmail.com, phrpisda@yahoo.com, Fax: (662)579-9518

Abstract: The effect of varying the Al_2O_3-content on the lead-free high refractive index glass prepared from local sand which used barium carbonate to replace lead oxide was studied. The physical and optical properties of the prepared glass were investigated. The glass samples were synthesized and characterized by an Analytical Balance, a Refractometer and a X-ray Diffractometer. The density and the refractive index were measured and found that all values increased almost linearly as the increase of the Al_2O_3-content. The amorphous state of the modification of glass structure due to Al_2O_3 addition was confirmed.

E_E0072 SYNTHESIS OF SBA-15 AND ALUMINUM CONTAINING -SBA-15

Arisara Chaipurimat[1], Aticha Chaisuwan[2], Duangamol Nuntasri[2]*

[1] Programmed of Petrochemistry and Polymer Science, Faculty of Science, Chulalongkorn University, Bangkok, Thailand. E-mail: arisara.c@student.chula ac.th

[2] Materials Chemistry and Catalysis Research Unit, Department of Chemistry, Faculty of Science, Chulalongkorn University, Bangkok, Thailand. E-mail: duangamol.n@chula.ac.th

Abstract: In this present study, mesoporous silica structure SBA-15 has been synthesized by hydrothermal method in strong acidic condition and using the tri-blockcopolymer, poly(ethylene oxide)$_{20}$ – poly(propylene oxide)$_{70}$ – poly(ethylene oxide)$_{20}$ ($EO_{20}PO_{70}EO_{20}$), as a structure directing agent with the gel composition (1) 1.00 TEOS : 1.65×10^{-2} $EO_{20}PO_{70}EO_{20}$: 6.95 2M HCl : 140 H_2O . The aluminum containing SBA-15 (Al-SBA-15) with the Si/Al mole ratio 10 was synthesized via post synthesis approach by reacting siliceous-SBA-15 with an aqueous solution of sodium aluminate for 12 h (2). The reactivity of Al-SBA-15 is reduced when sodium ion presents in its structure. From this viewpoint, therefore, the development of an ion exchanged condition from Na-Al-SBA-15 to H-Al-SBA-15 will be investigated using various reagents and conditions. The synthesized products were characterized using X-ray diffraction, inductively coupled plasma-atomic emission, solid state ^{27}Al-NMR, nitrogen adsorption technique and scanning electron microscopic technique. The H-Al-SBA-15 could be obtained from two suitable pathways, i.e. refluxed with 0.01 M NH_4Cl or 0.01 M HNO_3 at boiling temperature for 24 h.

E_E0073 Effect of dispersant level and pH on properties of lead zirconate titanate aqueous suspensions

Rudeerat Suntako[a,*], Nisanart Navapan-Traiphol[a], Pitak Laoratanakul[b]

[a]Department of Materials Science, Faculty of Science, Chulalongkorn University, Bangkok, 10330, Thailand

[b]National Metal and Materials Technology Center, Pathumthani, 12120, Thailand Phone 0-2218-5555, Fax. 0-2218-5561, E-mail: Rudeerat_s@yahoo.com

Abstract: Lead zirconate titanate PZT aqueous suspensions were prepared at 60 wt% solids loading using Dispex A40, ammonium polyacrylate, as a dispersant. Effects of dispersant level on rheological behavior and stability were investigated by means of viscosity and sedimentation height measurements, respectively. All suspensions were found to exhibit shear thinning behavior. The optimum dispersant level was determined to be 1 wt% Dispex A40 based on PZT powder dried weight basis. Effects of pH on viscosity and stability of the suspensions were also investigated. It was found that acidic pH suspensions exhibited higher viscosity and sedimentation height compared to those of alkaline pH suspensions.

E_E0074 SYNTHESIS AND CHARACTERIZATION OF ETS-10 AND ETGeS-10 AND THEIR CATALYTIC ACTIVITY IN TRANSESTERIFICATION OF PALM OIL

Satima Saranark[1], Aticha Chaisuwan[2], Daungamol Nuntasri[2]*

[1] Program of Petrochemistry and Polymer Science, Faculty of Science, Chulalongkorn Univesity, Bangkok 10330, Thailand. E-mail:luknam01@hotmail.com.

[2] Materials Chemistry and Catalysis Research Unit, Department of Chemistry, Faculty of Science, Chulalongkorn University, Bangkok 10330, Thailand. E-mail:duangamol.n@chula.ac.th.

Abstract: ETS-10 catalyst can be synthesized with colloidal silica and water glass solution as silica source, both methods were operated in the Na^+ and K^+ ions system without presence of organic template. ETS-10 gels were hydrothermally crystallized at 200°C and 220°C for 45 h and 24 h, respectively. ETS-10 was moodified by adding germanium in structure called as ETGeS-10. The structure of synthetic materials were confirmed by XRD technique. ETS-10 from different silica sources and ETGeS-10 show main phase of ETS-10 with some impurities of unreacted anatase and small amount of quartz. Titanium phases were identified by DR-UV, both tetrahedral titanium and octahedral titanium are in synthetic materials with small amount of anatase. Moreover, SEM-EDX was used to measure amount of substituted germanium in framework structure. Catalytic activities were shown in transesterification of palm oil, the ETGeS-10 catalyst shows good catalytic activity better than ETS-10 catalyst.

E_E0075 NATURAL RUBBER-SILICA COMPOSITE- THE SOL-GEL PROCESS OF ALKOXYSILANE IN RADIATION PREVULCANIZED LATEX

Kamolchat Charungchitaree[1], Varawut Tangpasuthadol[2,*], Jariya Boonjawat[3], Suda Kiatkamjornwong[4]

[1] Program of Petrochemistry and Polymer Science

[2] Organic Synthesis Research Unit, Department of Chemistry

[3] Department of Biochemistry

[4] Department of Imaging and Printing Technology Faculty of Science, Chulalongkorn University, Bangkok 10330, Thailand. Tel: +66-2218-7626, Fax: +66-2218-7598, E-mail address: varawut.t@chula.ac.th

Abstract: The advantage of radiation vulcanization over sulfur vulcanization of natural rubber (NR) is less toxic chemical being used, but this method usually leads to products with poor strength. In this work, radiation-prevulcanized NR filled with in situ generated silica was prepared. The NR latex having 50% dry rubber content was irradiated under gamma rays with radiation doses of 15 kGy. The prevulcanized latex was then mixed with an alkoxysilane. The mixture was heated at 50 °C for various heating time to initiate the sol-gel process of the silane to form silica inside the rubber matrix. Three types of

alkoxysilane, i.e. tetraethoxysilane (TEOS), vinyltriethoxysilane (VTOS), and ethyltriethoxysilane (ETOS), were studied. The appropriate heating time was 3 days to obtain 71% conversion of the TEOS to silica particles. Therefore in a single heating step, vulcanized natural rubber composites filled with 10 phr silica can be obtained. Comparing among 3 silanes, the silica content of TEOS and VTOS were about the same at 10 phr while that of ETOS was only 2 phr. The silica particles obtained from all silanes dispersed evenly in the rubber as observed by SEM. The particle size, however, was found to be the biggest when generated from TEOS, and smaller in the case of VTOS, in which the silica contents were the same.

E_E0076 Molecular Design Architecture of Carbon Nanotube Junctions: AM1 Study

Md.Shafiquzzaman[1,2], Anurak Udomvech[1,4], Sirapat Pratontep[3], and Teerakiat Kerdcharoen[1,2]

[1] Department of Physics, Faculty of Science, Mahidol University, Bangkok 10400, Thailand;

[2] Centers of Nanoscience and Nanotechnology, Faculty of Science, Mahidol University, Bangkok 10400, Thailand,

[3] National Nanotechnology Center, National Science and Technology Development Agency, Thailand Science Park, Pathumthani 12120, Thailand.

[4] Department of Physics, Faculty of Science, Thaksin University, Songkhla, 90000 Thailand.

Abstract: In this paper, the junctions between two fusing carbon nanotubes are proposed. This junction occurs at the interface between two zigzag tubes having different diameters. One end of the fused nanotube is constant by fixing the diameter at (5,0) configuration, while varying another segment from (6,0) to (10,0). Practically, the junctions are constructed by insertion of pentagon-heptagon pair into the prefect hexagonal lattice. In this study, diameter and length are considered to study the variation in electronic structure. The initial structure was optimized by molecular mechanical calculation (MM3). The atomic structure of junction is optimized by semi-empirical (AM1) method. The study shows that HOMO-LUMO energy and the energy gap are changed with the variation of length and diameter of the carbon nanotubes.

E_E0077 EFFECTS OF ZrO_2 ADDITIVE ON MICROSTRUCTURE OF SUBMICRON Al_2O_3 CERAMICS

Jutinun Kraikrer, Sirithan Jiemsirilers, Shigetaka Wada

Research Unit of Advanced ceramics, Department of Materials Science, Faculty of Science, Chulalongkorn University; Tel: 02-2185552, e-mail: kjutinun@yahoo.com

Abstract: Technology for synthesizing translucent polycrystalline alumina ceramic by controlling grain size in the range of submicron level using ZrO_2 additive as grain growth inhibitor was studied. Zero, 0.2 and 0.4 wt% of ZrO_2 was added to Al_2O_3 powder (TM-DA) together with 0.03 wt% of MgO. Green samples were prepared by biaxial hydraulic pressing machine with 20 MPa pressure and followed by Cold Isostatic Press (CIP) of 200 MPa pressure. Sintering was performed at temperatures range from 1300-1500°C for 2.0 hr followed by Hot Isostatic Press (HIP) at 1300°C for 1.0 hr with pressure of 127 MPa. Densities were measured using Archimedes method. Grain size was measured by the intercept length method following ASTM standard (E112-96) and microstructure was observed by SEM. Most of HIP-specimens have reached 100% of theoretical density. Grain sizes of HIP-specimens, which dope with ZrO_2, were smaller than undoped and ZrO_2 suppressed grain growth at any temperatures.

E_E0078 Influence of Sintering Time on Physical and Mechanical Properties of Glass-Ceramics from Mixtures of Zinc Hydrometallurgical Waste and Cullet

Wilasinee Hanpongpun[a,*], Sirithan Jiemsirilers[a], Pajaree Thavornit[b]

[a] Research Unit of Advanced ceramics, Department of Materials Science, Faculty of Science, Chulalongkorn University; Tel: 02-2185552, e-mail: wilasinee_h@yahoo.com

[b] National Metals and Materials Technology Center, Thailand Science Park, Paholyothin Rd., Klong Luang, Pathumthani 12120;

ABSTRACT: Glass-ceramics were prepared utilizing zinc hydrometallurgical waste (Zn-waste) and glass cullet as raw materials. A mixture of 60 wt% Zn-waste and cullet was melted at 1450 °C for 1 hour. The obtained glass was ground and pressed into a bar shape. Pressed specimens were sintered in a furnace firing at 850°C for 2, 4 and 6 hours. Their physical and mechanical properties were determined. It was found that the density of the glass-ceramics ranged from 2.78-2.83 g/cm^3. The highest bending strength of 96.5 MPa obtained from a sample sintered for 4 hours. Crystalline and morphological phases in the specimens were investigated by XRD and SEM respectively.

E_E0079 MICROSTRUCTURE AND ABRASIVE WEAR BEHAVIOR STUDY OF 18wt.% Cr SEMI-SOLID CAST IRON

Natthaphol Chomsaeng[1], Torranin Chairuangsri[2], Nuchthana Poolthong[3], Amporn Wiengmoon[4], J.T.H. Pearce[5]

[1] Department of Physics, Faculty of Science, Chiang Mai University, Chiang Mai, 50200, Thailand. E-mail: nat_b73@hotmail.com, Fax: (665)389-2262

[2] Department of Industrial Chemistry, Faculty of Science, Chiang Mai University, Chiang Mai 50200, Thailand.

[3] Division of Materials Technology, School of Energy and Materials, King Mongkut's University of Technology Thonburi, Bangkok, 10140, Thailand.

[4] Department of Physics, Faculty of Science, Narasuan University, Phisanulok, 65000, Thailand

[5] National Metals & Materials Technology Centre, 114 Paholyothin Rd, Patumthani 12120, Thailand.

Abstract: A 18wt.%Cr cast iron with a composition of 18wt.%Cr-3.06wt.%C-0.87wt.%Mo-0.58wt.%Si-0.36wt.%Mn-0.09wt.%Ni-0.02wt.%Cu casted by a semi-solid process was studied. Heat treatments including tempering at 773 K,

destabilization at 1348 K and destabilization followed by tempering were performed. The microstructures of the cast iron were compared using scanning electron microscopy (SEM) and transmission electron microscopy (TEM). Morphology of eutectic structure was as radiating clusters rather than a blade-like shape observed in the conventionally cast irons. The $M_{23}C_6$, secondary carbides was found after destabilization. No significant change in microstructure was observed after tempering. Abrasive wear testing was performed using a pin-on-disk, Tribometer ISO200 tester. It was found that the volume loss and the coefficient of friction were lower in an order from as-cast, tempering, destabilization and destabilization with tempering, respectively. The relationship between the abrasive wear behavior and the microstructure was discussed.

E_E0080 Hyperbranched Polymers as Vitamin Carriers : Influence of Microencapsulation Methods and Polymer Structure on Release Kinetics

Rattikarn Khankrua, Supakij Suttiruengwong
Department of Materials Science and Engineering, Silpakorn University, Sanam Chandra Palace, Nakorn Pathom, Thailand, 73000

Abstract: Dendritic polymers have increasingly been applied for medical and pharmaceutical fields in the last two decades. These polymers, especially dendrimers, were used in drug delivery systems. In this work, two commercially available hyperbranched polymers Boltorn® and Hybrane® were used as carriers for controlling the release of vitamin E (Alpha Tocopherol). Microparticles of Vitamin E-encapsulated hyperbranched polymers were prepared by coacervation and solvent evaporation methods in different loading (5, 15 , 25 %wt). The samples were characterized and analysed by various techniques (UV-VIS, FT-IR, DSC and SEM). The release kinetics were measured *in vitro* at 37 .C using decane as a dissolution medium. It was found that the release of vitamin E from Boltorn microparticles was slower than that from Hybrane due to long hydrophobic moiety of Boltorn. The results were confirmed by DSC and FT-IR measurements. The release kinetics also depended on microencapsulation methods used. The release of vitamin E from microparticles encapsulated by coacervation method exhibited slower release when compared to solvent evaporation method and the release processes were diffusion-controlled. In case of microparticles prepared by solvent evaporation method, the release was biphasic; burst release followed by diffusion.

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E_E0081 Influence of Drug Loading on the Release of Profen-drugs from Silica Aerogels

Supakij Suttiruengwong[1], Irina Smirnova[2], Wolfgang Arlt[2]
[1] Department of Materials Science and Engineering, Silpakorn University, Sanam Chandra Palace, Nakorn Pathom, Thailand, 73000
[2] Lehrstuhl für Thermische Verfahrenstechnik, Institut für Chemie und Bioingenieurwesen, Friedrich-Alexandra-Universität-Erlangen-Nürnberg, Erlangen, Germany, D-91058

Abstract: Hydrophilic and hydrophobic silica aerogels with different density have been prepared and used as drug carriers for controlled drug delivery systems. Three profen-drugs, ketoprofen, flurbiprofen and ibuprofen, were selected as model drugs. The release kinetics were monitored in vitro (37 °C, 100 rpm, 0.1 N HCl). The adsorption of profen-drugs on silica aerogels was measured under supercritical carbon dioxide condition. In comparison to ketoprofen and flurbiprofen, which exhibited the Langmiur isotherm, ibuprofen showed multilayer adsorption. It was found that the drug loading was dependent on the specific surface area, pore size distribution, and hydrophobicity of aerogels and the concentration of drugs in carbon dioxide. The release of ketoprofen and flurbiprofen from hydrophilic aerogels was in all cases firstorder, and independent of the drug loading. In case of ibuprofen, the release process was more complicated and dependent on the drug loading due to its extremely high adsorption. The slow release rate was shown in the higher ibuprofen-loaded aerogels.

E_E0082 Synthesis and Water Absorption of Superabsorbent polymer of Acrylamide-co-(Itaconic Acid)/Mica Composites

Daungtawan Foungfung[a], Siriwan Phattanarudee[b], Suda Kiatkamjornwong[a,*]
[a] Program of Petrochemistry and Polymer Science, Faculty of Science, Chulalongkorn University;
[b] Department of Imaging and Printing Technology, Faculty of Science, Chulalongkorn University;
Tel: 0-2218-5041; *e-mail: ksuda@chula.ac.th

Abstract: In this research, novel poly(acrylamide-co-(itaconic acid))/mica composites (P(AAm-co-IA)/mica composites) were synthesized by a solution polymerization via a redox initiator system of ammonium persulfate (APS) and *N,N,N',N'*-tetramethylethylenediamine (TEMED), and the crosslink agent of 0.5 %wt *N,N'*-ethylenebisacrylamide (N-MBA). The effects of acrylamide-to-itaconic acid ratio, and mica concentration on the water absorption without load and under load of the synthesized copolymer were investigated. The P(AAm-co-IA) with the IA content of 1-5 %mole gave the water swelling in the range of 372 - 991 g/g of its dried weight.

E_E0083 PREPARATION LEAD ZIRCONATE CERAMICS AND MECHANICAL PROPERTY

วิไล ชมชัย และ ชมพูนุช พืชมาก*
Department of Physics, Faculty of Science, Naresuan University, Phitsanulok, Thailand 65000
*Corresponding author. E-mail:kungmic2002@yahoo.com, Fax: (6655)261000-4#3501

Abstract: In this work, $PbZrO_3$ was prepared by the conventional mixed oxide method. The optimum temperature for calcinations of phase perovskite was found to be 775 °C for 3 h with heating/cooling rate of 5 °C/min. The phase formation

was examined by X-ray diffraction (XRD). The pellets were sintered at 1100, 1150, 1200 and 1250 °C for 2 h with heating/ cooling rate of 5 °C/min. The average grain size of $PbZrO_3$ ceramics slightly increases with increasing sintering temperature. The Vickers hardness of $PbZrO_3$ ceramics decreases with increasing sintering temperature.

E_E0084 EFFECTS OF AMINO ACID AND SERICIN PRETREATMENT ON PROPERTIES OF PRINTED SILK FABRIC

Klongthong Chakvattanatham[a], Siriwan Phattanarudee[a], Suda Kiatkamjornwong[a,*]
[a] Department of Imaging and Printing Technology, Faculty of Science, Chulalongkorn University; Tel: 0-2218-5347; e-mail: ksuda@chula.ac.th

Abstract: This research focuses on the silk fabric pretreatment. Pretreatment on fabric enhances smoothness on the fabric surface, and ink absorption is more uniform. Moreover, the functional groups of the pretreated compounds are expected to promote ink absorption, resulting in a better fixation of ink on the fabric. The pretreated solutions are serine, glycine, aspartic acid and sericin. The untreated and treated fabrics were printed with a set of pigmented inkjet ink. The printed fabrics were then evaluated in terms of color gamut, crockfastness and morphology.

E_E0085 PREPARATION OF SILICA NANOMATERIAL USING SUCCINIC AND TARTARIC ACIDS AS TEMPLATES.

Natkamol Peungsamran[1] and Sutatip Siripaisarnpipat[2]
Department of Chemistry, Faculty of Science, Kasetsart University, PO Box 1011 Kasetsart Chatujak Bangkok 10903, Thailand,
[1] E-mail:nat_km@hotmail.com [2] E-mail:fscists@ku.ac.th

Abstract: The sol-gel template method using tetraethylorthosilicate (TEOS) as silica source under shaking condition was used to prepare silica nanomaterials. The reactions were carried out at room temperature with two organic acid templates which were succinic and tartaric acids. FTIR spectra exhibit three characteristic frequencies at 1100, 800, and 470 cm^{-1}. XRD results reveals the amorphous nature of silica framework. SEM and TEM images show three morphologies which are spherical, plate and tubular shapes with variation of diameter (70-1,000 nm) and length (0.5-3.4 μm).

E_E0086 The microstructural study of lithium nickel oxide powders with dopants prepared by sol-gel processing

Panadda Phansamdaeng, Jinda Khemprasit
Department of Chemistry, Faculty of Science, Khon Kaen University, Khon Kaen 40002, Thailand

Abstract: In this research, lithium nickel oxide powders with dopants including Ti, Cr, Mn, Fe, Co and Zn ($Li_{0.30}M_{0.020}Ni_{0.68}O$, LMNO), where M is the dopants, were prepared by sol-gel processing. The sol-gel solutions were dried at 250 °C and then sintered at 1200 °C for 2 hr. The physical properties of dried gels and sintered oxide samples were characterized by FT-IR and XRD techniques. Investigation of microstructure of sintered samples in pellet form was carried out by SEM technique. The results showed that sintering at 1200 °C for 2 hr was able to remove residual organic species and also found that the XRD spectra of all oxide samples exhibited hexagonal phase without any secondary phases. From SEM micrographs, all samples illustrated the polyhedral grains with the typical grain size of several microns. By comparison with the pure LNO, the samples doped with Cr, Mn, Fe, Co and Zn showed larger grains whereas Ti-doped sample was smaller. The largest grain size was observed in Fe-doped sample.

E_E0087 SYNTHESIS AND PERFORMANCE OF ACRYLAMIDE-BASED ALUMINIUM FLOCCULANT

Praon Nanakorn[1], Supaporn Noppakundilograt[2], Suda Kiatkamjornwong[2]
[1] Program of Petrochemistry and Polymer Science, Faculty of Science, Chulalongkorn University, Bangkok 10330, Thailand.
[2] Department of Printing and Imaging Technology, Faculty of Science, Chulalongkorn University, Bangkok 10330, Thailand. Tel: +66-2218-5041; E-mail address: ksuda@chula.ac.th

Abstract: Polymeric floccuants of aluminium hydroxide-poly(acrylamide-co-acrylic acid), AHAMAA, were synthesized using aluminium hydroxide as a coagulant in the presence of acrylamide and acrylic acid as a comonomer pair. Ammonium persulphate (APS), *N, N, N', N'*-tetramethylethylenediamine (TEMED), and *N, N'*- methylenebisacrylamide (NMBA) were used as initiator, coinitiator, and crosslink agent, respectively. The effect of acrylamide-acrylic acid mole ratio in poly(AM-co-AA) and AHAMAA on the water absorbency were investigated. The water absorbency of poly(AM-co-AA) was higher than AHAMAA. The water absorbency of poly(AM-co-AA) increased with increasing the acrylic acid content and AHAMAA gave the highest water absorbency of 145±6 g g^{-1} at 4% mole acrylic acid.

E_E0088 SYNTHESIS OF CHELATING POLYMER CONTAINING SCHIFF BASE AND SULFUR AND ADSORPTION PROPERTIES FOR HEAVY METALS

Pradit Nutthanara[1], Wittaya Ngeontae[2], Thanapong Kreethadumrongdat[2], Apichat Imyim[1,2]
[1] Program of Petrochemistry and Polymer Science, Faculty of Science, Chulalongkorn University, Bangkok, 10330 Thailand
[2] Department of Chemistry, Faculty of Science, Chulalongkorn University, Bangkok, 10330 Thailand
E-mail: iapichat@chula.ac.th

Abstract: New chelating resins were prepared from chloromethylated polystyrene- divinylbenzene copolymer (Cl-PS-DVB) with three ligands, i.e. 2-[3-(2-amino ethylsulfanyl)-propylsulfanyl]-ethylamine (1), 2-[2-(2-amino-ethylsulfanyl)-ethylsulfanyl]-

ethylamine (2) and triethylenetetramine (3). All derivative resins were characterized by infrared spectroscopy technique (FT-IR). The synthesized resins showed adsorption property towards Cd(II), Cu(II), Pb(II), and Zn(II) ions in aqueous solution. Their adsorption depends on pH of the solution.

E_E0089 PREPARATION OF HIGH QUALITY ALUMINUM DOPED ZINC OXIDE (AZO) TARGET USING WARMLY PRESSED TECHNIQUE

Kriangkrai Wantong, Sojiphong Chatraphorn, Kajornyod Yoodee, Chanwit Chityuttakan
Semiconductor Physics Research Laboratory, Department of Physics, Faculty of Science, Chulalongkorn University, Bangkok, 10330, Thailand.
E-mail: w_kriangkrai@hotmail.com, Tel: 0-2218-5108, Fax: 0-2253-1150

Abstract: The 2.5 wt% aluminum-doped zinc oxide (AZO) ceramic target made by warmly pressed technique was used in RF magnetron sputtering process. The raw materials of the target were calcined at 500°C for 5 hours. The mixture was moistened with de-ionized water and stirred in a container. The target was pressed and heated with the pressure up to 4,000 psi, and the temperature of 150°C, respectively. After the warmly pressed process, the target was sintered at 1200°C for 1 hour under atmospheric pressure. The films obtained from this target were deposited on 5x6 cm^2 soda lime glass substrates at room temperature. The sputtering conditions used are: the RF power of 80Watt, Ar pressure of $6x10^{-3}$ mbar and the deposition time of 75 minutes. The as-grown films were characterized for their electrical transport, optical and structural properties. The values of electrical resistivity, mobility and carrier concentration of the films are about $2x10^{-3}$ Ωcm, 8.7 cm^2/Vs and $3.5x10^{20}$ cm^{-3}, respectively. It was found that the average optical transmittances are about 90% in the wavelength of 450-800 nm. From the XRD spectral, the AZO films are polycrystalline with (002) preferred orientation. The mean crystallite size calculated from the (002) peak is about 2.8 nm.

E_E0090 Incorporation of cadmium sulfide into the interlayer space of montmorillonite by solid-solid reactions

Areeporn Ontam[1], Makoto Ogawa[2], Nithima Khaorapapong[1*]
[1] Department of Chemistry, Faculty of Science, Khon Kaen University, Khon Kaen 40002, Thailand
[2] Department of Earth Science, Waseda University, Nishiwaseda 1-6-1, Shinjuku-ku, Tokyo 169-8050, Japan

Abstract: CdS, which is a class of very promising material use as a phosphor in thin film electroluminescence devices was formed in the interlayer spaces of montmorillonite by solid-solid reactions between powders of Cd(II)-montmorillonite and Na_2S at room temperature. The intercalation of Na2S molecules into Cd(II)-montmorillonite was demonstrated by powder X-ray diffraction and thermal analysis. The basal spacings of the Cd(II)-montmorillonite-Na_2S increased to 1.29 nm. The *in situ* formation of CdS particles in the interlayer spaces was indicated by diffuse reflectance absorption and photoluminescence spectra. The diffuse reflectance absorption spectrum of Cd(II)- montmorillonite-Na_2S exhibited an onset at 525 nm. The weak luminescence intensity of CdS was ascribed to cause by quenching impurity in montmorillonite.

E_E0091 STUDY OF THERMAL DEGRADATION KINETICS OF POLYPYRROLE

Walaiporn Prissanaroon Ouajai, Teera Tanachaivijit and Kamolwan Wasintonwisutti
Department of Industrial Chemistry, Faculty of Applied Science
King Mongkut's Institute of Technology North Bangkok, Thailand
E-mial: pwalaip@hotmail.com, Fax: 02-9132500 ext 4816

Abstract: This research is focused on study of thermal degradation mechanism of polypyrrole (PPy), one of electrically conducting polymers extensively used in many applications. PPy has been prepared via an electrochemical polymerization of pyrrole monomer in an aqueous solution. Dodecylbenzenesulfonic acid (DBSA) has been used as a dopant. TGA, DSC and XPS techniques revealed that thermal degradation of the PPy film consisted of 2 steps involving DBSA degradation in the range of 211 °C to 226 °C and degradation of PPy backbone itself in the range of 418 °C to 444 °C. The S/N ratios of the PPy films decreased with the increased treatment temperature. This result was associated with the degradation of DBSA anions incorporated in PPy chains. Nitrogen on the PPy films changed from the positively charged component to the imine type (-N=) resulting in the decreased electrical conductivity. In addition, the degradation rate of the PPy film was found to be directly dependent on the exposed temperature.

E_E0092 Aqueous processing of lead zirconate titanate: Effects of ball milling time

Nisanart Navapan-Traiphol[a,*], Rudeerat Suntako[a]
[a]Department of Materials Science, Faculty of Science, Chulalongkorn University, Bangkok, 10330, Thailand

Abstract: Effects of ball milling time on properties of lead zirconate titanate aqueous suspension were investigated in this study. Particle size distribution, stability and rheological behavior were studied by means of laser diffraction particle size analysis, sedimentation height and viscosity measurement, respectively. It was found that a colloidal particle size with unimodal distribution can be obtained by ball milling the suspension for 30 and 40 hrs. In addition, sedimentation height measurement showed an improvement in suspension stability. Extended ball milling time of 50 hrs, however, caused particle agglomeration and bimodal size distribution. Viscosity measurement showed that all suspensions exhibit shear thinning behavior with different shear rate exponents based on a power law model. The optimum concentration of ammonium polyacrylate dispersant for the system was also studied.

E_E0094 SYNTHESIS OF TIN OXIDE NANOPARTICLES BY SOL-GEL METHOD USING GELATING PROMOTER.

Wachirapunt Puntgrawee[1] and Sutatip Siripaisarnpipat[2]
Department of Chemistry, Faculty of Science, Kasetsart University, PO Box 1011 Kasetsart Chatujak Bangkok 10903, Thailand.
[1] E-mail: g4764024@ku.ac.th[2] E-mail: fscists@ku.ac.th

Abstract: Tin oxide (SnO_2) nanoparticles have been synthesized by sol-gel method starting from Sn(IV) inorganic salt and using epoxide as a gelating promoter. XRD pattern results revealed that the product was SnO_2. FTIR spectrum results exhibited characteristic frequencies of Sn-O-Sn vibration at 619 cm^{-1}. From TEM image, most of SnO_2 particles have spherical shape. Only few rodlike shape of SnO_2 were found.

E_E0095 Ga-GRADED CIGS THIN FILM ABSORBER GROWN BY CO-EVAPORATION METHOD.

Rachsak Sakdanuphab, Panita Chinvetkitvanich, Sojiphong Chatraphorn, Kajornyod Yoodee, Chanwit Chityuttakan
Semiconductor Physics Research Laboratory, Department of Physics, Faculty of Science, Chulalongkorn University, Bangkok 10330, Thailand
E-mail: chin_phy@hotmail.com, Tel. 02-2185108

Abstract: Ga-Graded CIGS polycrystalline thin films were grown by multi-source co-evaporation method using the two-stage (Cu-Ga-rich and Cu-Ga-off) process on soda-lime glass substrates as well as Mo coated soda-lime glass substrate at 500 °C. Using this technique, the 1.5-2.0 μm thick Ga-Graded CIGS thin films of Cu/(In+Ga) ratio = 1.2 in the 1st stage and Cu/(In+Ga) ratio = 0.9 at end point detection (EPD) were fabricated. The as-grown films were characterized for their structural, optical and morphology properties. XRD and SEM results show that all films are typically (112) oriented chalcopyrite with dense columnar grains. The surfaces of Cu-Ga-rich film at t_1 are uniformly smooth without grain separation and Cu-Ga-poor films at EPD show small sharp grain on the top part. From the optical transmission spectra, the film at t_1 shows small interference in the long wavelengths of 1,000-2,600 nm with the sharp cut-off at 1.47 eV and the film at EPD shows the graded band gap.

E_E0096 Preparation of Electrically Conducting Polymer Composites by the Wet-lay Process for Use as Bipolar Plates in a Proton Exchange Membrane Fuel Cell

Woraphong Khawprapan, Jantrawan Pumchusak
Department of Industrial Chemistry, Faculty of Science, Chiang Mai University, Muang, Chiang Mai 50200 Thailand.
E-mail: woraphong_kh@hotmail.com, jantra.t@chiangmai.ac.th, Fax: 66-53-892262

Abstract: Bipolar plate is an important component for the Proton Exchange Membrane Fuel Cell. The efficiency of fuel cell also depends on the conductivity of bipolar plate. This study investigated the preparation of conductive polymer composite by using wet-lay process. Polypropylene fiber was used as the matrix. Graphite and carbon fiber were added as conductive fillers. More quantity of graphite and carbon fiber resulted in the increasing of conductivity. The best conductivity, 21.6 S/cm, was found in the composite consisting of 25% matrix, 70% graphite and 5% carbon fiber.

E_E0097 REINFORCEMENT OF NATURAL RUBBER BY THE SOL-GEL PROCESS OF TETRAETHOXYSILANE AND ALKYLTRIETHOXYSILANE IN LATEX

Varawut Tangpasuthadol[1,*], Jirawan Siramanont[2], Nuchanat Na-Ranong[3], Amarawan Intasiri[1], Suda Kiatkamjornwong[4]
[1] Organic Synthesis Research Unit, Department of Chemistry, Faculty of Science, Chulalongkorn University, Bangkok, Thailand 10330
[2] Program of Petrochemistry and Polymer Science, Faculty of Science, Chulalongkorn University, Bangkok, Thailand 10330
[3] Rubber Products Industry Group, Post-harvest and Processing Research and Development Office, Department of Agriculture, Bangkok, Thailand 10900
[4] Department of Imaging and Printing Technology, Faculty of Science, Chulalongkorn University, Bangkok, Thailand 10330

Abstract: NR composite containing "in situ-generated" silica was prepared by the sol-gel process of ethoxysilanes that was mixed in commercially-available concentrated NR latex. Four types of ethoxysilanes: tetraethoxysilane (TEOS), vinyltriethoxysilane (VTOS), ethyltriethoxy-silane (ETOS), and iso-butyltriethoxysilane (BTOS), were studied. From SEM and TEM analysis of the composite, the in situ silica particles were fine and well dispersed in the dry NR matrix. The tensile modulus, tensile strength, and tear strength of the in situ silica-filled vulcanizates were higher than silica-NR vulcanizate prepared by mechanical mixing. Furthermore, the use of VTOS/TEOS mixture (5, 10 and 20 mol% VTOS) resulted in an increase of these three mechanical properties over to the vulcanizate prepared from only TEOS. The results lead to a conclusion that the vinyl group from VTOS most probably participates in the sulfur vulcanization.

E_E0098 ELECTROSTATIC SPINNING OF ACRYLATE AND METHACRYLATE COPOLYMERS: EFFECT OF SOLVENT SYSTEM

Chidchanok Meechaisue[1], Pornpen Khaiman[1], Sarawut Pornsirichotkul[1], and Pitt Supaphol[2]
[1] Department of Materials Technology, Faculty of Science, Ramkhamhaeng University, Bangkok 10240, Thailand
[2] Technological Center for Electrospun Fibers and The Petroleum and Petrochemical College, Chulalongkorn University, Bangkok 10330, Thailand

Abstract: Electrostatic spinning or electrospinning is the process in which the electrical forces are responsible for the production of ultra-fine fibers with diameters being in the range of nanometers to sub-micrometers. The electrospun fibers formed as

non-woven mats exhibit several interesting characteristics, for examples, large surface area to volume ratio, small pore size between depositing fibers of the fiber mats, making these electrospun fibers being suitable for use in biomedical applications. In this study, a copolymer of acrylate and methacrylate (Eudragit® RL100), usually used for producing of transdermal patches for drug delivery system, was fabricated into ultra-fine fibers by the electrospinning process. The effect of solvent systems, i.e., single solvent and mixed solvent, on morphological appearance and size of the obtained fibers was investigated by electron scanning microscopy (SEM).

E_E0099 FEASIBILITY STUDY OF BINDER SYNTHESIS FROM NATURAL RUBBER FOR USE IN MAKING RUNNING TRACKS IN THAILAND

Chanchai Thongpin, Komklit Wongtimnoi, Jirarat Kamolsawat and Patradanai Rotkasem
*Department of Materials Science and Engineering, Faculty of Engineering and Industrial Technology, Sanamchandra Palace Campus, Nakompathom, 73000. E-mail: chanchai@su.ac.th

Abstract: The aim of this research is to functionalize acrylate group onto natural rubber molecule in order to improve the reactivity of the rubber molecule for photocrosslinking. Natural rubber latex was firstly epoxidized then oxidized by periodic acid, at room temperature, giving rise to the low molecular weight natural rubber latex. The low molecular weight natural rubber latex was then being acrylate modified with acrylic acid at 50 °C. The acrylated epoxidized natural rubber latex was then radiated with UV of the wavelength 256 nanometer for 30 minutes. Darocure 1173 was used as photoinitiator in the photocrosslinking process. The crosslinked film was characterized, using FT-IR, and dissolved in toluene. It was found that the extent of crosslinking was increased as the amount of photoinitiator added was increased.

E_E0100 PREPARATION OF ELECTRICALCONDUCTIVE POLYCARBONATE COMPOSITE FOR BIPOLAR PLATES IN PEM FUEL CELL

Thitiporn Petudom, Jantrawan Pumchusak
Department of Industrial Chemistry, Faculty of Science, Chiang Mai University, Moung, Chiang Mai 50200 Thailand
E-mail: t.numfon17@hotmail.com, jantra.t@chiangmai.ac.th, Fax : 66-53-892262

Abstract: The development of using polymer composites instead of graphite plate for bipolar plate in polymer electrolyte membrane fuel cell (PEMFC) are interesting because they offer a high potential to reduce cost, light weight and corrosion-resistance. In this research, polycarbonate was used as matrix while, graphite and metal powders were used as electrical conductive fillers in composite preparation. Materials were mixed by two roll mill and molded by compression molding. The results indicated that electrical conductivity of composite increased as the amount of graphite increased. The electrical conductivity was 2.17 S/cm when polymer to graphite ratio was 30:70

E_E 0101 Effact of excess PbO on phase formation of lead barium titanate powers

Atthakorn Thongtha,Thiranee Khumlumlert, Theerachai Bongkarn*
Department of Physics, Faculty of Science, Naresuan University, Phitsanulok, Thailand

Abstract: In this work, Effect of excess PbO on phase formation of $(Pb_{0.925}Ba_{0.075})$ TiO_3 (PBT) powers was investigated. The PBT powers were prepared via the mixed oxide method under various of excess PbO contents. Then the mixed powders were calcined at 800 °C for 1 hour. The calcined powers were studied pharse development by X-ray diffractometer. It was found that the structural of PBT powers are tetragonal. An impurity pharse was found in the samples which contained excess PbO higher than 3 wt%. The c/a ratio is decresed with increasing of the excess PbO content. This indicates that the tatragonality of PBT could be reduced with the addition of excess PbO.

E_E0102 ELECTRON MICROSCOPY OF CAST ALUMINIUM A356

Suttawan Imurai[1], Torranin Chairuangsri[2], Chanchana Thanachayanon[3], J.T.H. Pearce[4]
[1] Department of Physics, Faculty of Science, Chiang Mai University, Chiang Mai, 50200, Thailand.
E-mail: s.imurai@hotmail.com, Fax: (665)389-2262
[2] Department of Industrial Chemistry, Faculty of Science, Chiang Mai University, Chiang Mai 50200, Thailand.
[3] National Metals & Materials Technology Centre, 114 Paholyothin Rd, Patumthani 12120, Thailand.

Abstract: Cast aluminium alloy, A356, has been widely used in the automotive industry due to its high ductility and strength-to-weight ratio. In this work, the microstructure of an A356 aluminium alloy, (Al-7%Si-0.3%Mg), was studied. The alloy was heat-treated by solution treatment at 540°C for 4 hours and aging treatment at 160 °C for 16 hours. Optical microscopy revealed that the eutectic structure became spheroidal after solution treatment, rather than a blade-like shape observed in the as-cast condition. Scanning electron microscopy confirmed that the chemical composition within the primary α-Al became homogeneous after solution treatment. The eutectic phases could be Si, Mg_2Si and also a minority of an intermetallic (Al, Fe, Si) phase. The effects of these phases on the mechanical properties of the A356 aluminium alloy were discussed.

E_E0103 Microstructure of Interface between Borosilicate Glass-Stainless Steel-Yittria Stabilized Zirconia.

Nattapol Laorodphan[1], Pratchya Narmwong[2], Manat Jaimasit[1], Worrapong Theimsorn[1], Torranin Chairuangsri[1], Sumittra Jarosrojkul[3], and Anucha Wannagon[3]
[1] Department of Industrial Chemistry, Faculty of Science, Chiang Mai University, Chiang Mai 50200, Thailand.
E-mail: m_e_n_g_ic4405@hotmail.com, Fax: (665)389-2262

[2] Department of Physics, Faculty of Science, Chiang Mai University, Chiang Mai 50200, Thailand.
[3] National Metals & Materials Technology Centre, 114 Paholyothin Rd, Patumthani 12120, Thailand.

Abstract: Joining of stainless steel to yittria stabilized zirconia (YSZ) using borosilicate glass as a sealant has been applied in a development of planar solid oxide fuel cell (planar-SOFC). In this work, interface between borosilicate glass-stainless steel-YSZ joined in an electrical furnace under normal atmosphere at 900 °C was studied. The borosilicate glass used has the B_2O_3: SiO_2 ratio of 0.2 and the coefficient of thermal expansion (CTE) of 10.58×10^{-6} °C^{-1}, which is close to that of the stainless steel and the YSZ. The microstructure and phases presented at the interface were investigated by scanning electron microscopy (SEM) and energy-dispersive x-ray spectrometry (EDS). The results revealed a fine crystalline phase devitrified at the region near to the interphase boundaries and the free surface of the glass. The EDS analysis suggested that these fine crystals are calcium-rich, alumino-silicate phase. Another large crystalline phase with blade-like shape was also observed nucleating on those fine crystals and growing into the amorphous glass. The latter could be a barium-rich, alumino-silicate phase. The effect of devitrification in the borosilicate glass at the borosilicate glass-stainless steel-YSZ interface to the properties of the assembly was discussed.

E_E0104 AN ALTERNATIVE FOR PREPARATION OF ENVIRONMENTALLY FRIENDLY CONDENSATION POLYMER: PREPARATION OF AQUEOUS DISPERSIBLE POLYURETHANES

Charoen Chinwanitcharoen[1], Kanoh Shigeyoshi[2], Toshiro Yamada[2], Kaoru Tada[2], Shunji Sugano[3] and Shunichi Hayashi[4]
[1] Department of Chemical Engineering, Faculty of Engineering, Burapha University, Chonburi, 20131 Thailand.
E-mail: charoen@buu.ac.th, Fax: (6638)745-806
[2] Department of Chemistry and Chemical Engineering, Faculty of Engineering, Kanazawa University, Japan.
[3] Negami Chemical Industrial Co., Ltd., Japan.
[4] Diaplex Co., Ltd., Japan.

Abstract: Polyurethane is one of the important condensation polymers. The study of waterborne dispersions of polyurethanes with zero content of conventional harmful organic solvents, such as N,N-dimethylformamide, has much attention due to increasing of environmental and ecological legislative pressures. In this work, stable aqueous dispersions of aromatic diisocyanate-based polyurethane anionomer were successfully prepared by phase inversion emulsification which water was added to polyurethane anionomer until the water became the continuous phase. As the phase inversion was complete, all water droplets in the system were simultaneously transformed into the continuous phase and discrete waterborne particles of polyurethane were formed. Various formulations were design to investigate the effect of process variables such as hard segment content, mole ration of isocyanate and hydroxyl group on the droplet size of emulsion, and type of neutralizing agent. In addition, the effect of emulsification method (i.e., direct emulsification and phase inversion emulsification) on the droplet size will be discussed.

E_E0105 BONE-LIKE APATITE FORMATION ON TITANIUM METAL VIA ELECTROCHEMICALLY PREPARED CALCIUM PHOSPHATE FILM

Dujreutai Pongkao Kashima, and Achariya Rakngarm
Research Unit of Advanced Ceramics, Department of Materials Science, Faculty of Science, Chulalongkorn University, Phayathai Rd., Patumwan, Bangkok 10330, Thailand. Tel.02-218-5552, E-mail: Dujreutai.P@Chula.ac.th

Abstract: This electrochemical deposition process was set up for preparation of calcium phosphate film on pure titanium (99.99%) substrate with 0.8 cm in width and 2 cm in length. These substrates were subsequently etched by 2M HF for 1 minute before electrochemical reaction. Calcium phosphate film could form at different current densities for each kind of electrolytes as follows: 10 mA/cm^2 for Monocalcium phosphate monohydrate (MCPM) based aqueous solution, 20 mA/cm^2 for MCPM based aqueous solution with NO^{3-} and F^- ion addition, 10 mA/cm^2 and 20 mA/cm^2 for MCPM based 20%V/V ethanol and 50%V/V ethanol solution, respectively. The variation in film thickness depended on the kind of electrolyte and deposition time. The major phase appeared in the film from MCPM based aqueous solution was brushite co-existed with monetite. Apatite was driven to form with ions addition of $NaNO_3$ and NaF. On the other hand, monetite was formed as a major phase under the electrolyte condition of MCPM based ethanol solution. After incubation in R-SBF (Revised Simulated Body Fluid) for interval times, the amorphous bone like apatite was detected by X-ray diffraction and scanning electron microscope technique.

E_E0107 Physical Properties of Clay

Nutchanun Sompao[1], Tosawat Seetawan[2]
[1] Thaphanom Industrial & Community Collcalge, Thaphanom District, Nakhon Phanom province 47000, Thailand
[2] Program of Physics, Sakon Nakhon Rajabhat University, 680 Nitayo Road, Muang District, Sakon Nakhon 47000, Thailand

Abstract: Clay samples were using clay from Nongyangcheen ban, Nungyangcheen district, Ranu Nakhon Amphur, Nakhon Phanom province, Thailand, study two regions were under surface soil around 1 m (Clay No.1) and under surface around 2 m (Clay No. 2).To observation the characteristics of the Clay No. 1 and No.2 at room temperature upon heating to 500 oC by Optical microscope. The results showed that the surface of Clay No.1 was more than hardness the Clay No. 2 and the Clay No. 2 was changed color with increases temperature. To find the crystal structure and most elements in the clays were measured by X-- ray diffraction (XRD). From the result of the XRD, the phases of Clay No.1 and Clay No.2 corresponded to the SiO2 element about 70-80%.

E_E0108 Crystal Structure and Electronic Properties : Rock Salts

Saovarotjanee Jantawang[1], Chalermchai Kaewmaneechai[1], Tosawat Seetawan[2]
[1] Phachongsamukkeewithaya, Nakae-renu Road, Nakae District, Nakhonphanom 48130, Thailand
[2] Program of Physics, Sakon Nakhon Rajabhat University, 680 Nitayo Road, Muang District, Sakon Nakhon 47000, Thailand

Abstract: Rock Salts samples from the Phasong district, Nakae Amphur, Nakhon Phanom, Thailand study. To verify the crystal of rock salt sample compared with the pure Sodium chloride (NaCl) were measured by X-ray diffraction (XRD) at room temperature and calculated crystal by Powder Cell 2.3 program. The results showed that the crystal structures were cubic in from and the lattice parameters a, b, c are 0.56481 nm. The electronic structure of rock salt was calculated by Discrete Variational Xα (DV-Xα) method showed that the model cluster, energy level and density of state. It was found that the Na13Cl14 is the cluster model of rock salt, the electronic structures were 3.2 eV, 1.8 eV and 1.8 eV of energy gap, conduction band and valence band, respectively.

E_E0109 Production of Pure and High Specific Surface Area Silica from Non-glutinous Rice Husks with Nitric Acid Pre-treatment

Juthamas Jitcharoen* and Thanapong ChuaChun*
*Department of Chemistry, Faculty of Science, Ubonratchathani University, Ubonratchathani, 34190, Thailand.

Abstract: The conditions of acid pre-treatment in production of pure and high specific surface area silica from non-glutinous rice husks with nitric acid pre-treatment were investigated in this research. The concentrations of HNO_3 were studied from 1 N to 7 N at refluxing temperature 60 - 70 °C and refluxing time from 3 hours. From the results, the optimum concentration for nitric acid pre-treatment was 3 N for pyrolysis at low temperature at 600 °C and short soaking time 3 horus. The % yields of produced silica varied from 16 - 23 %. The highest BET specific surface was found to be 500 m^2/g of sample treat with 3N. From scanning electron microscopy (SEM), x-ray diffractrometry (XRD) results, the produced silica were white amorphous silica and small grain sizes around 1 to 50 µm with broad grain size distribution. The purity of silica was about 98 - 99 % by weight.

E_E0110 Production of Pure and High Specific Surface Area Silica from Black Glutinous Rice Husks with Hydrochloric Acid Pre-treatment

Juthamas Jitcharoen[1], Arunya Pimmongkon[2] and Prachak Chantree[1]
[1] Department of Chemistry, Faculty of Science, Ubonratchathani University, Ubonratchathani, 34190, Thailand.
[2] Department of Biology, Faculty of Science, Ubonratchathani University, Ubonratchathani, 34190, Thailand.

Abstract: The preparation of pure and high specific surface area silica from black glutinous rice husks by hydrochloric acid pre-treatment was investigated. Due to get high pure amorphous silica using low temperature 600 °C and low soaking time 3 hours were applied in this research. The effects of concentrations of hydrochloric acid pre-treatment from 1 N to 7 N were studied. The refluxing temperature 60 °C and refluxing time for 3 hours were applied. From the results, the optimum concentration for hydrochloric acid pre-treatment was 5 N. The % yields of produced silica varied from 16 - 27 wt%. The highest BET specific surface was found to be 660 m^2/g of sample treat with 5N. From scanning electron microscopy (SEM), x-ray diffractrometry (XRD) results, the produced silica were white amorphous silica and small grain sizes around 1 to 100 µm with broad grain size distribution. The purity of silica was about 99. % by weight.

E_E0011 DYE POWDER FROM LOCAL PLANTS FOR SILK DYEING

Teeraphol Phromsopha Wanna Kanchanamayoon* Chintana Chitchamnong
Department of Chemistry, Faculty of Science, Mahasarakham University, Mahasarakham 44150, Thailand.
E-mail:wanna.s@msu.ac.th

Abstract: Preparation of dye powder from local plants; the barks of *Pithecolobium dulec* Benth.,the leaves of *Terminalia catappa* Linn., the root of *Curcuma longa* Linn., the fruits of *Disopyros mollis* Griff., the flowers of *Clitoria termatea* Linn. and the flowers of *Hibiscus sabdariffa* Linn. were studied. The plant materials were extracted in boiling water (ratio 1:30, 120 min.) and evaporation to dryness on water bath. Production of dye powder by water bath are found easy and non-expensive. Dye powder was used for silk dyeing by direct dyeing without and with mordant. Alum and ferric oxide were used as mordant for silk dyeing. The dyeing with alum mordant showed brighter colors, while ferric oxide showed darker color than direct dyeing. Light fastness was tested according to ISO 150-B02(1994). Dyeing without and with mordant are showed the standard grey scale in the same value.

E_E0012 Production of Pure and High Specific Surface Area Silica from Black Glutinous Rice Husks with Hydrochloric Acid Pre-treatment

Juthamas Jitcharoen[1], Arunya Pimmongkon[2] and Prachak Chantree[1]
[1] Department of Chemistry, Faculty of Science, Ubonratchathani University, Ubonratchathani, 34190, Thailand.
[2] Department of Biology, Faculty of Science, Ubonratchathani University, Ubonratchathani, 34190, Thailand.

Abstract: The preparation of pure and high specific surface area silica from black glutinous rice husks by hydrochloric acid pre-treatment was investigated. Due to get high pure amorphous silica using low temperature 600 °C and low soaking time 3 hours were applied in this research. The effects of concentrations of hydrochloric acid pre-treatment from 1 N to 7 N

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F_F0001 Application of RAPD in genetic analysis related to growth rate of green catfishes (*Mystus nemurus*).

Sasuree Jarujit[1], Nison Sattayasai[2], Suporn Nuchadomrong[2], Sompong Doolgindachabaporn[3], Ponchai Jaruratjamon[3]
[1] Graduate School, Khon Kaen University, Mittraphab Road, Khon Kaen 40002, Thailand.
E-mail: Noburoa @hotmail.com, Tel: +66-43-342911, Fax: +66-43-342911
[2] Department of Biochemistry, Faculty of Science, Khon Kaen University, Khon Kaen, Thailand.
[3] Department of Fisheries, Faculty of Agriculture, Khon Kaen University, Khon Kaen, Thailand.

Abstract: Green catfish (*Mystus nemurus*) is a kind of freshwater fishes and one of the most highly demanding fishes from markets both inside and outside Thailand. Nowadays, green catfishes in nature become smaller in size. Due to the market demand, green catfish aquaculture should be well-planned to obtain high production with good quality. In the present study, fish samples at ages of 9 months were collected from Chiang Rai. They were divided into six groups by sex and weight: small, medium and large sizes of females and males. Each group contained 4 individuals (n = 4). Upper part of the caudal fin tissue was cut for DNA extraction. Each DNA sample was used as a template in RAPD fingerprinting by seven primers . The fingerprints were then analyzed by using fingerprinting ™ II program. The genetic distance (D) was between 0.12-0.29. Dendrogram by Pearson's model divided green catfish populations into 2 groups. The big males, big females, and medium-sized males were in one group whereas the small males, small females and medium sized female were in the other group. The DNA fingerprints showed that the DNA bands at 500 bp (OPA10 primer), 700 bp (OPA11 primer), 800 bp and 2072 bp (OPA12 primer) only appeared in large female fishes. These DNA fragments may be markers for selection of female green catfish broodstocks .

F_F0002 EFFICIENCY OF SAND, ACTIVATED CARBON AND BIOBALL FOR WATER TREATMENT IN ARTEMIA CULTURE TANK

Chalee Paibulkichakul*, Jaruwan Buakheaw and Benjamas Paibulkichakul
Faculty of Marine Technology, Burapha University, Chanthaburi Campus, Thailand
* E-mail of corresponding author: pchalee@buu.ac.th

Abstract: This study was divided into 2 experiments. The objective of the first experiment was to study the efficiency of sand, activated carbon and bioball for filtration of total suspension solid (TSS), color and inorganic nitrogen compounds, respectively. Result revealed that 6 and 4 cm wide layers sand and activated carbon had the highest filtration. For bioball filtration, the highest removal of inorganic nitrogen compound found at 226 cm^2 surface area.
The second experiment applied the results from first experiment to operate in artemia culture tank. Density of cultured artemia in 30x60x30 cm aquarium was 1,500 individual/L. Water quality and all artemia parameters were compared between culture units with and without filter units. The filter unit could remove 34.15% ammonia, 72.71% nitrite, 21.84% nitrate, 33.69% orthophosphate, 74.30% TSS, 78.12% water color and boost 158.54% survival rate, 14.69% artemia length and 36.99% number of artemia cyst. However, size of artemia cyst were not significant different (P>0.05). The result of this study presented the filter unit could improve water quality and artemia growth.

F_F0004 MASS PRODUCTION MICROSPORIDIAN (PROTOZOA) TECHNIQUE FROM *SPODOPTERA LITURA* FABRICIUS (LEPIDOPTERA: NOCTUIDAE)

Suchonwat Wongwilikhit[1] and Vacharee Somsook[1]
[1] Plant Protection Research and Development office,Department of Agriculture, Chatuchak, Bangkok. 10900. Thailand.
E-mail: norf@doa.go.th, Tel: (662)579-7580 Fax: (662)940-6895

Abstract: Mass production of Microsporidia (Protozoa) Genus *Vairimorpha* spp. from *Spodoptera litura* Fabricius was studied. The experiment was designed in Factorial in CRD, 2 factors(2x2) with 2 treatments and 3 replications (10 larvae/replication). Factor A, samples were harvested from dead and moribund larvae. Factor B, samples were incubated at 4°C and 25°C. Concentration used for infection was 1.2 x 10^4 spores/larva. After that, spores were in directly counted using haemocytometer and the colonies were counted on nutrient agar plates. The result showed that the spores from moribund larvae kept at 25 °C had the was highest spores significantly(1.34 x 10^{10} spores/larva) and the bacteria contamination was not significant at both temperatures. This mass production of microsporidian from *S. litura* is new technique and had low bacteria contamination. This Microsporidia can be produced and used as the biological control agent.

F_F0006 Micropropagation of *Phalaenopsis Cygnus* 'Silky Moon' from leaf segments

Tuangporn Rojanawong, Chockpisit Thepsithar and Aree Thongpukdee
Department of Biology, Faculty of Science, Silpakorn University, Nakhon Pathom 73000, Thailand

Abstract: The appropriate medium for protocorm-like body (PLB) induction from leaf segments of *Phalaenopsis* Cygnus 'Silky Moon' was established. Plants, about 3 months old, were cultured in the dark condition for 1 month, then young etiolated leaves, only half basal ends, were excised transversely about 1-2 mm thick, and cultured on modified half-strength of Murashige and Skoog (1/2MS) medium supplemented with 0-66.6 µM of benzyladenine (BA) in combination with 0-10.74 µM of ∞- naphthalene acetic acid (NAA). It was found that 1/2 MS medium added with 22.2 µM BA provided the best number of PLBs with 9.3 PLBs per explant within 3 months. PLBs were then transferred to three media (MS, Vacin and Went (VW) and modified Hyponex) for plantlet regeneration. The modified Hyponex was shown to be the suitable medium for plantlet regeneration.

F_F0007 In vitro multiple shoot induction of physic nut (*Jatropha curcas*)

Nannapat Thepsamran, Chockpisit Thepsithar and Aree Thongpukdee
Department of Biology, Faculty of Science, Silpakorn University, Nakhon Pathom 73000, Thailand

Abstract: The appropriate *in vitro* multiple shoot induction medium for physic nut (*Jatropha curcas* L.) from axillary bud-derived shoots, about 0.7 cm., was established. Shoot proliferation was assessed on Murashige and Skoog (MS) medium supplemented with singly different concentrations of N^6 benzyladenine (BA) and in combinations with indole-3-butyric acid (IBA). MS medium with 2.22 µM BA and 0.049 µM IBA provided the best shoot multiplication about 5.9 shoots from an axillary bud-derived shoot for 6 weeks. Regenerated shoots were rooted on MS medium with 2.46 µM IBA after 5 weeks, then transferred to MS medium without plant growth regulator.

F_F0008 *In vitro* flower bud induction of *Phalaenopsis Cygnus* 'Silky Moon' from seed-derived plantlets.

Tuangporn Rojanawong, Chockpisit Thepsithar and Aree Thongpukdee
Department of Biology, Faculty of Science, Silpakorn University, Nakhon Pathom 73000, Thailand

Abstract: The induction of flower buds *in vitro* of *Phalaenopsis* Cygnus 'Silky Moon' was developed. Young plants about 2 months old, derived from seeds, were cultured for 4 months on Vacin and Went medium (VW) supplemented with 100 g/L potato juice, 2 g/L peptone and 20-50 g/L sucrose at pH 5.6. Then, plants without roots were transferred onto modified VW medium containing 4.5 mM total nitrogen and 22.2-66.6 µM benzyladenine (BA). 14-43% of flower bud-induced plants were observed at 60-120 days of spiking with average spike length about 0.5-1 cm. The results showed that many factors influenced on flower bud initiation such as sugar content in plants, nitrogen and BA concentrations in medium.

F_F0009 EFFECTS OF CULTURE MEDIUM TYPES ON SOME GROWTH CHARACTERS OF TISSUE-CULTURE-DERIVED TUBERS OF *CALADIUM BICOLOR* AIT. CV. 'CHAO YING'

Preeda Sansri, Aree Thongpukdee and Chockpisit Thepsithar
Department of Biology, Faculty of Science, Silpakorn University, Sanamchandra Palace Campus, Muang, Nakhon Pathom, 73000, Thailand. Fax:(6634)255-820

Abstact: Tissue-culture-derived tubers of *Caladium bicolor* Ait. cv. 'Chao Ying' at approx. 0.4 cm. dia. x 0.8 cm. long were transplanted in 11 different culture types (ie. 6 monotypic media: soil, dried Rain-tree (*Samanea saman*) leaves (DRTL), dried Madras-thorn (*Pethecellobium dulce*) leaves (DMTL), dried Copper-pod (*Peltophorum pterocarpum*) leaves (DCPL), pumice, vermiculite) and 5 ditypic media (ie. mixture of soil with each of other five monotypic material at the ratio of 1:2). At 30 days after transplanting, *Caladium* tubers showed the highest growth via number of leaf, width and length of the 4th leaf of 7.10±0.42 leaves, 4.07±0.38 cm., 5.94±0.53 cm. respectively in pots filled with monotypic medium, DRTL. There were lower but no significant differences in those parameters found in pots filled with ditypic medium, soil plus DRTL or soil plus DMTL. Vermiculite had highest ability on water uptake while the highest water releasing ability occurred in soil.

F_F0010 Multiple shoot induction of asparagus (*Asparagus officinalis* L.)

Ratapon Sukamsaig, Chockpisit Thepsithar and Aree Thongpukdee
Department of Biology, Faculty of Science, Silpakorn University, Nakhon Pathom 73000, Thailand

Abstract: The appropriate medium for multiple shoot induction from single node of asparagus (*Asparagus officinalis* L.) cv. Block's Improve was investigated. Single nodes of shoots derived from axillary buds of young spear were cultured for 6 weeks on Murashige and Skoog (MS) medium supplemented with 0.27-2.69 µM naphthaleneacetic acid (NAA) singly or in combination with 0.23-2.32 µM Kinetin (Kn). The best shoot multiplication, with 4.3-5.8 shoots per explant and 10.1-10.5 total nodes, occurred on MS added with 0.27 or 0.54 µM NAA and 0.23 µM Kn. Whilst MS medium supplemented with 2.69 µM NAA and 0.46 µM Kn provided 4.1 roots per explant and average root length 0.92 cm. with poor shoot multiplication.

F_F0011 Potential of agar substitutes to tissue culture of chrysanthemum (*Dendranthemum* spp.)

Nipan Ratchapol Srathongjai, Chockpisit Thepsithar and Aree Thongpukdee
Department of Biology, Faculty of Science, Silpakorn University, Nakorn Pathom 73000, Thailand

Abstract: Nine low-cost substitutes for agar; cassava starch, corn flour, mung bean starch, rice starch, glutinous rice starch, tapioca pellets, cassava pellets, malva nuts and science soil 2, were investigated to be gelling agents in application to plant tissue culture media. Murashige & Skoog's (MS) basal medium was prepared without plant regulator supplemented with different concentrations of each agar substitute alone or in combination with agar, total 38 formulas. Stability of each formula was verified weekly interval for 4 weeks. Only 10 formulas were chosen and chrysanthemum shoots were cultured for one month. As the result, all substitutes for agar were promising to be gelling agents. The gelling agent consisted of 40 g/L rice starch in combination with 4 g/L agar provided the best outcome for chrysanthemum growth, while 30 g/L malva nut seed coat mixed with 3g/L revealed induction of root initiation. However, applications of these agar substitutes should be considered to achieve the optimum benefit.

F_F0012 THE EFFECT OF CULTIVARS AND MANGO RIPENING STAGE ON RECOVERY PERCENTAGE OF PACLOBUTRAZOL DETERMINED BY SOLID-PHASE MICROEXTRACTION (SPME) TECHNIQUE WITH GAS CHROMATOGRAPHY-MASS SPECTROMETRY (GC-MS)

Anuwat Jaradrattanapaiboon[1/], Pittaya Sruamsiri[1/], Martin Leitenberger[2/], Sybille Neidhart[2/], Reinhold Carle[2/].

[1/] Department of Horticulture, Faculty of Agriculture, Chiang Mai University, Chiang Mai, 50200 Thailand. E-mail: ajr_zhang@yahoo.com, Fax:(6653)892716

[2/] Institute of Food Technology, Section Plant Foodstuff Technology, The University of Hohenheim, D-70593 Stuttgart, Germany.

Abstract: Three mango cultivars (Kent, Haden and Palmer) were selected for determining the effect of cultivars on the recovery percentage of paclobutrazol (PBZ) measured by SPME-GC-MS technique. For the influence of ripening stage, the cultivar Tommy Atkins was chosen. Prior to the analysis of PBZ, all mango samples were blended with the standard solution of PBZ at the concentration of 0.7 mg/kg mango. It was found that among the three cultivars studied the recovery of PBZ in cv. Palmer was the lowest (62.81%). The recovery percentage of PBZ was also affected by ripening stage. It was significantly decreased at the day 4 of ripening where the mangoes reached their eating-ripe stage. It dropped from 99.3% at harvest to 83.7% on day 4 of ripening. The extraction of PBZ appeared to be enhanced when mangoes became soft.

F_F0013 Effect of calcium chloride infiltration on quality and storage life of tomato (*Lycopersicon esculentum* Mill)

Sompoch Gomolmanee and Chanthaporn Chinaraj

Department of Postharvest Technology, Faculty of Engineering and Agro-industry, Maejo University, Chiang Mai, Thailand. E-mail address: sompoch@mju.ac.th

Abstract: Mature green tomatoes were harvest from Ban Luang, Omkoi district, Chiangmai. Tomato fruits were carried to Maejo University in the same day. Fruits were washed in tap water, dipped in 100 ppm chlorine solution for 10 minutes and 500 ppm benomyl solution for 5 minutes. Fruits were dipped in 0, 0.5, 1.0 or 1.5% of calcium chloride and evacuated air about 350-400 mm-Hg for 10 minutes (infiltration). Then the fruits were placed on foam tray and wrapped with PVC film. The fruits were kept at 5 degree Celsius, 85% RH. It was found that vitamin C content and respiration rate were increased, while firmness, total soluble solids and total acids were decreased. The fruits which dipped in 0.5% $CaCl_2$ infiltration could delay ripening.

F

F_F0014 Developments of subsurface irrigation system using porous ceramics for minimum irrigation

Sukthai Pongpatanasiri*

* School of Agriculture Natural Resources and Environment, Naresuan University (Phayao Campus) 56000

Abstract: The purpose of this research is the development of a subsurface irrigation system to control the efficient use of water resources. The porous ceramics was invented to both hold and control the release of water to plant production. The result of the subsurface irrigation system using spherical porous ceramics found higher efficiency of water use than with conventional irrigation. Additionally, the application of porous ceramics for subsurface irrigation was effective for reducing evaporation.

F_F0015 *In vitro* shoot culture of olive (*Olea europaea* L.) cv. Arbequina

Pathra Sakunasingh, Chockpisit Thepsithar and Aree Thongpukdee

Department of Biology, Faculty of Science, Silpakorn University, Nakhon Pathom 73000, Thailand

Abstract: Surface sterilization of (*Olea europaea* L.) cv. Arbequina nodes, using 0.1% Kanker-X for 25 min and 2% Benlate for 10 min. following with 15% Clorox for 5 min. and 5% Clorox for10 min., provided 80.87% of survival in sterilized conditions. Nodal segments were cultured on Murashige and Skoog (MS) medium for 3 weeks to induce shoots from axillary buds. Then, shoots, about 0.6-0.8 cm., were cultured on Murashige and Skoog medium supplemented with different concentrations of Kinetin (Kn) or Benzyl adenine (BA) either singly or in combination with Naphthaleneacetic acid (NAA) and Gibberellic acid (GA_3). The medium containing 2.22 µM BA + 0.27 µM NAA + 2.89 or 5.78 µM GA_3 induced the best shoot proliferation with 3.3 and 3.5 shoots per explant, respectively.

F_F0016 APPLICATION OF FIXED-BED CONTACTING TECHNIQUE FOR EXTRACTING EFFECTIVE INGREDIENTS FROM NON-TAI-YAK (STEMONA spp.) ROOT AGAINST ONION CUTWORM (*Spodoptera exigua* HUBNER)

U. SANGUANPONG [1]

[1] Department of Postharvest Technology and Processing Engineering, Faculty of Agricultural Engineering and Technology, Rajamangala University of Technology Thanyaburi, Patumtani 12110, THAILAND E-mail: unchalee @rmut.ac.th; Fax (66 2) 549 3360

Abstract: By using fixed-bed contacting method with serial and parallel technique, optimal solvents for the extraction of secondary metabolites from root of *Stemona tuberosa* have been determined. It was shown that in most cases the yields of crude extract were highest using parallel technique than serial technique. The highest yield of crude extract by using both techniques were obtained with acetone, followed by water, ethanol, methanol, dichloromethane and hexane respectively. Furthermore it was found that the L-a-b value and the total soluble solid (TSS) value in term of degree Brix of crude extracts

were different with employed organic solvents. In particular, dichloromethane has derived more total soluble solid from plant material with both techniques, followed by hexane, ethanol, acetone, water and methanol respectively.

The efficacy of different crude extracts from *S. tuberosa* against *Spodoptera exigua* were experimented. It was observed that the high toxic to larvae was the crude extract with employed high polarity solvents such as water, methanol and ethanol. The results suggested that water extract with high concentration could promote higher mortality. On the other hand, hexane extract caused approximately 30 % mortality with highest concentration at 15 %. Besides, dichloromethane and acetone extract could be considered as similar efficacy.

F_F0017 Application of Agricultural wastes for Hand Made Papermaking

Supannika Kittilikitsak, Aree Thongpukdee, Chockpisit Thepsithar
Department of Biology, Faculty of Science, Silpakorn University, Sanamchandra Palace Campus, Muang, Nakorn Pathom, 73000, Thailand. Fax:(6634)255-820

Abstract: Hand made papermaking from 3 kinds of agricultural waste (young coconut husk, pineapple peel and sugar cane bargasse) were done after soda pulping process with 2% (w/v) NaOH under ratio of waste to the solution at 1:30 (w/v) for 2 hrs. The young coconut husk showed highest Slenderness ratio of 130, indicating as favorable raw material for making paper. To study factors affecting pulping process from this raw material, it was later cooked in 2 variable factors, ie. NaOH at 1.0, 2.0 and 3.0 %(w/v) and 2 cooking periods at 3 and 4 hours. The color intensity, texture and smoothness of resulting paper depended on alkaline concentration and cooking period, while its tearing resistance property showed inversely depending upon these factors. An increasing concentration of NaOH and longer period for cooking decreased Tensile Index (Standard: TAPPI T.2220) and Brightness (Standard: ISO 2470). Natural glue extracted from Ceylon Spinach (*Basella* rubra L.) affected increasing Tensile Index for 20.34% and 93.33% but decreasing Brightness value for 2.61%and 4.24% in papermaking from 1%and 2% (w/v) NaOH and under 3 and 4 hrs cooking period, respectively.

F_F0018 Study of tanning fish skins by vegetable tannins

Penpisut Hormsuwan, Chockpisit Thepsithar and Aree Thongpukdee
Department of Biology, Faculty of Science, Silpakorn University, Nakhon Pathom 73000, Thailand

Abstract: Processes of tanning grey featherback (pla cha-lad) skin were investigated. Fresh skins were soaked in lime water [$Ca(OH)_2$], ash water and sodium metabisulphite at different concentrations and times. It was found that 25% lime water for 48 hr. provided the best result in stopping the decay of fish skin. The skins were then treated with different concentrations of 5% distilled vinegar for 5 min to remove all flesh remnants and to puff the skin slightly. The ratio of 5% distilled vinegar to distilled water at 1:1 (V/V) was the best to make the skins puffing, soft, flexible and odorless. The treated skins were tanned with vegetable tannins from rose petal, peat coconut, tea leaf, guava leaf, eucalyptus leaf and cinnamon. There were on differences among these vegetable tannins. The skins were tuff, flexible but not soft and elastic. The tanning skins were then softened with 2:1 (V/V) of glycerol to distilled water.

F_F0019 Hand Made Papermaking from Lesser reedamace (*Typha angustifolia* L.)

Pachaya Ngamtin, Aree Thongpukdee, Chockpisit Thepsithar
Department of Biology, Faculty of Science, Silpakorn University, Sanamchandra Palace Campus, Muang, Nakhon Pathom, 73000, Thailand. Fax:(6634)255-820

Abstact: Hand made papermaking from leaf pulp of Lesser reedamace (*Typha angustifolia* L.) derived from soda pulping process with 7 concentration levels of alkaline solution at 0.5, 1, 2, 5, 10, 15 and 20% (w/v NaOH) was done under ratio of pulp to the solution at 1:10 (w/v). The satisfied yielded pulp was released from cooking process in 5 and 10% (w/v) NaOH. In order to find suitable period for cooking, the leaves of Lesser reedamace were cooked in these solutions under 3 variable periods of 1, 2 and 3 hours. The best properties of pulp for papermaking were taken from cooking process in 10% (w/v) NaOH for 2 hours with percentage of total yield, Brightness value (Standard: ISO2470), Tensile Index (Standard: TAPPI T.2220) and Moisture content in pulp of 21.27%, 35.54, 10.20 kN.m/kg and 72.45% respectively. Mucilagenous extraction from unriped fruits of *Coccinea grandis* (L.)Voigt at ratio at 1:10 affected increasing Tensile Index for 84.41% but decreasing Brightness value for 3.40%.

F_F0024 Biocontrol of *Lasiodiplodia* spp. by *Bacillus* Species Isolated from Thua Nao

Kanjana Niraphai[1], Uraporn Sardsud[2] and Ekachai Chukeatirote[1]
[1] School of Science, Mae Fah Luang University, Chiang Rai 57100, Thailand
[2] Department of Biology, Faculty of Science, Chiang Mai University, Chiang Mai 50200, Thailand

Abstract: One hundred and seventy bacterial strains previously isolated from *thua nao* were screened for their antagonistic ability against *Lasiodiplodia* species. Of these, 39 strains were able to inhibit the fungal growth in dual culture as observed by the inhibitory zones. Radial growth reduction calculated in relation to the control growth was between 25 and 67.5%. Based on cell morphology, most bacterial isolates were Gram-positive, endospore-forming bacilli. These bacterial species offer a potential use as a biocontrol agent(s) of the postharvest pathogen *Lasiodiplodia*.

F_F0026 SELECTION OF ORIENTAL PICKLING MELON (*CUCUMIS MELO VAR. CONOMON*) FOR COMPACT PLANT HABIT

Pramote Pornsuriya and Pornthip Pornsuriya
Department of Plant Science, Faculty of Agriculture and Natural Resources, Rajamangala University of Technology Tawan-Ok, Bangpra, Sriracha, Chonburi, 20110, Thailand.
E-mail: pornsuriya@hotmail.com, Fax: (6638)341808-9.

Abstract: The compact habit plant of oriental pickling melon was accidentally found during the line selection for round fruit. It was around 50 cm of plant length, with short internodes and no lateral branch. The plant was artificially cross-pollinated since it was gynoecious. The progenies were grown in the next season and found that the population mean in plant length was 260 cm, whereas the shortest plant was 89 cm. The following population which selfed from the shortest plant had plant length ranging from 67 to 310 cm, and mean of 182 cm. The selection gain obtained was high as 30 percent, indicated feasibility in breeding for this character. Correlations determined in plant length with internode number and with internode length were statistically significant (r = 0.78 and 0.61, respectively). In consideration of lateral branch, the present population still had lateral branch development, however, short plants also tended to have short lateral branches.

F_F0027 Safety Evaluation of Crocodile Blood Diet

Win Chaeychomsri[1], Jindawan Siruntawineti[1], Boongeua Vajarasathira[1], and Yosapong Temsiripong[2,3]
[1] Department of Zoology, Faculty of Science, Kasetsart University, Bangkok, Thailand
E-mail:fsciwcc@ku.ac.th, Fax: (662)942-8695
[2] Sriracha MODA Farm, Chonburi, Thailand
[3] Crocodile Management Association of Thailand (CMAT)
E-mail address: yosapong@srirachamodal.com, Fax: (662)354-7174

Abstract: The safety evaluation of crocodile blood diet either fresh or freeze dried form were performed in 5 groups of both sexes of Wistar rats. The crocodile blood was orally administered for 7 weeks. The blood ingestion had no effect on rat behavior and survival. After taking the crocodile blood 0, 12 and 24 weeks, the rat blood was collected from tail-vein for hematological investigations. The hematological values did not reveal differences between the treated and the control groups. The biochemical values including alkaline phosphatase (ALP), aspartate transaminase (AST), alanine transaminase (ALT), blood glucose, blood urea nitrogen (BUN) and albumin were not significantly different among experimental groups throughout the study time. Histopathological examinations of the liver and kidney tissue specimens showed no differences in pathological findings between the treated and the control groups. These data suggest the safety of crocodile blood as food supplement in tested animals.

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F_F0029 9-*epi*-Viridiol, A NOVEL CYTOTOXIC FURANOSTEROID FROM SOIL FUNGUS *Trichoderma virens*

Jakaphan Rangsan[1,2], Preecha Phuwapraisirisan[1], Pongpun Siripong[3] and Santi Tip-pyang[1]
[1] Natural Products Research Unit, Department of Chemistry, Faculty of Science, Chulalongkorn University, Bangkok 10330, Thailand
[2] Program of Biotechnology, Faculty of Science, Chulalongkorn University, Bangkok 10330, Thailand
[3] Natural Products Research Section, Research Division, National Cancer Institute, Bangkok 10400, Thailand

Abstract: A novel furanosteroid named 9-*epi*-viridiol (1), along with viridiol (2) and mevalonic acid (3), was isolated from *Trichoderma virens*. The structure of 1 was verified by combined spectroscopic data (COSY, HSQC, HMBC and NOESY) to be a C-9 epimer of viridiol. 9-*epi*-Viridiol exhibited cytotoxicity towards HeLa and KB cells with IC_{50} values of 19 and 50 µg/mL, respectively.

F_F0030 BIOACTIVE COMPOUNDS FROM FUNGUS *Bipolaris oryzae*

Kanokwan Sawang[1,2], Santi Tip-pyang[2] and Preecha Phuwapraisirisan[2]
[1] Program of Biotechnology, Faculty of Science, Chulalongkorn University, Bangkok 10330, Thailand.
E-mail: kanokwann@msn.com
[2] Natural Products Research Unit, Department of Chemistry, Faculty of Science, Chulalongkorn University, Bangkok 10330, Thailand.

Abstract: In the course of preliminary screening test for bioactive compounds from 12 plant pathogenic fungi, *Bipolaris oryzae* was selected for further investigation. After isolation and purification of bioactive compounds from ethyl acetate crude extracts by using chromatographic techniques we have found 7 compounds and divided into two groups were four ophiobolins, 3-anhydroophiobolin A (**1**), ophiobolin I (**2**), ophiobolin A (**3**) and 6-ophiobolin A (**4**), and three cochlioquinones, isocochlioquinone A (**5**), isocochlioquinone C (**6**) and anhydrocochlioquinone A (**7**). Compound **7** has not been previously reported in the literature. The structures of all isolated compounds were elucidated on the basis of spectroscopic methods, as well as comparison with previously reported. The study of cytotoxic activity against cell-lines and acetylcholinesterase inhibition were investigated Compound 2 showed highest cytotoxic activity against HeLa cell-lines and KB cell-lines at IC_{50} <0.1 and 0.89 µg/mL, respectively. In addition the acetylcholinesterase inhibition assay, Compound **1**, **2**, **3**, **4**, **5**, and **7** showed the potential inhibition at concentration 1 mg/mL.

F_F0032 PLANT PATHOGENIC FUNGAL AGENTS BASED ON BERBERINE

Wanchan Noppanit[1], Udom Kokpol[2], and Warinthorn Chavasiri[2]
[1]Department of Biotechnology, [2]Natural Products Research Unit, Faculty of Science, Chulalongkorn University, Phayathai Road, Bangkok 10330, Thailand.
E-mail:wanchan_n@hotmail.com

Abstract: Berberine was extracted from *Coscinium fenestratum* (Gaertn.) Colebr. Antiphytopathogenic fungal activities against various plant pathogenic fungi (*Phytophthora parasitica, Phytium spp., Colletotrichum gloeosporioides, Cercospora spp., Fusarium oxysporum* and *Alternaria porri*) was tested and IC_{50}'s are 48, 284, 1011, 653, 599 and 101 ppm, respectively. There derivatives of berberine such as 8-methoxy-7,8-dihydroberberine, tetrahydroberberine (canadine) and 8-trichloromethyl-7,8-dihydroberberine were prepared. The antiphytopathogenic fungal activity compared with berberine and positive control such as tipoconazone or diphenoconazone were conducted.

F_F0034 SCREENING FOR AMYLASE, LIPASE, CASEINASE AND CELLULASE FROM MICROORGANISMS IN A.M. FERMENTED EXTRACT

Onanong Pringsulaka, Jaruwan Namnowsang, Somjai Siripoke and Kajeenart Potivejkul
Department of Biology, Faculty of Science, Srinakharinwirot University, Bangkok 10110
E-mail:onanong@swu.ac.th, Fax: (662)260-0127

Abstract: The total count, isolation and primary screening of microbial amylase, lipase and cellulase from A.M. fermented extract were investigated. The viable counts of three samples, named as A.M.1 stock solution, A.M.2 solution plus Leech Lime and A.M.3 (diluted A.M. 1) **were 113x10², 60x103 and 223x102 CFU/ ml, respectively. In all, the most kinds of** microorganisms were gram-positive rods, gram-positive cocci and yeast. Of the 28 microbial isolates tested, 4 isolates were capable of producing amylase as well as lipase. None of isolates found to produce cellulase and caseinase. These 4 isolates, which were shown to produce amylase and lipase, were identified as *Bacillus* spp.

F_F0035 FLAVOR QUALITY OF YOUNG BLACK PEPPER

Sumitra Boonbumrung*, Warunee Varanyanond[1], Juta Mookdasanit[2], Khaemaporn Boonbumrung[3]
*,[1]Institute of Food Research and Product Development, Kasetsart University 50 Paholyothin road, Chatuchak, Bangkok 10900, Thailand
[2] Deparment of Fishery Products, Faculty of Fisheries, Kasetsart University 50 Paholyothin road, Chatuchak, Bangkok 10900, Thailand
[3] Department of Transfusion Medicine, Faculty of Allied Health Sciences, Chulalongkorn University, Payathai road, Patumwan, Bangkok 10330, Thailand* To whom correspondence should be addressed.
E-mail: ifrstb@ku.ac.th

Abstract: The volatile components of young black pepper were analyzed and compared the flavor quality with black pepper. Based on odor unit value (Uo), it was found that linalool, δ-3-carene, α-pinene, myrcene, β-caryophyllene, α-phellandrene, limonene, terpinolene, β-pinene, and humulene were characteristic representatives of pepper aroma cultivated in Vietnam, Cambodia, Malaysia and Thailand. From triangle test, panelists were not able to distinguish between young and black pepper oil ($P \geq 0.05$). Moreover, the panelists were not able to differentiate fired pork prepared from black pepper oil or young pepper oil ($P \geq 0.05$). Therefore, young black pepper oil could be used instead of black pepper oil for enhancing food flavor. This study supported the utilization of agricultural waste product from black pepper processing.

F_F0036 Importance of vanadium contamination in fertilizers and its effect on plant growth

Narumol Vachirapatama[1*], Yaowapha Jirakiattikul[2], Boonhong chongkid[2]
[1] Department of Chemistry, Faculty of Science and Technology, Thammasat University, Rangsit, Pathumthani, 12121, Thailand, e-mail: nvachira@yahoo.com
[2] Department of Agricultural Technology, Faculty of Science and Technology, Thammasat University, Rangsit, Pathumthani, 12121, Thailand

Abstract: Vanadium (V) commonly contaminates in phosphorus fertilizers and soils. The aims of the present research were to determine the quantity of vanadium in fertilizers and to investigate the effect of vanadium on plant growth. Chinese green mustard, tomato and rice samples were used in this study and were cultured hydroponically. The plants were exposed to a solution containing 6 different concentrations of ammonium metavanadate (0.0-80.0 mg/L). The vanadium contained in fertilizers and accumulated in the plant tissues and substrates were determined by ion-interaction high performance liquid chromatography. As the vanadium concentrations increased, a resultant decrease in the stem length, root fresh weight, and plant fresh weight were noted. The results suggest that the accumulation of vanadium was higher in the roots compared with leaves, stem, or fruits.

F_F0037 OBSERVATION OF CURCIFER DISEASES IN CHIANG MAI

Sakmontri Nachaiwiang
Department of Plant Pathology, Faculty of Agriculture , Chiang Mai University Chiang Mai Thailand.
E-mail: s.nachai@chiangmai.ac.th tel 053-944021-2

Abstract: Diseases of Bassica spp, kale, choysum, cauliflower ,cabbage, broccoli,and chinese cabbage were observed once per week between June, 2003 and February, 2004. Eight diseases found on these investigated vegetables are damping off, downy mildew, leaf spot, leaf blight, mosaic, leaf curl, black rot and soft rot. The type of disease and time that the disease occurred on each vegetable are different. Downy mildew was found the most on kale (29.25%) in January and on chinese cabbage (60.50%) in February. There was 68.50% of diseased choysum and 6.5% of diseased cabbage were leaf spot which were most common in November and December, respectively. In December, black rot was found the most on cabbage at 13.25% whereas the leaf spot was observed at the highest percentage of 11.50% in January for broccoli.

F_F0040 Improving efficiency of plant mutation techniques for sustainable development by farmer participation

M. Ilhan Cagirgan* M. Onur Ozbas R. Soner Silme Plant Mutation Research Group
Department of Field Crops, Faculty of Agriculture, Akdeniz University Antalya, Turkey

Abstract: Induced mutants are useful not only for cultivar development but also as research tools for basic studies since they provide unselected variability by nature and man. Plant mutation research project at Akdeniz University aims at developing plant types and cultivars suited to sustainable agriculture. *Barley, chickpea and sesame* are the main crops on which the mutation techniques are efficiently applied for practical breeding purposes and germplasm development for basic studies. The main project originally started in 1984 with *barley* aiming at selecting proanthocyanidin-free mutants and other useful mutated traits such as genetic male-sterility, earliness, and short height. The barley mutants were successfully used in cross-breeding to generate transgressive variability and heterosis facilitated by genetic male sterile mutants as a tool. A fast germinating ABA-insensitive mutant, Akdeniz-M-Q-54 was registered by Crop Science Society of America. The second sub-project in *chickpea*, started in 1994, focuses on selecting mutants suited to winter growing such as cold and herbicide tolerant and resistant to Aschochyta blight in order take advantage of winter rainfalls, mechanized harvesting, reducing soil erosion, more nitrogen fixation and more residues via fall-sowing of the crop. Certain mutants with improved cold tolerance and with acceptable seed size have already been confirmed. Last but not least, *sesame* sub-project provided us the first induced non-shattering sesame mutants of the world in the frame of an International Atomic Energy Agency Coordinated Research Project, showing the effectiveness of mutation techniques to generate unique variants according to Vavilov's law of homologue series. The project was also demonstrated on CNN as a good example of using atomic energy for peaceful purposes. The success of mutation breeding depends on largely population size to be screened and efficient screening system in which is close to real conditions of the targeted farming system. These requirements can be achieved easily by farmer participation. Although farmer participation is in the fashion lately in the agricultural research, our project operations have traditionally been accomplished in real conditions of on-farm because of lack of research infrastructure at the developing University. This approach is also important to reach the infrastructure that farmers have. To be effective in agricultural research and sustainable development, it is crucial for us to stay in touch with the rapidly evolving ideas about innovation systems throughout the world and across various sectors, and to understand how these ideas translate to productivity. Recently, we are focusing on to expand farmer participation in the mutant screening and selection in the mutated populations of the crops in question. Our program frame and improved results in increasing efficiency of mutation techniques by farmer participatory approaches are discussed in this presentation.

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F_F0043 CULTIVATION OF MARINE BIVALVE USING CLOSED-RECIRCULATING SEAWATER SYSTEM UNDER LABORATORY CONDITION

Hathaiwan Kraisuwan[1], Sathaporn Direkbusarakom[1], Monthon Kanmanee[2] and Sorawit Powtongsook[3]
[1] Program in Technology of Aquatic Animal Production, School of Agricultural Technology, Walailak University
[2] Department of Fisheries Science, Faculty of Agricultural Technology, King Mongkut's Institute of Technology Lardkrabang
[3] Center of Excellence for Marine Biotechnology (at Chulalongkorn University), National Center for Genetic Engineering and Biotechnology
* Corresponding author: sorawit@biotec.or.th

Abstract: Laboratory culture of marine bivalve is necessary for both research and commercial aspects. Problems affecting unsuccessfulness of bivalve culture are the need of high water exchange rate to maintain good water quality and the complexity of life feed preparation. This study aims to evaluate the possibility of the closed recirculating seawater system for oyster culture under laboratory condition. The conceptual design of the system consisted of 3 main components. This included [1] phytoplankton (*Chaetoceros* sp.) continuous culture system that supplying live feed to the oyster, [2] oyster culture tank integrated with nitrification biofilter to maintain the water quality, and [3] filtration and disinfection systems for water treatment and recycle. In detail, seawater mixed with nutrients (F/2 algal medium) was continuously fed into the phytoplankton system using peristaltic pump. Phytoplankton cells produced from 5 liters phytoplankton reactor were automatically supplied twice a day into the oyster tank (10 L containing 55 oysters with average weight of 5.58 g). At 1 hour after phytoplankton feeding, water in the oyster tank at equal volume of phytoplankton supplement was flowed out into the water treatment tank. Water was filtered with 0.5 micron ceramic filter ant treated with chlorine. Finally, treated water was recycled as the water for the phytoplankton culture medium preparation. With this study, the oyster culture experiment was 45 days. The results showed that, with dilution rate of 0.55 per day in phytoplankton system, 7.87×10^5 cells/day of *Chaetoceros* cells were supplied to the oyster tank. Biofilter in oyster tank could maintain good water quality with ammonia concentration less than 0.1 mg-N/L throughout the experiment. With this system, seawater flow-out from oyster tank could be reused without the need of water exchange. At day 45, survival rate of the oyster was 94.5%. This suggested that the seawater recirculating system with continuous phytoplankton production could be used for oyster culture in laboratory condition. On 45 days basis, this system needed only 40 L of seawater while more than 450 L of water is needed for conventional system with water exchange.

F_F0046 EFFECT OF ALGAL AND ROTIFER VOLUME RATIO ON PRODUCTION YIELD OF THE ROTIFER *BRACHIONUS PLICATILIS* IN CONTINUOUS CULTURE SYSTEM

Paveena Tapaneeyaworawong[1], Sorawit Powtongsook[2*] and Piamsak Menasveta[1]

[1] Department of Marine Science, Faculty of Science, Chulalongkorn University

[2] Center of Excellence for Marine Biotechnology (at Chulalongkorn University[1]), National Center for Genetic Engineering and Biotechnology

* Correspondence e-mail: sorawit@biotec.or.th

Abstract: Growth of the rotifer *Brachionus plicatilis* fed with the microalga *Tetraselmis suecica* in continuous culture system was evaluated with various algal and rotifer volume ratio (V_A:V_R). It was found that the optimum V_A:V_R was 1:2. At this V_A:V_R incorporating with the dilution rate of 0.67 per day, average rotifer production rate was 99,093 rotifer/L/day. Thereafter, long-term continuous culture of the rotifer was performed for 24 days with V_A:V_R = 1:1.7 and dilution rate of 0.54 per day. At this stage, average rotifer concentration of 149 rotifer/ml and average rotifer production rate of 80,460 rotifer/L/day was obtained.

F_F0049 DETECTION OF CITRUS BACTERIAL CANKER BY THE SINGLE CLOSED TUBE NESTED PCR

Nuttima Kositcharoenkul[1,2*], Wichai Kositratana[2,5], Orawan Chachawankanphanich[3], Niphone Thaveechai[4*]

[1] Plant Pathology Research Group, Plant Protection Research and Development Office, Department of Agriculture, Bangkok, Thailand

[2] Center for Agricultural Biotechnology, Kasetsart university, Kamphaeng Saen, Nakhon Pathom Thailand

[3] Plant Research Group, National Center for Genetic Engineering and Biotechnology(BIOTEC), Kamphaeng Saen, Nakhon Pathom, Thailand

[4] Department of Plant Pathology, Faculty of Agriculture, Kasetsart University, Bangkhen, Bangkok, Thailand

[5] Department of Plant Pathology, Faculty of Agriculture at Kamphaeng Saen, Kasetsart University, Nakhon Pathom, Thailand

Abstract: A method of single closed tube nested PCR was developed for detection of *Xanthomonas axonopodis* pv. citri, a causal agent of citrus canker bacteria. The protocol was designed by using two pairs of external and internal primers with had different annealing temperatures and specific amplifications of the DNA fragment from *pthA* gene of *X. axonopodis* pv. *citri*. The sensitivity at the minimum DNA concentration was found at 5 pg/ul and the lowest concentration of cell suspension at 10^2 cfu/ul.

F_F0051 FEEDING RATE AND AMMONIA EXCRETION RATE OF BABYLON SNAIL (*BABYLONIA AREOLATA*) VELIGER LARVA

Yuwadee Aunthasoot[1], Chansawang Ngamphongsai[2*], Seri Donnua[2], Sorawit Powtongsook[2] and Somkiat Piyatiratitivorakul[1,2]

[1] Department of Marine Science, Faculty of Science, Chulalongkorn University

[2] Center of Excellence for Marine Biotechnology (at Chulalongkorn University[1]), National Center for Genetic Engineering and Biotechnology

* Correspondence e-mail: Chansawang@biotec.or.th

Abstract: Study on feeding and ammonia excretion rate of Babylon snail (*Babylonia areolata*) veliger were conducted in order to obtain the basic data for improving and designing the closed recirculating system with phytoplankton production unit and biofilter unit for nursing veliger larvae. The feeding rate of 1, 3, 8 and 13 day-old veligers from the same batch fed with *Chaetoceros* was studied. The larvae were placed in 3 ml wells with the stocking density of 1, 10 and 20 veligers and fed with *Chaetoceros*. The phytoplankton cells were then collected and counted at 0, 0.5, 1, 3 and 6 hours. The feeding rate was very high in the first hour, increased with ages and decreased with increasing stocking densities. The average feeding rate of Babylonia veliger was 1.1-2.6x10^7cells/veliger/day. The ammonia excretion rate of the veliger at 1, 3, 5, 7, 11 and 13 days of ages was also studied. The excretion rate was 0.14-0.44 µg-N/veliger/day and increased with the age of the veligers. Without changing water, ammonia might accumulate to the lethal concentration within 1-2 days and have an effect on the survival rate of the veligers.

F_F0053 CHROMATOGRAPHIC PROCEDURE FOR THE PURIFICATION OF HEN EGG WHITE OVALBUMIN, OVOTRANSFERRIN AND LYSOZYME

Anupong Tankrathok[1], Sakda Daduang[2] and Sompong Thammasirirak[2]

[1] Graduate School, Department of Biochemistry, Faculty of Science, Khon Kaen University, Khon Kaen, 40002, Thailand.

[2] Department of Biochemistry, Faculty of Science, Khon Kaen University, Khon Kaen, 40002, Thailand. E-mail: somkly@kku.ac.th, Fax: (66) 043-342-911

Abstract: Egg white proteins have been extensively studied in nutrition, biology and industry. Three major proteins, i.e. lysozyme, ovotransferrin and ovalbumin are of particular significant interest. In this study, we have purified three proteins lysozyme, ovotransferrin and ovalbumin by single step of anion exchange Q sepharose Fast Flow column chromatography. From the separation profile, two lysozyme peaks with purities of 79.9% were obtained. The one peak of ovotransferrin with the purity around 39.6% was estimated. Further three ovalbumin peaks with purities of 100% were obtained. The recovenes of each protein were estimated to be 55, 53 and 54% for lysozyme, ovotransferrin and ovalbumin, respectively. The three purified

proteins were characterized and identified by Western blotting using polyclonal mouse anti- lysozyme, anti-ovotransferrin and anti-ovalbumin serum. This result indicates that this purification method may allow the setting up of procedure more easily adaptable to industry.

F_F0054 Genotypic Evaluation in Eucalyptus (*Eucalyptus camaldulensis* Dehnh.) under NaCl Stress

Chumpunnee Naksiri[1] and Sutkhet Nakasathien[1]
[1] Center for Agricultural Biotechnology, Kasetsart University Kamphaeng-Saen Campus, Nakhon Pathom, 73140, Thailand

Abstract: NaCl is the predominant salt in most saline environments which is a major limitation to production of plant. Eucalyptus can grow well in moderately salt-affected areas but the yield and survival rate will be reduced when salt concentration in soil gradually increased. The different plant species have developed different mechanisms of salt tolerance. Understanding how the plant responds and adapts to NaCl stress will be one of the key success factors for improving salt-tolerant species. The methods can be further developed to use for NaCl tolerant screening in eucalyptus and with other plant species. Therefore, the objective of this research were to develop screening methods covering the physiological response of eucalyptus under NaCl stress between salt tolerant and salt sensitive clones, an evaluation the genotypic differences by studying expression of Cu/Zn SOD and APX genes, and identification and characterization of unique proteins expressed in eucalyptus leaves corresponding to stress conditions. Six clones of *Eucalyptus camaldulensis* Dehn. (C1, C2, C3, C4, C5 and C6) were grown in Hoagland solution under saline conditions (0 (Control), 100 mM NaCl and 200 mM NaCl). The result showed that growth and development of all clones were affected by 200 mM NaCl treatment, so we will use this level as a criterion for screening. Three clones of eucalyptus were selected, composed of C1 and C4 (as salt-tolerant clones) and C6 (as a salt-sensitive clone). When studies of plant growth under NaCl stress. At 21 days after NaCl treatment, it was found that C4 was more tolerant than those of C1 and C6 when cultured in 200 mM NaCl. Clone 4 showed significantly higher biomass and survival rate when compared with the other two clones. While the Cu/Zn SOD and APX gene expression in leaves of C6 and C4 were increased and greater than that of C1 when increasing NaCl concentration from 0 to 100 and 200 mM, respectively. When comparing the leaf protein profiles of treated plants with control by using 10% SDS-Polyacrylamind Gel Electrophoresis, it revealed that some leaf proteins could express in higher levels when compared to those of control. It was found that the intensity of the 28 and 70 kDa protein bands in treated-clone, C2 were greater than those of control. These two proteins which were increased by salt stress were identified by using Liquid Chromatography-Mass Spectrometry (LC-MS/MS) method. The partial amino acid sequences of 28 and 70 kDa showed similarity to those of ATP Synthase CF1 Beta subunit and Heat Shock Protein 70 (HSP70). This suggested that Cu/Zn SOD gene, APX gene, ATP Synthase CF1 Beta subunit and Heat Shock Protein 70 involved with mechanism of salt tolerance in eucalyptus.

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F_F0055 SOAPS IN NATURAL RUBBER LATEX FROM RRIM600 STRAIN RUBBER TREE (*Hevea brasiliensis*)

Wilairat Cheewasedtham[1] Somjai Peragularuck and Sureerat Chullasat
[1] Chemistry Division, Dept. of Science, Faculty of Science and Technology, Prince of Songkla University, Pattani Campus 94000

Abstract: Type and soaps or fatty acid salts contents in fresh latex of RRIM600 strain natural rubber (*Hevea brasiliensis*) tree from 2 regions, Rayong province in the eastern part and Phatthalung province in the southern part, of Thailand in February to April 2006 have been studied. Some chemical and physical properties of latex sample were also investigated. There is no significantly different in every sampling times in samples from two regions, Rayong and Phatthalung province latex in pH, %DRC and KOH number at 6.59-6.76 and 6.43-6.86, 24.23-32.52 and 26.1-33.6% g/g and 0.31± 0.00 and 0.38±0.04, respectively. While the significant different has been found in February and March in conductivity and %TSC values of latex sample at 2.64-2.88 and 2.47-3.14mS/cm, 0.93-1.06 and 1.11-1.14 g/cm^3 and 38.75-55.05 and 35-37-40.12%g/g in latex from Rayong and Phatthalung province, respectively. Fatty acids in latex sample have been extracted and esterified in one step, before analysed by means of Gas Chromatography. Octanoic acid (C8) was found in all sample in latex from every sampling times, while Dodecanoic acid (C12) in only March and April in latex from both regions. The efficiency of fatty acid methyl esters preparation and extraction, however, still need further investigation.

F_F0056 Characteristics of Ultisols under maize-based shifting cultivation in upland of Lower Northern Thailand with reference to soil nutrient change.

Jaruntorn Boonyanuphap
Department of Natural Resources and Environment, Faculty of Agriculture Natural Resources and Environment, Naresuan University, Phitsanulok, 65000 Thailand

Abstract: The quantitative study on changes of soil nutrient status under shifting cultivation was carried out in the upland of Lower Northern Thailand. Twelve sites were selected including maize field, forest fallow, and secondary forest, where were cultivated maize in following crop season. The studied soils were mostly classified as the order Ultisols, subgroup Typic Paleustults. The occurrence of weatherable minerals (such as chlorite, illite, and hydroxy-interlayered vermiculite) and high amount of σ_o indicated that the soils had not yet reached a strong weathering phase as compared with Ultisols in Northeast Thailand. Soil nutrient level was affected by annual fire invasion and fertilizer application, resulting in alleviating soil acidity and regular supplies of exchangeable bases, even so, ash input was considered short-lived. The results suggest that shifting cultivation can be practiced due to high levels of exchangeable bases. However, the large losses of mineral N, P, and K occurred. Such situation caused a difference in the soil nutrient status as compared with the traditional system indicating the necessity of appropriated fertilizer application with consideration on environmental conservation in this area.

F_F0058 PHYSICAL PROPERTIES OF FEED GRANULES PREPARED FROM DIFFERENT BINDERS

Bundit Tengjaroenkul
Faculty of Veterinary Medicine, Khon Kaen University, Khon Kaen 40002, Thailand

Abstract: The purpose of this study was to compare physical properties of feed granules prepared from three different binders (gelatin, starch and chitosan). To make the granules, the binders were mixed with feed powder, and sieved using oscillating granulator. The granules were coated with ethylcellulose and methylcellulose, and then their physical properties were evaluated. From the results, the mean granule size and moisture content of the granules were 425-480 micron and 4.12-5.30%, respectively. As a binder, the gelatin granule coated with ethylcellulose had the highest hydro-stability and the greatest floatability ($p<0.05$). From this study, it can be concluded that the gelatin granule coated with ethylcellulose has a potential to use as feed supplement in larvi-culture of the freshwater prawn.

F_F0059 EFFECTS OF GAMMA RAYS ON *IN VITRO* CULTURES OF FANCY-LEAVED CALADIUM (*CALADIUM BICOLOR* VENT.)

Charoen Khamla[1], Sujint Anguravirutt[2], Suphachai Samuppito[3] and Siranut Lamseejan[4]
[1] Agricultural and Technological College, Ubon Ratchathani, Thailand.
E-mail: charoenkhamla@hotmail.com
[2] Department of Chemistry, Faculty of Science, Mahasarakham University, Maha Sarakham, Thailand
[3] Department of Biotechnology, Faculty of Technology, Mahasarakham University, Maha Sarakham, Thailand.
[4] Gamma Irradiation Service and Nuclear Technology Research Center (GISC), Kasetsart University, Bangkok, Thailand.

Abstract: The fancy-leaved caladium has long been recognized as the queen of decorative foliage since it has various leaf shapes and multicolored leaf shades. Variation in leaf morphology can occur in nature but at a slow rate. Gamma irradiation in combination with *in vitro* culture techniques have been reported to induce morphological changes in plants at higher and faster rate than those occur in nature. The present research aimed to study the effects of acute gamma irradiation on *in vitro* culture of fancy-leaved caladium variety "Apsornsawan", in terms of morphological changes, which would be useful to induce clonally variations in the fancy-leaved caladium. It was observed that the dose which killed 50 percent of the *in vitro* culture of the fancy-leaved caladium (LD_{50}) was 32.5 gray (Gy). After growing the plants in natural environment for 180 days, observation was made to compare the irradiated plants with the control. The control plants and those irradiated at 5 Gy had statistically higher in the plant height and the leaf length than those irradiated at 20, 30, 40 and 50 Gy. The irradiated plants differed from the control plants in leaf shape, leaf color and petiole color. Three different characters, 7 different characters, 2 different characters and 1 different character were observed in the plants treated with the gamma rays at 20, 30, 40 and 50 Gy respectively. In conclusion, this study demonstrated that acute gamma irradiation could induce several morphological variations in the fancy-leaved caladium variety "Apsornsawan", especially, 30 Gy of the gamma rays could induce several changes which would be useful for varietal improvement of the plant in the future.

G_G0001 STATE OF MAJOR PACKAGING RELATED PROBLEMS OF THAI PROCESSED FOOD FOR EXPORTS

Ubonrat Siripatrawan[1], Romanee Sanguandeekul[1], Nucharin Luangsa-ard[2] and Panuwat Suppakul[3]

[1] Department of Food Technology, Faculty of Science, Chulalongkorn University, Bangkok, Thailand
Phone: 662-2185536 Fax: 662-2544314 Email: Ubonratana.s@chula.ac.th

[2] Department of Printing and Packaging Technology, School of Industrial Education, King Mongkut's University of Technology Thonburi, Bangkok, Thailand

[3] Department of Packaging Technology, Faculty of Agro-Industry, Kasetsart University, Bangkok, Thailand

Abstract: This research was designed to investigate the major problems and drawbacks of processed foods for export focusing on packaging related problems. The information was obtained directly from Thai exporters volunteering to participate in the survey. A sequence of meetings for brainstorming was also arranged for further discussion on the situation of Thai food exports. With regard to the questionnaires and personal interviews with companies related to export processed foods, and sequential brainstorming conference, there are many problems associated with packaging and labeling of processed foods for export. This information is benchmarking to further establish means to solve the food export problems and, consequently, to increase the competitiveness and to expand export opportunities of food products through improved product packaging.

G_G0002 EFFECT OF DRY- AND WET-MILLING PROCESSES ON RICE FLOUR AND RICE NOODLE PROPERTIES

Anocha Suksomboon[1] and Onanong Naivikul[1]

[1] Department of Food Science and Technology, Faculty of Agro-Industry, Kasetsart University, Bangkok, 10900 Thailand. Corresponding author: E-mail:onanong.n@ku.ac.th, Phone: (662)562-5023, Fax: (662)562-5021

Abstract: In this research, the chemical and physicochemical properties of low amylose (Pathum Thani 1), medium amylose (RD 7) and high amylose (Leuang 11) milled rices prepared from dry- and wet-milling processes were determined. Protein and fat contents of dry-milled rice flours were significantly higher ($P \leq 0.05$) than those of wet-milled rice flours in all rice varieties. There was a higher degree of starch damage found in dry-milled rice flour samples according to higher damage starch content and starch molecular weight distribution data. Dry-milled rice flour contained higher amounts of damaged starch (8.32-9.11%) than those of wet-milled rice flour (2.99-5.70%). Rice starch molecular weight distributions were obtained by size-exclusion chromatography with RI and multi-angle laser light scattering detection (SEC-RI-MALLS). Starch from dry-milled rice flour contained lower amounts of the high molecular weight portion of starch (amylopectin) than wet-milled samples. Dry-milled rice flour showed a higher swelling power and solubility compared with wet-milled rice flour. Rice noodle prepared from dry-milled rice flour showed greater water absorption index and softer texture with fewer amounts of cutting force and tensile strength compared with the noodle prepared from wet-milled rice flour.

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G_G0003 Quality changes of frozen rice noodle product:Pad -Thai

Vipa Surojanametakul , Patcharee Tungtrakul and Warunee Varanyanond
Institute of Food Research and Product Development, Kasetsart University, Bangkok 10903, Thailand

Abstract: The research aims to investigate the quality changes of frozen Pad-Thai rice noodle product. The rice noodles withstand to freezing condition were made by mixing rice flour with other starches namely F1; rice flour : tapioca starch (80:20); F2; rice flour: tapioca starch: thin boiling starch (75:20:5); F3; rice flour: tapioca starch : modified tapioca starch, acetyl distarch adipate(75:20:5); F4 rice flour : tapioca starch : potato starch (75:20:5).The optimum process of Pad Thai preparation were blanching the noodle at 70°C for 45 sec, mixing treated noodle with Pad Thai sauce at the ratio of 10:8 (w/w), freezing by cryogenic using liquid nitrogen and storing at -20°C. The result showed that noodle formula and number of freeze-thaw cycle affected product's qualities, especially textural properties. Among the samples, noodle F3 showed less changed in maximum force, break distance and hardness, while noodle F1 showed the worst quality as number of freeze-thaw cycle increased. From sensory evaluation it was found that the panelists, on the other hand, could not detect any difference among the samples ($p>0.05$). The analysis of micro-organisms in the frozen products, showed that the total plate count was not higher than 3.2×10^3 cfu/g, and there was no pathogenic and other microflora found in the samples.

G_G0004 Determination of Benzoic Acid and Sorbic Acid in Bael Fruit, Rossella Drink and Flavor Concentrate Syrups by Steam Distillation.

Ladda Wattanasiritham*, Kulvadee Trongpanich [(1)]
*,1Institute of Food Research and Product Development, Kasetsart University, Chatuchak, Bangkok, 10900, Thailand

Abstract: Benzoic acid and sorbic acid in bael fruit, rossella drink and flavor concentrate syrups were extracted by steam distillation that modified from standard method. Analyzed benzoic acid sorbic acid in extracted solution by HPLC. Chromatographic condition are using Platinum EPS C_{18}, 0.01M acetate buffer (pH 4.5) : methanol (75:25) as mobile phase 1.0 ml/min flow rate and UV detection at 240 nm. Average recoveries of benzoic and sorbic acid added bael fruit, rossella drink strawberry and sala flavor concentrate syrups were 90-107% and 87-118% by steam distillation at 50-1000 ppm level, respectively. Applicability of the method has been investigated in food that consumes less time for extract and analysis and a few of toxics solvents.

G_G0005 A study on heavy metal contamination of Thai dried longan.

Kulvadee Trongpanich, and Monthatip Yunchalaad.
Institute of Food Research and Product Development, Kasetsart University.

Abstract: The quality of Thai dried longan on the heavy metal contamination aspect was studied. Commercial dried longan meat from ten production plants were sampled in triplications from Thai local markets. The samples were analyzed for lead, arsenic, cadmium, and total mercury. It was found that every sample contained no arsenic and total mercury, but there was lead < 0.122 mg/kg in one sample and cadmium 0.033 mg/kg in 1 sample and <0.033 mg/kg in 7 samples.

G_G0006 THERMAL PROPERTIES OF FLOUR AND STARCH FROM CHESTNUT *Sterculia monosperma* Vent.

Montakarn Benjapalakorn[1], Kalaya Laohasongkram[2], Saiwarun Chaiwanichsiri[2]
[1] Department of Food Technology, Faculty of Science, Chulalongkorn University, Phayathai Road, Bangkok, Thailand. E-mail:zanaka23@yahoo.com, Fax: (662)254-4314
[2] Department of Food Technology, Chulalongkorn University, Phayathai Road, Bangkok, Thailand.

Abstract: The objective of this study was to investigate the thermal properties of dry-milled and wet-milled flours and starch from chestnut (Sterculia monosperma Vent.) extracted with three sodium hydroxide (NaOH) concentrations (0.1, 0.3 and 0.5% w/v). The chemical compositions and thermal properties showed that dry-milled flour had higher contents of protein, lipid, ash and damaged starch than wet-milled flour ($P \leq 0.05$). Dry-milling gave flour having higher onset temperature (T_o), peak temperature (T_p) and conclusion temperature (T_c), but lower ΔH_{gel}. The result also showed that NaOH concentration in the starch extraction affected the protein content, T_o and T_p of the starches. Increasing NaOH concentration from 0.1% to 0.5% decreased protein content from 0.60% to 0.28%, T_o from 72.50 °C to 70.39 °C and T_p 76.18 °C to 74.78 °C.

G_G0007 EFFECT OF PREPARING AND MALTODEXTRIN CONTENT ON SPRAY DRIED JOB'S TEARS DRINK POWDER QUALITIES

Pattaree Tiphyarug[1], Saiwarun Chaiwanichsiri[2], Kalaya Laohasongkram[2]
[1] Department of Food Technology, Faculty of Science, Chulalongkorn University, Phayathai Road, Bangkok, Thailand. E-mail: pattaree_t@hotmail.com, Fax: (662)252-4314
[2] Department of Food Technology, Chulalongkorn University, Phayathai Road, Bangkok, Thailand.

Abstract: Heating temperature of job's tears drink (65, 70 and 75±1°C) before feeding into a spray dryer was found to affect the viscosity of the drink. Increased temperature resulted in higher viscosity. At 75±1°C, the viscosity was too high to be fed into the spray dryer. The higher heating temperature, the lower as percentage of total insoluble solid and the higher bulk density and wettability of the spray-dried job's tears drink powder were found. The heating temperature of 70±1°C was used in the study of the effect of maltodextrin (DE 10) content (5, 10, 15 and 20%w/v) on the quality of the finished products. Increaseing maltodextrin content, the moisture content, solubility and wettability of the powder decreased from 3.31 to 2.22%, 48.29 to 39.27% and 23.1 to 5.4 min, respectively, while the bulk density increased from 0.58 to 0.65 g/cm^3. The highest yield was obtained by using 15%(w/v) maltodextrin.

G_G0008 Application of native and modified canna starches as thickening agent in tomato sauce

กสิภูมิ ทวนคง[1] จุรีรัตน์ พุดตาลเล็ก[2] วิไล รังสาดทอง[3] ดุษฎี อุดภาพ[1]
[1] Division of Biochemical Technology, School of Bioresources and Technology, King Mongkut' s University of Technology Thonburi, 83 moo 8 Tha-khan, Bangkhuntian, Bangkok 10150, Thailand
[2] Department of Biotechnology, Faculty of Engineering and Industrial Technology, Silapakorn University, Nakorn Pathom 73000, Thailand
[3] Department of Agro-Industrial Technology, Faculty of Applied Science, King Mongkut' s Institute of Technology North Bangkok, 1518 Pibulsongkram Road, Bangsue, Bangkok 10800, Thailand

Abstract: Native canna starch and its derivatives (hydroxypropyl canna starch with molar substitution of 0.11; HP-canna and canna starch acetate with degree of substitution of 0.08; AC-canna) together with the other two starches; cassava and commercial-modified starches were evaluated as thickening and phase stabilizing agents in tomato sauce. Viscosities of tomato sauce containing all types of starch at a concentration of 1.5 % w/w were too low to be accepted. At a starch concentration of 3 % w/w; commercial-modified, HP-canna and AC-canna starches gave comparable viscosities (5,000-5500 cp), which were considerably higher than cassava and native canna starches (2,500- 3,500 cp). After being kept at room temperature for two weeks, tomato sauce adding with native canna starch had the highest percentage of water separation (47%), followed by AC-canna and commercial-modified starches (15-22%) and HP-canna and cassava starches (1-5%), respectively, whereas the percentage of water separation of commercial tomato sauce kept under the same condition, was around 20-22%. Therefore, it could be concluded that hydroxypropyl canna and cassava starches are good candidates for being used as thickening agent in tomato sauce.

G_G0009 Dry noodle from wheat - brown rice composite flour

Suparat Reungmaneepaitoon
Institute of Food Research and Product Development, Kasetsart University, Bangkok 10903, Thailand

Abstract: The objective of this study was to develop dried noodles from wheat - brown rice composite flour in order to add value of Thai milled rice. This study focus on two groups of rice based on amylose content : variety of medium amylose content of 20.95 - 24.82% db which were Suphan Buri 1, Suphan Buri 90, Phitsanulok 2 and variety of low amylose content of 12.21 - 13.31% db which were RD 23 and Khao Dawk Mali 105. Brown rice was dry milled and replaced 30% of wheat

Abstract: The quality of Thai dried longan on the heavy metal contamination aspect was studied. Commercial dried longan meat from ten production plants were sampled in triplications from Thai local markets. The samples were analyzed for lead, arsenic, cadmium, and total mercury. It was found that every sample contained no arsenic and total mercury, but there was lead < 0.122 mg/kg in one sample and cadmium 0.033 mg/kg in 1 sample and <0.033 mg/kg in 7 samples.

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***Sterculia monosperma* Vent.**

Montakarn Benjapalakorn[1], Kalaya Laohasongkram[2], Saiwarun Chaiwanichsiri[2]
[1] Department of Food Technology, Faculty of Science, Chulalongkorn University, Phayathai Road, Bangkok, Thailand. E-mail:zanaka23@yahoo.com, Fax: (662)254-4314
[2] Department of Food Technology, Chulalongkorn University, Phayathai Road, Bangkok, Thailand.

Abstract: The objective of this study was to investigate the thermal properties of dry-milled and wet-milled flours and starch from chestnut (Sterculia monosperma Vent.) extracted with three sodium hydroxide (NaOH) concentrations (0.1, 0.3 and 0.5% w/v). The chemical compositions and thermal properties showed that dry-milled flour had higher contents of protein, lipid, ash and damaged starch than wet-milled flour ($P \leq 0.05$). Dry-milling gave flour having higher onset temperature (T_o), peak temperature (T_p) and conclusion temperature (T_c), but lower ΔH_{gel}. The result also showed that NaOH concentration in the starch extraction affected the protein content, T_o and T_p of the starches. Increasing NaOH concentration from 0.1% to 0.5% decreased protein content from 0.60% to 0.28%, T_o from 72.50 °C to 70.39 °C and T_p 76.19 °C to 74.78 °C.

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Pattaree Tiphyarug[1], Saiwarun Chaiwanichsiri[2], Kalaya Laohasongkram[2]
[1] Department of Food Technology, Faculty of Science, Chulalongkorn University, Phayathai Road, Bangkok, Thailand. E-mail: pattaree_t@hotmail.com, Fax: (662)252-4314
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G_G0008 Application of native and modified canna starches as thickening agent in tomato sauce

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[1] Division of Biochemical Technology, School of Bioresources and Technology, King Mongkut' s University of Technology Thonburi, 83 moo 8 Tha-khan, Bangkhuntian, Bangkok 10150, Thailand
[2] Department of Biotechnology, Faculty of Engineering and Industrial Technology, Silapakorn University, Nakorn Pathom 73000, Thailand
[3] Department of Agro-Industrial Technology, Faculty of Applied Science, King Mongkut' s Institute of Technology North Bangkok, 1518 Pibulsongkram Road, Bangsue, Bangkok 10800, Thailand

Abstract: Native canna starch and its derivatives (hydroxypropyl canna starch with molar substitution of 0.11; HP-canna and canna starch acetate with degree of substitution of 0.08; AC-canna) together with the other two starches; cassava and commercial-modified starches were evaluated as thickening and phase stabilizing agents in tomato sauce. Viscosities of tomato sauce containing all types of starch at a concentration of 1.5 % w/w were too low to be accepted. At a starch concentration of 3 % w/w; commercial-modified, HP-canna and AC-canna starches gave comparable viscosities (5,000-5500 cp), which were considerably higher than cassava and native canna starches (2,500- 3,500 cp). After being kept at room temperature for two weeks, tomato sauce adding with native canna starch had the highest percentage of water separation (47%), followed by AC-canna and commercial-modified starches (15-22%) and HP-canna and cassava starches (1-5%), respectively, whereas the percentage of water separation of commercial tomato sauce kept under the same condition, was around 20-22%. Therefore, it could be concluded that hydroxypropyl canna and cassava starches are good candidates for being used as thickening agent in tomato sauce.

G_G0009 Dry noodle from wheat - brown rice composite flour

Suparat Reungmaneepaitoon
Institute of Food Research and Product Development, Kasetsart University, Bangkok 10903, Thailand

Abstract: The objective of this study was to develop dried noodles from wheat - brown rice composite flour in order to add value of Thai milled rice. This study focus on two groups of rice based on amylose content : variety of medium amylose content of 20.95 - 24.82% db which were Suphan Buri 1, Suphan Buri 90, Phitsanulok 2 and variety of low amylose content of 12.21 - 13.31% db which were RD 23 and Khao Dawk Mali 105. Brown rice was dry milled and replaced 30% of wheat

flour in dried noodle products. Textural properties and protein content of noodles made from wheat - brown rice composite flour were significantly different from wheat noodle ($P < 0.05$). Tensile strength and firmness of noodle made from Phitsanulok 2 brown rice flour was higher than others in medium group and noodle made from Khao Dawk Mali 105 brown rice flour had tender texture.

G_G0012 Shelf life extension of Chinese cake (Kanom Pia)

Tavidsa Lohana Kulvadee Trongpanich and Pailin Phoopat
Institute of Food Research and Product Development Kasetsart University Bangkok 10903

Abstract: The objective of this research is to prolong the Chinese cake shelf life to be more than 7 days. They were packed in paper box, PET and KOP bag with oxygen absorber. The results showed that the Chinese cake could be kept in paper box for about 2 weeks, in PET bag with oxygen absorber for 4 weeks and in KOP bag with oxygen absorber for 8 weeks at slightly like acceptable level.

G_G0013 Effect of heating under Tom Yum soup condition on chemical and physical properties of Thai indigenous chicken, spent hen and broiler muscles.

Khwunsiri Chuaynukool, Saowakon Wattanchant* and Sunisa Siripongvutikorn
Department of Food Technology, Faculty of Agro-Industry, Prince of Songkla University, Hat Yai, Songkla.Thailand 90110.
* corresponding author: E-mail: saowakon.w@psu.ac.th

Abstract: Effect of heating under Tom Yum soup condition on chemical and physical properties of Pectoralis muscle and biceps femoris muscle of Thai indigenous chicken, spent hen and broiler was investigated. After heating, no significant differences in total collagen and cooking loss of pectoralis muscle ($P>0.05$) were obtained, where as soluble collagen showed significantly different among breeds ($P<0.05$). For the biceps femoris heated muscle, the highest total collagen content was found in spent hen muscle ($P<0.05$). The indigenous chicken and spent hen muscles exhibited the higher shear force value with the higher cooking loss than those of broiler muscles ($P<0.05$). Heating under Tom Yum soup condition (95°C, 20 min) decreased the collagen content and increased soluble collagen leading to reduced shear value of chicken muscles.

G_G0015 The Use of Dry-milled Rice Flour for Rice Noodle Production

Patcharee Tungtrakul, Vipa Surojanametakul, Rasamee Supasri and WaruneeVaranyanond
Institute of Food Research and Product Development, Kasetsart University, Bangkok

Abstract: Broken rice was used for the production of dry-milled flour (pin milling). The physicochemical properties and the suitability of the flour for making rice noodle were investigated. The protein content decreased whereas the ash content increased with decreasing particle size. The amylose content of each fraction was similar. The swelling power and solubility index of the flour increased with the decrease of particle sizes. Rapid viscosity analysis indicated that the gelatinization temperature of the flour with smaller particle size was lower than that with larger size. The larger particle size flour exhibited lower peak, breakdown, and final viscosity. The texture of the rice noodle made from flour fraction of 75 µm particle size gave the highest tensile strength as well as the highest hardness and stickiness of all fractions.

G_G0016 Effects of Milling Methods on Rice Flour

Patcharee Tungtrakul[1], Onanong Naivikul[2], Vipa Surojanametakul[1], Warunee Varanyanond[1]
[1] Institute of Food Research and Product Development, Kasetsart University, Bangkok
[2] Faculty of Agro industry, Kasetsart University, Bangkok

Abstract: This work aims to reduce energy and water consumption, according to the green technology concept, in conventional washing and wet milling processes for rice flour production. Modified processing with moist tempering of rice to 25% (w/w) water prior to dry milling was carried out to produce rice flour. Pasting properties of the obtained flour were comparable with those of the flour produced by wet and dry milling. However, physical properties were in the middle between those of the flour from wet and dry milling.

G_G0017 EFFECT OF SOME HYDROCOLLOIDS ON JUICINESS OF FROZEN BATTERED SHRIMP BURGER

Pichayana Juemanee[1], Kongkarn Kijroongrojana[1*], Worapong Usawakesmanee[1], and Wilatsana Posri[2]
[1] Department of Food Technology, Faculty of Agro-Industry, Prince of Songkla University, Hat Yai, Songkhla, 90112, Thailand.
[2] Department of Food Technology, Faculty of Technology, Khonkaen University, Khonkaen, 40002, Thailand.
* corresponding author. Fax: +66-74-212889 E-mail: kongkarn.k@psu.ac.th,

Abstract: A mixture design was used to optimize juiciness of frozen battered shrimp burger containing 1% hydrocolloids (Modified Tapioca Starch (MTS), Sodium alginate (AL), and iota-Carrageenan (CA)). Moisture content, sensory evaluation by trained panelists, and Texture Profile Analysis of products were analyzed. The combinations between MTS and AL were responsible for moisture content, and juiciness scores, while CA influenced on hardness. The optimize formulation (0.3% MTS + 0.7% AL) had higher moisture content and juiciness scores but lower hardness than control (with out hydrocolloid). However, no significant difference was found in cohesiveness of both formulations.

G_G0018 DETERMINATION OF RANCIDITY THRESHOLD BY ASTM AND R-INDEX METHOD

Pimtong Chitbunchong[1], Adjima Tongvisetsak[1] and Parinda Penroj[1]

[1] Department of food technology, Faculty of Engineering and industrial technology, Silpakorn university, Sanamchandra palace campus, Nakorn Pathom 73000, Thailand
E-mail: ppenroj@yahoo.com, Fax 66-34-219361

Abstract: The objective of this study is to determine rancidity threshold of soybean oil in consumer and trained panels by ASTM and R-index method. By ASTM, rancidity threshold of untrained panels and trained panels were found at peroxide value 7.08 and 10.0 meq./kg, respectively. By R-index method, rancidity threshold of untrained panels and trained panels were found at lower peroxide value, 6.33 and 6.16 meq./kg, respectively. Correlation of sensory evaluation and other chemical values such as acid value (AV), thiobabituric acid (TBA), anisidine value and totox number were also reported.

G_G0019 Development of a Novel Method for the Detection of Soy Lectin (Le1) Gene Using Loop Mediated Isothermal Amplification Technique

Preprame Pattanamahakul[1,2], Y. Chikagawa[3,4], S. Furui[3], K. Kitta[3], A. Hino[5]

[1] Department of General Science, Faculty of Science, Chulalongkorn University, Bangkok 10330
[2] Food Research and Testing Laboratory, Faculty of Science, Chulalongkorn University, Bangkok 10330
[3] National Food Research Institute, 2-1-12 Kannondai, Tsukuba, Ibaraki, 305-8642 Japan
[4] FASMAC Co., Ltd., 5-1-3 Midorigaoka, Atsugi City, Kanagawa, 243-0041 Japan
[5] Food Safety Commission Secretariat, Cabinet Office, Government of Japan, 2-13-10 Nagata-cho, Chiyoda, Tokyo, 100-8989 Japan

Abstract: A novel detection method to detect soy lectin (Le1) gene has been developed based on the loop-mediated isothermal amplification (LAMP) technique. The LAMP method is a method that amplifies target DNA under isothermal conditions with high specificity, efficiency and rapidity.

In this study, two sets of primers were successfully designed for the amplification of the lectin Le1 gene. The reactions for amplification were completed when incubated at 65°C for 60 minutes. Moreover, the reactions derived from both primer sets were shortened to 30 and 20 minutes (from 50 and 60 minutes, respectively) after the addition of one set of loop primers to each reaction.

The specificity test demonstrated that both sets of primers specifically amplified only the DNA samples from soy bean and were not specific to maize (non-GM maize, GM maize i.e. GA21, Event176, Mon810, Bt11, NK603, T25, Mon863 and TC1507), rice, wheat and barley. Furthermore, the sensitivity test revealed the detection limit for soy bean DNA concentration to be 0.01 ng/ul final concentration.

The resulting LAMP products were able to be visualized using agarose gel electrophoresis. In addition, they generated characteristic patterns when undergone restriction enzyme analysis.

G_G0020 Solubility Improvement of Tomato Powder

Panita Ngamchuachit[1], Nipapron Sansawait[1], Sorapat Samerkai[1], and Saiwarun Chaiwanichsiri[1]
Department of Food Technology, Faculty of Science, Chulalongkorn University, Bangkok10330, Thailand

Abstract: The objective of this research was to improve the solubility of spray dried tomato (*Lycopersicum esculentum* P.Mill) powder. Tomato feed was prepared from tomato concentrate diluted into tomato juice, modified starch (FLO-MAX 8®) and anti-caking agent (SiO_2). The feed concentration and amount of SiO_2 was varied at 4.9-30.1°Brix (fixed ratio of modified starch:total soluble solids (TSS) in tomato juice at 1:1), and 0.7-2.3 g/100g feed TSS, respectively. The feed was spray dried at inlet air temperature of 143-177°C and the solubility of the tomato powder was measured. Using the Response Surface Methodology, it was found that the optimum conditions for high solubility powder were the feed concentration of 10°Brix, the amount of SiO_2 of 1g/100g of feed TSS and the inlet air temperature of 150°C. The tomato powder produced from the optimum conditions was packaged in PE/AL/PE under vacuum and kept at 35, 45 and 55°C for 10 weeks. The sample was taken every week to be analyzed for the solubility, a_w and color (L*, a*, b*). The result showed that the solubility and lightness (L*) were decreased significantly ($p \leq 0.05$) while a_w and color difference (ΔE) were increased significantly ($p \leq 0.05$). The shelf-life of tomato powder was 9 weeks at 35°C, 2 weeks at 45 °C and 1 week at 55°C. When estimated with Q_{10}, shelf-life was estimated to be 40 weeks at 25°C.

G_G0021 Effect of Packaging Materials on the Quality of Jasmine Rice with Mulberry Tea

ภาควิชา เทคโนโลยีทางอาหาร คณะวิทยาศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย
Kritsana Ruxwong*, Kanokwan Puttisakunwong, Supaporn Suttitum and Ubonrat Siripatrawan

Abstract: The effect of different packaging material on the quality of Jasmine rice with mulberry tea studied (mulberry tea : roasted jasmine rice = 10 g : 25 g). The changes in water activity, color and catechin of Jasmine rice with mulberry tea packaged in polypropylene (PP), laminated aluminium (Al) and nylon (Ny) pouches and stored at 30 °C were determined at 30 days interval. The sensory quality of the product was also evaluated using difference from control test by semi-trained panelists. The results showed that packaging conditions affected ($p \leq 0.05$) quality of the product. The quality of Jasmine rice with mulberry tea decreased ($p \leq 0.05$) with storage period. The water activity values of product packaged in Al was lower ($p \leq 0.05$) than those packaged in Ny and PP respectively. Catechin was found to decrease ($p \leq 0.05$) as storage period increased. Al could maintain sensory quality, aroma and color of the product better than other packages. The shelf life of Jasmine rice

with mulberry tea in NV-Al and V-Al at 30°C was found to be 90 days while product packaged in Ny and PP could be stored for 60 days.

G_G0022 The effect of ascorbic acid on dried shrimp quality and development of dried shrimp packaging in laminated bag and oxygen absorber

Assist. Prof. Supraewpan Lohalaksanadech[1] Pisal Srigate[1]
[1] Faculty of Science and Fisheries Technology, Rajamangala University of Technology Srivijaya., Sikao, Trang. 92150.Thailand.
Tel : 66-75-274151-8 ; Fax : 66-75-274159
E-mail: supraewpan@yahoo.com

Abstract: Dried shrimp was processed by dipping fresh shrimp in 0.2 0.4 0.6 % ascorbic acid solution then boiling in 4% brine. It was found that dried prepared by dipping fresh shrimp in 0.4% ascorbic acid solution then boiling in 4% brine and drying at 55 °C for 8 hours was most accepted. Shelf life of dried shrimp were studied. Dried shrimp sample were packaged in NYLON/LLDPE laminated bags under vacuum and under an atmosphere with oxygen absorber and kept at 4±2 °C and 25±2 °C. Qualities of dried shrimp were tested for astaxanthine content, moisture content, NaCl content, pH, TVC, yeast and mold, a_w and sensory property. The results showed that dried shrimp packaged under vacuum and under an atmosphere with oxygen absorber had a shelf - life for 12 weeks at 4±2 °C and 25±2 °C. However dried shrimp packaged under an atmosphere air with oxygen absorber showed a better quality than those packaged under vacuum condition with both temperatures studied

G_G0023 PROPERTIES OF LOW-DE MALTODEXTRINS FROM TAPIOCA STARCH.

Doungjai Thirathumthavorn[1], Suched Samuhasaneetoo[1], Piyachat Chaiuar[1]
[1] Department of Food Technology, Faculty of Engineering and Industrial Technology, Silpakorn University, Nakhon Pathom 73000, Thailand

Abstract: The properties of low-dextrose equivalence (DE) maltodextrins from tapioca starch were studied by using 3 levels of enzyme concentration (0.06, 0.09 and 0.12 unit/ starch 30 g. dry starch basis) and 3 levels of hydrolysis time (0, 5 and 10 min.) at temperature 95 °C. The results were found that the DEs were in the range of 1.64 - 4.05 with the second-order polynomial relation between both experimental factors and the DEs. The weight average molecular weights (Mw) were in the range of 3,800 - 14,700. The higher the DE of maltodextrin, the lower the Mw and polydispersity. The viscosity of these maltodextrins was greatly reduced. The solubility of the maltodextrin samples was in the range of 95.70 - 98.69 % with no significant difference (P>0.05). The appearances of the products were either round or irregular shapes. The granule sizes were in the range of 2-35 µm. in diameter.

G_G0024 THE APPLICATION OF CLEANER TECHNOLOGY IN THE SURVEY AND PRELIMINARY ASSESSMENT TO SUGGEST THE ALTERNATIVE METHODS FOR THE MINIMIZATION OF RAW MATERIALS AND ENERGY LOSSES IN ANIMAL FEED PROCESSING FACTORY

Aekarak Samranthin, Noppol Leksawasdi
Department of Food Engineering, Faculty of Agro-Industry, Chiang Mai University, Chiang Mai, 50100, Thailand;
telephone: +66 53 948242, fax: +66 53 948238;
e-mail: noppol@hotmail.com

Abstract: J.T. Chareonthai Co. Ltd. is a medium size animal feed factory which produces animal feed for laying-hen and swine. Two available production processes include pelletized and powder feeds from corn, rice bran, soybean and palm meals. The preliminary assessment indicated the significant loss of corn during production period in October 2005 (17.6%) and March 2006 (10.7%), high and fluctuating electricity cost per unit (5.96 – 11.3 Bahts/Unit) during October 2005 – April 2006 and high level of dust from hammer mill and pelletizer. The corrective actions to alleviate the identified problems were setting up a loss prevention team to monitor workers action at the drive-through weighing scale and corn silo as well as scheduling the replacement of "hammer" inside the hammer mill on a regular basis (every 1-2 months) (4,500 Bahts Investment, Expected Investment Returns in 3 months), switching electrical charging service from residential to Time-Of-Use (TOU) rates (23,000 Bahts, 15 days) and installation of an industrial vacuum cleaner as well as dust keeper (5,000 Bahts, 3 months).

G_G0025 DEVELOPMENT AND EVALUATION OF DRIED SIAMESE CROCODILE BLOOD PRODUCT

Jindawan Siruntawineti[1], Win Chaeychomsri[1], Boongeua Vajarasathira[1] and Yosapong Temsiripong[2,3].
[1] Department of Zoology, Faculty of Science, Kasetsart University, Bangkok 10900, Thailand
E-mail:fscijws@ku.ac.th, Fax: (662)942-8695
[2] Sriracha Moda Co., Ltd., Chonburi 20110, Thailand;
[3] Crocodile Management Association of Thailand (CMAT)
E-mail:yosapong@srirachamodal.com, Fax: (662)354-7174

Abstract: The large volume-collecting and freeze drying processes of Siamese crocodile blood were designed and developed. This freeze dried blood (FzD-product) products were compared with crocodile blood collected by a conventional method and then processed by heat drying (HD-product). The products were packed in capsule and kept at three storage conditions for six months. After storage for 0, 1, 2, 3 and 6 months, microbial contamination in dried blood products was determined by the total bacterial plate count. There were no coliform bacteria Escherichia coli, and Samonella spp. in the products indicating no

contamination of gastrointestinal tract and typhoid pathogens. Despite storage conditions and storing times, fewer bacteria were found in FzD- products than in HD-products. The relative suitability for storing FzD-products, in descending order, were at 4°C, at room temperature (26.7°C) with dried condition, and at room temperature with 39.5% r.h. The optimal storage condition for HD-products was at room temperature with dried condition.

G_G0026 Effects of Malting and Freeze Drying to Some Quality Aspects on Pathum Thani 1 Rice Variety

Yupakanit[1] Puangwerakul
Faculty of Biotechnology, Rangsit University, Patumthani, Thailand
E-mail: lombiotec@yahoo.com, Fax: (662) 997-2220 ext.3661

Abstract: Modification in Pathum Thani 1 rice variety during malting was found to be associated mainly with degradation of starch endosperm resulting increasing of total reducing sugar, protein , vitamin B1 and B2 when compared to control unmalted brown rice. Malted grains were polished and treated with ethanol vapors for stabilizing of lipolytic hydrolysis, as indicated by minimal in free fatty acids followed by soaking in aqueous acetic acid and NaCl solution for the texture conservancy before completely cooking and freeze drying in the final step. By this mentioned process, rice qualities had been significantly improved not only in gaining special color and flavor characteristics but also in reducing time and lower temperature for reheat rice grains without loss of nutritional value. Consequently, the processed rice will bring about convenience for consumption and will be an alternative of adding value for rice market.

G_G0027 Accumulation of gamma-aminobutyric acid (GABA) in non-waxy and waxy rice germ during water soaking

Patcharee Tungtrakul, WaruneeVaranyanond, Vipa Surojanametakul and Ladda Wattanasiritham
Institute of Food Research and Product Development, Kasetsart University, Bangkok

Abstract: Rice germ contains protein, vitamins, minerals, dietary fiber and gamma-aminobutyric acid (GABA). GABA has been proved to be effective for lowering the blood pressure of human being. It has neurotransmission functions and tranquilizer effects. Determination of GABA in rice germ and brown rice were investigated by using low-amylose, high-amylose and waxy rice cultivars. Percentage of germ weight showed no relation to the GABA content. The amount and patterns of the GABA accumulation varied depending on the cultivar. GABA content in most of rice varieties increased during incubation. The accumulation of gamma-aminobutyric acid (GABA) in non-waxy and waxy rice germ during water soaking were determined by using 14 different cultivars. Water soaking can enrich GABA content in the germ of all rice varieties. The GABA accumulation was differed upon rice varieties and soaking time. GABA content in most of rice varieties increased during 4 h of incubation at 40 °C.

G_G0028 Study on Shelf-life Extension of Antimicrobial Agents-Incorporated Mung Bean Protein Film

Ampun Chaikulsareewath* and Sirikwan Leehokseng
* Department of Food Technology, Faculty of Science, Siam University, Bangkok 10160, Thailand.

Abstract: Shelf-life extension of mung bean protein film (MBPF) was studied. Microorganisms, capable of degrading MBPF, were isolated and studied. Nine strains of microorganism were identified as bacteria. Among these bacteria, there were six bacilli, which were gram positive and endospore forming, and three cocci, which were gram positive and non-spore forming. The minimal inhibitory concentration (MIC) of antimicrobial agents against the isolated microorganisms were 1,000 ppm of lactic acid, 3,000 ppm of potassium metabisulfite and 3,000-7,000 ppm of sodium benzoate, except sodium nitrite. The lactic acid-incorporated mung bean protein (MBP) solution was not able to form film, while the others were succeed. Consequently, the 2 substances (potassium metabisulfite and sodium benzoate) were used to test the efficiency of inhibition by mixing in the protein film solution. The results showed that, the 7,000 ppm of sodium benzoate-incorporated mung bean protein film was more effective than the 3,000 ppm of potassium metabisulfite. In fifteen day of storage time, the inhibitory efficiency of the 7,000 ppm of sodium benzoate and 3,000 ppm of potassium metabisulfite were 29.41% and 0.33%, respectively.

G_G0029 Effects of carboxymethylcellulose on tensile strength, water vapor transmission rate and oil resistance of mung bean protein-based films

Nathamol Chindapan* and Soonthorn Somsual
Department of Food Technology, Faculty of Science, Siam University, Bangkok 10160, Thailand

Abstract: The objective of this research was to investigate the effects of addition of carboxymethylcellulose on tensile strength, water vapor transmission rate and oil resistance of mung bean protein-based films. Carboxymethylcellulose was added in different amounts (0, 0.1, 0.3 and 0.5 % w/w mung bean protein) to mung bean protein films having sorbitol as plasticizer (30:70 sorbitol/mung bean protein), before were heated to 85°C, 25 min. and spread on acrylic plate (225 cm^2), then water was evaporated by using hot air oven at 60°C, 10 hours. It was found that the appearance of all mung bean protein-based films was translucent with yellowish color. Oil resistance of all samples was longer than 480 hours. Increasing the content of carboxymethylcellulose in the film decreased water vapor transmission rate and increased tensile strength.

G_G0030 Utilization of Mucilage from Hairy Basil Seed (*Ocimum canum Sims.*) as a Stabilizer in Pandanus Ice Cream

Piyanoot Noiduang and Sarinya Kitticharoenkan*
* Department of Food Technology, Faculty of Science, Siam University, Bangkok 10160, Thailand

Abstract: Utilization of mucilage prepared from hairy basil seed (Ocimum canum Sims) in pandanus ice cream was studied. The content of 0.1, 0.3 and 0.5% (w/w) dried mucilage was added in pandanus ice cream. The results showed that the viscosity of pandanus ice cream increased while the overrun and melting rate decreased significantly ($p \leq 0.05$) as the level of dried mucilage from hairy basil seed increased. Pandanus ice cream contained 0.5% (w/w) dried mucilage from hairy basil seed gave the highest sensory score in terms of appearance, flavor, texture, melting in mouth and overall acceptability. The proximate analysis of pandanus ice cream was as following: moisture, carbohydrate, protein, fat, ash and fiber at 67.68, 19.78, 2.83, 9.02, 0.67 and 15.60% respectively. The fiber content is significantly higher ($p \leq 0.05$) as compared to control formula. Microbiological quality investigation was found that the total plate count and coliform count were lower than standard of regulation.

G_G0031 The Production of Ready to Eat Breakfast Flaked Cereals from Mung Bean Flour Partial Substitution of Wheat Flour

Jiranart Boonkong and Jumnaian Khongprakhon
* Department of Food Technology, Faculty of Science, Siam University, Bangkok 10160, Thailand

Abstract: The mung bean flour was used to substitute for wheat flour in ready to eat breakfast flaked cereal production. The mung bean flour was varied at 5, 10, 15 and 20% (w/w of flour), then the texture and the swelling power was determined. Substitution with mung bean flour increased the hardness, while the swelling power was decreased with increasing amount of mung bean flour. The chemical analysis it was found that the content of protein fat moisture ash and fiber were 11.36-23.04%, 4.08-4.28%, 4.28-5.57%, 2.08-4.34% and 1.31-1.98% respectively. The microbiological examination showed that there was no bacteria, fungi and *Staphylococcus aureus* presented in the samples. The result from the sensory evaluation of breakfast flaked cereal was tested, the samples that were substituted with mung bean flour at 5 and 10% levels were the optimal formula ($p \leq 0.05$).

G_G0032 PRELIMINARY STUDY OF ANTIMICROBIAL ACTIVITIES ON THAI LOCAL BITTER VEGETABLES

Arunee Nagadatta[2], Boonyod Julamanee[2], Nuttaporn Chaisawadi[2], Arpa paksachadkul[2], Manita Archsiwanon[2], Pemika Pewleang[2], Suchada Chaisawadi[1], Darawan Thongbute[1]
[1] Pilot Plant Development and Training Institute, King Mongkut's University of Technology Thonburi, Bangkok 10140, Thailand;
[2] Satri Si Suriyothai School, Bangkok, Thailand.
E-mail address: arunee@suriyothai.net Fax: (662) 211-0383

Abstract: To investigate bitter vegetable for Thai food's ingredients as natural antimicrobial agents, six of bitter vegetables were selected to screen for antimicrobial activities. Fresh extracts and oil extracts of all bitter vegetable in this study were tested against *Bacillus cereus*, *Salmonella typhi* and *Staphylococcus aureus* by using *Agar Diffusion* Method. All of them including Cha-oom leaf (*Acacia insuavis* Lace.); Ka-tin leaf (*Leucaena glauca* Benth.); Kee-lek leaf or Siamese Cassia leaf (*Cassia siamea Britt*); Yor leaf (*Morinda citrfolia*); Bitter Cucumber flesh (*Momordica charantia Linn*) and Bitter Cucumber seed (*Momordica charantia Linn*) have shown high activities. Screening for antimicrobial activities of six potential bitter vegetable were performed in duplication. Most of them except Cha-oom leaf and Bitter cucumber seed in both fresh extract and oil extract, exhibited antimicrobial activities against *Bacillus cereus*. Kee-lek leaf showed the highest potential activity along with Bitter Cucumber flesh. Cha-oom leaf and Bitter cucumber seed show no antimicrobial activities. All except Bitter cucumber seed in both fresh extract and oil extract ,exhibited high antimicrobial activities against *Salmonella typhi*. Only Bitter cucumber seed showed no antimicrobial activity when Bitter cucumber flesh in fresh extract showed low antimicrobial activity. Most of them except Cha-oom leaf and Bitter cucumber seed, exhibited high antimicrobial activities against *Staphylococcus aureus*. Only Katin leaf in fresh extract showed low activity and Cha-oom leaf and Bitter cucumber seed in both fresh and oil extract showed no antimicrobial activities. In addition, it was found that antimicrobial activities of oil extracts were higher than fresh extracts. Potential of Ka-tin leaf, Yor leaf, Kee-lek leaf and Bitter Cucumber flesh on antimicrobial activities against *Bacillus cereus, Salmonella typhi* and *Staphylococcus aureus* have been concluded. Identification of active compounds and suitable purification method in these bitter vegetables have been suggested to further studies. The results from this study may led to use the common bitter vegetables as a medicine and natural drug development for all Thai people in the near future.

G_G0033 Effect of coating on physicochemical properties in breading frozen shrimp

Tunyaporn Sinlert and Supranee Muenpueng*
* Department of Food Technology, Faculty of Science, Siam University, Bangkok, 10160, Thailand.

Abstract: Study of biopolymer coatings on physicochemical properties and prolonging shelf life of breading frozen shrimp. Two types coating of Methylcellulose (MC) and Hydroxypropylmethylcellulose (HPMC) were compared. All of coatings solution were prepared in 1 % concentration in distill water, the optimum times of solubility in coatings solution showed clearing around at 12 and 20 min. The ratio of batter solution between flour and water were varied at 3.5:6.5, 4.0:6.0 and 4.5:5.5, respectively. The optimum of 4.0:6.0 affected on adhesion and appearance properties, which depended on overall liking. Increasing of

prolonging times (0, 15, 30 and 45 days) at -18 °C, result showed that coating of MC was reduced moisture and oil content more than that HPMC coating. Blending batter with coating solution showed higher efficient barrier of moisture and oil content than that coated sample with coating solution before battering. The effect of physicochemical properties obviously resulted in part of crust more than core of fried sample. Sensory evaluation of coating was not significantly ($p>0.05$) affect on odor and appearance without compromising on overall liking when comparing with uncoated sample.

G_G0034 Quality of instant noodles from high-iron rice and iron-fortified brown rice flour

Reungmaneepaitoon, Suparat., Sikkhamondhol, C., Jariyavattanavijit, C., and Tiangpook, C.
Institute of Food Research and Product Development, Kasetsart University Bangkok 10903, Thailand.

Abstract: Instant noodles were prepared from wheat flour and high iron brown rice flour, preparing from dry milling. Three varieties of rice flour : Suphan Buri 90 (SB), Homnin 313 (HW), Homnin 1000 (HP) with various amylose content (30.40, 19.10, 15.74% w/w) and iron content (1.24,2.04,2.22 mg/100 g) respectively were used to replace wheat flour for instant fried noodle production, each variety at the level of 30, 40, 50% (w/w) and each level was fortified with ferrous sulphate(anhydrous) at level of 0, 32, 64% iron of the RDI per serving (30 mg/100 g). Increasing the amount of iron content from 0, 32, 64% of the RDI in the mixtures decreased the L* value, b* value and increased a* value for the color of the instant noodle. brown rice flour. The sensory acceptability of the noodles made from each variety of 30% brown rice flour fortified with 32% iron of RDI had highest preference scores for elasticity, firmness, color and overall acceptability (slightly like to moderate like), they were used for consumer test (100 persons) of rural primary school children. The frequency percent of the acceptability scores (like very much to like extremely) of the noodle with HP and HW were 88 and 84%.

G_G0035 SURVEY OF BACTERIA IN MILK FROM FARM TO PRODUCT DISTRIBUTION POINTS

Suttisak suknaisilp, Romanee Sanguandeekul, Sumate Tantratian and Jirarat Tattiyakul
Department of Food Technology, Faculty of Science, Chulalongkorn University, Phayathai Road, Bangkok, Thailand.
E-mail:sssssth@yahoo.com, Fax: (662)02-254-4314

Abstract: Bacteria is an important factor that affected the quality of milk. The survey of amount of bacteria in milk from farm to product distribution points could provide information to improve the milk quality in Thailand. The survey showed that the milk samples taken from 3 dairy co-operatives in different provinces contained higher bacterial count than the number suggested by the Ministry of health (400,000 cfu/ml). But as the milk passed the heat process, the amount of bacteria was found to be lower than 300 cfu/ml. The number of bacteria was slightly increased during storage and distribution. The amount of bacteria in the milk products were smaller than the number suggested from the Ministry of Health. The coliform bacteria and E. coli were found only in the milk sampled before pasteurization, while the thermoduric bacteria was found at the average of 100 cfu/ml in all surveyed steps.

H_H0001 Screening of Male anti-fertility compounds from Marine Seaweed Macro algae

M. Babuselvam and S. Ravikumar
Division of Marine Microbiology and Medicine, Centre for Marine Science and Technology,
Manonmaniam Sundaranar University, Rajakkamangalam 629 502, Tamil Nadu, India. Phone: +91-4652-253078,
Telefax: +91-462-221214, E-mail: babu31993@gmail.com

ABSTRACT: This study is part of an integrated systematic approach and develops orally effective contraceptive agents from natural sources. Seaweeds, which were reported to posses variety of therapeutic property might, acted either by preventing the growth of metabolic activities. Hence, the present study was made an attempt to explore spermicidal compounds from seaweed marine macro algae. This study investigates the potential contraceptive property of the crude extracts of marine algae viz.,*Chaetomorpha indica, Ulva fasciata, Chaetomorpha antennina, Enteromorpha compressa, Helimeda gracilus, Enteromorpha intestinalis, Caulerpa toxifolia, Amphirova anceps, Gracilaria edulis, Laurencea papillosa, Sargassum illicifolium, Padina gymnospora, Sargassum flavican* and *Dictyota dichoderma*. The in vitro spermicidal effect of methanolic crude extracts from 14 seaweed species were investigated, 3 of them were found to inhibit maximum sperm motility at the concentration of 10 mg/ml. These 3 species were further investigated for their sperm viability, cytotoxicity and morphology. However, the selected 3 species of seaweed extracts indicates, disruption plasma membrane of the spermatozoa. Testing of spermicides depends on a series of *in vitro* screening methods incorporating human sperm with spermicides and utilizing immobility or loss of functionality as an end point.

H_H0002 The effect of PI3K and MAPKK/MEK inhibitors on ECG-induced apoptosis of leukemic (HL-60) cells

Ratana Banjerdpongchai, Prachya Kongtawelert
Department of Biochemistry, Faculty of Medicine, Chiang Mai University, Chiang Mai, Thailand.
E-mail: ratana@chiangmai.ac.th, Tel: 66 53 945323, Fax: 66 53 894031

Abstract: Epicatechin 3-gallate (ECG) is a component of green tea polyphenols. These polyphenols, catechins, have various physiological activities, including anticarcinogenic, antimutagenic, antioxidative and anti-inflammatory activities. ECG induced human leukemic (HL-60) cells to undergo apoptosis as evidenced by morphological changes, i.e., condensed nuclei and apoptotic bodies and the externalization of phosphatidylserine from the inner to outer leaflet of cell membrane detected by using annexin V-FITC and propidium iodide. It also caused a dose-dependent reduction in mitochondrial transmembrane potential in HL-60 cells. There was a slight increase of hydrogen peroxide (H_2O_2) in the cells detected by dichlorofluorescein diacetate and flow cytometry. ECG-induced apoptosis was enhanced by phosphatidylinositol-3 kinase (PI3K) inhibitor wortmannin and LY294002; MAPKK/MEK inhibitor PD98059; whereas MEK1 and MEK2 inhibitor U0126 was toxic to the cells by itself. ECG (at 100 μM) inhibited S/G2 cell cycle progression. For clinical application, it requires further in vivo experiments should they be used in leukemic patients.

H_H0003 TECHNOLOGY TRANSFER TO THE COMMUNITY : VITAMIN B COMPLEX PRODUCTION FROM ORGANIC RICE BRAN.

Pranee Nandhasri[1], Chisanucha Sattaponpun[1], Kasidit Uechiewcharnkit[2] Weon Ritusso[1] and Wassana Parawach[1]
[1] Research Center Project, Faculty of Medicine, Thammasat University (Rangsit) , Pathumthani 12120
[2] Department of Agricultural Technology, Faculty of Science and Technology, Thammasat University (Rangsit), Pathumthani 12120

Abstract: The technique on vitamin B complex production from organic rice bran was transferred to 10 agriculturalists in the community of Nhong Sure, Pathumthani province. The organic rice bran extract ORBE were concentration at the central laboratory and obtained vitamin B complex syrup (VBCS) with the yield of 14-18 %. The VBCS was continued in spray drying process and finally placed into the hard capsule machine to obtain vitamin B complex capsule (VBCC). The vitamin B complex content: vitamin B1, B2, B3, B6 and B12 were 14.06, 2.28, 19.03, 2.25 and 9.26 mg/g syrup, respectively in VBCS while in VBCC were 0.96, 0.21, 1.65, 0.21 and 1.07 mg/capsules, respectively.

H_H0004 *In Vitro* Glucose Entrapment of Mucilaginous Substances from Various Medicinal Plants

Chanida Palanuvej[1] and Nijsiri Ruangrungsi[1,2]
[1]Institute of Health Research and [2]Department of Pharmacognosy, Faculty of Pharmaceutical Sciences, Chulalongkorn University, Soi Chulalongkorn 62, Phyathai Road, Pathumwan, Bangkok 10330, Thailand

Abstract: Mucilaginous substances from 5 medicinal plants were studied for *in vitro* glucose entrapment compared to glucomannan powdered. The mucilage from fruits of *Hibiscus esculentus* Linn., seeds of *Ocimum canum* Sims., seeds of *Plantago ovata* Forssk., fruits of *Scaphium scaphigerum* G. Don. and aerial parts of *Basella alba* Linn. were extracted with water and lyophilized. The mucilage solutions from 5 plants and glucomannan were prepared at concentration of 0, 0.5, 1 and 2% in Ringer buffer containing 2% glucose. The mucilage-glucose solution was dialyzed through membraneous cellulose with Ringer buffer for 2 hours. The released glucose was assayed by glucose oxidase (GOD-PAP) method. All mucilage solutions (except *S. scaphigerum*) showed gel-forming characteristics and concentration response on glucose entrapment activity. Glucose entrapment ability of the studied mucilages were ranked as follow: *O. canum* > *glucomannan* > *P. ovata* > *H. esculentus* > *B. alba* > *S. scaphigerum*.

H_H0005 POLYLACTIC ACID (PLA)/POLY(ETHYLENE GLYCOL) (PEG) BLENDS FOR CONTROLLED DRUG DELIVERY APPLICATIONS

Thirasuda Prasert[1], Sergei Nazarenko[2], and Jinming Gao[3]

[1] Department of Rubber Technology and Polymer Science Faculty of Science and Technology, Prince of Songkhla University, Pattani, Thailand
E-mail: pthirasu@bunga.pn.psu.ac.th, Fax: 66-73-331-099

[2] Macromolecular Science and Engineering, Case Western Reserve University, Cleveland, OH, USA.

[3] Biomedical Engineering, Case Western Reserve University, Cleveland, OH, USA.

Abstract: The objective of this study is to modify biodegradable poly (d,l-lactic acid) (PLA) for the use as an effective coating membrane in site specific drug delivery device for local chemotherapy. The approach is to incorporate water soluble poly (ethylene glycol) (PEG) into PLA matrix by blending to form porous structure upon exposure to the aqueous medium in order to manipulate the drug diffusion rate. The PEG/PLA blend films at various weight faction of PEG (10, 20, 30 % w/w) were prepared using a solvent-casting-evaporation method. Scanning electron microscopy (SEM) was employed to reveal the internal structure of the blend films as a result of PEG leaching out. The SEM images suggested that molecularly dispersed system and pure PLA retained non porous structure, while numerous micropores started to form in 20 % and increasingly became interconnected to create channel morphology at 30 % PEG. Two distinct drug release kinetics of drug delivery devices coated with PLA/PEG blends were observed: a constant release kinetics for 10% PEG and fast and identical release kinetics for 20 - 30% PEG. The coating blend films were believed to act as a rate controlling membrane.

H_H0006 Screening of inhibitors of Ca2+-signal transduction from microbial products by using a high throughput yeast screening system

Benjamas Thanomsub[1], Siriluck Attrapadung[1], and Tokichi Miyakawa[2]

1. Department of Microbiology, Faculty of Medicine, Srinakharinwirot University, Bangkok 10110, Thailand
2. Department of Molecular Biotechnology, Graduate School of Advanced Sciences of Matter, Hiroshima University, Hiroshima, Japan 739-8530

Abstract: Calcium ion is a universal second messenger that is important in the regulation of diverse biological processes in eukaryotic organisms. Hyper activation of Ca^{2+}-signaling in yeast causes a severe defect of growth through the inhibition of the cell-cycle engine in G2 phase. Based on this mechanism, we previously developed a high throughput drug screening method to detect small-molecule inhibitors of this pathway. Several signaling molecules of medical interest, including calcineurin, protein kinase C, MAP kinases, GSK-3 kinase are potential targets of the compounds that are expected to be found by the screening. We screened the biosurfactant fraction of the culture broth of microorganisms isolated from soils and plants. The bacteria and yeast strains were cultivated in the presence of soy-bean oil as the carbon source and the culture broth was fractionated by solvent extractions to obtain a biosurfactant fraction. After examining 240 samples, 11 hit samples were obtained. Active substances are under investigation.

H_H0007 DEVELOPMENT OF ANTI-INFLAMMATORY AND ANTI-CANCER DRUGS FROM LANNA MEDICINAL PLANT DATABASE

Jiradej Manosroi[1,2], Rattanabhorn Junthip[1], Kanok-on Phrueksathamrungkun[1], Udom Rungruangsri[3] and Aranya Manosroi[1,2]

[1] Natural Products Research and Development Center (NPRDC), Institute for Science and Technology Research and Development (IST), Chiang Mai University, Chiang Mai, Thailand 50200.

[2] Faculty of Pharmacy, Chiang Mai University, Chiang Mai, Thailand 50200.

[3] Faculty of Humanities, Chiang Mai University, Chiang Mai, Thailand

Abstract: The Lanna medicinal plant recipes have been selected from the Lanna Medicinal Plant Database of NPRDC. The recipes were collected from 7 provinces of northern Thailand. They are Chiang Mai, Chiang Rai, Lampoon, Lampang, Payao, Phare and Nan. The total numbers of recipes were 11,130 with 419 recipes for cancer and 17 recipes for anti-inflammatory. There were 97 diseases or symptoms which were related to cancer. But, after interviewing with the northern folklore doctors, only 37 diseases and 248 recipes related to cancers and 12 recipes were selected for further study. For anti-inflammation, there were 17 recipes which showed evidences of this activity. However, there were only 3 Lanna medicinal plant recipes which have sufficient scientific information concerning anti-inflammatory activities. Information from this study can be applied for the development of anti-cancer and anti-inflammatory drugs in modern medicines.

H_H0008 STUDY OF MEDICINAL PLANTS AND DISEASES / SYMPTOMS IN LANNA MEDICAL PLANTS TEXTBOOKS DATABASE FOR THE RESEARCH AND DEVELOPMENT OF DRUGS, COSMETICS AND FOOD SUPPLEMENTS

Jiradej Manosroi[1,2], Natitcha Chiangkum[1], Direk Injan[1], Udom Rungruangsri[3] and Aranya Manosroi[1,2]

[1] Natural Products Research and Development Center (NPRDC), Institute for Science and Technology Research and Development (IST), Chiang Mai University, Chiang Mai, Thailand

[2] Faculty of Pharmacy, Chiang Mai University, Chiang Mai, Thailand

[3] Faculty of Humanities, Chiang Mai University, Chiang Mai, Thailand

Abstract: The objective of this study was to survey medicinal plants and diseases or symptoms appeared in Lanna medicinal plants textbooks database developed by NPRDC. The textbooks were collected from 7 provinces of northern Thailand (Chiang Mai, Chiang Rai, Lamphun, Lampang, Phayao, Phrae, Nan). Twenty one Lanna medicinal text books were translated

into Thai alphabet an understandable Thai language and recorded in "Lanna Medicinal Plant Textbook Database: Recipes-Disease-Medicinal Plants", the computer program developed by NPRDC. There were the total recipes of 11,880 with the total medicinal plants of 4,066 and 2,008 diseases. The 10 highest frequency in orders of medicinal plants found were *Cassia alata* L., *Piper nigrum* L., *Saccharum chinensis* Roxb., *Zingiber officinale* Roscoe, *Zingiber cassumunar* Roxb., *Plumbago indica* L., *Dracaena loureiri* Gagnep., *Millettia kityana* Craib, *Dregea volubibis* (L.f.) Hook.f. and *Cassia fistula* L. respectively with the numbers of recipes found of 642, 616, 612, 597, 561, 510, 507, 490, 486 and 485 recipes respectively. Numbers of pharmacological activities studies of these plants have been reported. The 10 highest frequency of diseases or symptoms found in orders were pyretic, san-ni-bat, ma-reng-krut, khang, lom, head ache, ma-hoke, juk-sead, mut-ta-kheut and pi with the numbers of recipes found of 484, 344, 280, 221, 221, 149, 148, 107, 104 and 102 recipes respectively. These information indicated the frequent use Thai medicinal plants in Lanna folklore medicine in the 7 provinces in the Northern part of Thailand. These data can be applied in primary health care and the research and development of modern medicines, food supplements and cosmetic raw materials.

H_H0009 Preparation of the Lanna Medicinal Plant Textbooks Database for the Research and Development of Drugs, Cosmetics and Food Supplement

Jiradej Manosroi[1,2], Direk Injan[1], and Aranya Manosroi[1,2]

[1] Natural Products Research and Development Center(NPRDC), Institute for Science and Technology Research and Development (IST), Chiang Mai University, Chiang Mai, Thailand

[2] Faculty of Pharmacy, Chiang Mai University, Chiang Mai, Thailand

[3] Faculty of Humanities, Chiang Mai University, Chiang Mai, Thailand

Abstract: The objective of this study was to prepare a database of Lanna medicinal plants textbooks which were collected from 7 provinces of northern Thailand [Chiang Mai, Chiang Rai, Lamphun, Lampang, Phayao, Phrae and Nan]. The 3 most reliable and complete recipes from each province were selected and translated into Thai, 21 copies of Lanna medicinal plant textbooks were selected for this study. These copies were translated from Lanna alphabet to understandable Thai language and recorded in the "Lanna Medicinal Plant Textbook Database: Recipes-Disease-Medicinal Plant" program. The user can search and print the recipes or disease and medicinal plant report from this database. The database contains 11,880 recipes, 4,066 diseases and 2,008 medicinal plants. Among these recipes, 53 cosmetic recipes such as 26 recipes of skin treatment, 21 recipes of hair treatment, 6 recipes of nail treatment and 2 recipes of teeth treatment, which were 0.45 % of the Lanna medicinal plants recipes. A number of health care recipes were also found. This database can be applied in primary health care and the research and development of drugs, cosmetics and food supplement.

H_H0010 EFFECT OF PHYTOESTROGEN ON PARVALBUMIN-IMMUNOREACTIVE CELLS IN BRAINS OF OVARIECTOMIZED RATS FED WITH YOUNG COCONUT JUICE

Nisaudah Radenahmad[1], Kitja Sawangjaroen[2], Patchara Subhadhirasakul[1], Wilart Rundorn[2], Boonsirm Withyachumnarnkul[3], James R. Connor[4]

[1] Department of Anatomy, Faculty of Science, Prince of Songkla University, Hat Yai 90112, Thailand. E-mail: nisaudah.r@psu.ac.th Fax: (66-74)-446663

[2] Department of Pharmacology, Faculty of Science, Prince of Songkla University, Hat Yai 90112, Thailand.

[3] Department of Anatomy, Faculty of Science, Mahidol University, Bangkok 10400 Thailand.

[4] Department of Neurosurgery, The Penn State University College of Medicine, Hershey, PA, 17033 USA.

Abstract: Young coconut juice (YCJ), Cocos *nucifera* (Arecaceae), believed to contain phytoestrogen was investigated for its possible beneficial effects on delaying Alzheimer's disease (AD). Sixty ovx rats were devided into 6 groups, 10 rats per group. Group 1 received E2 at 2.5 µg/kg BW/day; group 2 and 3 received YCJ at 20 mL, and 100mL/kg BW/day, respectively. Group 4 received 100 mL YCJ /kg BW plus E2 at 2.5 µg/kg BW/day only twice a week, all for 5 weeks. The other two were ovx and sham-operated controls. Using anti-parvalbumin antibody, the majority of immunoreactive(-ir) neurons were located within the deep half of layers III, and in layers IV and V. Immunoreactivity was found in neuronal perikarya, nuclei and processes. In the ovx group, a similar neuronal distribution was found but the numbers of ir-cells were much less than in the control groups.

H_H0011 H5N1 Influenza A Virus and Infected Human Plasma

Salin Chutinimitkul,* Parvapan Bhattarakosol,* Surangrat Srisuratanon,† Atthapon Siamudomkan,† Kittipong Kongsomboon,† Sudarat Damrongwatanapokin,‡ Arunee Chaisingh,‡ Kamol Suwannakarn,* Thaweesak Chieochansin,* Apiradee Theamboonlers,* Yong Poovorawan*

* Chulalongkorn University Bangkok, Thailand; †Srinakharinwirot University, Nakhon Nayok, Thailand; ‡National Institute of Animal Health, Bangkok, Thailand

Abstract: The last patient infected AI H5N1of the third wave outbreak was a 5-year-old boy whose EDTA blood sample was collected and examined by multiplex RT-PCR and multiplex real-time RT-PCR, both of which showed positive. The plasma specimen was processed for virus isolation by embryonated egg injection. The allantoic fluid was shown to contain 2,048 hemagglutinin (HA) units. Whole genome sequencing was performed and submitted to the GenBank database under the strain A/Thailand/NK165/05 accession no. DQ 372591-8. The sequence analyses of the viruses showed that the HA cleavage site contained R to K amino acid substitution. In addition, a single amino acid substitution from E to K at position 627 of PB2 showed increased virus replication efficiency in mammals. This case should be a reminder of the necessity to carefully handle

and transport serum or plasma samples suspected to be infected with H5N1 avian influenza.

H_H0012 DETERMINATION OF NEOMYCIN SULFATE IN PHARMACEUTICAL FORMULATIONS BY CAPILLARY ELECTROPHORESIS WITH INDIRECT UV DETECTION

Piyaporn Srisom[1], Boonsom Liawruangrath[1], Saisunee Liawruangrath[2], Sunanta Wangkarn[2], and Jonathan M. Slater[3]
[1] Department of Pharmaceutical Sciences, Faculty of Pharmacy, Chiang Mai University, Chiang Mai 50200, Thailand. E-mail:piyaporn@cru.in.th
[2] Department of Chemistry, Faculty of Science, Chiang Mai University, Chiang Mai 50200, Thailand.
[3] School of Biological and Chemical Sciences, Birkbeck College, University of London, London WC1E7HX, UK.

Abstract: A simple and rapid capillary electrophoresis (CE) method for the determination of neomycin sulfate (NS) in pharmaceutical formulations was studied. The optimal conditions were 15 mM phosphate buffer containing 40 mM N-(4-hydroxyphenyl)acetamide and 50 mM tetradecylammonium bromide (TTAB) at pH 5.0, 6 kV as applied potential and 27 cm total capillary length. Detection was indirect UV set at 280 nm. The limit of detection (LOD) and the limit of quantification (LOQ) were 3.7 and 12.5 µg/mL, respectively. This method gave high accuracy and precision, wide linear range with the regression coefficient greater than 0.999.

H_H0015 Expression and function of toll-like receptors on dendritic cells from rhesus macaques

C, Ketloy,* AJ, Engering, † A, Limsalakpetch, † U, Kum-Arb, † K, Yongvanitchit, † K, Ruxrungtham,* S, Pichyangkul†
*Vaccine and Immunology Laboratory, Chula MRC, Faculty of Medicine, Chulalongkorn University, Bangkok Thailand
†Department of Immunology and Medicine, USAMC-AFRIMS, Bangkok, Thailand

Abstract: Toll-like receptors (TLRs) are pattern-recognition receptors of the innate immune system that interact with a broad variety of pathogens. Due to their potent role in activation of dendritic cells, ligands for TLRs are attractive candidates for adjuvant formulations. Based on their close relationship to humans, non-human primates such as rhesus macaques have proven to be valuable as animal models for testing vaccines and immunization strategies. However, so far, it is not known if a similar set of TLRs is present on dendritic cells from human and rhesus. Therefore, our aim was to analyze TLR expression and function on rhesus dendritic cells.

We used an optimized protocol for the generation of rhesus monocyte-derived dendritic cells (mo-DCs) and analyzed expression of TLRs by RT-PCR. We found that rhesus mo-DCs express TLR3, TLR4 and TLR8, but do not express TLR7 and TLR9. Moreover, the ability of several different TLR ligands to stimulate dendritic cell maturation and cytokine production was studied using flow cytometry and ELISA, respectively. Our results show that rhesus dendritic cells responded to TLR3 and TLR4 ligands by upregulation of costimulatory and maturation markers, but not to ligands for TLR7, TLR8 and TLR9. In comparison, human monocyte-derived dendritic cells were shown the same TLRs expression pattern and to be activated by the same TLR ligands. However, unlike human monocyte-derived dendritic cells, rhesus dendritic cells produced very low amounts of IL-12p70. Interestingly, high levels of interferon type I production were induced by poly I:C, a ligand for TLR-3 from rhesus dendritic cells. In addition, we will present results of ongoing research on TLR expression and function of other antigen-presenting cells from rhesus macaques, including blood dendritic cell subsets.

Thus, whereas murine dendritic cell subsets substantially differ from their human counterparts, we here show that non-human primate dendritic cells share functionality of TLRs with human dendritic cells. Our results indicate that non-human primates will be useful for testing novel antigen delivery systems containing TLR ligands.

H_H0016 THE QUALITY AND STANDARD OF *CLITORIA HANCEANA* ROOTS

Niran Vipunngeun[1,3], Somchai Issaravanich[1], Anusorn Rungsiyothin[1], Tanasorn Tunsaringkarn[1], Chanida Palanuvej[1], Anchalee Chuthaputti[4] and Nijsiri Ruangrungsi[1,2]
[1] Institute of Health Research, [2]Faculty of Pharmaceutical Sciences, Chulalongkorn University, Bangkok 10330, [3]School of Health Science, Mae Fah Luang University, Chiang Rai 57100, [4]Department for Development of Thai Traditional and Alternative Medicine, Ministry of Public Health, Nonthaburi 11000

Abstract: Macroscopic and microscopic characters of roots of *Clitoria hanceana* Hemsl. (Leguminosae) were examined and illustrated. Samples were collected from 15 Thai traditional drug stores in 13 provinces located at 4 regions of Thailand. Crude drug was evaluated by WHO quality control methods. Their results of pharmacognostic specification of *C. hanceana* roots were described as follow: total ash 7.06 % w/w, ethanol-soluble extractive 2.91 % w/w, water-soluble extractive 28.79 % w/w, loss on drying 10.59 % w/w and water content 8.26 % w/w. The root of *C. hanceana* contained periderm layer which composed of several layers of cork cells. None of crystal was found. The arrangement of vascular tissue showed lignified xylem rays containing starch granules, alternating with fibers and scattering vessels.

H_H0017 PHARMACOGNOSTIC SPECIFICATIONS OF FRUITS OF *BRUCEA JAVANICA* IN THAILAND

Somchai Issaravanich[1],Chanida Palanuvej[1],Anusorn Rungsiyothin[1],Tanasorn Tunsaringkarn[1], Niran Vipunngeun[1,3], Anchalee Chuthaputti[4] and Nijsiri Ruangrungsi[2]
[1] Institute of Health Research, [2]Faculty of Pharmaceutical Sciences, Chulalongkorn University, Bangkok 10330, [3]School of Health Science, Mae Fah Luang University, Chiang Rai 57100, [4]Department for Development of Thai Traditional and Alternative Medicine, Ministry of Public Health, Nonthaburi 11000
E-mail: isomchai@chula.ac.th

Abstract: Fifteen samples of fruits of *Brucea javanica* (L.) Merr. (commonly known in Thai as RAT-CHA-DAT) were collected from 15 Thai traditional drug stores in 13 provinces located at 4 regions of Thailand. Crude drugs were evaluated by World Health Organization quality control methods for medicinal plant materials. Cross section of the fruit and powdered drug were studied for microscopic characters. The mean contents of pharmacognostic specifications of RAT-CHA-DAT were described as follow: foreign matter 0.11% w/w, acid-insoluble ash 3.57% w/w, total ash 5.58% w/w, ethanol-soluble extractive 18.14% w/w, water-soluble extractive 15.67% w/w, loss on drying 7.94% w/w and water content 7.33% w/w. The fruit of RAT-CHA-DAT contained numerous oil globules distributed among the reserved parenchyma. The rosette aggregate crystals were distributed in parenchyma layer.

H_H0018 EFFECTS OF ANTI-RICKETTSIA DRUGS ON THE MICROFILARIA MOTILITY OF DIROFILARIA IMMITIS

Sivapong Sungpradit[1], Tanittha Chatsuwan[2], and Surang Nuchprayoon[1]

[1] Lymphatic filariasis research unit, Department of Parasitology, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand.

[2] Department of Microbiology, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand.

Abstract: Canine and feline heartworm diseases (Dirofilariasis), caused by a filarial nematode, *Dirofilaria immitis*, are transmitted by mosquitoes. Human accidentally infected with *D. immitis* have been reported. Human pulmonary dirofilariasis develops when the parasites die, embolize, travel to the lung, locate in small branches of the pulmonary arteries and develop nodule. Anti-rickettsia drugs have bacteriocidal activity against the endosymbiont *Wolbachia*, required for fertility and survival of the filarial nematodes. Tetracycline and doxycycline reduced >50% *Brugia malayi* microfilaria motility *in vitro*. Our study showed that doxycycline was the most effective compound, that could stop microfilaria motility on day 2, with the minimum effective concentrations (MEC) of 256 µg/ml. Rifampicin and ciprofloxacin could stop microfilaria motility but slower than doxycycline. The outcome of this study will be useful for treatment, prevention of *D. immitis* infection and could be applied in control of the human lymphatic filarial parasites (e.g. *Wuchereria bancrofti and B. malayi*).

H_H0019 Comparison between different methods for YMDD mutation detection in Hepatitis B virus

Thaweesak Chieochansin[1], Salin Chutinimitkul[1], Sunchai Payungporn[1], Apiradee Theamboonlers[1], Pisit Tangkijvanich[2], Piyawat Komolmit[3] and Yong Poovorawan[1].

[1] Department of Pediatrics, Faculty of Medicine, Chulalongkorn University, Bangkok 10330, Thailand. E-mail:thch2525@hotmail.com Fax: (662)256-4929

[2] Department of Biochemistry, Faculty of Medicine, Chulalongkorn University, Bangkok 10330, Thailand.

[3] Department of Medicine, Faculty of Medicine, Chulalongkorn University, Bangkok 10330, Thailand.

Abstract: Mutations at the YMDD motif of hepatitis B virus (HBV) render infected patients resistant to lamivudine therapy. Hence, sensitive and specific methods aimed at detecting the mutants are essential. The purpose of this study was to develop methods for detecting the YMDD mutations by PCR-RFLP and real-time PCR using Locked Nucleic Acid (LNA)-mediated TaqMan probes. The results obtained by these methods were compared with those examined by conventional direct sequencing on 77 serum samples of patients treated with lamivudine. Our results show that both PCR-RFLP and real time PCR can detect mixtures of different mutants with wild-type virus. However, real time PCR is less time-consuming, and more sensitive for the detection of mixed populations than PCR-RFLP. It is concluded that real-time PCR using LNA-mediated Taq-Man probes has the advantages of a sensitive, specific and rapid detection method, which will be essential for monitoring patients undergoing antiviral therapy.

H_H0020 THE QUALITY AND STANDARD OF *HOLARRHENA PUBESCENS* STEM BARK

Tanasorn Tunsaringkarn[1], Chanida Palanuvej[1], Anusorn Rungsiyothin[1], Niran Vipunngeun[1,3], Somchai Issaravanich[1] Anchalee Chuthaputti[4] and Nijsiri Ruangrungsi[1,2]

[1] Institute of Health Research, [2]Faculty of Pharmaceutical Sciences, Chulalongkorn University, Bangkok 10330, [3]School of Health Science, Mae Fah Luang University, Chiang Rai 57100, [4]Department for Development of Thai Traditional and Alternative Medicine, Ministry of Public Health, Nonthaburi 11000, E-mail: tkalayan@chula.ac.th

Abstract: Quality and standard of Mok-Luang stem bark were examined. They were collected from 14 Thai traditional drug stores of 13 provinces in 4 regions of Thailand. Crude drug evaluations were performed by macroscopic and microscopic methods whilst standardizations were performed for foreign matter, acid-insoluble ash, total ash, loss on drying, extractive values, water content and thin layer chromatography (TLC) identification of fingerprint which were followed by World Health Organization (WHO) guideline standard methods. Their results showed that the percentage of foreign matter, acid-insoluble ash, total ash, loss on drying, water content, ethanol-soluble extractive and water-soluble extractive were 0.13, 5.89, 7.20 8.39, 9.25, 4.25 and 11.52 respectively.

H_H0021 Application of real-time RT-PCR for H5N1 influenza A virus detection

Sunchai Payungporn[1], Salin Chutinimitkul[1], Arunee Chalsingh[2], Sudarat Damrongwantanapokin[2], Bandit Nuansrichay[2], Wasana Pinyochon[2], Chantanee Buranathai[2], Alongkorn Amonsin[3], Ruben O. Donis[4], Apiradee Theamboonlers[1] and Yong Poovorawan[1]

[1] Center of Excellence in Viral Hepatitis Research, Chulalongkorn University, Bangkok 10330, Thailand

[2] Department of Livestock Development, National institute of Animal Health, Bangkok 10900, Thailand

[3] Faculty of Veterinary Science, Chulalongkorn University Pathumwan, Bangkok 10330, Thailand

[4] Influenza Branch, Centers for Disease Control and Prevention, Atlanta, GA 30333, USA

Abstract: H5N1 influenza A virus causes a rapidly fatal systemic disease in domestic poultry and mammalian. The aim of this study was to develop 2 rapid and sensitive diagnostic assays based on single step real-time RT-PCR for H5N1 influenza A virus detection. The first assay employed multiplex primers and triple fluorescently labeled TaqMan MGB probes corresponding to M, H5 and N1 genes. The other assay utilized SYBR Green I with melting curve analysis for discrimination between subtypes H5 highly- pathogenic avian influenza (HPAI) and low-pathogenic avian influenza (LPAI) viruses based on the differences of their amplicon sizes and %GC contents within the cleavage site of hemagglutinin (H5) gene. The results showed that the multiplex TaqMan MGB real-time RT-PCR can be applied to specifically detect H5N1 influenza A virus and the SYBR Green I with melting curve analysis yielded effective discrimination between HPAI and LPAI strains with the sensitivity of 10^2 copies/ µL. In conclusion, the highlights of these particular methods lie in the rapidity, specificity and sensitivity thus rendering the feasible and effective for large-scale screening at times of H5N1 influenza A virus outbreaks.

H_H0022 The neuroprotective effect of melatonin and desipramine on SH-SY5Y dopamine cell line

Banthit Chetsawang[1], Chutikorn Nopparat[1] and Piyarat Govitrapong[1,2].

[1] Neuro-Behavioural Biology Center, Institute of Science and Technology for Research and Development, Mahidol University, Salaya, Nakornpathom 73170, Thailand. E-mail: grbcs@mahidol.ac.th

[2] Center for Neuroscience and Department of Pharmacology, Faculty of Science, Mahidol University, Bangkok, Thailand.

Abstract: The degeneration of dopaminergic neurons of the substantia nigra is responsible for primary motor symptoms observed in Parkinson's disease. It has been reported that overproduction of reactive oxygen species occurs after brain injury and mediates both necrotic and apoptotic cell death. Recently, melatonin has been reported to process an efficient antioxidant capacity. In addition, an inhibition of cell death induced by neurotoxin with a monoamine uptake blocker, desipramine has been demonstrated. In the present study, the protective roles of melatonin and desipramine against neuronal cell death have been investigated in human dopaminergic neuroblastoma SH-SY5Y cultured cells. The present results showed that desipramine was able to abolish the toxic effects of neurotoxin, 1-methyl-4-phenylpyridinium iodide (MPP^+) but not hydrogen peroxide on cell viability reduction. However, the protective effect of melatonin on hydrogen peroxide reduced cell viability was demonstrated in SH-SY5Y cultured cells. Further study on the mechanisms of these two compounds in protecting the toxic effect of dopamine cell is necessary.

H_H0024 EVALUATION STUDIES OF NEPHROPROTECTIVE EFFECT OF *Curcuma comosa* EXTRACTS ON CISPLATIN-INDUCED NEPHROTOXICITY

Pranida Kigpituck[1], Aporn Chuncharunee[3], Samaisukh Sophasan[2], Pawinee Piyachaturawat[1,2] and Surawat Jariyawat[1,2]

[1] Graduate Program in Toxicology,

[2] Department of Physiology, Faculty of Science and

[3] Department of Anatomy, Faculty of Medicine, Siriraj Hospital, Mahidol University, Bangkok, Thailand.

Abstract: The nephroprotective effect of *Curcuma comosa* extract was evaluated in cisplatin-induced nephrotoxicity in mice. Adult male mice orally received the ethanol extract of *Curcuma comosa* for 3 days before cisplatin injection (12.5 mg/kg BW, ip). The ethanol extract at a dose of 200 mg/kgBW showed an effective nephroprotective effect by reducing blood urea nitrogen and plasma creatinine. Further studies on its mechanism of action showed that the extract markedly decreased lipid peroxidation of cisplatin in kidney and increased gluthatione content, glutathione peroxidase and superoxide dismutase activities. Alterations of kidney histopathology were well correlated with the alterations of biochemical analysis. *Curcuma comosa* extract may have therapeutic potential as a nephroprotective agent.

H_H0025 EVALUATION STUDIES OF NEPHROPROTECTIVE EFFECT OF *Curcuma comosa* EXTRACTS ON CISPLATIN-INDUCED NEPHROTOXICITY

Pranida Kigpituck[1], Aporn Chuncharunee[3], Samaisukh Sophasan[2], Pawinee Piyachaturawat[1,2] and Surawat Jariyawat[1,2]

[1] Graduate Program in Toxicology, [2]Department of Physiology, Faculty of Science and [3]Department of Anatomy, Faculty of Medicine, Siriraj Hospital, Mahidol University, Bangkok, Thailand.

Abstract: The nephroprotective effect of *Curcuma comosa* extract was evaluated in cisplatin-induced nephrotoxicity in mice. Adult male mice orally received the ethanol extract of *Curcuma comosa* for 3 days before cisplatin injection (12.5 mg/kg BW, ip). The ethanol extract at a dose of 200 mg/kgBW showed an effective nephroprotective effect by reducing blood urea nitrogen and plasma creatinine. Further studies on its mechanism of action showed that the extract markedly decreased lipid peroxidation of cisplatin in kidney and increased gluthatione content, glutathione peroxidase and superoxide dismutase activities. Alterations of kidney histopathology were well correlated with the alterations of biochemical analysis. *Curcuma comosa* extract may have therapeutic potential as a nephroprotective agent.

H_H0026 THE QUALITY ASSESSMENT OF *CAESALPINIA* SAPPAN STEM WOOD

Anusorn Rungsiyothin[1], Chanida Palanuvej[1], Somchai Issaravanich[1], Tanasorn Tunsaringkarn[1], Niran Vipunngeun[1,3], Anchalee Chuthaputti[4] and Nijsiri Ruangrungsi[1,2]

[1] Institute of Health Research, [2]Faculty of Pharmaceutical Sciences, Chulalongkorn University, Bangkok 10330, [3]School of Health Science, Mae Fah Luang University, Chiang Rai 57100, [4]Department for Development of Thai Traditional and Alternative Medicine, Ministry of Public Health, Nonthaburi 11000

ABSTRACT: The stem wood of *Caesalpinia sappan* L. was collected from 15 Thai traditional drug stores in 13 provinces located at 4 regions of Thailand. Crude drug was evaluated by WHO quality control methods for medicinal plant materials. Macro- and microscopy were studied for anatomical and histological characters. Pharmacognostic specification of *C. sappan* wood was described as follow : foreign matter 0.01 % w/w, acid-insoluble ash 0.44 %w/w, total ash 0.87 %w/w, ethanol-soluble extractive 2.94 % w/w, water-soluble extractive 3.77 % w/w loss on drying 8.50 %w/w and water content 8.52 % w/w. TLC fingerprint was also performed for chemical composition.

H_H0027 A novel recombinant of Hepatitis B virus genotypes G and C isolated from a Thai patient with hepatocellular carcinoma

Kamol Suwannakarn,[1] Pisit Tangkijvanich,[2] Apiradee Theamboonlers,[1] Kenji Abe[3] and Yong Poovorawan[1]
[1] Center of Excellence in Viral Hepatitis Research, Chulalongkorn University, Bangkok 10330, Thailand
[2] Department of Biochemistry, Faculty of Medicine, Chulalongkorn University, Bangkok 10330, Thailand
[3] Department of Pathology, National Institute of Infectious Diseases, Tokyo 162-8640, Japan

Abstract: Genomic recombination between different genotypes of Hepatitis B virus (HBV) resulting in hybrid strains has been increasingly documented. In this study, a novel recombinant of HBV genotypes G and C isolated from a Thai patient with hepatocellular carcinoma is reported. Based on phylogenetic analyses of the S, P and X genes and the entire genome, the HBV isolate clustered on a branch within genotype G, but clustered with genotype C on analysis of the C gene. Using the program SIMPLOT and bootscanning analysis, the recombination breakpoints were located at nt 1860 and 2460 of the precore/core region. The hallmarks of the original genotype G, including a 36 bp insertion in the core region and dual stop codons in the precore region, were not identified in this isolate. These data should encourage further investigations on the epidemiological and virological characteristics of HBV genotype G involved in recombination with other genotypes.

H_H0028 BACTERICIDAL ACTIVITIES OF NOVEL N-SUBSTITUTED CHITOSAN DERIVATIVES CONTAINING QUATERNARY AMMONIUM FUNCTIONALITY

Warayuth Sajomsang[1], Varawut Tangpasuthadol[1], Supawan Tantayanon[1], and William H. Daly[2]
[1] Functional Polymer and Petrochemistry Research Unit, Department of Chemistry, Faculty of Science, Chulalongkhorn University, Phyathai Road, Pathumwan, Bangkok 10330, Thailand.
E-mail:sajomsang@hotmail.com
[2] Macromolecular Studies Group, Department of Chemistry, Louisiana State University, Baton Rouge, LA 70803, USA.

Abstract: Quaternary ammonium functionalized chitosan derivatives were synthesized and their antibacterial properties were evaluated using a MIC method. In the present study, we have synthesized four types of N-substituted chitoan derivatives, i.e., aliphatic, aromatic containing electron donating and electron withdrawing groups, heterocyclic aromatic, and mono, di-saccharides. The reaction was performed by via the Schiff base formed by reaction between the 2-amino group of chitosan with an aldehyde under acidic conditions followed by reduction of the Schiff base intermediate with sodium cyanoborohydride. The different extents of N-substitutions (ES) obtained depended on the molar ratio of the aldehydes or ketone to the glucosamine residue of chitosan, the reaction time and the substituent on the aromatic ring. The quaternary ammonium derivatives of chitosan were prepared by reacting with 3-chloro-2-hydroxypropyl trimethylammonium chloride (Quat-188) as the quaternizing agent. Minimum inhibitory concentration (MIC) antibacterial studies of these materials were carried out on *E. coli* (gram negative) and *S. aureus* (gram positive) in order to explore the impact of the substituents of their biological activity. The antibaterial activity observed depended on the level of ES; a high a level of ES (> 10%) decreased antibacterial activity possibly as a result of a corresponding reduction in positively charges substituents on the chitosan backbone.

H_H0029 STUDY OF INTERACTION BETWEEN HYNIC-TYROSINE-OCTREOTIDE AND RAT PANCREATIC TOMOUR CELL LINE BY SURFACE PLASMON RESONANCE (SPR)

Surasak Laloknam[1], Wanwimol Mekboonsonglarp[2], Wutthinun Raksajit[3], Aran Incharoensakdi[3], Nipawan Poramathikul[1], Wiranee Srivieng[1], Chaloemsin Permtermsin[1], Napharat Minsakorn[1] and Jatupol Sangsuriyan[1]
[1] Radioisotope Production Program, the Office of Atoms for Peace, Bangkok, 10900, Thailand
[2] Scientific and Technological Research Equipment Center, Chulalongkorn University, Bangkok 10330, Thailand
[3] Department of Biochemistry, Faculty of Science, Chulalongkorn University, Bangkok 10330, Thailand
E-mail: Lsurasak2005@yahoo.com, Fax: (662)562-0127

Abstract: Surface plasmon resonance spectroscopy was used to directly measure the binding interactions of Hynic-Tyrosine-Octreotide to somatostatin receptors. The binding of the peptide to viable AR42J (rat pancreatic tumour cell line) and its membrane was studied. The analyte; Sandostatin, bovine serum albumin (BSA), and Hynic-Tyrosine-Octreotide were observed to bind to the rat pancreatic tumour cell line and membrane. Sandostatin could interact with rapid association and rapid dissociation rates on both immobilized cells and membranes. BSA showed slight binding to both tumour cells and membranes. Receptor binding experiments indicated that the Hynic-Tyrosine-Octreotide was able to specifically bind to tumour cells as well as membranes.

H_H0030 EFFECTS OF HOT-DRAWING AND ANNEALING ON THE MECHANICAL PROPERTIES OF AN ABSORBABLE MONOFILAMENT SUTURE.

Supap Bunkird, Jintana Siripitayananon, Robert Molloy, Rachanida Panjakha, Pajaree Chooprayoon.
Biomedical Polymers Technology Unit, Department of Chemistry, Faculty of Science, Chiang Mai University, Chiang Mai

50200, Thailand
E-mail: Tel: 053-943406 Fax: 053-892277

Abstract: A random terpolymer of L-lactide (LL), ε-caprolactone (CL) and glycolide (G) with a composition of 70:20:10 mol % was synthesized via bulk ring-opening polymerisation using stannous acetate as an initiator. The polymer was biodegradable with potential for use as an absorbable monofilament surgical suture. The polymer synthesized ($\bar{M}_w$= 92300, from GPC) was spun into a monofilament fibre by a small- scale melt-spinning apparatus. The mechanical strength of the as-spun fibre was improved by off-line hot-drawing and annealing under controlled conditions of draw rate, draw ratio (λ) and temperature. The results obtained from tensile testing showed that the fibre properties were strongly dependent on the draw ratio. A high draw ratio was obtained by off-line hot-drawing twice to λ = 6.44 with intermediate annealing at 60 °C for 20 hrs. The tensile strength of the drawn fibre was found to increase by 1125 % relative to that of the as-spun fibre.

H_H0031 SYNTHESIS OF TIN(II) 1-PROPOXIDE FOR USE AS A NOVEL INITIATOR IN THE RING-OPENING POLYMERISATION OF ε-CAPROLACTONE

Pimpanitpa Kunthadong, Robert Molloy, Winita Punyodom, Puttinan Meepowpan
Biomedical Polymers Research Unit, Department of Chemistry, Faculty of Science, Chiang Mai University, Chiang Mai 50200, Thailand.
E-mail: robert@chiangmai.ac.th Tel: 053-943406 Fax: 053-892277

Abstract: This paper describes the synthesis of a novel tin(II) alkoxide for use as an initiator in the ring-opening polymerisation (ROP) of a cyclic ester. This was achieved via the reaction between anhydrous tin(II) chloride, 1-propanol and triethylamine. In the polymerisation of ε-caprolactone (CL), it has been found that tin(II) alkoxides, $Sn(OR)_2$, with R = C_3H_7 or higher are effective as polymerisation initiators. This effectiveness clearly depended on the solubility of the tin(II) alkoxide in the monomer and increase with the length of the alkoxy group. This present work describes the use of tin(II) 1-propoxide, $Sn(1\text{-}OC_3H_7)_2$, as an initiator for the bulk ROP of CL monomer and the characterisation of the polycaprolactone (PCL) polymer.

H_H0032 Antioxidant activity of Thai aromatic plants and spices

Nitima Wongwattananukul[1], Sunee Chansakaow[1], Chaiyavat Chaiyasut[1] Pimporn Leelapornpisit[1],
[1] Department of Pharmaceutical Sciences, Faculty of Pharmacy, Chiang Mai University, Chiang Mai, Thailand.
E-mail: w_nitima@hotmail.com, Fax.(053)222-741

Abstract: The aim of this study was to determine the antioxidant activity of essential oils and absolutes of 19 Thai aromatic plants and spices from 12 family by scavenging effect on 1,1-diphenyl-2-picrylhydrazyl radical(DPPH*). The antioxidant activity of the essential oils and absolutes were compared with the activity of known antioxidants: trolox, quercetin and kaempferol. Essential oils were obtained by hydrodistillation and absolutes were obtained by solvent-extraction. As the result, holy basil oil(*Ocimum Sanctum* Linn.) exhibits the highest antioxidant activity with IC_{50} of 0.6294mg/mL followed by phlai oil (*Zingiber cassumunar* Roxb., IC_{50}=1.0599mg/mL) and ginger oil(*Z. officinale*, IC_{50}=4.385mg/mL). In the part of absolute, saraphi (*Mammea Siamemsis* Kosterm.) exhibits the highest antioxidant activity with IC_{50} of 0.3271 mg/mL followed by white champaka (*Micheli alba*, IC_{50}=0.7155 mg/mL) and frangipani (*Plumeria alba*, IC_{50}= 1.0766mg/mL). High antioxidant activity of these plants will be selected and developed to spa products for Anti-aging.

H_H0033 Rapid detection and strains identification of porcine reproductive and respiratory syndrome virus (PRRSV) by real-time RT-PCR

Woradee Lurchachaiwong[1], Sunchai Payungporn[1], Utumporn Srisatidnarakul[2], Chatthapon Mungkundar[2], Apiradee Theamboonlers[1] and Yong Poovorawan[1]
[1] Center of Excellence in Viral Hepatitis Research, Chulalongkorn University, Bangkok 10330, Thailand
[2] Animal Health & Technical Service Office, Bangkok Agro- Industrial Products Public Co.,Ltd.

Abstract: Porcine reproductive and respiratory syndrome virus (PRRSV) cause reproductive failure and respiratory symptoms in pigs. This virus can be classified into 2 genotypes including EU and US strains. The rapid and reliable diagnostic assay is essential for disease surveillance and prevention. Therefore, this study described 2 assays based on real-time RT-PCR for rapid detection and strains identification of PRRSV. The first assay utilized SYBR Green I with melting curve analysis; another assay was performed by using strain specific TaqMan probes. Primers were selected from the conserved regions within the ORF-7 (N) of both strains whereas 2 TaqMan probes labeled with different fluorescent dyes were designed from specific nucleotides corresponding to each strain. The result of strain identification was confirmed by direct nucleotide sequencing. Both assays can be used for rapid detection and strain identification of PRRSV with a sensitivity of 10 copies/ μL. In conclusion, the real-time RT-PCR is a powerful method with the rapidity, specificity and efficiency for large-scale screening of PRRSV infection.

H_H0034 PROTECTIVE EFFECTS OF THE EXTRACT FROM *Zingiber cassumunar* ON GASTRIC MUCOSAL LESIONS IN RATS

Yutana Pongpiriyadacha[1*], Patcharin Nuansrithong[1], Dhiravit Chantip[2]
[1] Department of Chemistry, [2]Department of Animal Science, Faculty of Agriculture Nakhonsithammarat, Rajamangala University of Technology Srivijaya, Nakhonsithammarat 80240, Thailand.
[*] e-mail address: yutanap@hotmail.com

Abstract: The effects of methanolic extract isolated from the rhizomes of *Zingiber cassumunar* on ethanol, 0.6 M HCl, and indomethacin induced gastric mucosal lesions in rats were examined. It was found that the extract markedly inhibited the ethanol induced gastric mucosal lesions (ED_{50}=17.8 mg/kg). In addition, this extract also significantly inhibited the lesions induced by 0.6 M HCl and indomethacin with ED_{50} values of 31.3 and 29.5 mg/kg, respectively. Similarity, a reference drug omeprazole, significantly inhibited the gastric mucosal damage produced by ethanol, 0.6 M HCl, and indomethacin with ED_{50} values of 10.9, 39.5, and 3.5 mg/kg, respectively. These results indicate that the extract of *Z. cassumunar* play a role of action similar to omeprazole in the experimentally model and probable for further developing a new anti-gastric ulcer.

H_H0035 IDENTIFICATION OF ISCHEMIC HEART DISEASE VIA MACHINE LEARNING ANALYSIS ON MAGNETOCARDIOGRAMS

Tanawut Tantimongcolwat[1], Thanakorn Naenna[2], Chartchalerm Isarankura-Na-Ayudhya[1], Mark J. Embrechts[3], Virapong Prachayasittikul[1]

[1] Department of Clinical Microbiology, Faculty of Medical Technology, Mahidol University, Bangkok 10700, Thailand
[2] Department of Industrial Engineering, Faculty of Engineering, Mahidol University, Nakhonprathom 73170, Thailand
[3] Department of Decision Sciences and Engineering Systems, Rensselaer Polytechnic Institute, Troy, NY

Abstract: Ischemic heart disease (IHD) is predominantly the leading cause of death worldwide. Early detection of IHD may effectively prevent severity and reduce mortality rate. Recently, magnetocardiography (MCG) has been developed for detection of heart malfunction, however its interpretation is time-consuming and requires highly trained professional. Hence, we propose an automatic method for the interpretation of IHD pattern of MCG recordings using machine learning approaches, namely back-propagation neural network (BNN) and direct kernel self-organizing map (DK-SOM). Datasets were obtained by sequential measurements of emitted magnetic field of cardiac muscle above the torso of 125 cases of both IHD and healthy persons. BNN exhibited sensitivity of 89.7%, specificity of 54.5% and accuracy of 74.5%, while DK-SOM provided relatively higher prediction performance with a sensitivity, specificity and accuracy of 86.2%, 72.7% and 80.4%, respectively. This finding suggests a high potential of applying machine learning approaches for automatic detection of ischemic heart disease recorded by MCG.

H_H0036 OCCURRENCE OF CHLORAMPHENICOL PRODUCING STREPTOMYCETE IN SOIL SAMPLES IN THAILAND

Kamonnuch Kasemchit, Jeerapun Worapong, Apinya Assavanig, Sittiwat Lertsin
Department of Biotechnology, Faculty of Science, Mahidol University, Rama 6 Road,Bangkok, Thailand.

Abstract: The occurrence of Streptomycetes in soils and their antibiotic production were investigated in this study. Sixty soil samples were collected. Streptomycetes ranged from 10^3-10^7 CFU/g were isolated from soil. A total of 600 Streptomycete colonies were subjected to primary screening by spot test method against test organisms. Seventeen isolates with antibiotic activity were subjected to secondary screening by agar well method. One of these isolates produced chloramphenicol.

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H_H0037 A case study of a female child patient with delay development, metal retardation and 46, XX,add (14p+) karyotype

Pranom Dacheungkhoa and Thavorn Supaprom
Chromosome Analysis Center, Department of Biological Science, Faculty of Science, UbonRatchathani University Warinchamrap , UbonRatchathani 34190 Thailand
e-mail address: thavorn_s@yahoo.com

Abstract: A 3 - year old female child with delay growth & development and metal retardation was described after lymphocyte culture using the chromosome banding techniques. Karyotype analysis displayed the extra copy on the short arm of chromosome No. 14 (14p+).The 14p+ chromosome was confirmed by CBG - banding and NOR - banding technique. It showed C - negative and NOR – positive characteristics. This case is sporadic (de novo) because the parental karyotype is normal.

H_H0038 OCCURRENCE OF FOODBORNE PATHOGENS IN CHILLED FRESH MEAT AND SEAFOOD IN DIFFERENT LOCATIONS OF THAILAND

Wimon Chanchaem[1], Nuanchawee Wetprasit[2], Somchai Awakairt[3] and Siriporn Chantaroj[3].

[1] Department of Biology, Faculty of Science, Ramkhamhaeng University, Ramkhamhaeng Road, Bangkok, Thailand . E-mail: wimolc@hotmail.com, Fax 02-3108418
[2] Department of Biotechnology, Faculty of Science, Ramkhamhaeng University , Ramkhamhaeng Road ,Bangkok, Thailand
[3] National Institute of Health, Department of Medical Sciences, Tiwanond Road, Nonthaburi,Thailand

Abstract: As it is well recognized now that foodborne diseases are one of the most serious public health problems.The sources of pathogen are generally main concerns . In order to evaluate for microbiological quality of fresh meat and seafood available in markets , we investigated for the presence of foodborne pathogens in fresh meat and seafood both in Bangkok and selected province representing all parts of Thailand. Microbiological analysis was done by using conventional method and confirmed by serology. Of 96 fresh meat and seafood samples including pork, chicken, shrimp and squid;19 samples of each source from Bangkok and another 6 provinces, enteric pathogen were found in 56 (58.3%) samples. Of the 56 positive samples the detected pathogens were as followed ; Salmonella groups 43 (76.8%) samples, Vibrio cholera nonO1 7 (12.5%)

samples, Vibrio parahemolyticus 9(16.1%) samples, Staphylococcus aureus 4 (7.1%) samples and Bacillus cereus 1 (1.8%) The presented data shows a health hazard to the consumers and confirms the needs for improved practice in these kinds of products.

H_H0039 The Possible Differnetiating Role between ATM and DNA-PKcs in DNA Double-Strand Breaks Repair.

Wichai Pornthanakasem[1], Narisorn Kongruttanachok[2], Wanpen Ponyeam[1], Oranart Matangkasombut[3], Apiwat Mutirangura[1]
[1] Molecular Biology and Genetics of Cancer Development Research Unit, Department of Anatomy, Faculty of Medicine,
[2] Inter-Department Program of Biomedical Sciences, Faculty of Graduate School, [3]Department of Microbiology, Faculty of Dentistry, Chulalongkorn University, Bangkok 10330, THAILAND.

Abstract: One of the main mechanism to repair DNA double-strand breaks (DSBs) is nonhomologous end-joining (NHEJ) pathway. NHEJ have been classified into 2 sub-pathway, precise and imprecise repair. We investigated how cells decide to use which one of the sub-pathways in repairing endogenous DNA double-strand breaks (EDSBs) in nonreplicating cells. EDSBs are DSBs that occur naturally in cell and could account for a substantial fraction of oncogenic events in human carcinomas if EDSBs do not arise uniformly or are not processed at equal rates across the genome. We used ligation-mediated polymerase chain reaction (LMPCR) combine with interspersed repetitive sequence PCR (IRSPCR) , using LINE-1, and combined bisulfite restriction analysis (COBRA) technique to the detect methylation status of EDSBs. We found that unmethylated EDSBs preferentially undergo imprecise repair. Down-regulation of DNA-dependent protein kinase catalytic subunit (DNA-PKcs), a requisite error-prone NHEJ protein, increased unmethylated EDSBs. In contrast, defect in Ataxia Telangiectasia Mutated (ATM)–mediated precise end-joining repair raised the level of EDSB methylation.

H_H0040 Tetratricopeptide repeat domain 12 (*TTC12*) methylation in leukemia

Roongtiwa Wattanawaraporn[1], Tasawan Singhsilarak[2], Issarang Nuchprayoon[2], Apiwat Mutirangura[1]
[1] Molecular Biology and Genetics of Cancer Development Research Unit, Department of Anatomy, Faculty of Medicine, Chulalongkorn University, Rama IV., Bangkok 10330, Thailand
[2] Department of Pediatric, Faculty of Medicine, Chulalongkorn University, Rama IV, Bangkok 10330, Thailand

Abstract: We are searching a candidate tumor suppressor gene of nasopharyngeal carcinoma (NPC) on the critical region of loss of heterozygosity on chromosome 11q. Unexpectedly, we accidentally discovered that tetratricopeptide repeat domain 12 (*TTC12*), an NPC down regulated gene located in the LOH region, hypermethylated in leukemic cell lines. These cells included Daudi (B-lymphoblastoid line), Jurkat (acute T cell leukemia), Molt4 (acute lymphoblastic leukemia). No methylation was observed in K562 (chronic myelogenous leukemia) and those of epitherial cell lines, HN12 and Hela, were nonmethylated. Therefore, we hypothesized that similar to several candidate tumor suppressor genes, the methylation of *TTC12* may be specific in leukemogenesis in vivo. To prove this hypothesis, we tested 32 acute lymphoblastic leukemia (ALL) in comparison with normal white blood cells from 10 healthy volunteers using combined bisulfite restriction analysis (COBRA) technique. In ALL group, the results demonstrated 38 % hypermethylation, 19 % partial methylation and 43% hypomethylation. In contrast, all healthy volunteers showed nonmethylated pattern. The results were confirmed by cloning and sequencing. Interestingly, this *TTC12* possesses two promoters and transcribes into two isoforms, FLJ13859 and FLJ20535, respectively. While the methylation expands through to the second promoters, the methylation limits specifically expression to the promoter 1. By RT-PCR, nonmethylated cells, K562, HN12 and Hela, expressed FLJ13859, whereas hypermethylated cells, Daudi, Jurkat and Molt4, didn't express. This selective epigenetic control has also detectable in vivo. We compare the proportion between FLJ13859 and GAPDH and found significant increase in expression of FLJ13859 isoform in hypomethylated ALL when compared with hypermethylated cases ($p<0.05$). Therefore, hypermethylation in *TTC12* may induce leukemogenesis by inhibiting its isoform1. The function, differentiated function between isoforms, mechanism of methylation and application as tumor marker of *TTC12* will be interesting topic in better understanding and management of leukemia in the future.

H_H0041 LINE-1 loci loss of methylation pattern in head and neck squamous cell carcinogenesis.

Chureerat Phokaew[1], Keskanya Subbalekha[2], Shanop Shuangshoti[3], Apiwat Mutirangura[1]
[1] Molecular Biology and Genetics of Cancer Development Research Unit, Department of Anatomy, Faculty of Medicine, Chulalongkorn University, Rama IV., Bangkok 10330, Thailand
[2] Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, Chulalongkorn University, Rama IV., Bangkok 10330, Thailand
[3] Department of Pathology, Chulalongkorn University Hosital, Rama 4 Road, Bangkok, Thailand

Abstract: Previously by applying combined bisulfite restriction analysis (COBRA) technique at LINE-1s, we proved that global hypomethylation is one of the most common epigenetic events in cancer. The aim of this study is to molecularly describe how methylation at LINE-1s loss during the multistep carcinogenesis. Since LINE-1s are interspersed repetitive sequences, it is interesting to evaluate and compare the pattern of demethylation among LINE-1 loci. Here we applied head and neck squamous cell carcinoma (HNSCC) as a model to molecularly describe how 17 full length LINE-1 loci loss methylation. In our study, we compared methylation levels of LINE-1 loci applying COBRA LINE-1s to unique sequences among genomic DNA derived from 18 HNSCC microdissected tissues, 10 normal buccal epithelial from oral rinsed, 11 HNSCC cell lines. Almost all LINE-1 loci were hypermethylated in the normal oral epithelial. On the other hand, however, complete, partial and non-methylation of LINE-1 loci were found randomly in both HNSCC cell lines and microdissected tissues. Interestingly, the potential in methylation loss of LINE-1 among each loci are distinct. While some loci lost methylation frequently, 11 loci loss methylation between 60-70% of all cases, the others were frequently hypermethylated, 6 loci loss methylation in 30-40% of all cases. LINE-1s are interspersed repetitive sequences, which the active role in cancer development is still to be elucidated.

This study is the first to demonstrate that each LINE-1s have different potential to be demethylated and may imply distinctive potential of each LINE-1s in promoting cancer development. In addition, since there are large number of LINE-1s and each possess different frequencies and specificities of demethylation in HNSCC. The combined information of several COBRA-LINE-1 to unique sequences demonstrated strong potential as an advance molecular technique with high specificity and sensitivity for HNSCC diagnosis and screening in the future.

H_H0042 LINE-1 methylation pattern

Supakit Kowudtitham[1], Montakarn Tansatit[2], and Apiwat Mutirangura[2]
[1] Inter-Department Programme of Biomedical Sciences, Faculty of Graduate School
[2] Molecular Biology and Genetics of Cancer Development Research Unit, Department of Anatomy, Faculty of Medicine, Chulalongkorn University, Bangkok 10330, Thailand

Abstract: Long interspersed nuclear elements (LINE-1) are the most active transposable elements, making up approximately 17% of the human genome. Although the most LINE-1 retrotranspositions generated truncated and rearranged inactive copies of the progenitor elements, their insertion into gene has demonstrated that LINE-1 can interfere with normal gene expression. In previous study, *Chalitchagon et al* have showed that LINE-1 methylation status is a unique feature of a specific tissue type and the global hypomethylation is a common epigenetic process in cancer, which may progressively evolve during multistage carcinogenesis. Here, we aim to evaluate the general pattern of LINE-1 among tissues by examining several LINE-1 loci. First, we selected heterozygous LINE-1 by using 2 sets of primers. First set is used to amplify unique sequence and amplification between LINE-1 and unique sequence use another set. Then, we detect methylation at 5'LINE-1 by methylated sensitive restriction enzyme (HpaII). We found that some loci of LINE-1 were heterozygous in several cell lines such as Daudi, Hela and Hacat. For further study, I will study the extension of methylation at 5'LINE-1 and LINE-1 negative allele by using bisulfite genome sequence analysis. Besides, we hypothesize whether LINE-1 hypomethylation loci lead to tissue specific gene expression. To prove this hypothesis, 7 LINE-1 loci on X chromosome have been evaluated for methylation status by *Hpa*II and COBRA assay. By using methylated sensitive restriction enzyme digestion, we found that one (Xq21.33) out of 7 loci, which are methylated, is partially methylated in both male and female white blood cells. These data suggested that methylation at Xq21.33 might be tissue specific. In the future plan, LINE-1 at this position will be evaluated for methylation level in several cell lines including hematopoietic cell lines (Daudi, Jurkat, K562 and Molt4) and epithelial cell lines (HeLa, Hacat). Moreover, the expression of neighbor genes will be investigated.

H_H0043 PREPARATION AND ANTIBACTERIAL ACTIVITY OF QUATERNARY AMMONIUM-CONTAINING CHITOSAN SURFACE

Napanporn Vallapa[1], Nuttha Thongchul[2], Suda Kiatkamjornwong[3], Varawut Tangpasuthadol[4], Voravee P. Hoven[4]*
[1] Program of Petrochemistry and Polymer Science, Faculty of Science, Chulalongkorn University, Bangkok 10330, Thailand,
[2] Institute of Biotechnology and Genetic Engineering, Chulalongkorn University, Bangkok 10330, Thailand,
[3] Department of Photoimaging and Printing, Faculty of Science, Chulalongkorn University, Bangkok 10330, Thailand,
[4] Organic Synthesis Research Unit, Department of Chemistry, Faculty of Science, Chulalongkorn University, Bangkok 10330, Thailand. Tel: +66-2218-7627 ext 102, Fax: +66-2218-7598,
E-mail address: vipavee.p@chula.ac.th

Abstract: Quaternary ammonium-containing chitosan surface was prepared by reductive alkylation of amino group of chitosan using butyraldehyde followed by methylation with methyl iodide under heterogeneous condition. Results from ATR-FTIR analysis, water contact angle and zeta potential measurements confirmed the success of surface quaternization. As determined from an optical density (OD_{600}) and scanning electron microscopy (SEM) image, the antibacterial activity of the surface-modified chitosan film against a gram positive bacteria, *Staphylococcus aureus* was superior to that of the virgin chitosan film. The additional positive charge and hydrophobicity introduced to the chitosan film after surface quaternization render the quaternary ammonium-containing chitosan film a more favorable substrate for interacting with the negatively-charged phospholipid membrane of the bacteria.

H_H0044 BIOEQUIVALENCE STUDY OF PIOGLITAZONE TABLETS IN HEALTHY THAI MALE VOLUNTEERS

Pattana Sripalakit[1], Sirada Maphanta[1], Penporn Neamhom[1], Dhirayudh Yokubol[3], Sanglar Polnok[2],
Aurasorn Saraphanchotiwitthaya[1]
[1] Bioequivalence Test Center, Faculty of Pharmaceutical Sciences, Naresuan University, Phitsanulok, Thailand.
E-mail: pattana9@excite.com, Tel: 055 261058 ext. 3618 Fax: 055 261058
[2] Naresuan University Hospital, Naresuan University, Phitsanulok, Thailand.
[3] Faculty of Nursing, Naresuan University, Phitsanulok, Thailand.

Abstract: The bioequivalence of two pioglitazone 30-mg tablets was determined in 35 healthy Thai male volunteers after 1 single dose. Reference (Actos®) and test (Glubosil®) were administered to volunteers after overnight fasting. Blood samples were collected at specified time intervals. Plasma was separated and analyzed for pioglitazone concentration using a HPLC method. The analysis of variance (ANOVA) for assessment of sequence, period and formulation effects did not show any significant difference between two formulations. Average bioequivalence between two products was determined by calculating 90% confidence interval for the ratio of *Cmax* and AUCt values for the test and reference products. Both 90% confidence intervals of *Cmax* (0.88-1.19) and AUCt (0.80-1.02) were within the 0.80-1.25 range, proposed by the Thailand FDA guidelines. These results indicated that Glubosil® is bioequivalent to Actos® and may be prescribed interchangeably.

H_H0045 EFFECTS OF GAMMA IRRADIATION ON VARIOUS STAGES OF GESTATION IN PREGNANT MICE

Siriluk Meesuwun[1], Lakana Himakoun[1], Yindee Kitiyanant[2], Panya Temcharoen[1]

[1] Department of Pathobiology, Faculty of Science, Mahidol University, Bangkok 10400, Thailand.

[2] Department of Anatomy, Faculty of Science, Mahidol University, Bangkok 10400, Thailand.

Abstract: Pregnant ICR mice were exposed to 2 Gy gamma irradiation for 1 minute on day 3,8,10,12,14 and 18 of gestation. The pregnant mice and the fetuses were examined for implantation site, mortality, growth retardation and incidence of malformation. Radiation induced the preimplantation loss and resorption on irradiated pregnant mice on day 3 of gestation. The preimplantation irradiated embryos those who survived did not show any abnormalities. Congenital malformation was prominent after exposure irradiation on day 8,10 and 12 of gestation. The body weight of offspring from irradiated pregnant mice on day 14 of gestation was lesser than other groups. Offspring from irradiated pregnant mice on day 18 of gestation had no congenital malformation.

I_I0001 Soil Quality Indicators and Soil Fertility of the Toposequence as Influenced by Land Use of Slope Complex Soil in the Northern Thailand

Suphathida Aumtong[1] and Jakob Magid[2]
[1] Department of Soil Resource and Environment, Maejo University, Thailand
[2] The Royal Veterinary and Agricultural University, Denmark

Abstract: The decrease in soil fertility and increase of degradation in slope complex soil, which is evident in the mountainous areas of Northern Thailand is often represented as a result of human pressure e.g. clearing land for agricultural practices, deforestation by people, exploitation of marginal soils under inadequate soil management practice. The objective of this research was to evaluate the changes in soil chemicals and physical properties, and to examine the sensitivity of different soil quality indicators to detect changes due to different soil management under various land used located on slope complex soil in Northern Thailand. The study was carried out in the Khun Samun Watershed, which in Nan Province of Northern Thailand. The land characteristics are varied according to the position on the landscape. Five main landscape types are: undisturbed forest, secondary forest, mixed crop, fruit tree crop summit follow, Mid slope and foot slope, which are situated from 300 to 600 m, are compared to the mean soil's chemical, physical and organic ratios. Composite soil samples were collected from each land use pattern. Samples were taken at three depth levels (0-5, 5-10 and 10-20 cm), and had three replications. Soil samples were taken to a laboratory; Soil samples were air dried, ground and passed through a 2-mm. mesh sieve and physical and chemical properties were determined. Soil reaction, exchange capacity, clay content, bulk density and levels of major soil nutrients were determined. And the same soil samples were tested with five carbon indicators (% C-POM_{53}, % C-POM_{250}, water soluble carbon, hot water soluble carbon and active carbon) as soil quality indicators. These compared traditional soil indicator (%OC). This study shows land use patterns did not cause a substantial decrease in the carbon content of soil. Even when measuring to 1.2 m. depth with great care (including the bulk density of the soil as well as the concentration of carbon. We only found a slight tendency to increase bulk density with more intense land use, in a number of our catena's. This study also indicates that use of labile organic fractions enhanced the detection of changes in soil quality of land use by loosed C. Therefore, the labile organic fractions must be considered a key indicator of the hilly cultivated land under mild practice management and existing climate and relief conditions of Northern Thailand. Our study shows higher pH, and available of K, Ca, Mg and P, and lower %N and %OC resulted from burning.

I_I0002 HYDRODESULFURIZATION CATALYZED BY MOLYBDENUM COMPLEXES

Boonchai Seentrakoon[1], Wimonrat Trakarnpruk[2]
[1] Program of Petrochemistry and Polymer Science, Faculty of Science, Chulalongkorn University; Bangkok, Thailand, 10330;
[2] Green Chemistry Research Unit, Program of Petrochemistry and Polymer Science, Faculty of Science, Chulalongkorn University; Bangkok, Thailand, 10330.
E-mail address: wimonrat.t@chula.ac.th

Abstract: MoS_2, generated from *in situ* decomposition of ammonium tetrathiomolybdate [$(NH_4)_2MoS_4$] and tetrabutylammonium thiomolybdate [$(N[CH_3(CH_2)_3]_4)MoS_4$] were used as catalysts for the hydrodesulfurization (HDS) of dibenzothiophene (DBT) and 4,6-dimethyldibenzothiophene (4,6-DMDBT). The catalysts were characterized by XRD, SEM and BET. Parameters affecting the reaction were investigated: hydrogen pressure, reaction time, amount of precursor, promoter and water addition. For the catalyst obtained from alkyl precursor, both the surface area and HDS activity were increased. The addition of water enhanced the activity for tetrathiomolybdate but decreased the activity for the alkyl precursor. Cobalt and nickel added were found to function as promoter. The catalytic system successfully reduced sulfur content in gas oil and light cycle oil.

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I_I0003 Reduction of COD from fruit cannery waste effluent using *Candida utilis* CBS 1517 in batch culture

TARNTIP RATTANA[1], SIRICHOM THUNGKAO[2], SAETHAWAT CHAMSART[3] AND SUDARAT SUANJIT[2]
[1] Environmental Sceince Graduate Program, Faculty of Science, Burapha University, Chonburi, Thailand.
E-mail: kae_kaebuu@hotmail.com
[2] Dapartment of Microbiology, Faculty of Science, Burapha University, Chonburi, Thailand.
[3] Department of Biology, Faculty of Science, Burapha University, Chonburi, Thailand.

Abstract: A batch process for cultivating *Candida utilis* CBS 1517 for the reduction of COD in waste effluent from a fruit canning industry was carried out. A volume of 3L unsteriled wastewater with initial pH of 3.5 was supplemented with urea to an initial concentration of 0.05% (w/v) and inoculated with the yeast strain at 10% (v/v). With aeration rate of 2 vvm the yeast strain could remove 89.9% of COD from the wastewater within 96 h compared with 61.3% removal of the un-inoculated control batch. The existence of *Bacillus sphaericus, Aerococcus viridans* and *Rhodotorula* sp. as natural contaminants was expected to account for the reduction of COD of the wastewater in the control experiment.

I_I0004 The Efficiency of Mangrove Soil to treat Wastewater (Amphur Sikao, Trang Province)

Assist. Prof. Dumrong Lohalaksanadech[1] Vikit Pinrub[1] Pranom chumreang[2]
[1] Faculty of Science and Fisheries Technology Rajamangala University of Technology Srivijaya. 179 M. 3 Tambon Maifad Amphur Sikao Trang, Thailand. 92150
E-mail dumronglo@yahoo.co.th
[2] สถานีวิจัยและพัฒนาทรัพยากรป่าชายเลนที่ 3 (สตูล) สำนักวิจัยทรัพยากรป่าชายเลน กรมทรัพยากรทางทะเล และชายฝั่ง กระทรวงทรัพยากรธรรมชาติและสิ่งแวดล้อม

Abstract: Mangrove soil efficiency in treating waste water was done by randomize some soil from 0-30 cm. and 30-60 cm. in depth in mangrove area. There were 4 kinds of water used in the experiment- synthesis sea water, synthesis waste water, sea water and waste water from shrimp pond. Each kind of water was poured 3 times through the 10 cm. -diameters and 70 cm-length PVC pipes which contain the soil in order to test water quality-conductivity, salinity, BOD value, nitrate nitrogen, ammonia-nitrogen, total nitrogen, phosphate-phosphorus and total phosphorus. It was found that mangrove soil efficiency in treating synthesis waste water and waste water from shrimp pond in both pipes could reduces BOD value (86.52%, 85.17% and 82.75%, 89.10) , nitrate nitrogen (68.75%, 71.42% and 61.25%, 66.67%) , ammonia -nitrogen (93.39%, 97.87% and 92.98%, 97.87%,), total nitrogen (79.04%, 69.38% and 77.65%, 69.60%), phosphate-phosphorus (95.85%, 96.30% and 91.67%, 96.30%) and total-phosphorus (64.24%, 66.63% and 67.00% , 65 67%)

I_I0010 THE BIODIVERSITY OF WETLAND IN LAMNAM MUN, SURIN PROVINCE

Ms.Sukchai Sompongpun[1], Asst.Prof.Sopa Simarugumpai[1], Asst.Prof.Thunyaporn Kiranantawat[2], Asst.Prot.Pinphet Choochongdij[2], Miss.Oranuch Nakchat[1]
Department of Chemistry[1], Department of Agriculture [2]Faculty of Science and Technology, Surindra Rajabhat University,Surin-prasart Road, Muang , Surin 32000 , Thailand,
e-mail address: pimsurin@hotmail.com,Tel/Fax 044-521393

Abstract: This research focused on studying the biodiversity and the quality of Lamnam Mun, Thatum District, Surin province in order to arrange learning modules for high school and university, to build the Maenam Mun preservative networks, and to manage the database. The significance of research is on The participation in all method. First, surveying; using questionnaires, interviewing the local leader, arranging group discussion, Then, collecting data and categorizing type of fish and aquatic plants by analysis the samplings. Maenam Mun preservation networks have been set up from the brainstorming of community leader, state leaders, high school students, and university students and managing the database. The results showed that :

1. Fish have 88 species and 13 species of rare or dying fish by Interviewing
2. The researchers discovered that 38 species of fish match with the interviewing data, and the species 17 species and 11 families of aquatic plants.
3. Water quality analysis at Lamnam Mun has the good quality both physical and chemical. The activity investigates the average water quality. The river is plentiful.
4. The data collected to create the modules. The experiment by using the modules in Science Camp on the biodiversity at Sripathumpittayakom School indicated that teachers and students have more understanding about biodiversity. The Science methodology skills are noticed and also the satisfaction on the learning modules.
5. The researchers and others have the good conscience on Maenam Mun preservation And managed the Maenam Mun preservation networks into two levels. The database is established as the learning center on the website for the community.

I_I0011 THE STUDY ORTHOPHOSPHATE ADSORPTION ON NATURAL ADSORBENTS

Noppakao Ex-un[1], Pinsuda Viravathana1, Pongsak Noophan[2]
[1] Department of Chemistry, Faculty of Science, Kasetsart University, Bangkok 10903, Thailand
[2] Department of Environmental Science, Faculty of Science, Silpakorn University, Muang Nakhon Pathom 73000, Thailand

Abstract: This study was focused on orthophosphate adsorption on several adsorbents, mordenite, ball clay, kaolin, diatomite, and perlite, naturally found in various parts of Thailand. These materials have same chemical compositions but the different quantities. In This work, the adsorbents were calcined in the tube furnace at 750°C before having orthophosphate adsorption at the initial orthophosphate concentration of 5 and 30 mg/L. The results showed that mordenite was the best adsorbent more than 80% adsorption. Ball clay, kaolin, diatomite, and perlite can adsorb orthophosphate from 30 % to less than 1 %. The results indicated that the different quantities in chemical composition affect the adsorption capability and leads to the further investigation.

I_I0013 FACTORS AFFECTING BRAIN ACETYLCHOLINESTERASE ACTIVITY IN HYBRID CATFISH (*CLARIAS GARIEPINUS X C.MACROCEPHALUS*) EXPOSED TO CHLORPYRIFOS & CARBARYL

Chutarat Saengkul[1], Voravit Cheevaporn[2]
[1] Environmental Science Program Faculty of Science, Burapha University, Chonburi, Thailand.
E-mail:aomkmitl@hotmail.com. Fax: (663)874-5900 ext. 3034
[2] Department of Aquatic Science, Faculty of Science, Burapha University, Chonburi, Thailand.

Abstract: AChE is an important enzyme in nervous system degrading Ach at nerve cell synapsis. Some pesticides can inhibit AChE function. This study, AchE was measured in brain tissue of hybrid catfish (*Clarias gariepinus x C. macrocephalus*) exposed to chlorpyrifos and carbaryl as respectively sublethal concentrations for 4 days. AChE inhibition increased linearly with pesticide concentration. In exposed catfish, relative inhibition of AChE was higher in larger fish but did not differ significantly with sex. Relative inhibition of AChE accompanying pesticide exposure was highest in brain tissue and progressively less in liver, muscle and gill tissue. AChE inhibition in the brain increased over 4-day exposures to their respective sublethal concentrations of both pesticides. After transforming to pesticide-free water, AChE inhibition and pesticide residue in the brain decreased but still remained above control values after 7 days recovery periods exposured to carbaryl and chlorpyrifos, respectively. Carbaryl could be eliminated from the brain tissue faster than chlorpyrifos.

I_I0014 Seepage Ground Water Discharge Studied along the East Coast of the Inner Gulf of Thailand.

สมภพ รุ่งสุภา[1]
[1] Aquatic Resources Research Institute, Chulalongkorn University, Bangkok, Thailand.
E-mail: rsompop@chula.ac.th, Fax : (662)2544259

Abstract: Seepage Ground Water Discharge (SGD) to the coastal area was derived from freshwater on land and seawater which pass through the sediment and flow back to the upper seawater again. SGD may dissolved the waste as organic matter and heavy metal and other pollutant both on land and which accumulated in coastal sediment back to coastal area again. SGD flow rate measurement was very difficult. SGD flow rate was studied from 2005-2006 at East Coast of the Inner Gulf of Thailand at Siracha and Sichang Island, Cholburi Province. Sampling site were 3 lines 12 stations at Siracha Bay and 6 lines 24 stations at Sichang Island (Eastern side both north and south direction). Modified Manual Seepage Meter from Lee-type Manual Seepage Meter was used in July-September 2005 and January-March 2006. Maximum SGD flow rate was at Sichang Island (East side north direction) in rainy season in the range of 11,971-15,560 L/m.day and minimum at Siracha in rainy season as 3,142-3,955 L/m.day. SGD flow rate at Sichang Island (both north and south direction) were higher than Siracha. SGD flow rate at Siracha in January 2004, 3,787-7,790 L/m.day from Wattayakorn, 2004 was closed to flow rate at Siracha in 2005-2006. SGD flow rate in rainy season was higher than in summer season except at Siracha which vice versa.

I_I0015 Comparison of Rainwater Sampling Methods Based on Chemical Composition

Nawarut Chunsuk[1], Somporn Chantara[1]and Urai Tengjaroenkul[1]
[1] Department of Chemistry, Faculty of Science, Chiang Mai University, Chiang Mai Thailand, 50202
E-mail address: now265@hotmail.com Fax: (053) 892277

Abstract: Comparison of bulk and wet-only precipitation collected from rural area of Chiang Mai was conducted. 65 rain samples were collected from each of bulk and wet-only samplers during 9 months sampling (August 05 – April 06). Electro conductivity (EC) and pH of rainwater samples were measured. Major cations (Na^+, NH_4^+, K^+, $Ca^{2+}$and Mg^{2+}) and major anions (Cl^-, $NO_3^-$and SO_4^{2-}) were determined by Ion Chromatograph (IC). Of the rain events, the mean pH values of bulk and wet-only precipitations were 5.52 and 5.46, respectively, while EC values of those were 0.7 and 0.66 mS/m, respectively. Scatter plots between wet-only and bulk concentrations (μeq/L) for each ion showed high correlation. The ratio of bulk to wet-only concentrations were about 1.5 times for Ca^{2+}, Na^+ and SO_4^{2-}, 1.2 times for Mg^{2+}, K^+, NH_4^+ and NO_3^-, while concentrations of H^+ and Cl^- from both samplers were not different. The calculated volume-weighted average ions concentration were significantly ($p < 0.01$) higher in bulk than in wet-only precipitation for all ions except Mg^{2+}.

I_I0016 THE REMOVAL OF HEAVY METAL Cu^{2+} AND Zn^{2+} BY ZEOLITE.

Achanai Buasri*, Parnupong Artsalee, Niwatchai Pompatcharasakul and Sorrapob Potisook
Department of Materials Science and Engineering, Faculty of Engineering and Industrial Technology, Silpakorn University, Nakorn Pathom 73000, Thailand.
E-mail:achanai@su.ac.th

Abstract: In this research, there was a study of using zeolite in order to adsorb the heavy metal ions for finding designedly ascertained the optimum condition of zeolite and bringing the zeolite used in heavy metal ions adsorption back to use again. This studiousness used the ions of heavy metal which were Copper (II) and Zinc (II). From the results, it found that the appropriate circumstance that could produce both ions adsorption is different. The results of parameters that had influence in both ions adsorption were as follows. When there were increasing quantities of zeolite and time spending in ions adsorption, there would be more efficiency in the heavy metal ions adsorption. The pH values that were suitable for Cu^{2+} and Zn^{2+} adsorption are 5 and 7 respectively. If we increased more pH values, there was the complex compound sedimentation. The temperatures that were suitable for both heavy metal ions adsorption were 60 °C. Bringing the zeolite used in heavy metal ions adsorption back to use again in the suitable circumstance. It found that regenerated zeolite with NaCl solution, the efficiency in heavy metal ions adsorption were increasable in the suitable circumstance.

I_I0017 INFLUENCE OF SALICYLATE ON ANTHRACENE DEGRADATION BY *BURKHOLDERIA CEPACIA* VUN10013

ชนิษฐา สมตระกูล[1], สุดารัตน์ สวนจิตร[2], สุชาติ อุปถัมภ์[3]
[1] Biological Science Program, Faculty of Science, Burapha University, Bangsaen, Chonburi, Thailand.
Email: neung186@hotmail.com
[2] Department of Microbiology, Faculty of Science, Burapha University, Bangsaen, Chonburi, Thailand
[3] President Office, Burapha University, Bangsaen, Chonburi, Thailand.

Abstract: This study was undertaken to assess the anthracene degradability of *Burkholderia cepacia* VUN10013 in liquid media and soil samples as well as to determine the feasibility of using salicylate as an inducer for anthracene degradation pathway. Firstly, the degradation was performed in basal salt medium containing anthracene (50 mg/L) as a sole carbon and energy source. It was found that this PAH compound was degraded to undetectable level after 9 days of incubation. The presence of salicylate demonstrated adverse effect on the rate and extent of anthracene degradation in basal salt medium. Biodegradation of anthracene in sterile soil was slower and small amount of this PAH was detected as 10.11% to 3.84% after 20 days of incubation. A lag period of about 10 days was observed in soil supplemented with salicylate before

the degradation was commenced.

I_I0018 FINE PARICULATE MATTER LEVELS (PM10) FROM COMMUTATION IN PHITSANULOK MUNICIPALITY AREA

Pajaree Thongsanit[1], Boonphol Meechaiyo[1], Kitsana Aumjang[1], Thittiya Phongern[1], Nootchanat Kunlayanawisut[1]
[1] Department of Civil Engineering, Faculty of Engineering, Naresuan University, Phitsanulok, Thailand.
E-mail:pajareet@hotmail.com, Tel: (665) 526-1000 Ext. 4033, Fax: (665)526-1062

Abstract: This research investigates the quantity of fine particulate matter levels (PM10) from commutation in Phitsanulok municipality area, aiming to study PM10 dust levels and reductions from road transportation in the area of Phitsanulok municipality. Daily 24-hour PM10 sampling was carried out, using the High Volume Air Sampler, from a roadside area of Barrommatrilokanat Road. Personal low volume air samplers were used to collect PM10 samples from road users. Commutation samplings were taken on five consecutive working days (Monday - Friday). One sampling takes 5 days in order to collect desired weight of PM10 from the road users in the following categories: air-conditioned bus; non air-conditioned bus; minibus, private car; motorcycle; and footpath users. The roadside PM10 levels at Barrommatrilokanat Road were found to be higher than the Thailand's standard for ambient air quality of 120 $\mu g/m^3$. PM10 concentrations from the categories of air-condition bus, motorcycle, footpath users, non air-condition bus, minibus, and private car were 57, 49, 37, 33, 33 and 25 $\mu g/m^3$ respectively.

I_I0019 QUANTITATIVE AND QUALITATIVE MEASUREMENT OF RADIO-ACTIVITY IN SAND SAMPLES FROM SAMILA BEACH IN SONGKHLA PROVINCE

Ining Meesa[1], Prasong Kessaratikoon[2], Suchin Udomsomporn[3]
[1, 2] Department of Physics, Faculty of Science, Thaksin University, Songkhla 90000, Thailand.
[3, 4] Bureau of Technical Support for Safety Regulation, Office of Atoms for Peace, Bangkok 10900, Thailand.

Abstract: The quantitative and qualitative measurement of radioactivity in 30 sand samples collected from Samila beach in Songkhla province are presented. Experimental results were obtained by using a high-purity germanium detector and gamma spectroscopy analysis system and comparing to the standard soil (IAEA SOIL 6) at the Office of Atoms for Peace (OAP). The measuring time of all sand samples is 10,000 seconds. Some radioisotopes such as K-40, Cs-137, Tl-208, Pb-212, Pb-214, Pb-214, Ra-226 and Ac-228 were found in sand samples. In addition, the specific radioactivity of Ra-226 and Cs-137 in those sand samples were evaluated and found in normal level.

I_I0020 DECOMPOSITION OF MANGROVE LEAF LITTER IN NONG-SANAMCHAI, CHANTHABURI PROVINCE

Benjamas Paibulkichakul*, Wanthana Phimsuwan and Chalee Paibulkichakul Faculty of Marine Technology, Burapha University, Chanthaburi Campus, Thailand
Corresponding author: *ccbenjamas@yahoo.com

Abstract: Decomposition study on mangrove leaves litter plastic basket was carried out in Nong-Sanamchai mangrove forest, Nayaiarm District, Chanthaburi Province during September to December 2005. Litter basket technique was employed in field study. Decomposition rate were compared between 4 types mangrove forest; natural, abandon, 3 and 10 years of plantation mangrove, respectively. The parameters of these researches were to compare the decomposition rate of leaf, concentration of total nitrogen (TN), total phosphorus (TP) and total organic carbon (TOC) in leaf and soil and organism density below basket in four types mangrove forest. Leaf and soil sampling were carried out every 15 day.

The result demonstrated that decomposition rate (% weight loss) was increased follow by study periods. Decomposition rate was not depending on types of mangrove forest. Natural and abandon mangrove had more total nitrogen and total phosphorus concentration than 3 and 10 years of plantation mangrove. Benthos density was increased by time and found the highest in 10 years of plantation mangrove. Results showed that benthos in litter basket of four plantation mangroves were crabs, molluscs, bitting midges and polychaetes.

I_I0021 Migration and Sorption Behavior of Europium(III) on Calcite

Nanthavan Ya-anant
Radioactive Waste Management Program, Office of Atoms for Peace (OAP), Bangkok.

ABSTRACT: The migration and sorption behavior of Eu(III) on calcite was investigated to study the necessary data for the transport modeling. Calcite, $CaCO_3$ is an important component of geological host formation for a low and intermediate level radioactive waste repository. Eu(III), a trivalent lanthanide from rare earth elements, was selected to study its migration and sorption characteristics. Because Eu(III) is stable and its suitable chemical analogue for various trivalent actinides, such as ^{243}Am ^{245}Cm และ ^{246}Cm, which are important long-lived radionuclides from nuclear wastes. Two methods were performed by using column and batch systems. The migration of Eu(III) in column experiment was effected by the quantity of calcite, the higher percentage of calcite mixed in sand column(5% wt. calcite), cased the longer time for the transportation of Eu(III) through column than the lower percentage (1% wt. calcite). The transport parameters of the column experiments were that Darcy velocity was 6.5×10^{-3} and 7.3×10^{-3} cm/min ,Pore water velocity was $1.73 \times 10^{-2}$and 1.92×10^{-2} cm/min, Porosity was 0.376 and 0.380, Dispersion coefficient was 3.83×10^{-3} and 2.20×10^{-3} cm^2/min for the column 1 and column 2 respectively. The results of the batch experiments were that the K_d sorption of Eu(III) on calcite were in the rage of 10^3 - 10^5 cm^3/g. The K_d of a larger quantity of calcite (37.5 g/L) was higher than the lower quantity of calcite (12.5 g/L). The K_d of

the higher concentration of Eu(III) solution was higher than the K_d of the lower concentration of Eu(III) solution. The results showed that the sorption of Eu(III) on calcite was very high and the complete sorption time took about 24 hrs.

I_I0022 EFFECT OF AQUACULTURAL ACTIVITIES DISTANCE ON ABUNDANCE AT NONG-SANAMCHAI MANGROVE FOREST, CHANTHABURI PROVINCE

Benjamas Paibulkichakul*, Suphachai Boonrod and Chalee Paibulkichakul
Faculty of Marine Technology, Burapha University, Chanthaburi Campus, Thailand
Corresponding author: *ccbenjamas@yahoo.com

Abstract: The comparison study of the effect of aquacultural activities distance on total nitrogen (TN), total phosphorus (TP), total organic carbon (TOC), biomass and organism density were carry out at Nong-Sanamchai mangrove forest, Nayaiarm District, Chanthaburi Province during September to December 2005. One hundred meter distance interval of three lines was determined in field study. Four stations dividing by distance of each lines transect were 10, 50, 100 and 150 meter. Soil and leaf sampling were collected every 15 day.

I_I0024 METAL SORPTION BEHAVIOURS OF BAMBOO CHARCOALS IN CATALYST BASED TRANSESTERIFICATION OF FATTY ACID

Siriwit Buajarern, Supakorn Boonyuen*, Nawaporn Ittichaimanon
Department of Chemistry, Faculty of Science and Technology, Thammasat University Rangsit Center: Khong Luang, Prathum Thani 12121, Thailand.
E-mail:sinwit@hotmail.com, Fax: (662)564-4483

Abstract: During recent years, there are many studies and researches focusing in Biodiesel due to oil crisis and the strong urge of alternate energy source. The main process of Biodiesel production is transesterification of fatty acid. In this process, catalyst such as Potassium Hydroxide is needed. The products of transesterification are Biodiesel and Glycerol. In Biodiesel part, the ICP-AES instrument showed the presence of Potassium ion and some other metal ions in trace amount. In order to improve quality of Biodiesel, these metal ions need to be removed. The conventional process is by separation with water which takes time and inconvenient. This study proposes filtration by bamboo charcoal since it contains high porosity and large pores size. Moreover bamboo is now considered a sustainable forest which means with proper care, bamboo wood will be a non-depleted natural resource. The results show that carbonized bamboo wood at temperature below 500°C yielded non metal-absorption charcoal, at temperature between 500 and 800°C yielded metal-absorption charcoal with no significant in absorption ability. At temperature 800-900°C yielded charcoal that has the highest absorption ability due to higher porosity and larger pore size.

I_I0025 DEVELOPMENT OF HAZARDOUS WASTE DATABASE MANAGEMENT WITHIN KMUTT

Suchada Chaisawadi[1], Theerasak Luechapongthip[1], Uthai Chantawit[1], Nataporn Nanta[1]
[1] Energy Environmental Safety and Health Office, King's Mongkut's University of Technology Thouburi, Bangkok, 10140, Thailand
E-mail:nnantha11@yahoo.com, Fax: (662)470-8293-4

Abstract: KMUTT is committed to the proper management of environment including hazardous waste from education and research activities. The main purpose of this study are to decrease the environmental pollution and develop the suitable management system on hazardous waste generated within the university. Hazardous waste management database within KMUTT has been developed according to the policy and standard practices and separated to liquid and solid waste. The liquid waste was separated into 23 difference categories for storage and treatment according to the activities and solid waste was separated into 5 groups according to physical properties. The developed hazardous waste database system has been designed by using SQL server for database operating system, Microsoft Window 2003 Server for Server operating system and ASP for webpage development. The system, procedures and manuals for hazardous waste management by using Hazardous waste database have been developed and implemented for ten of pilot departments within the university. Hand-on training for 50 staffs worked in the laboratories of pilot departments has been done. The hazardous waste database showed hazardous wastes generated from 10 pilot departments within KMUTT in one year (August 2005-June 2006) are 7,023 litres of liquid waste and 699.5 kilograms of solid waste. Laboratories in the ten of pilot departments have been successfully operated under the new developed database system. The demonstration results indicate that the hazardous waste database system established could be collected all data and analyzed the amounts and types of hazardous generated within the pilot departments. The developed system have been evaluated by the university EESH committee. The linkage of Chemical usage and Hazardous waste generated have been suggested to add up in this system to show the hazardous material route within the university. The new hazardous waste database management system are now under development to fit the committee's suggestion. And therefore, it takes one year more to have a suitable hazardous waste database management for all laboratories within KMUTT.

I_I0026 Molecular response of Giant Tiger Shrimp, *Penaeus monodon* exposed to sub-lethal concentration of chlorpyrifos

Tassanee Eamkamon[1], Narongsak Puanglarp[2,5], Kumthorn Thirakhupt[3], and Piamsak Menasveta[2,4]
[1]National Research Center for Environmental and Hazardous Waste Management, Faculty of Graduate School, [2]Center of Excellent for Marine Biotechnology (CEMB), [3]Department of Biology, [4]Department of Marine Science, Faculty of Science,