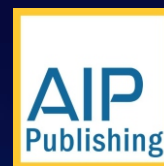


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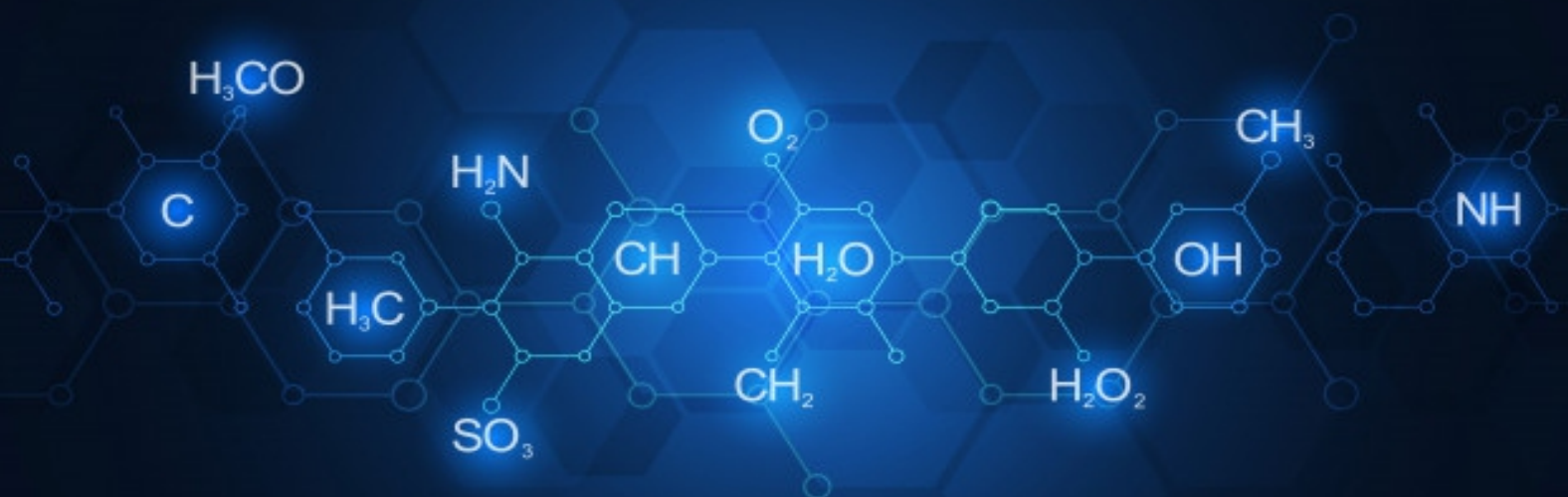
Chemistry Postgraduate Programs
Faculty of Mathematics and Natural Sciences
Universitas Sumatera Utara



Book of Abstract ICCCST

2020

INTERNATIONAL CONFERENCE ON CHEMICAL SCIENCE & TECHNOLOGY



VNU
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Entre Consultant

Book of Abstract
International Conference on Chemical Science
and Technology (ICCST) 2020

Universitas Sumatera Utara

Medan, Indonesia

September 08, 2020



Welcome Speech: Chairman of ICCST 2020

Distinguished guests and participants,
Assalamualaikum Warahmatullahi Wabarakatuh.
Good Morning Ladies and Gentlemen.

On behalf of the Organizing Committees, we would like to express a warm welcome to all delegates and participants to the International Conference on Chemical Science and Technology (ICCST) 2020. It is a great honor for all faculties and departments at Universitas Sumatera Utara (USU) to support the conference.

- The honourable, The Rector of Universitas Sumatera Utara. (Prof. Dr. Runtung Sitepu, SH. M.Hum)
- The honourable, The Dean of Mathematics and Natural Science - Universitas Sumatera Utara. (Prof. Dr. Kerista Sebayang, MS).
- The honourable, The chairman of the postgraduate chemistry study program - Universitas Sumatera Utara. (Prof. Dr. Tamrin, M. Sc.).
- The honourable, The all professors at the Universitas Sumatera Utara.

The honourable, Key note Speaker in the international seminar :

- Prof. Taifo Mahmud, Ph.D. (Oregon state Universitu, USA)
- Assoc. Prof. Dai Phu Huynh (Ho Chi Minh City University, Vietnam)
- Dr. Nattakan Skeabkaew (Mae Fah Luang University, Thailand)
- Prof. Dr. Hadi Nur (Universiti Teknologi Malaysia, Malaysia)
- Mr. Saharman Gea, Ph.D. (Universitas Sumatera Utara, Indonesia).

Thank you for your coming today.

I would like to say thank you very much for the entire committee of the international seminar who had hardwork to prepare this seminar with good, and especially to all the guest of this seminar. The theme of this conference is Chemical science and technology innovation for better future. The International Conference on Chemical Science and Technology (ICCST – 2020) aims: as a forum for scientific communication between researchers, lecturers, educators and industry to exchange ideas and places of discussion in finding and developing research results and promoting the results of industrial products on an international scale. The results of this conference can be applied in the Industrial 4.0 to develop the business world and be able to invest safely. The results of research from the world of higher education that can be applied or used are intellectual works as a research and research commodity. At this conference, we will get a lot of important information. By this, I, who represents the entire committee hope that this conference beneficial to all.

So my opening remarks, I cover with wabillahitaufik wal Hidayah
wassalamualaikum wr wb. success for all of us

Your Sincerely,

Dr. Muhammad Taufik, S.Si., M.Si.
Chair of the ICCST 2020

Program Schedule

Tuesday, September 8, 2020

Time	Event Details
07.00 - 08.00	Registration
Opening Ceremony	
08.00 - 08.05	Opening by MC
08.05 - 08.10	National Anthem
08.10 - 08.15	Pray
08.15 - 08.55	Welcome Speech from:
	1. Chairman of Organizing Committee, Dr. M. Taufik, S.Si., M.Si.
	2. Rector of USU, Prof. Dr. Runtung Sitepu, S.H., M.Hum
	3. Govener of North Sumatera, Edy Rahmayadi
08.55 - 09.05	Opening Conference
09.05 - 09.30	Break
Keynote Speech	
09.30 - 10.00	Keynote 1: Prof. Taifo Mahmud, Ph.D. Oregon University, USA
10.00 - 10.30	Keynote 2: Prof. Dr. Nguyen Van Noi Vietnam National University, Vietnam
10.30 - 11.00	Keynote 3: Prof. Hadi Nur, Ph.D. Teknology Malaysia, Malaysia
11.00 - 11.30	Keynote 4: Dr. Nattakan Soykeabkaew Mah Fae Luang University, Thailand
11.30 - 12.00	Keynote 5: Saharman Gea, Ph.D. Universitas Sumatera Utara, Indonesia
12.00 - 13.30	Break
13.30 - 16.30	Parallel Sessions

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Keynote Abstract

CELLULOSIC MATERIAL

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The vast number of cellulosic materials as one of biomass has been extensively studied including those from wooden and non-wooden plants. For instance, the utilization of empty bunches of Pam oil, Kapok randu as well as synthesizing bacterial cellulose from coconut wastewater. Given that the sources of cellulose are varied, then to isolate the cellulosic material, its derivative, and to functionalize the cellulosic material cost-effectively to obtain functional materials for the future prospect in various fields such as in energy, coating, and medical uses are required. Characterizations that have been performed commonly are FTIR to confirm the functional groups, XRD to analyze crystalline and amorphous features, TGA-DTG to obtain thermal properties, and SEM/TEM to observe morphological properties. Our reports have shown that cellulosic materials could have been used as precursor for carbon dots, carbon fiber and carbon nanotube (CNT), anti-bacterial wound dressing, membrane material, food packaging, paper recycling, and liquid smoke. In short, potential use of cellulosic materials is varied, and here we present several reports regarding to the isolation of cellulosic materials and its derivative, and its use for certain applications.

Adhesion Phenomena of Carbon-Containing Titania Coated Stainless Steel

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Currently, many studies involve coating materials on stainless steel prepared by various methods, and many approaches have been taken to improve the abrasion resistance of the coatings. Here, the attachment of carbon/titania (C/TiO₂) on stainless steel and the evaluation of its coating adhesion is reported. The commercially available epoxy resin was used as the source of carbon, and the transformation from epoxy resin to pyrolytic carbon was performed. It is proposed that the incorporation of an inorganic particle will improve the adhesion properties through the reduction of the carbon shrinkage. C/TiO₂ was prepared from the mixture of commercialized epoxy resin (Oxyplast PR12[®]) and anatase TiO₂ powder, followed by spraying the mixture onto stainless steel (AISI 304) surface using high voltage powder spray coating (HVPSC). The commercially available epoxy resin was used as the source of carbon, and the transformation from epoxy resin to pyrolytic carbon was performed. It is proposed that the incorporation of an inorganic particle will improve the adhesion properties through the reduction of the carbon shrinkage. C/TiO₂ was prepared from the mixture of commercialized epoxy resin (Oxyplast PR12[®]) and anatase TiO₂ powder,

followed by spraying the mixture onto stainless steel (AISI 304) surface using high voltage powder spray coating (HVPSC). The sprayed powders on stainless steel underwent pyrolysis at several temperatures from 300 to 700 °C for an hour to determine the optimum temperature for excellent adhesion. The physical properties of C/TiO₂ coated samples were characterized by Fourier transform infrared (FTIR) spectroscopy, field emission scanning electron microscopy (FESEM), surface profiler meter and X-ray photoelectron (XPS) spectroscopy. FESEM images showed that the TiO₂ particles were fully covered with the carbon layer, and the thickness was determined to be in the range of 4.8–15.5 μm. The abrasive and peel adhesion test was performed, showing no detachment of coated material of C/TiO₂ pyrolyzed at 300 °C, suggesting that this temperature produces the best coating adhesion. The carbon-based coating adhesion phenomena were elucidated by XPS analysis of Fe2p, C1s, and Ti2p element peaks. It was demonstrated that the presence of an oxide layer on stainless steel, availability of functional groups, and structure shrinkage were the factors that affect the adhesion of the carbonaceous coating. The structure shrinkage was reduced due to the presence of TiO₂, which is associated with strong coating adhesion. This demonstrated that the carbonaceous coating produced by HVPSC formed an excellent adhesion in the presence of TiO₂.

Biosynthetic Pathway Engineering and Chemoenzymatic Approaches to New Natural Products

Taifo Mahmud

Department of Pharmaceutical Sciences, Oregon State University, Corvallis, OR 97331, U.S.A.

Natural products continue to play an important role in drug discovery. About two-thirds of recently approved pharmaceuticals are natural products, botanicals, natural product-derived or nature-inspired chemical entities. Plants, marine animals, algae, and microorganisms are known to be prolific sources of bioactive natural products. However, despite their enormous potential, the number of new natural products identified in recent years has significantly declined. This trend has called for new ways of drug discovery and development. Using biosynthetic pathway engineering and chemoenzymatic methodologies we have designed and generated various analogues of natural products. Some of them exhibit excellent biological properties, presenting hope in their development as new sources of pharmaceuticals. This presentation will include our biosynthetic studies and engineered production of new analogues of the antitumor antibiotic pactamycin, the antifungal agent validamycin, and the sunscreen compounds gadusporines.

Visible light driven photocatalysts for green growth

Nguyen Van Noi^{1,a}, Thanh-Dong Pham²

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The photocatalytic activity of a certain photocatalyst could be enhanced based on the modification of one or all three characteristics of the material matrix including electron-hole separation efficiency, electron-hole separation capacity, and charge transfer efficiency. The electron-hole separation efficiency of a photocatalyst refers to the possibility that electron-hole pairs could be

successfully separated when the photocatalyst is excited by light irradiation. The electron-hole separation capacity is the number of electron-hole pairs that the photocatalyst can generate under excited conditions. The charge transfer efficiency refers to the possibility that the electrons generated could be transferred to electron donors or acceptors to initiate oxy radical generation reactions. Recently, metals or non-metals could be used as doping agents to enhance one or all three characteristics leading to increase in photocatalytic activity. Therefore, the study aims to review and summarize the relevant works to provide clear mechanisms of metal doping enhancing the photocatalytic activity of photocatalyst.

Abstracts of Parallel Sessions: Analytical Chemistry

Development and Validation of Area Under Curve Spectrophotometry Method for Ternary Mixture of Dextromethorphan HBr, Doxylamine Succinate and Pseudoephedrine HCl in Tablet Dosage Form

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This study aimed to develop spectrophotometry method using area under curve to determine the levels of dextromethorphan HBr (DMP), doxylamine succinate (DOX) and pseudoephedrine HCl (PSE) in tablet dosage form using ethanol as solvent. The method is based on the AUC method absorption measurement in the wavelength ranges 273-283 nm for DMP, 262-272 nm for DOX and 251-261 nm for PSE. Then, the method was applied to determine the levels of DMP, DOX and PSE in tablet dosage form. The selection of wavelengths based on wavelengths gives the best result. The mean % recoveries were found to be in 100.89%, 100.52%, and 100.69% for DMP, DOX and PSE, respectively. The method is successfully applied to analyze DMP, DOX and PSE in pharmaceutical formulation with no interference from excipients as indicated by the recovery study. All validation parameters were within the acceptable range.

Decrease of Stress and nicotine levels and at Active Smokers After Giving Vitamin C

Afniwati^{1,a}, Endang Susilawati¹, Muhammad Taufik^{2a}, Maya Handayani Sinaga³, Mariany Razali⁴, Fadillah Pratiwi⁵, Rifina Ramadhani Savitri⁵

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Vitamin C contains high antioxidant compounds and important role to increase endurance. Consumption of vitamin C can reduce stress levels of active smokers. During stress, cortisol levels are very high. Cortisol levels are regulated by Vitamin C which also acts as a connective tissue regenerator and functions to play a role in the immune system. This research was conducted to study the reduction in stress levels of active smokers after giving Vitamin C. The dose of Vitamin C given was 200 mg / day. Reduction in smoker's stress level was measured using the HARS method on the third day after giving this compounds. A purposive sampling method was developed for 60 respondents. Paired t test was developed using SPSS. The results showed that there was a very strong and significant relationship obtained at the 0.01 level. There is a difference between before and after treatment in this study. This indicates that the provision of Vitamin C can decrease stress levels of active smokers.

Relationship of Vitamin C to the stress level of active smokers in Medan City

Endang Susilawati^{1,a}, Muhammad Taufik^{2,a}, Afniwati¹, Maya Handayani Sinaga³, Rifina Ramadhani Savitri⁴

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Cigarettes contain more than 400 chemicals that are harmful to health, one example is nicotine which is addictive and tar which is carcinogenic. Cigarettes have a negative impact on the respiratory system and specifically will cause the emergence of heart disease, hypotension, cancer, liver, and impotence. Each cigarette contains at least 10 milligrams of nicotine. Nicotine will enter the body and reside in the brain. These compounds are stimulants that can stimulate the central nervous system which causes a sense of calm when the user is experiencing stress. This study aims to know the relationship of vitamin C in reducing the stress level of active smokers in Medan This research was conducted in the Medan City Area, a purposive sampling method developed for 60 respondent. The dose of Vitamin C given is 100 mg x 2 / day. The stress level was measured by the HARS method on the seventh day by developing the Paired T Test. On the seventh day a very strong relationship was obtained with the correlation value between the two variables 0.941, a significant level of 0.000 (significant at the 0.01 level), t arithmetic (6.679) ; t table (2.5669) showed significant, p value < 0.05 (95% confidence). Mean : 1.166667. Positive value indicates a tendency to decrease stress levels. The average decrease = 1.6667. Vitamin C giving is recommended in therapy to reduce stress levels for active smokers

Extraction of lard in adulterated food and supplement products: Study of the application of Electrosynthetic coupling maceration and Solid Phase Extraction

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The separation of components from a mixture based on differences in solubility has a very important role in producing a purer extraction result. Electrosynthetic coupling maceration and solid phase extraction have been developed using silica derived from shellfish to extract lard from food products (meatballs) and supplements adulterated with pork oil. The research objective was to examine the application of electrosynthetic coupling maceration and solid phase extraction in extracting lard in adulterated food and supplement products. Experimental methods were developed in order to explore these two methods. The obtained lard was analyzed qualitatively and quantitatively. Qualitative analysis was performed using paper chromatography (Kkt) and solubility tests. Quantitative analysis was carried out by applying UV-Vis spectrophotometer and Infra Red Spectroscopy. The concentration of lard in food and supplements products was 35% and 28%, respectively.

Analysis of Lard on Teradulterated Soybean Oil in Order to Increase Halal Food

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Soybean oil is a vegetable oil that is produced from soybean seeds. Some oil products are often adulterated with other ingredients in order to benefit by enhancing their taste and aroma. This oil is often adulterated with palm oil. To improve aroma and taste, it is often adulterated with lard. Adulteration events greatly affect the halalness of a food product. This study aims to analyze soybean oil adulterated with lard. A completely randomized design method was developed with two factorials, namely the concentration of n-hexane (20, 30, 40, and 50%) and maceration time (6, 12, 18, and 24 hours). The interaction of n-hexane concentration and maceration time had no significant effect on density, acid number, iodine number, and total microbes. This shows that the interaction between the concentration of n-hexane and maceration time gives a difference value that is smaller than the 5% real level.

Extraction of Nicotine in The Urine of Active Smokers: A Study of The Application of Electrosynthetic Coupling Maceration and Solid Phase Extraction

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Nicotine is an alkaloid compound that comes from the Solanaceae family. One of them is the type of tobacco (*Nicotiana*). This plant is used for the manufacture of cigarettes and one cigarette contains at least 10 milligrams of nicotine which makes a person addicted to smoking. This study aims to examine the application of electrosynthetic coupling maceration and solid phase extraction to nicotine extraction in the urine of active smokers. The sample collection was carried out on 5 active smokers in the area of Padang Bulan in Medan. The extraction process used will be by developing an electrosynthetic coupling maceration using aluminum electrodes (maceration time 120 minutes) and solid phase extraction using *Moringa* leaves as a filler for the chromatography column. *Moringa* leaves were prepared and activated to have good adsorption power in separating samples. weight variations of column fillers (*Moringa* leaves) are 20, 25, 30, 35, and 40 grams, respectively. The extracted nicotine was then analyzed qualitatively using Cyanogen bromide and Paper Chromatography. Quantitative analysis was carried out using UV and Infra Red spectroscopy to produce nicotine levels for the five samples, respectively, namely 5.6, 5.8, 6.7, 6.4, and 6.8 ppm. This method is quite simple and easy to apply in the determination of nicotine in the urine of active smokers.

Solid Phase Extraction Nicotine from The Urine of Active Smokers using *Moringa Oleifera* Leaves

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Nicotine is an alkaloid compound that has the chemical formula $C_{10}H_{14}N_2$, which is widely contained in plants with the genus solanaceae. One of them is the type of tobacco (*Nicotiana*). This plant is used in the manufacture of cigarettes. Each cigarette contains at least 10 milligrams of nicotine. This nicotine will cause addiction to smokers. The purpose of this study was to extract nicotine from the urine of active smokers using the SPE method by utilizing *Moringa oleifera* leaves as an adsorbent. Nicotine analysis was performed qualitatively (spot test and Kkt) and quantitatively (UV spectroscopy). This research method is experimental. In this study, the urine sample of active smokers in extraction for 120 minutes was then passed through an SPE cartridge using *Moringa oleifera* leaves as a filler. The weight of the activated *Moringa* leaves was varied, respectively 20, 25, 30, 35, and 40 g. The qualitative analysis using the spot test and paper chromatography showed the presence of nicotine in the extracted urine. The best results were obtained using 30 grams of *Moringa* leaves ($R_f = 0.45$). UV spectroscopic analysis was developed at a wavelength of 260 nm. The nicotine weight that has been produced is 5.6 ppm.

Distribution and Risk Assessment of Natural Radioactive Elements in Volcanic Ashes, Cold Lava, River Waters Due to Volcanic Eruption of Mount Sinabung

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Analysis of activity concentration of natural radioactive elements in volcanic ashes, cold lava and river waters has been carried out due to volcanic eruption of mount Sinabung. It was found the activity concentration of U-238, Ra-226, Th-228, Th-232 and K-40 were 22.62 ± 13.22 , 15.10 ± 0.27 , 35.45 ± 0.48 , 36.55 ± 0.74 , 538.78 ± 3.85 respectively for volcanic ashes and cold lava were 17.46 ± 6.70 , 11.72 ± 0.23 , 27.01 ± 0.38 , 28.76 ± 0.60 , 428.56 ± 3.10 for U-238, Ra-226, Th-228, Th-232 and K-40 and for river waters not detected. Risk assessment of the exposure to Gamma radiation from radioactive elements to human and environment in the vicinity of study area were calculated as risk indices. The average radium equivalent (Raeq) for volcanic ashes was of 174.60 Bq/kg, the average absorbed dose rate (D) was of 60.50 nGy/h, gamma index was of 1.40 and the average of annual effective dose was of 0.084 mSv. Whereas for cold lava was 149.39 Bq/kg, 54.43 nGy/h, 0.471, 0.0476 mSv respectively for Raeq, D, γ and the average of the annual effective dose and for river waters could not detected. The activity concentration and its radiological risk assessment indices were below the limit world. These natural radioactive levels were first study in this area and could be considered a baseline for natural radioactivity levels.

Abstracts of Parallel Sessions: Organic Chemistry

Phytochemical Screening of 96% Ethanol Extract of Pirdot (*Saurauia vulcani korth*) Leaves

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Pirdot (*Saurauia vulcani korth*) is one type of wild plants found in the forest of Aek Nauli, Simalungun Regency. This plant is often used as one of the traditional medicines of the village to treat various diseases such as diabetes, cancer, rheumatism, high blood pressure, fatigue and many more. Therefore, the aim of this study was to investigate the presence of phytochemicals from the leaves of Pirdot (*S.vulcani korth*). Pirdot (*S.vulcani korth*) leaves powder was extracted using ethanol 96% solvent for 24 hours in a standard treatment. The results showed that in the leaves of Pirdot (*S. vulcani korth*) several kinds of secondary metabolites such as Terpenoid, Flavonoid, Alkaloid, and Tanin. Therefore, sometimes the content of secondary metabolites contained in the leaves of Pirdot (*S.vulcani korth*) can function as an alternative medicine which is very efficacious.

Antioxidant Activity (E)-1-(3-bromophenyl)-3-(4-isopropylphenyl)prop-2-en-1-on

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(E)-1-(3-bromophenyl)-3-(4-isopropylphenyl)prop-2-en-1-on was synthesized from 4-isopropylbenzaldehyde with 3-bromoacetophenone by using aldol condensation reaction. The compound characterized by using UV, IR, MS, and ¹H-NMR. Test of antioxidant activity using DPPH method showed that those compounds have low potency as antioxidant agent LC50 with value 656,579 ppm.

A New of Colorimetric Sensor Based On Azo-Hydrazone Compound for Recognition of CN⁻ Ion

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A novel of Chemosensor compound 4-((E)-(2-(2,4-dinitrophenyl)hydrazineylidene)methyl)-2-methoxy-6-((E)-phenyldiazenyl)phenol has designed and synthesized from 2,4-dinitrophenylhydrazine and (E)-4-hydroxy-3-methoxy-5-(phenyldiazenyl)benzaldehyde. This sensor was applied as a colorimetric sensor for recognition of cyanide anion in acetonitrile solution. In the presence of cyanide ion, the solution of the sensor turned from bright yellow to red with a bathochromic shift from 390 nm to 555 nm. The limit of detection of the sensor was investigated by a UV-Vis spectrophotometer that detected 7 mM of cyanide ion in acetonitrile solution. Further, FT-IR, ¹H-NMR, and ¹³C-NMR were used to confirm the structure of the sensor.

Preparation and Characterization of Natural Breadfruit (*Artocarpus altilis*) and Starch Phosphates Edible Film

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Starch phosphates derived from natural breadfruit starch (*Artocarpus altilis*) was prepared from the addition of 0.9 g trisodium trimetaphosphate (Na₃O₉P₃) for 60 min in an optimum condition. The synthesis of starch phosphates was supported by the evidence of P-O-C stretch vibration at 1050–995 cm⁻¹. The degree of phosphate substitution was 0.33. Edible film produced from both natural breadfruit starch and breadfruit starch phosphates was added with glycerol as plasticizer. Edible films of natural breadfruit starch and starch phosphates were tested for their characteristics with the following results: Tensile strength values = 0.632 and 3.054 Mpa, elongation of 6.95 and 4.78%, thickness of 0.13 and 0.08 mm, water vapor transmission rate (WVTR) of 0.1175 and 0.1093 kg/m²/s, and solubility of 28.11 and 19.14%. SEM analysis showed that starch phosphates edible film have a smoother surface compared to natural breadfruit starch edible films with large granules intact. The results of the FT-IR analysis show that there is no formation of new functional groups in edible film of natural breadfruit starch or starch phosphates edible film

The Synthesis of Carboxymethyl Polysaccharide from *Arenga pinnata* Merr. Endosperm and Sodium Chloroacetate with Microwave Irradiation

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Carboxymethyl polysaccharides of *Arenga pinnata* endosperm (APE) seeds can be synthesized directly without the addition of water through the reaction between soft and hard APE polysaccharides with chloroacetate using NaOH solution under irradiation of microwaves for 5 minutes. Firstly the soft and hard APE were crushed. Next the etherification process using NaOH solution and sodium chloro acetate reagent in 96% ethanol was conducted with a ratio of sodium chloro acetate and NaOH used was 1.95: 2.6 (w/w) and in soft and hard APE seeds. The carboxymethyl polysaccharides of soft and hard APE seeds obtained have brown color and were analyzed by spectrophotometer FT-IR, X-RD and SEM. The formation of carboxymethyl polysaccharides was characterized by the appearance of absorption bands in the wavenumber area of 1729 cm^{-1} which indicates the presence of C = O stretching vibrations from carboxymethyl. The degree of substitution obtained by the titration method is between 1.58 - 1.86. The X-RD results show that the hard and soft carboxymethyl APE seeds are amorphous and the intensity of the carboxymethyl polysaccharides of the soft APE seeds is lower than from the hard APE and the degree of substitution is lower. The surface morphology of hard APE is finer than soft APE seeds.

Isolation and Cytotoxic Activity of Terpenoid Compounds from n-Hexane Extract of Cocoa Pod Husk (*Theobroma cacao* L.)

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Cocoa is a plant that belongs to the Malvaceae family. The n-hexane extract of cocoa pod husks (*Theobroma cacao* L) and its fraction was determined for its cytotoxic activity by the Brine Shrimp Lethality Test (BSLT) method which showed very strong activity. Isolation of chemical components from *Theobroma cacao* L. n-hexane 7.4 (TCH 7.4) and TCH 9.1 subfractions obtained strong cytotoxic activity with LC₅₀ value of 20.39 ppm and 5.52 ppm, respectively. The compounds that were active as cytotoxic agents in TCH 7.4 subfraction were patchouli alcohol and TCH 9.1 subfraction were pinene and limonene.

Abstracts of Parallel Sessions: Inorganic Chemistry

Reduction of Silica to Silicon Obtained from The Extraction of Quartz Sand Using a Solution of Concentrated Sodium Hydroxide and Hydrochloric Acid

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Quartz sand from the Tanjung Tiram Asahan area has been used to obtain silicon. The silica extraction method from quartz sand was carried out by adding a solution of NaOH 10N and HCl 6N in three steps. The silica product obtained from the three extraction stages were respectively (Stage I = 29.6 g; Stage II = 21.9 g and Stage III = 10.8 g). The silica product was characterized by FT-IR and XRD. The amorphous silica from each extraction step is reduced using magnesium to obtain the silicon. Purification was carried out first with the addition of HCl 2N, second the addition of a mixture of HCl 2N and 25% CH₃COOH and the third a mixture of 25% CH₃COOH and 4.8% HF. The silicon obtained from the reduction of silica from the three extraction stages were respectively 1.1345; 1.2727; 3.4551 grams. All silicone products were characterized by XRD, BET and SEM

The Use of Palm Oil as Hydrocarbon Fuel with Saponification Pretreatment Through Catalytic Cracking with Fe/Cr Catalyst

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The catalytic cracking of palm oil to become hydrocarbon fuel with saponification pretreatment has been done by using Fe/Cr catalyst. Palm oil or triglyceride is very difficult to cut off with metal catalysts so that to do it should use chemical catalyst through saponification pretreatment in order to form triglyceride acetous salt which will be analyzed its DSC to find out its degradation temperature. Catalytic cracking was made in the acetous salt by using Fe/Cr catalysts in stainless steel receptacle of 304 austenitic type with the most dominant Fe/Cr component. The process of catalytic cracking reaction occurred in the temperature of 250-360 °C which produced hydrocarbon fuel. The produced hydrocarbon fuel was analyzed by using FTIR which indicated that there was functional cluster which stated that distillate produced from catalytic cracking contained hydrocarbon fuel –strong absorption in the wavelength of 2923.94 cm⁻¹ which indicated the existence of alkenes functional cluster and absorption peak in the area of 992.19 cm⁻¹ and 906.03 cm⁻¹ which showed the existence of C -H cluster in the alkenes. GC-MS analysis was done to identify the compounds found in hydrocarbon fuel obtained from distillate in catalytic cracking. The hydrocarbon fuel contains 11.71% of compound 1-Dodekane (C₁₂H₂₄). The analyzed nature of hydrocarbon fuel which was heat of combustion value of 10,896.28 cal/gr determined by using Bomb-calorimeter, and the Cetana Index of 50.9, determined by using Calculated Cetana Index.

Method of Temperature Variation in Burning Rice Husks to Obtain Silica

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The silica content in rice husks ranges from 13.00-16.03%. The process of obtaining silica from rice husks is influenced by several factors such as temperature and combustion method. In this study, the process of ashing rice husks was carried out by varying the combustion temperature at 700, 800, 900, and 1000 °C for 3 hours. The method of burning rice husks in a furnace at temperature 700 °C result in an impure silica with a grayish-white color of 6.76 grams (16,90%) of 40 grams of rice husk.

Determination of SPF Value of Sunflower Oil Lotion Combined with Titanium Dioxide and Octyl Methoxycinnamate

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The skin is the most extensive human body organ that protects the skin from ultraviolet (UV) radiation. Excessive exposure to sunlight can cause other diseases that are harmful to human health, such as inflammation of the skin or burning skin. The natural defense system of human skin cannot protect the skin perfectly, so it takes a sunscreen to help prevent damage to various skin conditions. Sunflower oil is a vegetable oil that is rich in vitamin E which acts as an antioxidant. The purpose of this study was to determine the effect of adding various variations of sunflower oil concentration to the SPF value of sunscreen lotion. The sunscreen lotion is made in 5 formulas namely Formula 1 (base lotion), Formula 2 (base of positive control), Formula 3 (1% sunflower oil), Formula 4 (5% sunflower oil) and Formula 5 (sunflower oil) 10%). Formula 2 to Formula 5 is added with octyl methoxycinnamate (7.5%) and titanium dioxide (2.5%). Determination of SPF value was

carried out by spectrophotometry Uv-Vis at wavelengths of 290-320 nm. The SPF results indicate that the higher the concentration of sunflower oil, the higher the SPF value produced. Formula 1 SPF values are 11.71, Formula 2 is 20.73, Formula 3 is 22.98, Formula 4 is 24.66 and Formula 5 is 28.18. From the results of this study, it was concluded that the addition of various concentrations of sunflower oil can increase the SPF value.

Abstracts of Parallel Sessions: Electrochemical Science

Correlation between Voltage, Dissolved Oxygen, and Power Density of Yeast Microbial Fuel Cells in Different Environmental Waters as a Catholyte

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Submersible yeast MFC was developed, while the voltage and the maximum power density (MPD) were calculated and analyzed. A quantitative correlation was obtained between the voltage and DO level of distilled water as the catholyte ($y = 0.9828e^{0.3623x}$; $R^2 = 0.9978$). While the correlation between voltage, DO level, and MPD was obtained by varying samples of environmental waters as a catholyte. The pattern that occurs was that seawater has a high MPD of about 21.92 mW/m² with a voltage and DO level of 12.53 ± 2.25 mV and 6.0 ± 0.2 mg/L, respectively. This voltage and DO are more or less similar to river water with 12.99 ± 0.38 mV and 6.4 ± 0.6 mg/L values, respectively, but river water has a lower MPD of 10.10 mW/m² due to relatively low conductivity. While MPD in lake water and tap water was 4.69 and 11.79 mW/m², with DO levels of 5.7 ± 0.6 and 3.3 ± 0.6 mg/L, and voltages around 9.69 ± 0.89 and 2.67 ± 0.10 mV. The relationship between the three was very complicated because it is influenced by many things such as conductivity, pH, temperature, and organic matter from the catholyte.

Abstracts of Parallel Sessions: Material Science and Nanotechnology

Investigation on the Mechanical and Microstructural Characteristics of Diffusional Bonded Gray Cast Iron and Low Carbon Steel

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An investigation has been made of the diffusional bonded couples of gray cast iron and low carbon steel that has been subjected to heat treatment. The objective is to establish the post bond heat treatment's parameters influence on the mechanical and structural properties of the diffusional bonded couples. The tensile strength of the diffusion bonded joints was found to be increased with increases of heat treatment's temperature and time. The microstructural examination also shown that at higher heat treatment temperature and time also had resulted in micro-voids and interface lines to be disappeared, and the bond/weld at the interfaces of the diffusional welded couples seemed to be more complete. Correspondently these resulted in the increased of the tensile strength. The microhardness value at the interface lines of the joints was found to be increased while the charpy impact strength value was on the opposite way with the increases of heat treatment temperature. The microstructural analysis also shown that much thicker diffusion layers of spheroidization zone and carbon rich zone were formed at higher temperature at the interfaces of the joints. These are also correlation with the microhardness and the charpy impact values obtained at higher temperature. These results were in consistent with the principle and theory of diffusion bonding whereby at higher temperatures, more activation energy is available for atoms interdiffusion to take place, while with longer time, it allows higher volume of diffusion of atoms, hence it changes the behavior of the joints. Thus, heat treatment's temperature and time were found to have a strong influence on the mechanical and microstructural characteristics of the diffusion bonded gray cast iron and low carbon steel.

The Effect of Artificial Aging Time on Crystal Size, Dislocation Density, Hardness and Micro Structure on Al 6061 Materials

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Research on the effect of T6 heat treatment and artificial age time on crystal size, dislocation density, hardness, and microstructure of Al 6061 material have been carried out. The T6 heat treatment begins with heated solid solution at a temperature of 530 °C held for 60 minutes, then dips quickly in water media, as well as an artificial aging process at 200 °C and variations in holding time of 45, 60 and 180 minutes. Crystal structure testing with X-ray diffractometer(XRD), hardness testing with Vicker scale and microstructure observation with SEM-EDX. Test results of crystal size, dislocation density, and micro lattice strain show that the crystal size increases with the duration of heating time of artificial aging. While the dislocation density and micro lattice strain increased during the heating period of 45 minutes to 180 minutes, the dislocation density and lattice strain decreased. The hardness testing of Al 6061 as-cast material was 54 HV after the quench process was provided with a water hardness value of 75 HV, but after artificial aging the hardness decreased with longer holding time from 45.50 HV to 39.95 HV. Microstructure observations with SEM-EDX, showed that the Al 6061 test sample without heat treatment showed the dominant Al matrix, whereas in the Al 6061 sample after the T6 process Mg₂Si phase was seen which functions to harden the alloy.

Morphology of Bacterial Cellulose-curcuma longa linn from acetobacter xylinum

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Bacterial cellulose-curcuma longa linn from acetobacter xylinum has been produced. The aim of research To isolated bacterial cellulose-curcuma longa linn from acetobacter xylinum and To improved activity catalitic of bacterial cellulose. Morphology and thermal properties was carried out on sample of bacterial cellulose and bacterial cellulose-curcuma longa linn extract . This characteristic test was carried out by SEM, XRD, and TGA.

The Manufacture Nanofiber from Sugarcane Bagasse Lignin with Polyvinyl Alcohol by Electrospinning Methodn

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Electrospinning is a process of making nanofibers by utilizing the influence of an electric field to produce jet-charged solutions or melts of electrically charged polymers. In this research sugarcane bagasse lignin is then added to PVA as a matrix, this is done because nanofiber cannot be obtained only with lignin solution. 10% PVA was prepared by dissolving 10 grams of PVA in 100 mL of distilled water, then added with 0.5, 1.0, and 2.0 g of lignin. The addition of PVA was done to increase the viscosity of the solution. The viscosity value of the solution was 6,732 Nm/S², 10,532 Nm/S², and 21,310 Nm/S². With the addition of lignin, the conductivity value will increase. Conductivity value of the solution 402.7 S/cm⁻¹, 471.6 S/cm⁻¹ and 531.4 S/cm⁻¹ After the viscosity and conductivity test was carried out, from the viscosity value carried out by the electrospinning process to produce lignin nanofiber on the addition of lignin 0.5 g were then tested for SEM and DSC.

Synthesis of Hematite Iron oxide Nanoparticle Fe₂O₃ from Logas Natural Sand and Its Application for The Catalytic Degradation of Methylene Blue

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Nicotine is an alkaloid compound that comes from the Solanaceae family. One of them is the type of tobacco (*Nicotiana*). This plant is used for the manufacture of cigarettes and one cigarette contains at least 10 milligrams of nicotine which makes a person addicted to smoking. This study aims to examine the application of electrosynthetic coupling maceration and solid phase extraction to nicotine extraction in the urine of active smokers. The sample collection was carried out on 5 active smokers in the area of Padang Bulan in Medan. The extraction process used will be by developing an electrosynthetic coupling maceration using aluminum electrodes (maceration time 120 minutes) and solid phase extraction using *Moringa* leaves as a filler for the chromatography column. *Moringa* leaves were prepared and activated to have good adsorption power in separating samples. weight variations of column fillers (*Moringa* leaves) are 20, 25, 30, 35, and 40 grams, respectively. The extracted nicotine was then analyzed qualitatively using Cyanogen bromide and Paper Chromatography. Quantitative analysis was carried out using UV and Infra Red spectroscopy to produce nicotine levels for the five samples, respectively, namely 5.6, 5.8, 6.7, 6.4, and 6.8 ppm. This method is quite simple and easy to apply in the determination of nicotine in the urine of active smokers.

Physical, Mechanical and Morphological Characteristics of Unsaturated Polyester-based Polymeric Foam Composite Containing Oil Palm Empty Fruit Bunches Fibre using Polyurethane as Blowing Agent

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Polymeric foam composites containing natural fibre is gaining attention for light-weight and environmental friendly engineering materials. In this works, physical and morphological characteristics of unsaturated polyester-based polymeric foam composites containing oil palm empty fruit bunches fibre (OPEFBF) were investigated. Sodium hydroxide treated-OPEFBFs (average diameter 0.3 mm, fibre length 3-5 mm) were loaded as fillers for unsaturated polyester-based polymeric foam composites, using polyurethane as blowing agent. It was found that increased content of the blowing agent decreased density of the composites. It was revealed that increased loading of the OPEFBF resulted on increase of mechanical characteristics, but also density of the composites. Optimum formulation of the polymeric foam composite was achieved using weight ratio: Polyester: OPEFBF: Polyurethane: MEPOX= 40: 40: 15: 5, with resulted characteristics: density: 990 kg/m³, foam content: 6.32%, Modulus of Elasticity: 8460 MPa. Morphological investigation of the composites using SEM microscopy indicated finely distributed of OPEFBF and air pores within the bulk of the composites.

Preparation Film and Film Gelatin PVA, Gelatin and Characterization Mechanical Properties

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It has been done the preparation of film PVA and gelatin film using drop casting method. Drop casting is a method of pouring the solution into a Petri dish which dried at temperature 80 °C. solution PVA 10% was prepared by dissolving 0.1 gram of PVA powder in 100 ml of distilled water while the gelatin film was made from 5% gelatin (0.05 gram solution of gelatin powder in 100 ml of distilled water). The PVA film and gelatin film produced were tested mechanically by tensile test and characterized by FT-IR to determine the functional groups contained in the PVA film and gelatin film.

Characteristics Loads of Cold Water Pipe Based on Fibreglass-Filled HDPE Composites

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Cold water pipe (CWP) which is used in ocean thermal energy conversion stationary surface platform should be able to keep water at a temperature of 5°C, with the result that cold water could be used to liquefy ammonia vapor from a turbine generator to generate electricity. CWP has an inner diameter of about 3m to 4m that reach to 500m water depth. CWP on the stationary platform will experience stresses due to current and wave loads and the weight of the pipe itself. This paper will explain the loading that occurs. Seawater currents generate movement of CWP in the horizontal direction which causes the pipe to be subjected to bending stress. Bending loading fluctuates with different wavelengths and angles each time. In addition, seawater currents lead vortex-induced vibration. The properties of pipe material used should be lightweight, flexible and strength that subjected to wave and current loads. HDPE material is suitable for CWP than other polymeric materials. Because of lightweight and flexible. For the strength, it is filled with short fiberglass in order to withstand low temperature and corrosion. The CWP bending due to seawater current causes the structure of the pipe material to experience repetitive tensile and compressive loading. And due to waves occurs axial tensile load. So that the main load on the CWP is the tension and pull loading that occurs repeatedly or fluctuating in sinusoidal shape and the resistance of the CWP will be more accurately known by fatigue testing alternating load.

Single Phase Cu₂O Synthesized by Ammonium Sulfate-Assisted Electrodeposition

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Cu₂O was electrodeposited from an electrolyte containing (NH₄)₂SO₄ additive with different deposition temperatures. The influence of deposition temperature on the formation of Cu₂O phases and deposit morphology was examined using X-ray diffractometer and field emission scanning electron microscope, respectively. Band gap energy of the Cu₂O deposit was determined from UV-vis light reflectance recorded using diffuse reflectance sphere. The deposit morphology was change obviously forming different crystal shapes at high deposition temperatures. The crystalline phase of cubic Cu₂O was also begun to form above room temperature deposition. In this work, a pure Cu₂O deposit with uniform surface morphology was successfully electrodeposited at temperature of 75°C with a direct bandgap energy of 2.18 eV.

Preparation and Characterization of Activated Carbon/Hematite Composite as Efficient Photocatalyst for Naphthol Blue Black Dye Degradation

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This work focuses on the preparation and characterization of activated carbon/hematite (AC/Fe₂O₃) composite for use as photocatalyst in the decolorization of naphthol blue black (NBB) dye under ultraviolet irradiation. The photocatalyst was produced using iron sand as a source of hematite with the addition of 15% w/w of activated carbon derived from waste coffee grounds. The as-prepared materials were characterized by using the X-Ray Diffraction (XRD), Scanning Electron Microscopy-Energy-Dispersive X-Ray Spectroscopy (SEM-EDS) and nitrogen adsorption-desorption (BET). The examination of photocatalytic activity of (AC/ α -Fe₂O₃) composite showed that the of activated carbon's addition can improve the performance of hematite. The degradation percentage of NBB dye was found to be 78.99 that was observed at pH 1.0, the amount of photocatalyst of 300 mg, initial dye concentration 20 mg L⁻¹ after being irradiated for 120 minutes.

Effect of Alkali Treatment on Processing of Pineapples Leaf Fibers

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Pineapple (*Ananas cosmosus* (L) Merr) which belongs to the Bromeliaceae family is a tropical and subtropical plant that is widely available in Indonesia. The shape of pineapple leaves is like a sword that tapers at the end with a blackish green color and sharp thorns on the side of the leaves. The fiber of Pineapple leaf consists of cellulose and non cellulose which is obtained by removing its outside layers mechanically. The research results of pineapple leaves chemical properties showed that cellulose content was between 69.5% - 71.5%, lignin level was between 4.4% - 4.7%, pectin level was 1.0% -1.2%, fat content and wax was 3% -3.3%, ash content was between 0.71% - 0.87%, while pentosan content was between 17.0% -17.8%. Pineapple leaf fiber has the potential to be used as an alternative to textile raw material by reducing the lignin content in the pineapple leaf fibers through the delignification process. In this research, pineapple leaf fiber extraction process was carried out in five stages were preparation stage, deliginification stage, washing stage, neutralization stage and preservation stage. The preparation stage is to prepare the raw material by removing the flesh of the pineapple leaf skin until white fiber is seen then slowly the fiber is taken. The second stage is the delignification stage of pineapple leaf fiber soaked in 2 – 7% NaOH solution with and without stirring using a magnetic stirrer. The third stage is the washing stage by rinsing the fiber of pineapple leaves using distilled water to remove the remaining solvents and impurities in the fiber. The next process is neutralization conducted by boiling pineapple leaf fiber at a temperature of 100 °C for 2 hours. Then the preservation stage is done by drying the pineapple leaf fiber until it reaches its constant weight. In this experiment, the most optimal pineapple fiber result was pineapple fiber in 4% NaOH concentration, immersion temperature 80 °C, and 300 rpm stirring rate with lignin content of 0.3%; pore size 18.30 μ m; and tensile strength of 10.83 g / Tex

Abstracts of Parallel Sessions: Environmental Chemistry/ Green Chemistry

The Potency of Biomass and Carbon Stock on Understory of Rubber Agroforestry and Rubber Monoculture in Simalungun Regency, North Sumatra, Indonesia

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The objective of this study was to know the potency of carbon stocks of understory in rubber agroforestry and rubber monoculture in Simalungun Regency, North Sumatra, Indonesia. This research was conducted in Marjanji Asih Village, Simalungun Regency and in the Forest Products Chemistry Laboratory, Faculty of Forestry, IPB University on July 2016 to October 2016. Sample plots was carried out on complex agroforestry stands and rubber monoculture. Each plots was made 3 plots measuring 40 x 60 m² by purpose sampling with random start. This research results that the average of biomass and carbon stocks in rubber agroforestry was 3.64 tons/ha and 0.75 tons C/ha and in rubber monoculture was 2.29 tons/ha and 0.52 tons C/ha, respectively. The results indicate that carbon stocks in rubber agroforestry and rubber monoculture have significant differences.

Role of Bacterial Symbionts of Larvae *Oryctes rhinoceros* L. and Microbial Decomposer on Composting of Empty Bunch of Oilpalm in Big Hole Planting System

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Empty bunch of oil palm needs time 5-6 months to decompose by natural process to be as compost which could become as potential breeding site for *Oryctes rhinoceros* beetle. *Oryctes rhinoceros* larvae has microbial contents in their intestines and produce hydrolytic enzymes, these potential can be developed to degrade empty bunches of palm. The purpose of this study was to utilize the bacterial symbionts of *Oryctes rhinoceros* potency to accelerate decomposition process of empty bunch palm to minimize source of food and pest attack of *Oryctes rhinoceros*. The application of bacterial symbionts *Bacillus* sp. and *Acromobachter* sp. was carried out on empty bunch palm in big hole planting system with treatments P1: *Bacillus* (10 ml/kg) + *Trichoderma*, P2: *Acromobachter* (10ml/kg) + *Trichoderma*, P3: *Bacillus* + *Acromobachter* P4: *Bacillus* + *Acromobachter* + *Trichoderma*, P5: *Bacillus* + *Trichoderma* + Molase, P6: *Acromobachter* + *Trichoderma* + Molase, P7: *Bacillus* + *Acromobachter* + Molase, P8: *Bacillus* + *Acromobachter* + *Trichoderma* + Molase, P9: Control. The result showed that the highest temperature phase in the treatment of P7 (*Bacillus* + *Acromobachter* + Molase) was 34,85 °C. The best of C/N ratio was in the treatment of P8 (*Bacillus* + *Acromobachter* + *Trichoderma* + Molase) which was 16,60%.

Manufacture of Stove Body Using Press Machine System

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Press machine control system is required in accordance with the workings of the stove body circuitry to facilitate and accelerate the process of gas stove. Basically the working system of the press machine for the manufacture of stove body is done using a hydraulic system on the manual press machine. Gas stove body construction passes through seven processes with different machines, with different weight. Press machine making gas stove are related to each other in carrying out their respective work processes. The results on the stove maker are still very long sheets. The sheets are cut to a certain size on the press machine. Plates that have been cut into pieces are brought to the press machine to perform the work process and calculated manually. The finished gas stove is packed and labeled. The gas stove wrapping is done manually. The gas stove is inserted into a neatly packed and carton labeled, then ready to be marketed to consumers. This research discusses the working process of press machine. There are seven process of forming gas stove body by using press machine. In the end people will prefer practical products, energy saving, efficient, and good quality with reasonable price. Demand for household appliances, especially gas stoves also increased along with changes in this society. It takes time to complete 1 body of gas stove is 571 seconds : 60 seconds = 9,52 minutes. Goal / hour is the average process time of the person = 571 seconds: 7 = 81,57 seconds /pcs with goal / 60 minute is = 3600 seconds :81,57 seconds /pcs = 44 pcs/hour, goal one day = 44 x 8 hour = 352 pcs. In maintaining the occurrence of damage to the machine daily maintenance is required by following the guidelines of care according to the standards specified.

Analysis of The Use of Biogas Fuel from Palm Oil Waste as A Gas Engine (Electrical Generator)

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An analysis of the use of biogas fuel from palm oil waste has been carried out to produce mechanical energy, including moving generators that produce electricity. In this study two different types of gas are used, namely natural gas and biogas obtained from palm oil waste. This test aims to analyze what the impact of each gas on the performance of the gas engine both in terms of electricity output, fuel consumption and efficiency level. The low calorific value of natural gas is 9424 kkal/Nm³ (39,458 kJ/Nm³ and from the test results the power generated is 10.169 kWh/Nm³ while for biogas the power is 6.062 kWh/Nm³, then the low heating value of biogas is 10.169 kWh/Nm³ while for biogas the power is 6.062 kWh/Nm³, then the low heating value of biogas is obtained. 5615 kJ/Nm³ 40.32% lower than the low heating value (LHV) of natural gas. From the results of the analysis it was concluded that the biogas from palm oil waste fulfills the requirements as engine fuel.

Lithium Recovery from Spent Li-ion Batteries using Ion Exchange Resin and Activated Zeolite

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Lithium is one of the natural resources that need to recover besides extensive usage of different kind of Li-ion batteries. Recycling of valuable metals from secondary resources such as waste Li-ion batteries (LIBs) has recently attracted attention intensively due to the depletion of natural resources and increasing interest in the economic circular of heavy metals. In this study, 3 types of resin and 3 types of activated zeolite were tested for Li removal from Al and Fe ions in semi-continuous column adsorption. The cathode scrap was first soaked with the NaOH 0.3 M solution, and then the cathode residue was dried for 4 hours. The obtained residue was leached in phosphoric acid and hydrogen peroxide as a reductant. The adsorption capacity and selectivity of metal ions were compared between resin and activated zeolite with variables of flow rate. The optimum of lithium recovery from LIBs leaching solution was found using anion DOWEX resin with a flow rate of 1 mL/minute in pH 2.5 for 2-hour adsorption with purified concentration was 71% and it took a lag time 10 minutes 52 seconds. Meanwhile, for the optimum of lithium recovery was found using zeolite by physical activation at 300°C with purified concentration was 50.2% and it took a lag time 10 minutes 40 second.

Abstracts of Parallel Sessions: Natural Product Chemistry/ Biochemistry

Investigation on the Mechanical and Microstructural Characteristics of Diffusional Bonded Gray Cast Iron and Low Carbon Steel

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Mulberry or murbei (*Morus alba* L., Moraceae) is a fast growing tree species, native to China and nowadays have been cultivated in the tropical, subtropical, and temperate regions including Indonesia. Mulberry is commonly used as primary for silkworms (*Bombyx mori* L) and traditional medicine. Polyprenoids have been reported to have biological and medicinal properties. This present study describes the distribution and pattern of polyprenols and dolichols from *M. alba* leaves, roots, stems, barks, and fruits that were analysed using two-dimensional thin layer chromatography (2D-TLC) method. In these tissues, two-types the pattern of polyprenols and dolichols were obtained. Type-II, the occurrence of both polyprenols and dolichols, was traced in leaves, roots, stems, and barks. Type-III, having the predominance of polyprenols over dolichols was observed in the fruits. No type-I, displaying a predominance of dolichols over polyprenols, detected in *M. alba*. The composition of polyisoprenoids in various tissues of *M. alba* suggested the chemotaxonomic importance of polyisoprenoids in this species.

Cycloartenol Synthase in the Amino Acid Residues and Its Contribution to Phytosterol Composition

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This present study describes role of cycloartenol synthase *Kandelia candel* (KcCAS) and *Rhizophora stylosa* (RsCAS) in the amino acid residue and the contribution of cycloartenol synthase to the phytosterol. Comparison of amino acid sequence alignment around the critical active sites of plant cycloartenol synthases were performed by CLUSTALW (<https://www.genome.jp/tools-bin/clustalw>). The phytosterol profile from leaves and roots of *K. candel* and *R. stylosa* were analyzed using GC-FID and GC-MS. The amino acid residues corresponding to Tyr410 for cycloartenol synthase are conserved in both RsCAS and KcCAS, reinforcing the catalytic significance of this residue. The phytosterol pattern showed that β-sitosterol is the major phytosterol component both plants either in leaves or roots. This work found low concentration of cycloartenol in the leaves of both of *R. stylosa* and *K. candel*, supporting that both genes are responsible for the phytosterol biosynthesis in these plants.

Polyisoprenoids Profile in *Kopasanda* (*Chromolaena odorata*) Leaves Senescence

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Kopasanda (*Chromolaena odorata* (L.) R.M. Rob, Asteracea) is a, distributed in the tropical, and subtropical, countries including Indonesia. *C. odorata* have been reported to have biological and pharmaceutical properties. This study aimed to identify the distribution and pattern of polyisoprenoids and dolichols from *C. odorata* leaves senescence (bud, young, and old leaves), investigated by two-dimensional thin layer chromatography (2D-TLC) method. In these tissues, one-type of the profile of polyisoprenoids and dolichols was observed. Type-I and Type-III, were not detected. In the buds, the shorter carbon chain length and the longer one belongs to old leaves with carbon chain length of polyisoprenol C70-C95 and dolichol of C70-C95. The pattern of polyisoprenoids in this leaves stage indicated the chemotaxonomic significance of polyisoprenoids in this species.

Chemical Content Analysis of Agarwood (*Aquilaria malaccensis* Lamk) Twigs

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Utilization of wood, especially waste such as twigs of wood is influenced by chemical composition. This study aims to determine the chemical components of wood twigs. The chemical analysis which were examined covered solubilities in cold water, hot water, alcohol benzen and solubility in NaOH 1%, holocellulose, alfa cellulose, and lignin based on the TAPPI (Technical Association of Pulp and Paper Industries) standard. The results showed that agarwood wood twigs containing extractives solubilities in cold water 2.61%, hot water 3.28%, alcohol benzen 33.36%, and solubility in NaOH 1% is 4.75%. While holocellulose content 76.55%, alpha cellulose 45.09% and lignin 26.55%.

Isolation of Phenolic Compound from Eucalyptus Citriodora Leaves

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Phenolic compound have been isolated from Eucalyptus citriodora leaves by using maceration, fractionation and chromatography methods. Determination of the structure of the isolated compound was carried out by spectroscopic methods including UV-Vis, FTIR, H-NMR and C-NMR which stated that the isolated compound was methyl gallate.

Phytochemical and Toxicity Test With The BSLT Method on Kemuning Raya Leaf Extract (Muraya Paniculata L.)

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Phytochemical and toxicity tests have been carried out using the BSLT method on kemuning leaves. The kemuning leaves are picked in the morning before sunrise then washed, then dried for 5 days, then blended and sieved to obtain kemuning leaves powder. Furthermore, the phytochemical screening test obtained shows the presence of alkaloids that form red deposits (precipitate) with dragendroff reagent, yellowish white deposits (precipitate) with mayer reagents, and the presence of flavonoids is indicated by the formation of black colloids. The most flavonoid yields were obtained (the biggest secondary metabolites components in the extract are flavonoids), while the presence of saponins was indicated by the presence of foam that lasted ± 10 minutes. Tannins form dark blue or greenish black rings. While steroids and terpenoids marked with brown or violet rings are not formed and not present in kemuning leaf extract. The results of the toxicity test with BSLT showed moderate toxicity to shrimp larvae.

Effect of Heat Moisture Treatment Modification on The Characteristic of Durian Seed's Starch

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Durian seed is one part of durian fruit that not optimally utilized yet, it has high content of starch which can be utilized as a substitute material of wheat flour. The pristine starch is known have several deficiencies, i.e. incompatible with other food ingredients, especially cannot be utilized to make a good dough. Modification to the pristine starch is needed to resolve the deficiencies of starch, heat moisture treatment is an efficient and effective technique that able to modify the pristine starch's properties. The objective of this study was to evaluate the different characteristic of pristine starch and modified starch of durian seed, especially on rheology of starch, and its compatibility to make dough. The obtained result showed significant difference on their water content, ash content, pH, water solubility, water absorbency, oil absorbency, and opacity. .

Preparation of Facial Wash Enriched with Collagen from Mullet Scale Waste in Belawan Port

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Despite the abundant marine resources and fisheries in Indonesian waters, an environmental issue emerges from the untreated waste derived from 61% of total fish biomass in the form of fish scales and skins which may pose a threat if not utilized effectively. Mullet (*Mugilidae*) or belanak scales are one of the potential wastes as sources of collagen, which are currently popular in the cosmetic industry. Palm oil-based facial wash as anti-acne supplemented with collagen extracted from mullet scales are prepared in this study as an alternative to convert the mullet scale waste into a valuable product. The results showed that collagen yield from the extraction process reached 25.32% of biomass. Based on the analysis, it was found that the best formulation of 5% collagen in facial wash had characteristics such as pH of 5.28, foam stability of 93.33%, viscosity of 3.7396 CPS, and total free alkali of 0.448%.

Antioxidant Activity, Total Phenolic and Total Flavonoid Content of Hydroalcoholic Extract of *Artocarpus lacucha* Buch-Ham. Leaves

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The uncontrolled production of oxygen free radicals and the unbalanced mechanism of antioxidant protection results in the onset of many diseases, such as cancer, diabetes, Alzheimer's, heart diseases and aging. *Artocarpus lacucha* Buch-Ham. belongs to the family of Moraceae, popularly regarded as a medicinal plant and commonly called as monkey jack. This plant is widely distributed in the tropical regions of south and south-east Asia. The aim of this study was to determine antioxidant activity, total flavonoid and total phenolic content of *Artocarpus lacucha* Buch-Ham. Leaves. Extract was prepared using ethanol 80% with maceration method. Antioxidant activity were determined with 1,1-diphenyl-2-picrylhydrazyl (DPPH) method. Total flavonoid and total phenolic content were determination with colorimetric methods. Antioxidant activity from DPPH assay measured as IC_{50} was 48.23 ± 0.46 μ g/mL. Extract was found to contain high levels of total phenolic (79.87 ± 0.39 mg GAE/g) and total flavonoid (9.65 ± 0.03 mg QE/g). The results reveal that hydroalcoholic extract of *Artocarpus lacucha* Buch-Ham. Leaves has antioxidant potential.

Antioxidant and Antibacterial Activities of Ethanol Extract of *Vernonia amygdalina* Delile. Leaves

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Oxidation is an important process in living organisms. Free radicals arising from metabolism or environmental sources interact continuously with biological system. The uncontrolled production of oxygen free radicals and the unbalanced mechanism of antioxidant protection results in the onset of many diseases, such as cancer, diabetes, Alzheimer's, heart diseases and aging. Bacterial infection are present in high incidence and cause of death. *Vernonia amygdalina* Delile. (*Asteraceae*) is used in traditional medicine to treat diabetes mellitus and some research provides its activity to treat infections and breast cancer. The aim of this study was to determine antioxidant activity and antibacterial activities of *Vernonia amygdalina* Delile. Leaves. Extract was prepared using ethanol 100% with maceration method. Antioxidant activity were determined with 1,1-diphenyl-2-picrylhydrazyl (DPPH) method. Total flavonoid and total phenolic content were determination

with colorimetric methods. Antibacterial activity was determined using disc diffusion method towards *Escherichia coli* ATCC 25922 and *Staphylococcus aureus* ATCC 6538. Antioxidant activity from DPPH assay measured as IC_{50} was $73.24 \pm 1.09 \mu\text{g/mL}$. Ethanol extract (EE) was found to contain high levels of phenolic ($54.61 \pm 0.94 \text{ mg GAE/g}$), total flavonoid ($22.53 \pm 0.92 \text{ mg QE/g}$). Antibacterial activity of EE towards *Escherichia coli* ATCC 25922 and *Staphylococcus aureus* ATCC 6538 at concentration 50 mg/mL were showed inhibitory zone $19.37 \pm 0.20 \text{ mm}$ and $19.27 \pm 0.18 \text{ mm}$. The results reveal that EE of *Vernonia amygdalina* Delile. Leaves has antioxidant and antibacterial potential.

Comparative Studies on Physicochemical Properties of B-Type and C-Type Starches from Potato Starch

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Potatoes are a very high carbohydrate food source. Potato tubers contain B-type starch, which has many deficiencies during processing. The pristine starch (B-type) is known have several deficiencies, i.e. incompatible with other food ingredients, especially cannot be utilized to make a good dough. Heat Moisture Treatment process was able to change the type of potato starch from B-type to C-type. This technique can increase the resistance of starch during processing. The aim of this study was to compare the characteristics of natural starch (B-type) with modified starch (C-type) in potato starch. The obtained result showed significant difference on their water content, ash content, pH, water solubility, water absorbency, oil absorbency, and opacity.

Antioxidant Activity of Melur Leaves (*Gardenia jasminoides ellis*) as an Anti-Cancer Agent

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Aceh especially Langsa has medicinal plants, one of which is a melur plant (*Gardenia Jasminoides Ellis*). The leaves of the melur plant are traditionally used to treat heartburn and for fevers. The purpose of this study was to examine the antioxidant activity and anti-cancer agents from the leaves of melur plants. The method used in this study is phytochemical screening, namely testing the presence of medicinal compounds in melur leaves, such as alkaloids, teriterpenoids, flavonoids and saponins using standard reagents. Furthermore maceration uses polar solvents (ethanol 96%) and the solvent is evaporated with a rotary evaporator so that crude extracts are obtained. The extract was then tested for bioactivity, namely the toxicity test by the Brine Shrimp Lethality Test (BSLT) using *Artemia Salina* Leach shrimp larvae and its antioxidant activity using UV-Visible with DPPH method (2,2-diphenyl-1-picrilhidrazil) and for positive control using vitamin C. Phytochemical screening results show that the leaves of melur (*Gardenia Jasminoides Ellis*) contain medicinal compounds such as alkaloids, triterpenoids, saponins and flavonoids. The BSLT test results gave an LC_{50} of 37.50. The results of testing the antioxidant activity with the DPPH method showed that the leaves of the melur (*Gardenia Jasminoides Ellis*) IC_{50} were 6.93 and for the positive control the IC_{50} was 6.42.

Abstracts of Parallel Sessions: Chemical Synthetic/ Polymer Chemistry

The Effect of Temperature and Reaction Time on Lignin Content of *Imperata Cylindrica*

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Lignin is one of the chemical components of wood beside cellulose, hemicellulose and extractive. Lignin contains phenolic hydroxyl group that are bound to phenyl propane unit, allowing lignin bonds with formaldehyde to be similar to the results of the reaction between phenol and formaldehyde. The catalytic process in lignin isolation is expected to convert lignin efficiently. Although many catalysts have been developed and shown to efficiently degrade lignin compositions, only a few catalyst can degrade lignin with good conversion. In this study we will discuss the effect of temperature and reaction time on lignin isolation from reeds and is expected to be applied later in the process of making surfactants. This research was carried out at temperatures of 70 °C, 80 °C, and 90 °C, reaction times during (10, 20, 30, 40, and 50) minutes, the ratio of raw material to NaOH 1: 5 (w/v), and 10% NaOH concentration. The observations of the most lignin yield obtained from the reaction temperature of 90 and the reaction time of 30 minutes as much as 30,93%. The product will be investigated by FTIR (Fourier Transform Infra Red).

The Effect of Adding Sludge from Wastepaper Industry in Composite Panel Based on Polypropylene Plastic Waste with Cocofiber as Filler

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The study was conducted to produce composite panels that will be used as wall panel material in the manufacture of earthquake resistant buildings. Wall paneling begins with the preparation of polypropylene plastic waste, cocofiber and paper mill waste sludge. The second stage was carried out by mixing polypropylene plastic waste with cocofiber, and paper mill waste sludge. There were 2 mixing variations, namely without the addition of sludge (polypropylene plastic waste and cocofiber) with a ratio of 60:40, and with the addition of sludge (polypropylene plastic waste, cocofiber, and sludge) with a ratio of 60:20:20. Mixing is done by an extruder and pressing with a hot press method. The resulting composite panel is characterized by density and internal bond and swelling in thickness. From the comparison of the two wall panels, wall panels were obtained with the addition of sludge to improve the quality of the resulting wall panels where the density value increased from 0.9713 g/cm³ to 1.093 g/cm³. The internal strength of the wall panel without the addition of sludge is 0.59 N/mm² while after adding sludge to 0.61 N/mm². The development of panel thickness without the addition of sludge is 0.508% while with the addition of sludge is 0.104%.

Design of Cold Water Pipe Joints Based On Fibreglass-filled HDPE Composites Using Friction Stir Welding Technique

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Ocean Thermal Energy Conversion (OTEC) is a renewable energy for electricity generation by using the temperature difference between sea surface level and underwater. The medium of sea water conveyance from below sea level to the surface that reaches a depth of 800 m uses HDPE pipes with the term of Cold Water Pipe (CWP). In this OTEC industry large pipe diameters are needed to increase the energy capacity produced. Joining of HDPE pipes in large sizes becomes very crucial. This research is focused on joining with the FSW technology method for thermoplastic polymers or composite HDPE that will be applied to the OTEC industry. Friction Stir Welding (FSW) is a process of combining materials using friction heat generated by a rotating instrument. FSW has been widely applied for the incorporation of metal materials. Recent scientific studies state that FSW has the potential for combining thermoplastic polymers and polymer matrix composites.

Antibacterial Analysis of Polycaprolacton / Chitosan / TiO₂ Porous Composite

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Porous composites are known as a type of material that has a number of pores in its structure which is formed from a combination of two or more materials with different properties. The use of porous composites includes tissue engineering materials. Freeze-drying, or lyophilization, techniques can form interconnected pore structures. The manufacture of PCL / Chitosan / TiO₂ porous composites at various mix ratios using freeze-drying techniques has been successful. Analysis of crystal structure and size using XRD resulted in a peak of 2θ in composite 1, namely $2\theta = 22.20^\circ$, in composite 2 it was $2\theta = 22^\circ$, the highest in composite 3 was $2\theta = 25.14^\circ$ and identified the presence of TiO₂ particles in the anatase phase integrated with PCL. Thermal decomposition analysis

using DSC resulted in the maximum decomposition of composite 1 at 449.47 °C, for composite 2 at 460.14 °C for composite 3 at 471.20 °C. The analysis of the antibacterial test showed good results with clear zone values in the range of 6.8 mm to 7.8 mm. Porous composites/ PCL/ chitosan/ TiO² already have the ability to inhibit bacterial activity.

Abstracts of Parallel Sessions: Food and Agrochemical Science

Microencapsulation of Spearmint Oil Using Pectin and Gelatine by Complex Coacervation

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Microencapsulation is a process that entraps substances in tiny micron-sized capsules. This research was done on the microencapsulation of spearmint oil using wall materials pectin and gelatine type A, which can be applied to food products. Spearmint oil is often used in chewing gum. The using of spearmint oil microcapsules in chewing gum prolongs its sensory properties since the release of this flavour is controlled by mechanical forces when it is chewed. This research aims to produce microcapsules of spearmint oil by complex coacervation methods using wall materials, pectin and gelatine type A for food product application. The objectives were to optimise the condition of complex coacervation for microencapsulation of spearmint oil and to characterise the spearmint oil microcapsules. The encapsulation process was done by the complex coacervation process because this process can surround the core material with a continuous coating material. Complex coacervation formed between cationic gelatine type A and anionic pectin to encapsulate the spearmint oil and was induced by lowering the pH with the addition of acetic acid 10% solution. For optimisation of the complex coacervation process, the optimum pH was 4. The optimum weight ratio of core and wall materials was 1:1, and the weight ratio of pectin and gelatine type A was 1:2. The microcapsule from this research was a spherical shape with multi-oil droplets inside of it. The addition of tannic acid and sodium carboxymethyl cellulose (CMC) did not change the morphology of the microcapsule and caused no significant difference in payload and encapsulation efficiency. From the analysis using Mastersizer 2000 Malvern, the mean sizes of the microcapsules were $10.6 \pm 1.4 \mu\text{m}$ (control), $14.6 \pm 4.9 \mu\text{m}$ (with tannic acid), and $23.2 \pm 11.3 \mu\text{m}$ (with CMC). The size of microcapsules with CMC was the largest compared with the control microcapsules and the microcapsules with tannic acid. This size was increased at the time, which indicated the aggregation of microcapsules with the addition of CMC. The analysis using micromanipulation showed that the addition of tannic acid increased the mechanical strength of the microcapsules. This research successfully encapsulated spearmint oil using the complex coacervation of pectin and gelatine type A under specific conditions.

Extraction and Purification of Bromelain Enzym from Queen Pineapple

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The purpose of this study is to produce bromelain powder from extract of pineapple. bromelin enzyme extracted by enzyme isolation method then purified by ammounium sulphate salt, ethanol and ultrafiltration membranes. Then filtering and drying is done using a vacuum dryer. The variables of ammonium sulfate salt concentrations were 10%, 15%, 20%, 25%, and 30%. The properties and bromelain activity of the pineapple extract was determined. The best result of bromelain enzyme powder from pineapple were precipitated by ammonium sulphate 15%, and ethanol 5% using membranes with activity enzyme were 0,658 U/gr and protein content were 2,03%.

Effect of Dose and Time Application of Phosphorus Fertilizer on Phosphorus Availability, Growth and Production of Rice (*Oryza sativa* L.)

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The use of fertilizer as a supporting factor for plant growth continues to increase, but it is not directly proportional to the increase in plant growth, so some efforts are needed to improve fertilizer efficiency, among others, by paying attention to the right dosage and time application. The objective of this research to study the right application time and dosage of phosphorus fertilizer to increase the availability of phosphorus nutrients, growth and rice production. The research was carried out in the rice fields of Namoukur village, Sei Bingai District, Langkat Regency in September 2019 to December 2019. The research used a non factorial randomized block design with 6 levels of treatment, consist of: W0 = control; W1 = application at planting with a dose of 141 kg / Ha (100%); W2 = application 5 days after planting at a dose of 141 kg / Ha (100%); W3 = application 5 days after planting at a dose of 70.5 kg / Ha (50%) and application 25 days after planting at a dose of 70.5 kg / Ha (50%); W4 = application 5 days after planting at a dose of 70.5 kg / Ha, application 25 days after planting at a dose of 35.25 kg / Ha and application 45 days after planting at a dose of 35.25 kg / Ha (25%); W5 = application 5 days after planting at a dose of 70.5 kg / Ha (50%) and application 45 days after planting at a dose of 70.5 kg / Ha (50%). W₃ treatment significantly affected the weight parameter of 1000 grains, W₃ treatment also was the highest mean on plant height parameters and soil P nutrient availability at age 35, 55 and 75 days after planting, while the highest number of tillers was found in W5 treatment, on the leaf P nutrient analysis parameters and the highest P nutrient uptake was found in W4 treatment.

The Qualitative and Quantitative Analysis of Adulteration in Specialty Coffee from Tanggamus Lampung Using UV-Visible Spectroscopy and Chemometrics

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In Tanggamus region, Robusta coffee is mainly planted in the mountainous area (more than 600 meters above sea level) resulted in a high quality of Robusta coffee. In 2014, Robusta coffee from Tanggamus region got a certificate of geographic indication from Indonesian government and regarded as one of Indonesian specialty coffee. In ground roasted coffee, it is difficult to discriminate between specialty coffee and normal coffee (non-specialty coffee). To establish a fair trading of specialty coffee from Tanggamus region, it is highly desired to develop an easy and cheap analytical method for specialty coffee authentication. In this research, we utilize UV-visible spectroscopy

and chemometrics methods to discriminate specialty coffee from normal coffee both quantitatively and qualitatively. A number of 180 samples of Tanggamus specialty coffee with different degree of adulteration was prepared. All samples were subjected to an extraction procedure using hot distilled water. Spectral acquisition was done using a UV-visible spectrometer in the range of 190-1100 nm. Principal component analysis (PCA) and partial least squares (PLS) regression was applied for qualitative and quantitative analysis, respectively. The result of qualitative analysis showed that the samples can be clustered into three groups of adulteration (low, middle and high) using PC1 and PC2 with total 96% of explained variance. The best calibration model was achieved using preprocessed spectra with $R^2=0.99$ and $RMSECV = 2.08\%$. The result of prediction was accepted with $SEP = 2.38\%$ and $RPD = 7.30$.

Using UV-Visible Spectroscopy Coupled with Linear Discrimination Analysis to Discriminate between Monofloral and Multifloral Honey from Indonesia

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In the market, two types of honey are available: monofloral and multifloral honeys. Monofloral honey has been regarded having higher market values than multifloral one. In order to protect a fraud trading between monofloral and multifloral honeys, it is very important to develop an analytical method which can be used to discriminate the two type of honeys. In this research, we utilize spectral data in the UV-visible region (190-450 nm) coupled with linear discrimination analysis (LDA) to classify monofloral and multifloral honeys from Indonesia. Total 150 samples of monofloral and multifloral honeys were used as samples. The spectral data were recorded using UV-vis spectrometer in the range of 190-1100 nm with 1 nm of resolution. Several preprocessing methods was applied to improve the quality of spectral data. Principal component analysis (PCA) was applied to map the samples and the PCA scores were used as input for classification task using linear discriminant analysis (LDA). The result suggested that UV-Visible spectroscopy is a powerful tool for quality evaluation of Indonesian honeys.

The Potential Application of Portable Spectrometer Equipped with Integrating Sphere and PLS-DA Method to Authenticate Indonesian Specialty Coffee

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In this research, a potential application of using portable spectrometer equipped with an integrating sphere to authenticate Indonesian specialty coffee was described. 20 samples of specialty and normal ground roasted coffee was used as samples. Each sample has about 1.33 gram in weight and particle size of 297 micrometer. Spectral data in the range of 900-1657 nm was acquired in diffuse reflectance mode using a portable fiber optic NIR-Quest InGaAs spectrometer (Ocean Optics, USA) equipped with an integrating sphere (ISP-REF, Ocean Optics, USA) with 1.645 nm interval. The integrating sphere is coated with Spectralon[®] and installed a built-in tungsten-halogen light source. Partial least squares-discriminant analysis (PLS-DA) was used to classify the samples into two groups: specialty coffee (labelled as 1) and normal coffee (labelled as 0). The result demonstrated that the best PLS-DA model was obtained with $R^2 = 0.98$ and $R^2 = 0.93$ for calibration and validation, respectively. This achievement suggested that the proposed NIR spectral acquisition using portable NIR spectrometer equipped with an integrating sphere is potential to establish an authentication system for ground roasted Indonesian specialty coffee in direct and fast measurement.

Potential of Crude Protease from Mengkudu (*Morinda citrifolia*) Fruit on Extraction of Virgin Coconut Oil

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Virgin Coconut Oil (VCO) play a unique role for dietary supplements and crucial functional food. VCO can be obtained by different kind of processes such as fermentation, enzymatic process, centrifugation or freeze drying. This aimed of this study was to compare the possibility of using different concentration of crude protease enzyme from Mengkudu (*Morinda citrifolia*) fruit on extraction of Virgin Coconut Oil. Isolation of Crude protease by centrifugation method was conducted at 10.000 rpm in phosphate buffer solution at pH 7 and the enzymatic activity was determined by Bergmeyer Method. Additionally, the fatty acid composition was analyzed using GC-MS (Gas Chromatography – Mass Spectroscopy). The most significant concentration of crude protease to extract VCO was 0.12% (w/v) which showed high yield of VCO (21.15%) and the VCO contain medium chain of fatty acid (MCFA) especially lauric acid (41.07%), followed by myristic acid (23.24%). Even though, there are no significant method to obtain maximum quantity of VCO, this enzymatic process using 0.12% (w/v) crude protease of mengkudu fruit is reliable to fulfill the standard of Asian and Pacific Coconut Community.

Study of Vitamin C Level of Soursop Leaves (*Annona muricata* L.) and Galactomannan Utilization in Kombucha during Fermentation

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The Vitamin C level of Soursop leaves Kombucha using galactomannan as a food source of acidic bacteria in Kombucha was investigated. The aimed of this study was focused on evaluating the vitamin C content in the Kombucha during fermentation for 14 days using indophenol titration method. Soursop Leaves were prepared by drying the fresh leaves in the oven at 700 °C for 3 hours and Galactomannan was obtained by centrifugation process of endosperm of *Arenga pinnata* in neutral condition. Inoculation of the soursop leaves kombucha was performed by 20% (v/v) from previous kombucha broth and the samples with different concentration 0.5%(w/v), 1%(w/v) and 1.5%(w/v) were analyzed after 0, 7 and 14 days with 3 replications respectively. The results showed that there was a significant influence of concentration of soursop leaves and time duration during fermentation. The highest level of Vitamin C present in 1.5% (w/v) soursop leaves when fermented it for 14 days (3.3094 ± 0.439 mg/100 mL) and the lowest level of Vitamin C present in 0.5%(w/v) soursop leaves towards 0 days fermentation (0.3214 ± 0.067 mg/100 mL). Process duration and concentration of the leaves were the main factor influencing the content of Vitamin C of Kombucha.

Abstracts of Parallel Sessions: Applied Chemistry

Using RBDCNO as Substitute for CPKO to Produce Oleochemical Products Through the Splitting and Fractionation Process

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Raw material substitution has been carried out from CPKO (Crude Palm Kernel Oil) to RBDCNO (Refined Bleached Deodorized Coconut Oil) for producing oleochemical products. Splitting and fractionation process conducted using process parameters and standard operating conditions that normally used to produce oleochemical products with CPKO as raw material before. The two classes of products produced are differentiated based on whether they pass through the hydrogenation process or not. The non-hydrogenation product group is C8-18 while the hydrogenation product is Hydrogenated C8-18. The result show better color from individual variant of fractionated product C8-18 and Hydrogenated C8-18 compared to PKOFA but carbon chain distribution was fluctuated. Average was out of specification for D810 and Lauric Acid for C8-18 and D810 and Myristic Acid for Hydrogenated C8-18. Heat Stability (HS) color dari D810, Myristic Acid and D168 from fractionated C8-18 was higher than typical D810, FA1299 and D168 from CPKO. Adjustment with addition Palmitic Acid 98% have to conducted due to carbon chain distribution was out of range. HS Color after adjustment was higher than typical CPKO. Peroxide Value (POV) of C8-18 has increased significantly since first week and stable up to eighth week while POV of Hydrogenated C8-18 was stable ≤ 1 after eight weeks.

Abstracts of Parallel Sessions: Health and Biomedical Science

Effect of Watermelon (*Citrullus vulgaris*) Rind Juice in Muscle endurance in Healthy Non-Athlete Volunteers

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Excessive workload, lack of regular physical activity and unhealthy diet are commonly experienced by most of the people in modern society. These conditions lead to fatigue and decreased productivity. Previous studies showed that consumption of watermelon juice showed ergogenic effect due to the high content of amino acid citrulline. Despite rich of citrulline and another nutrients, watermelon rind is usually discarded and considered unedible. Therefore we are interested in studying the ergogenic effect of watermelon rind juice (WRJ) in particular to increase muscular endurance in healthy non-athlete volunteers. Twelve healthy male subjects with aged between 18-20 years old were volunteered to involve in this quasi-experimental study with cross-over design. Body weight and height were measured to obtain Body Mass Index (BMI) value. Blood pressure (BP), heart rate (HR), respiratory rate, blood lactate and muscle endurance in push up test were measured after consumption of mineral water. Three days later, the same parameters were measured from the same subjects 60 minutes after consumption of 500 ml WRJ. We observed no significant difference in BMI among subjects. Despite not statistically significant, the mean of BP after push up challenge was slightly lower following WRJ consumption than mineral water (117/80 mmHg vs. 115/75 mmHg, respectively). The decrease of blood pressure was coincided with the increase of mean HR indicating vasodilatation effect of WRJ. As expected, we found the increase of muscle endurance in 45% subjects following WRJ consumption. However, blood lactate level was increased. We concluded that WMJ supported muscle endurance in push up test with slight vasodilation effect in healthy, young non athlete-volunteers.

The Association of GSTT1 Polymorphism with Total Antioxidant Status of Nasopharyngeal Carcinoma Patients

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Several cancers, including nasopharyngeal carcinoma (NPC), are associated with the patients' antioxidant status. The polymorphism of enzymes responsible for metabolizing carcinogens such as the GSTT1 enzyme can decrease total antioxidant status (TAS). This study was done in order to analyze the association of GSTT1 polymorphism and the TAS level. 29 samples underwent PCR-electrophoresis to identify GSTT1 polymorphism and ELISA for measuring the TAS level. The study found 18 (62.0%) patients with GSTT1 null and 11 (38.0%) patients with GSTT1 positive. There were 21 (72.4%) patients with lower TAS levels and 8 (27.6%) patients with normal TAS levels. We did not find the significant association of GSTT1 polymorphism and TAS level. Lifestyles also influence the variety of antioxidant levels of NPC patients. The study can help the clinicians to consider adding antioxidant intake in NPC therapy, particularly in individuals with GSTT1 polymorphism and related enzymes.

The Association of GSTT1 Polymorphism with Immunoglobulin A (IgA) of Nasopharyngeal Carcinoma Patients

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Polymorphism of GSTT1 had been known to be associated with nasopharyngeal carcinoma. The polymorphism induces oxidative stress and enhances IgA level through increasing EBV lytic reactivation. IgA levels are important for screening NPC patients and also for consideration of NPC therapy. We did the study to analyze the correlation of GSTT1 polymorphism and IgA level. This study was an analytical study with a cross-sectional design. We used the blood of NPC patients and identified GSTT1 polymorphism by PCR and IgA level by ELISA. There were 18 (62.0%) patients with GSTT1 null and 11 (38.0%) patients with GSTT1 positive. Patients with increased IgA were 21 (72.4%) patients, and normal IgA were 8 (27.6%) patients. There was no significant association of GSTT1 polymorphism with the IgA level. These can be affected by other factors, including the antioxidant level of NPC patients. The study could be used as an initial study for identifying the association of other risk factors with the IgA level of NPC patients.

Role and Function of Family in Caring for Family Members with Chronic Disease in Medan

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The role and function of the family are important things needed by family members who experience illness, especially chronic diseases. Chronic illnesses suffered by family members require routine and long-term care so that the role and function of the family are to encourage family members to achieve a good quality of life. This research is descriptive which aims to determine the role and function of the family in caring for family members who have chronic diseases. The study population was patients suffering from chronic diseases with a total sample of 153 people. Sampling using purposive sampling with inclusion criteria, namely patients diagnosed by doctors with chronic diseases for more than 2 years, having a nuclear family member, being hospitalized and over 20 years old. Data collection using questionnaires made based on literature, consisting of questionnaires the role and function of the family. Validation of the questionnaire is carried out by experts who are experts in their fields. The results showed that the majority of respondents 132 people (86.2%) stated the role of a good family and as many as 112 family functions (73.2%).

The family has a role and function to improve the welfare of family members both biologically, socially and psychologically. Prosperous family members are good indicators of the quality of health services.

Family Foster Pattern and Food Consumption in Elementary School Children in Medan

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The foster pattern given by parents is very influential about the behaviour of daily children in the outside especially in the school environment, when there are children will find various types of food snacks that can adversely affect children's health such as diarrhoea, typhoid, food poisoning and in a long period of time can cause cancer and anaemia. This can happen if the child has not been able to choose healthy food. So the family foster pattern plays an important role for children's health. The purpose of this study is to identify family foster patterns and food consumption in elementary school children in Medan. This research uses descriptive design. The population of this research is parent and student/I elementary school in Medan amounting to 270 students with a sample of 73 students. Sampling retrievals using Simple Random Sampling. Data retrieval tools using questionnaires. Analysis of the data used is frequency distribution. The results showed that the category of majority family foster pattern was applied namely democratic foster pattern as much as 46 respondents (63.0%) From 73 respondents and the research results on food consumption in elementary school children in Medan obtained the majority category is not good with the number of respondents 64 people (87.7%) of 73 respondents. This can occur due to the many outside factors affecting the food consumption behaviour of the schoolchildren and the environmental factors greatly affect the child's behaviour especially the peer factor. Based on the results of the study should parents give supervision and knowledge to the child about the dangers of consuming food carelessly so that the child can distinguish good food to be consumed at the time of school.

Knowledge, Attitudes, And Efforts of Factory Workers Against The Dangers of Ispa at Pt Asia Karet Medan

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Health is one of the main priorities of people in living life. Everyone would want to have a healthy and strong body and good immunity in order not to be susceptible to illness. At factory workers there are risks of accidents and occupational diseases, which are derived from various factors such as work environment. Work environments that are often filled with dust, vapours, gases, and more can interfere with health. This research aims to identify the knowledge, attitudes, and efforts of the factory workers against the dangers of ISPA in PT Asia Karet Medan. This research is done in rubber factory which is located on Jalan Klambir V Medan, namely PT Asia Karet. The design of this research is descriptive with a sample number of 50 people. The data retrieval tool uses the questionnaire. The data retrieval technique used is Simple Random Sampling, where researchers spread the questionnaire directly to the samples in this study. Analysis of the data used is frequency distribution. The research was conducted from October 2017 to July 2018. The results of this study showed that 94% of respondents had good knowledge, 98% of respondents had a positive attitude, and 96% of respondents had a good effort against the ISPA hazards. This is due to the influence of the K3 program (Health, and safety of work) that runs well as well as the factory worker who always use the APD while working. For further study, it is advisable to complete this research by conducting an assessment of ISPA health at the plant and revisiting the factory facilities and condition of the plant.

Learning Methods in Improving the Soft Skill of Ners

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Learning strategy has a considerable share in the learning process. Selection of appropriate learning strategies can foster the interest of learners to follow the learning activities. The design of this study is descriptive. The sample of this research is the students of Faculty of Nursing University of Sumatera Utara as much as 207 people. Sampling technique is stratified random sampling. The instrument used is a learning strategy questionnaire. The result of the research shows that learning strategy implemented in North Sumatera University nursing faculty is Problem Base Learning 20%, 40% lecture, 10% practicum, 30% Lab Skill. In order for the strategies that have been done to further refine the soft skill attributes and add other learning strategies such as Small group discussion, Role play and simulation, Case study, Discovery learning (DL), Self Directed Learning (SDL), Cooperative Learning (CL), Collaborative Learning (CbL), Contextual Instruction (CI), Project Based Learning (PJBL) and Problem Based Learning and Inquiry (PBL).

Design and Analysis of Mobile Based Self Care Nursing Information System

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Information technology has become a necessity which continues to grow in many areas of life including the field of nursing. This is due to the rapid advancement of the mindset of the patient, family, and people who always want to immediately obtain nursing services quickly, accurately, effectively and efficiently. To that end, the nurse must be professional and use information technology as Telenursing. Telenursing a remote nursing care, where nurses carry out nursing care to use technology via telephone, video calls, internet, conference. Where the application is made the distance, time, place, and the cost is no longer obstacles in obtaining health services. Based on the survey results Asri Clinic Wound Care Center Terrain of 2017 s. d September 2019 there were 612 people who receive wound care, the average length of treatment ranges from 8 weeks, the patient visits on average each week were 96 visits, the economic status of predominantly middle to bottom, with the status of the work is not fixed, the number of families who accompany a patient visits average 2 to economically add expenses and causes companion could not indulge. These cases are handled when the average was dominated case of diabetic wound patients who have a history of diabetes mellitus is complex, currently the most distant patients come from Takengon (Central Kab.Aceh) for the Region of Aceh, North Sumatra, while for most patients far from Padang Sidempuan. Patient compliance in the treatment every week than the average patient per week ranges from 37% attendance for the wound care, and therefore contributes to the condition of the wound. For it requires the application of Self-Care Nursing based e-Madan, mine in Karo Tribe which means cured, says Madan is also the origin of the name of the city of Medan, North Sumatra. Objective: To improve the health of patients with wounds, equalizing nursing services regardless of distance, time, and space, reduce costs, monitor the condition of patients discharged from the hospital, memandirikan patients and families, involving families in the treatment process, building information systems are interactive to facilitate self-care patients received wound care. Stages of research methods: In the early stages of data collection and study of literature. Later in the first year of application development performed Chat Bot wound care, system documentation, testing. system, draft patent Chat Bot wound care, and research reports first year. In the second year made the development of integrated applications, system documentation, system testing, output reputable international journals, and reporting research results. Outcomes targeted: Patents Chat Bot wound care and wound care integrates the patent application, reputable international journals, international conference. Description TKT research: It is at level 5. This research according to academic excellence is a technology usu. Work Program No. USU 11 Strategic Plan: Develop a talent-based advantages. This study is an extension of previous research, namely the implementation of SMS in improving medication adherence in which this research has been proposed draft patent, the Draft Patent No. S00201902462 with Title Compliance Enhancement Techniques

nurses Drinking Drugs Through-Short Message Service Intervention (N-SMSI) In Patients Tuberculosis (pulmonary TB).