PROGRAM AND ABSTRACT

9th International Conference of the Indonesian Chemical Society

Toward a Meaningful Society

Organized by:
Indonesia Chemical Society University of Mataram

August 11-13, 2021 | Lombok Indonesia

Welcome Speech from Organizing Committee of The 9th International Conference of the Indonesian Chemical Society

Honorable Guests
Participants
Ladies and Gentlemen

Praise and gratitude towards Allah SWT, who has given His Grace, so that we are all here to attend the 9th International Conference of the Indonesian Chemical Society 2021, amid the current pandemic that forces us to do it online.
Still fresh to our mind that we, ICS Branch Nusa Tenggara, were elected to host the 9th ICICS that was initially scheduled last year. After a year of postponing, we witness that the pandemic turns to an unknown end. We would also like to express our deepest condolences for the loss of our chemists, professors, colleagues, and family members. May Allah bless all of them. We defined our conference theme, "Toward a meaningful society," before the onset of the pandemic. Now that we are still in the pandemic, the theme of our conference is even more relevant in the quest of our role as scientists and chemists, researchers, and educators and to push ourselves to the limit. We also learned that the impact of our effort could only be meaningful if we broaden the horizon by cooperating with other scientific societies and stakeholders.

Distinguished speakers and presenters,
On behalf of the organizing committee, I would like to welcome all of you to this conference. We are delighted to have you here to participate and share your expertise. The conference brought together more than 200 participants. There will be ten plenary and seven invited speakers sharing their expertise coming from Indonesia and various nationalities.

In conjunction with this conference, we also held two satellite activities, i.e. "XRD instrument analysis, maintenance and troubleshooting," in collaboration with ICS West Java and Banten, Dept of Pharmacy University of Mulawarman, Dept of Chemistry Andalas University, and Dept of Chemistry University of Gen Ahmad Yani; the second satellite will be PCR for education, which is a collaboration with Dept of Pharmacy, University Lambung Mangkurat, and ICS Branch South Kalimantan.

Right from the beginning, we realize there were so many obstacles that prevent us from preparing for an ideal conference. Hence, on behalf of ICS Branch Nusa Tenggara, University of Mataram, and the ICICS Committee, I do apologize for any inconvenience during preparation, registration, and the conference. We are grateful for the advice and support of the Steering Committee and ICS chief. I also wish to thank all members of the Organizing Committee for their hard work in organizing the symposium, to the Faculty of Mathematics and Natural Sciences, and the Faculty of Teacher Training and Education, University of Mataram.

Finally, on behalf of the Organizing Committee, I would like to express my gratitude and hoping that all of you will extract the benefit from the conference.
Thank you.

Mataram, August 11, 2021
Dr.rer.nat, Lalu Rudyat Telly Savalas, S.Si, M.Si.
Chairman

Welcome Speech from President of the Indonesian Chemical Society (HKI)

Honorable Rector of University of Mataram
Honorable Guests and Participants
Ladies and Gentlemen

Assalamualaikum Wr Wb
Good morning

Praise and gratitude towards Allah SWT, who has given His Grace, so that we are all here to attend the 9th International Conference of the Indonesian Chemical Society 2021. On behalf of the Indonesian Chemical Society, I would like to congratulate the organizing committee for organized this successful scientific meeting even though we could not meet offline because of the pandemic. Many thanks to the University of Mataram and support from the Indonesian Chemical Society Nusa Tenggara Branch for held this conference.

In this disruptive and challenging era, chemistry will play an important role and contribute significantly to science and technology's sustainable development with other disciplines. The Indonesia Chemical Society is delighted to see all of you, students, young and experienced scientists from Indonesia and other countries, come and gather at this conference. You will share your expertise and knowledge, discuss recent research results, brainstorm ideas, and motivate others to promote and enhance scientific knowledge and competency in chemistry and related fields. It will contribute to our society's continual development because we can create more bonds, collaboration, and networking.

Finally, I thank and welcome all of you to this conference. I would like to express my gratitude and hope you will have a good atmosphere conference and fruitful meeting.

Thank you.

Wassalamualaikum Wr Wb
Mohamad Rafi
President of the Indonesian Chemical Society 2021

ICICS 2021 Agenda

1st Day (August 11st) Santika Hotel Mataram	
Time	Plenary Season (*s.id/ICICIS-PrimaryROOM)*
08.00-09.00	Open Room
09.00-09.45	Welcome Speech from **Chairman of ICICS 2021** **President of Indonesian Chemical Society** **Rector of University of Mataram**
09.45-10.10	**Dr. Sastia Prama Putri**
10.10-10.35	**Prof. Dr. Fabian Dayrit**
10.35-10.45	Q and A
10.45-10.55	Break
10.55-11.20	**Prof. Mohd Basyaruddin Abdul Rahman**
11.20-11.45	**Prof. Dr. Yuki Orikasa**
11.45-12.10	**Prof. Dr. Hadi Nur**
12.10-12.25	Q and A

Break							
Panel Season (20 minutes fot invited and 15 minutes for presenter)							
Time	Room 1 s.id/ICICS-ROOM1	Room 2 s.id/ICICS-ROOM2	Room 3 s.id/ICICS-ROOM3	Room 4 s.id/ICICS-ROOM4	Room 5 s.id/ICICS-ROOM5	Room 6 s.id/ICICS-ROOM6	Room 7 s.id/ICICS-ROOM7
13.30	Dr. Emmy Yuanita	Dr. Febri Odel Nitbani	Dr. Leny Yulianti	Dr. Saprizal Hadisaputra	Dr.Sc Lukman Hakim	Dr. Aliefman Hakim	Prof. Dr. Erin Ryantin Gunawan
	ABS-21	ABS-116	ABS-17	ABS-115	ABS-139	ABS-54	ABS-96
	ABS-23	ABS-120	ABS-91	ABS-124	ABS-144	ABS-114	ABS-156
	ABS-24	ABS-130	ABS-128	ABS-75	ABS-121	ABS-25	ABS-8
	ABS-1	ABS-102	ABS-154	ABS-62	ABS-125	ABS-37	ABS-9
	ABS-5	ABS-103	ABS-158	ABS-68	ABS-13	ABS-44	ABS-69
	ABS-6	ABS-106	ABS-136	ABS-27	ABS-92	ABS-63	ABS-72
	ABS-7	ABS-107	ABS-40	ABS-98	ABS-95		ABS-169
16.00	ABS-12	ABS-108					
Break							
16.30	ABS-29	ABS-118	ABS-53	ABS-84	ABS-143	ABS-122	ABS-26
	ABS-42	ABS-127	ABS-87	ABS-86	ABS-148	ABS-126	ABS-30
	ABS-45	ABS-131	ABS-99	ABS-90	ABS-149	ABS-129	ABS-31
	ABS-38	ABS-123	ABS-100	ABS-19	ABS-146	ABS-150	ABS-52
	ABS-51	ABS-43	ABS-111		ABS-152		ABS-77
18.00	ABS-65	ABS-157					
Closing Day 1							

ICICS 2021 Agenda

2nd Day (August 12nd 2021) Santika Hotel Mataram							
Time	Plenary Season (*s.id/ICICIS-PrimaryROOM)*						
08.00-08.45	Open Room						
08.45-09.10	**Prof. Dr. Is Fatimah**						
09.10-09.35	**Prof. Dr. Harno Dwi Pranowo**						
09.35-09.45	Q and A						
09.45-09.55	Break						
09.55-10.20	**Prof. Dr. Zeily Nurachman**						
10.20-10.45	**Dr. Mohammad Rafi**						
10.45-11.10	**Prof. Dr. Ucu Cahyana**						
11.10-11.25	Q and A						
Break							
Panel Season (15 minutes for presenter)							
Time	Room 1 s.id/ICICS-ROOM1	Room 2 s.id/ICICS-ROOM2	Room 3 s.id/ICICS-ROOM3	Room 4 s.id/ICICS-ROOM4	Room 5 s.id/ICICS-ROOM5	Room 6 s.id/ICICS-ROOM6	Room 7 s.id/ICICS-ROOM7
11.30-12.30	ABS-50	ABS-132	ABS-47	ABS-104	ABS-2	ABS-83	ABS-22
	ABS-56	ABS-134	ABS-49	ABS-105	ABS-10	ABS-85	ABS-110
	ABS-78	ABS-135	ABS-58	ABS-117	ABS-4	ABS-55	ABS-112
	ABS-79	ABS-166	ABS-59	ABS-119	ABS-16	ABS-57	ABS-165
Break							
13.30-16.00	ABS-67	ABS-140	ABS-20	ABS-80	ABS-153	ABS-64	ABS-11
	ABS-70	ABS-155	ABS-28	ABS-81	ABS-159	ABS-101	ABS-32
	ABS-71	ABS-160	ABS-60	ABS-94	ABS-147	ABS-137	ABS-36
	ABS-73	ABS-161	ABS-76	ABS-164	ABS-151	ABS-66	ABS-41
	ABS-74	ABS-163	ABS-18	ABS-35			ABS-48
	ABS-168	ABS-14	ABS-33				ABS-133
	ABS-167	ABS-15					ABS-138
Break							
Time	Plenary Season (*s.id/ICICIS-PrimaryROOM)*						
16.30-17.00	Closing Ceremony						
	Closing Remark from Chairman of ICICS 2021						
	Closing Remark from ICS President						
	Welcome to ICICS Kendari						
Closing Day 2							

CONTENTS

KEYNOTE SPEAKER

Do Medicinal Plants Have a Role Against COVID-19?

Fabian M. Dayrit, Ph.D.

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Vice-President, National Academy of Science & Technology Philippines
President, Integrated Chemists of the Philippines
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Abstract As COVID-19 continues to devastate the world, vaccines are being promoted as the only effective defense against this disease. However, the availability of vaccines has been highly uneven and it has been estimated that it may take until 2023-24 until the global vaccine target is attained. While vaccines will continue to be important in controlling this pandemic, complimentary approaches which are more accessible and affordable should be developed.
Various medicinal plants have been proposed for use against the SARS-CoV-2 virus based mainly on *in vitro* experiments and computer modeling studies against key viral proteins. While a number of natural product compounds have shown good potential in these studies, only a handful of medicinal plants have been proven to be effective in clinical studies.
A more comprehensive approach against COVID-19 utilizing medicinal plants is proposed. This strategy is divided into four parts: before infection, initial infection, immune response, and anti-inflammatory treatment. The first part – before infection – addresses the concern of comorbidities, such as diabetes, which is known to contribute to more serious cases of COVID-19. The second part – initial infection – refers to direct antiviral action. The third part – immune response – refers to how treatments can better prepare the immune system against this virus. This is the primary role of vaccines. The fourth part – anti-inflammatory treatment – refers to the mitigation of inflammation, including the cytokine storm and long COVID. This presentation will discuss the potential role that various medicinal plants may have in each of these four parts. Some relevant examples will be presented. However, clinical studies have to be performed to support such claims and standardization of the medicinal plant needs to be done. This approach may also be used against future pandemics.

Keywords: COVID-19; SARS-CoV-2; medicinal plants; natural products; comorbidities

Romancing the materials for encapsulation and nanodelivery of molecules

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Abstract Application of advanced materials as novel supporting matrix for molecules and biomolecules immobilisation has engendered incredible interest in the chemical and biotechnology communities. The main reason of immobilization is to ease enzyme-product separation and to allow enzyme recyclability, persistency of functional activity rather than to stabilize enzymes and proteins. In particular, the robust nanostructured forms, such as nanoparticles, nanofibers, nanotubes, nanoporous, and nanosheets, possess a high surface area to volume ratios that can cause a high enzyme loading and facilitate reaction kinetics, thus improving biocatalytic efficiency for industrial applications. Several natural (kaolin, mica, feldspar) and synthetic (layered double hydroxide, metal organic frameworks, zeolitic imidazolate frameworks) materials were modified and characterised for enzyme immobilisation are highlighted. The developed immobilised lipases were used in several bio-organic reactions especially esterification, from lab scale to commercial scale. Amongst esters produced, palm-based esters and sugar fatty acid esters showed high conversion upto 95%. Molecular simulation of enzyme immobilised and behave in metal organic frameworks may offer better understanding in design future reticular materials.
Lately, nanomaterials can also be used in targeted nanodelivery of therapeutics and diagnostics to diseased tissues. New and modified nanomaterials such as mesoporous silica, iron oxide nanoparticles, graphene, metal organic frameworks, zeolitic imidazolate frameworks were used to encapsulate drugs for pulmonary drug nanodelivery. Globally, lung cancer has become the most common type of cancer cases. Various anticancer drugs have been extensively investigated for its pharmacological effects on lung cancer. However, clinical applications of hydrophobic drugs are limited due to poor solubility and low stability in aqueous medium. In this work, several nanoemulsion and nanoparticles systems were formulated and further characterized physico-chemically and aerodynamically. Addition of functional groups attached to the nanomaterials may help to increase the percentage of drug load as well as produce a controllable drug release process. The selection of appropriate support materials with tailored properties are critical for anticipated application and future investigations should endeavour at adopting logistic and sensible entrapment techniques. These could provide new perspectives to the industrial sector.

Keywords: advanced materials; drug nanodelivery; enzymes; immobilization; inorganic supports

Reaction Mechanism of Lithium-ion Battery—From Interface to Battery Cell—

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Abstract Lithium-ion batteries are expected to become widely used for energy storage in electric vehicles and smart grid communities to realize the carbon-free society. Lithium-ion batteries have not only changed the way society behaves, but are also expected to contribute to sustaining the global environment in the future, earning the 2019 Nobel Prize in Chemistry. Present battery performance (cycle life, rate capability, energy density, safety and cost) is needed to be enhanced for the wide spreading in our energy storage. To improve their performance, understanding of the reaction hierarchies over wide temporal and spatial ranges is essential background knowledge. Because the reactions in lithium-ion batteries are complicated and proceed in a nonequilibrium state, the kinetic factors and degradation mechanisms that govern them are not yet fully characterized. The origin of the battery reaction is the charge transfer reaction at the electrode/electrolyte interface, where lithium ions and electrons react with each other and after which lithium ions are stored in active materials. As lithium ions are inserted or de-inserted, the crystal lattice in active materials is reconfigured. To achieve a more active reaction site and improve the storage capacity for practical use, composite electrodes consisting of active materials, carbon, and a binder are widely used. In practice, a battery pack is used as energy storage devices. For further improvement of battery performance, it is essential to characterize each elementary reaction mechanism and enhance these reactions. This presentation reviews *operando* measurements using synchrotron X-ray radiation that were developed to observe reaction phenomena directly in lithium-ion batteries under operating conditions.

Keywords: Lithium-ion battery, Electrochemistry, Inorganic chemistry, X-ray analysis

The use of a magnetic field in materials science: A structure-properties relationship of well-aligned titanium dioxide particles and polybenzimidazole membrane

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Abstract The demonstration of the structure-properties relationship in material science remains a challenge today. In the first example, the synthesis of well-aligned titanium dioxide with a very high length-to-diameter ratio was demonstrated using a sol-gel method under a magnetic field, with cetyltrimethylammonium bromide and liquid crystal as the structure-aligning agents. It has been shown that a well-aligned structure affected its photocatalytic properties. The second example demonstrated an alternative aligned polybenzimidazole microstructures fabrication strategy utilizing a relatively weak magnetic field via the solvent casting method. The anisotropic alignment is induced by the interaction of the π--electron-rich structure with the magnetic field. It was proven that the external magnetic field impacts the proton conductivity's augmentation, which is useful in various future generation applications.

Liquid chromatography combined with chemometrics for development quality control method of herbal medicines

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Abstract Quality control of herbal medicines is crucial if we want to have a standardized efficacy, safety, and quality of the herbal medicinal product. This is because the herbal medicine's raw material (medicinal plant) composition or concentration of active compounds is significantly varied due to many factors, such as the location of growth, harvest, postharvest method, adulteration with closely related plants, etc. Quality control of medicinal plants is more complex than that of synthetic drugs due to its chemical complexity. The development of the quality control method of the medicinal plant becomes a crucial task to ensure the efficacy, safety, and quality of the herbal product. Today, targeted metabolite (chemical marker) and untargeted metabolite (profiling or fingerprinting) in the metabolomics approach using liquid chromatography (thin layer chromatography, high-performance liquid chromatography) is often used in the development of quality control methods. A large amount of data will obtain from the metabolite profiling/fingerprinting analysis, so we need aid from chemometrics for data handling and modeling. In this presentation, we would like to describe our developed quality control method of herbal medicine raw material using liquid chromatography and chemometrics.

Keywords: chemometrics, herbal medicine, liquid chromatography, metabolomics, quality control

INVITED SPEAKER

XANTHONE AS THERAUPETIC AGENTS: IN SILICO AND IN VITRO APPROACH

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Abstract Xanthones are a class of heterocyclic compounds in which containing oxygen with dibenzo-g-pyrone as the basic skeleton. These compounds have been isolated from various natural resources such as higher plants, fungi, and lichens. The wide range of biological activities as therapeutic agents of xanthone compounds can be obtained by structural modification of the substituent on the xanthone rings through various reactions. In comparison, substituting the hydrogen atoms in xanthone compounds with various positions and the number of functional groups, such as halogen and hydroxy, would take enormous time and cost. Therefore, in silico approach through Quantitative Structure-Activity Relationship (QSAR) and molecular docking approach is performed widely. Moreover, in vitro approach use to confirm the synthesis compound.

Keywords: in silico, in vitro, xanthone, synthesis

Several Reaction Approaches in Monoglyceride Synthesis

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Abstract Monoglycerides are a type of surfactant and are derived from the group of lipid compounds. As part of lipid compounds, monoglycerides can be synthesized from vegetable oils and fats. Chemically, a monoglyceride has 2 hydroxyl groups and 1 acyl group from fatty acids that attached to a glycerol backbone. Some monoglycerides such as monolaurin, monomyristin and monocaprine have excellent anti-bacterial, anti-fungal and anti-viral properties with a broad spectrum of inhibition. Conventionally, monoglycerides are synthesized through the glycerolysis reaction of vegetable oils or animal fats at high temperature and pressure. The product has a dark color with an undesirable flavor, so it requires a fairly difficult purification process. Another disadvantages are that the reaction requires high energy and the inorganic base catalyst used will be discharged into the environment as waste. In this research, several attempts and reaction approaches will be reported to improve the conventional monoglyceride synthesis. The most promising reaction pathway is through the use of protected glycerol. A promising catalyst in monoglyceride synthesis is the lipase enzyme.

The 3-[(E)-(4-acetylphenyl)diazenyl]-4-hydroxybenzaldehyde as A Potential pH Sensor

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Abstract Azo compounds have been applied as chemosensors for cations, anions, and neutral molecules. As they can be synthesized with a reasonable yield and reaction time, azo compounds are attractive to be developed as sensor materials. In this work, an azo compound, namely the 3-[(E)-(4-acetylphenyl)diazenyl]-4-hydroxybenzaldehyde, was synthesized from the coupling reaction between the 4-hydroxybenzaldehyde and the diazonium salt from aminoacetophenone. The successful formation of the azo compound was supported by thin-layer chromatography (TLC), Fourier transform infrared (FTIR), and ultraviolet-visible (UV-vis) spectroscopies. The chemosensor ability of the azo compound was evaluated for various amine-based molecules, which were isobutylamine, triethylamine, ethylamine, and ammonia by monitoring the changes in the absorption spectrum with the changes of the target molecule concentrations. The results showed that the azo compound could detect the amine molecules as the linear plots between the absorbance and the molecule concentrations could be obtained. However, the changes in the absorbance with the concentration were not distinctly observed. Since the concentration of the amine molecules affected the solution pH, the correlation between the absorbance *ca*. 470 nm and the pH was then examined using all the amine molecules. The linear correlation was established, indicating that the azo compound was able to detect the pH changes. The examined pH range was between 4.43–10.98. This work showed the preliminary study on the potential ability of the 3-[(E)-(4-acetylphenyl)diazenyl]-4-hydroxybenzaldehyde as one of the pH chemosensors.

Keywords: 3-[(E)-(4-acetylphenyl)diazenyl]-4-hydroxybenzaldehyde, amine molecules, azo compound, pH sensor, UV-vis spectroscopy

Corrosion Inhibition Performance of 4-Hydrocoumarin Derivatives Against Copper: Insight from Density Functional Theory, Ab Initio and Monte Carlo Simulation Studies

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Abstract The corrosion inhibition performance of 4-hydrocoumarin derivatives has been studied using weight loss, electrochemical impedance spectroscopy, potentiodynamic polarization, and electrochemical frequency modulation techniques. However, experimental studies have not explained in detail why the OCH_3 group contributed maximally to the increase in corrosion inhibition compared to CH_3 and chlorine Cl. Density functional theory, *ab initio* and Monte Carlo simulations have been used to study the corrosion inhibition performance of 4 curcumin derivatives against copper. In this theoretical study, the electronic aspects of target corrosion inhibitors will be studied in more detail to help explain these problems. Inhibition performance is associated with quantum chemical parameters especially electronic properties to provide information about the tested molecules as corrosion inhibitors. The Monte Carlo simulation was used to see the dynamics and the mechanism of inhibition of the target molecule on the copper surface. Fukui function analysis is useful for finding the active site of the inhibitor molecule which is used for interaction with the Cu(111) surface. Quantum chemistry approaches can mimic the geometric parameters of molecules. It also explains electronically why OCH_3 is better than other substituents. The adsorption energy of the 4-hydroquinone derivative is linearly correlated with the results of the experimental study. The level of corrosion inhibition performance is $OCH_3 > CH_3 > H > Cl$.

Keywords: copper, corrosion, DFT, *ab initio*, Monte Carlo simulation, 4-hydrocoumarin derivatives

Molecular Insights into The Transport Properties of Ionic Liquid Electrolytes for Sodium-Ion Battery Development

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Abstract Sodium-ion battery is actively investigated for its potential in large-scale energy storage grid owing to its abundance, uniform distribution, low cost, and low environmental impacts. The requirement for a sodium-ion battery with a high-energy density and excellent charging−discharging performance then urges the exploration for an effective combination of electrolyte and electrode materials. Recently, ionic liquid (IL) has been actively explored for its advantages as an electrolyte, such as low volatility, low flammability, high electrical conductivity, high operation temperature, and the ease in tuning its properties through a simple structure modification. Given the vast combination of cationic and anionic species available for IL, a deep understanding on the ionic transport properties in this highly concentrated system is of paramount importance that will lead to a reasonable design for a high performance electrolyte. In this work, we devise a self-consistent combination of MD of DFT method to describe the charge transfer and polarization effects, while enabling the sampling of dynamics properties over hundreds of nanoseconds. We shows that sodium-ion contributions to the total electrical conductivity increases when the coexisting cationic species can compete to form a coordination with the anion; which then lead to an increase in the sodium-ion transference number. The contributions of individual and cooperative motions of each ion pair to the electrolyte's electrical conductivity are systematically investigated by incorporating a physically appealing pictures in the space domain. In the absence of solvent, a peculiar "background" effect that arise from the momentum conservation can be clarified by dissecting electrical conductivity into local and nonlocal terms. The extent of spatial localization of those contributions is examined by introducing a cut-off dependent electrical conductivity. The results show that the contribution from the cross-correlated motions of ion pairs in IL mixture extends beyond the first coordination shell with an oscillatory form that corresponds the layer structures in the IL mixtures. We further show the potential of screening various cations structure that can provide IL based electrolyte for sodium-ion battery with high electrical conductivity and high sodium transference number through machine learning with proper descriptors such as viscosity and sodium-ion binding energy.

Keywords: ionic liquids, sodium battery, ion transport, molecular dynamics, density functional theory

NATURAL PRODUCT CHEMISTRY LABORATORY TO PRODUCE THE ACTIVE COMPOUND

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Abstract Natural product chemistry laboratory can be directed to isolate secondary metabolite from a medicinal plant. This laboratory provided students with the essential skills required to perform the extraction, fractionation, purification, and structural elucidation of a secondary metabolites. Various activities in the isolation of secondary metabolites can improve students' higher-order thinking skills. In this article, the higher thinking ability is the students' critical thinking skills. The highest increase in critical thinking skills indicator is "deciding on an action (select criteria to judge possible solutions) indicators", while the lowest is "the making and judging value judgments (balancing, weighing, and deciding) indicators. Secondary metabolite compounds produced from natural product chemistry laboratory activities can be commercialized to researchers or the herbal medicine industry. University of Mataram has established a center for the production of secondary metabolites which originally came from the activities of the natural product chemistry laboratory. Many of the activities in this laboratory may be appropriate for other courses, such as structure elucidation of organic compounds, organic chemistry, and chemotaxonomy.

Keywords: Natural product chemistry laboratory, higher-order thinking skills, and secondary metabolites.

Epoxidation of Ketapang (*Terminalia catappa*) Kernel Oil; Syntesis And Characterization

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Abstract The epoxidation process of ketapang (*Terminalia catappa*) kernel oil has been carried out. Epoxidation results based on vegetable oils are very important for the polymer industry. Epoxy is a compound that can be applied as a plasticizer, stabilizer, lubricant, and as a raw material for polyols. Epoxy was synthesized using the epoxidation method by reacting ketapang kernel oil with formic acid, hydrogen peroxide and sulfuric acid as chemical catalyst. The epoxy was then characterized using its oxirane numbers, FTIR, GC-MS, and NMR. The percentage conversion of the oxirane number obtained was 78%. FTIR analysis showed typical epoxy absorption at 1239 cm^{-1} which was a C-O group and at 824 cm^{-1} which was a C-O-C bond. The GC-MS spectrum presented a signal at 13.4488 minutes showing one of epoxy forms. C-NMR analysis showed carbon signals at 57, 56 and 54 ppm indicating the presence of C-O bonds of the oxirane ring which was formed by the epoxidation of ketapang kernel oil.

Keywords: Ketapang kernel oil, epoxidation, chemical catalyst, oxirane numbers

ORAL PRESENTER

ABS-01: In vitro Alpha Amylase Inhibitory Activity of Microencapsulated *Cosmos caudatus* kunth Extracts

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Abstract The presence of bioactive compounds in *Cosmos caudatus* Kunth extracts, mainly phenolic compounds, presents several health benefits. Nevertheless, the bioactive compounds are usually susceptible to degradation by exposure to light, heat, oxygen, or by interaction with other compounds, which may limit its biological activity. The current study aims to performs microencapsulation *R Cosmos caudatus* Kunth extracts using chitosan cross-linked to Na-TPP as wall material by spray drying and to analyze their in vitro biological activities. The influence of manufacturing conditions, like stirring time and Na-TPP concentration was assessed. The optimum conditions were determined based on the activity of microcapsules as inhibitors for alpha amylase enzymes, indicating by the lowest value of IC_{50}. Results showed that microcapsules prepared in 90 min stirring time and 0.3% (w/v) of Na-TPP had optimum efficiency, with the IC_{50} value of 92.85 ± 1.21 µg/mL. Characterization with FTIR on microcapsules have shown that amine and phosphate functional groups appeared at wavenumbers 1180.50 and 1118.71 cm^{-1}. Characterization with SEM for ethanol extracts and microcapsules indicated that the extracts and the microcapsules are in microcapsules size, with the sizes of the extract were 3.42 µm - 8.81 µm, and the microcapsules were 6.75 µm-19.6 µm. The microcapsules morphology showed a rough surface with spherical forms.

Keywords: *Cosmos caudatus* Kunth, microencapsulation, alpha amylase, Na-TPP, stirring time

ABS-02: Application of Ionic Rectification for Water Purification: Desalination with a Nafion Cationic Diode

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Abstract. A proof-of-principle (prototype) device of desalination or salination process driven by AC-electricity has been developed based on asymmetrically deposited Nafion ionomer onto 100 microholes array as a cationic diode material combined with Fumasep FAS-130 as an anion conducting membrane. The prototype utilizes a 3D-printed four-chamber system with two internal chambers to extract and/accumulate the salt in order to demonstrate desalination or salination processes. The demonstration of desalination or salination processes have been shown in three operational modes (device configurations) for an aqueous 250 mM NaCl solution. It has been demonstrated the process of 50% desalination/salination using three operational modes in a prototype device. Due to the experimental restrictions such as (i) material resistivity lowering rectification effect, (ii) rectification ratio limitations for the 100 microholes array, and (iii) insufficient stability of ionomer membranes under AC-pulse-driven operation, the charge efficiency is estimated to be only 12% over 18 hours experiment time. However, this chapter describes the new technology for desalination/salination applications with some perspectives for the improvements in the future.

Keywords: ionic rectification, water desalination prototype, Nafion, desalination/salination process, cyclic voltammetry

ABS-03: A Technique for Preparing A Stable Dispersion of Microcrystalline Cellulose

Abstract Cellulosic materials have attracted great interests due to their performance in any range of their size (macro to nano). The poor dispersibility of microcrystalline cellulose in water appears as an issue, that could hinder its further applications. In this work, microcrystalline cellulose which has stable dispersed particle are successfully prepared by modifying the common technique (alkaline-NaOCl). The obtained results show the stable dispersed particle has wide range of microcrystalline particle size, which confirmed by the TEM images and the particle size distribution.

Keywords: Microcrystalline cellulose, stable dispersion, particle size

ABS-04: Zeolite from Rice Husk Ash – Corncob Ash Blend as An Alternative Adsorbent for Removal Cr (VI)

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Abstract The aim of this work is to synthesize and characterization of zeolite from rice husk ash and corncob ash blend as a raw material for removing Cr (VI) from wastewater. Zeolite was prepared with 3 ratio rice husk ash and corncob ash by hydrothermal method. Zeolite synthetic were ZS1 (40 mL Na-silicate from rice husk ash, 30 mL Na-silicate from corncob ash, and 30 mL Na-aluminate), ZS2 (30 mL Na-silicate from rice husk ash, 40 mL Na-silicate from corncob ash, and 30 mL Na-aluminate, and ZS3 (25 mL Na-silicate from rice husk ash, 50 mL Na-silicate from corncob ash, 25 mL Na-aluminate) Adsorption studies were performed in batch experiments. Adsorption characteristics of Cr (VI) were solution pH, amount of adsorbent, and contact time between adsorbent. The result showed that the three zeolites contain a mixture of compounds $Na_6[AlSiO_4]_6 \cdot 4H_2O$ (hydroxy sodalite) and $(Na_6(SiAl_6O_{24})(H_2O)_{7.92})((CH_2OH)_2)$. The adsorption performance of zeolite was obtained at pH 4, amount of zeolite 0.5 grams, and contact time 30 minutes with an adsorption efficiency above 98.11 %. The maximum adsorption capacity of ZS3 0.84 mg / g was obtained by the Langmuir adsorption isotherm. Research shows that the zeolite has a removal effect on Cr (VI).

Keywords: zeolite, rice husk, corncob, Cr (VI), removal

ABS-05: The Computational Design of the Spike Glycoprotein Gene siRNA of SARS-CoV-2

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Abstract The COVID-19 pandemic has no immediate ending in sight, and significant case increase was observed worldwide (Per May 2021). Although vaccine rollout has been pushed, and drug development is being devised, these efforts seem unable to halt the progression of the pandemic. Situation is getting worse in the world as compliance to the health protocol is getting loose. Although vaccine rollout is currently showing some hope, the area of drug and therapeutic development for COVID-19 is still pretty much experimental. Up to now, there are two main strategies for COVID-19 drug development that mainly catered the proteomics-based approach. They are the drug repurposing and herbal medicine ones. However, a third strategy exists, namely the siRNA development based on transcriptomics approach. siRNA works with silencing the pathogenic genes based upon the flow of genetic information paradigm. In the case of SARS-CoV-2 infection, it will work by silencing the viral gene. Thus, the gene of choice here is the surface glycoprotein (S) gene that is responsible for the attachment of the SARS-CoV-2 viral attachment to the ACE2 receptor on the human host cell. This is one of the most feasible choices as the strategy to deter the expression of the S gene before the occurrence of the viral attachment to the host cell. The siRNA was developed with a molecular simulation method that comprises data retrieval, multiple sequence alignment, phylogenetic tree depiction, 2D/3D structure prediction, and RNA-RNA molecular docking. The result was that the 2D and 3D structures of both siRNA and mRNA of the S gene could be predicted accordingly, and the docking method shows that the siRNA and mRNA of the gene could form a stable complex. In this end, the siRNA of the S gene could be considered as a candidate for the therapeutic agent of the COVID-19.

Keywords: COVID-19, SARS-CoV-2, siRNA, S gene, molecular docking

ABS-06: Anticancer Potential of Various Extracts of the Marine Sponge Halicondriidae sp from Kangean Island

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Abstract. Sponge Halichondriidae sp obtained from the Kangean Islands belongs to the demospongiae class which has a lot of potential in the field of drug development, especially to treat cancer. In this study, extraction of the Halichondriidae sponge with a variety of solvents n-hexane, EtOAc, n-BuOH, and MeOH. Each extract was tested for its anticancer activity including toxicity test against *A. salina*, antioxidant test against DPPH, and *in silico* molecular docking test against breast cancer receptors (3E6I), lung cancer (3PGH), pancreatic cancer (1OV3), and triggers oxidative (4AOS). The results of the toxicity test showed that the EtOAc extract gave the highest toxicity with an LC_{50} value of 103.36 mg/mL. The test results for the ability of radical scavenging against DPPH radicals show that methanolic extract provides the highest antioxidant activity with an IC_{50} value of 99.64 mg/mL. Based on the chromatogram and mass spectrum measurement results of LC-HRMS, it is known that the EtOAc extract contains alkaloid and phenolic compounds which are the model ligands tested in silico (molecular docking) against cancer receptors. The molecular docking results showed that naringin had the best inhibitory activity against the CYP2E1 receptor in the 3E6I receptor and the NADPH oxidase enzyme (1OV3). While the cyclo compound (glycyltryptophylprolylglycylvalylglycyl-β-hydroxytyrosyl) showed the best inhibitory activity against the receptor enzyme monooxygenase (4AOS) and the enzyme cyclooxygenase-2 (3PGH).

Keywords: Marine sponges, Anticancer, Halicondriidae.

ABS-07: Antibacterial Activity of Potassium Fatty Acids Salt from Virgin Olive Oil

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Abstract Potassium and sodium fatty acid salts as an alkali soap are a type of surfactant known to have potent antibacterial activity. Traditionally this material is prepared from triglyceride oil with potassium or sodium hydroxide through a saponification reaction. The research aims to synthesize potassium fatty acids salt (potassium soap, K-soap) from olive oil and examined the antibacterial activity. The synthesis of potassium soap is carried out through the saponification reaction of olive oil with potassium hydroxide. Antibacterial activity testing was carried out on *S. aureus* and *E. coli.* Properties of potassium soap synthesized is a yellowish-white solid, melting point 200-204 °C, soluble in water, methanol, and ethanol. This K-soap showed antibacterial activity with MIC $\leq$ 1%, whereas olive oil showed no antibacterial activity, and possess great potential as antibacterial agents.

Keywords: potassium fatty acid, olive oil saponification, antibacterial activity

ABS-08: The influence of oleic acid and benzoyl peroxide against graft copolymerization of oleic acid onto linear low-density polyethylene

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Abstract In this study, we report that graft copolymerization of oleic acid (OA) onto linear low density polyethylene (LLDPE) was successfully prepared by free radical reaction using a benzoyl peroxide (BPO) initiator in the molten phase. This aims of study was to determine the influence of OA monomer and BPO initiator againts the percentage of graft degree (GD) of LLDPE-g-OA and its characteristics. This research was carried out by mixing LLDPE, OA, and BPO into the internal mixer, and continued with purification process using acetone and methanol to separate from the unreacted OA and OA homopolymer. The results showed that the addition OA monomer of 12% and BPO initiator of 5% was obtained in the maximum percentage of GD among other various. The presence of a small band at 1707.1 cm^{-1} which is the OA carbonyl group indicates that OA has been grafted onto LLDPE. LLDPE-g-OA also produces thermal stability better than neat LLDPE, and a melting point temperature of 123 ^{0}C. A significant morphological changes and an increase in the mass percentage of elemental carbon also occurred after OA monomer grafted onto LLDPE.

Keywords: LLDPE, Oleic acid, Benzoyl peroxide, Graft copolymer, LLDPE-g-OA.

ABS-09: Synthesis and application of Adsorbent XAD-16-DPC chelating resin for solid phase extraction of copper and lead ions from river water by AAS.

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Abstract Today, Heavy metals are the incontrollable question of magnitude and of ecological significance due to their high toxicity and ability to accumulate in living organisms. This study is likely to assessing the pollution grade of Cikapundung River in Bandung city and extent to which river water is exposed to heavy metals hence, the safety levels for water users. The purpose of this research was to Synthesis and apply the Adsorbent XAD-16-DPC chelating resin to copper and lead containing solution and determine dissolved heavy metal (Cu and Pb) levels in water of Cikapundung River using laboratory instruments through pre-concentration of sample by solid phase extraction method, then analysis of heavy metals in water sample was carried out using flame atomic absorption spectrometry (FAAS).Solid phase extraction was used as method for pre-concentration of trace metal as it attains a high concentration factor and potentially interfering matrices may be removed. The clear route is based on the retention of the targeted analytes on a mixed chelating organic ligand, 1, 5- diphenyl carbazide (DPC) coupled with polystyrene-divinyl benzene a co-polymer Amberlite XAD-16 resin matrix placed inside cartridge column tube .The synthesized chelating resin was found to be successful as it can absorb Cu II and Pb II with a high percentage of recovery around 101,2079% for Pb (II) and 96% for Cu (II) and the reusability of resin is possible as RSD > 2%.Fourier transform infrared (FTIR) spectroscopy was used to describe the chelating resin and 2M Nitric acid was the best eluent. Moreover, water quality properties in terms of its physico-chemical parameters assessed were Temperature (24.67^0C), pH (7.66) of sample solution, Conductivity 259 ɱS/cm), Turbidity (130) and DO(3.80mg/L).

Keywords: AXAD-16-DPC, AAS, Cu II, Pb II, Cikapundung River.

ABS-10: Activated Carbon Composite from LDPE Plastic Waste with Magnetite Nanoparticles as Antibacterial Agent

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Abstract LDPE plastic waste is a type of plastic that cannot be degraded naturally, so a processing method is needed so that it does not cause pollution. In this research, LDPE plastic will be processed into activated carbon and then composited with magnetite nanoparticles using the coprecipitation method. The synthesized composites will be tested for their ability as gram-positive and gram-negative antibacterial agents. Activation of activated carbon is carried out chemically using phosphoric acid. FTIR results showed a peak at wave numbers 3614 cm^{-1} and 3145 cm^{-1} as a sign of a hydroxyl group, while the peaks at wave numbers 1188-1222 cm^{-1} and 1600-1700 cm^{-1} showed C-O and C = O groups. Composite characterization using XRD showed that the peaks on the diffractogram matched the peaks on the diffractogram of activated carbon and magnetite in the reference. Composites with a ratio of activated carbon to magnetite 3: 1 do not contain impurities. SEM test results showed that there was no magnetite agglomeration with an average particle diameter of 0.135 mm. Antibacterial test results showed that the composite can inhibit gram-positive and negative bacteria in the intermediate group.

Keywords: Plastic waste, activated carbon, magnetite, composite, antibacterial

ABS-11: Determination of Quality and Sensory Profile of Arabica and Robusta Coffee Originated From Semendo Indonesia

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Abstract The *Coffea arabica* (Arabica) and *Coffea canephora* (Robusta) are the most important coffee species which are traded in the world. The research was intended to study the different profile of bean and roasted Arabica and Robusta coffee originated from Semendo Indonesia. The green and roasted samples were analyzed by using FTIR in the region 4000- 400 cm-1. The color was investigated by using Konica Minolta Color Reader was expressed in L*, a*, and b* Commission Internationale de Eclairage scale parameters, and caffeine content by Gas Chromatography. The results showed that Arabica and Robusta coffee have similar spectra but different in absorbance. Spectral correlation with the library common materials in the region 3495-499 showed that the spectra of roasted Arabica and Robusta have spicy and herb flavor such as Coriander seed, Red pepper seed, Carrot seed, Cumin seed. The spectra of roasted Arabica match with the spectra of Q10, Vitamin A, Saw Palmetto, Robusta coffee have a match with the spectra of Hersey cocoa. They differed in color, volume and pH. The caffeine content of Robusta bean (2.10 %) was higher than that of Arabica (1.17%).

Keywords: Arabica, Robusta, profile, FTIR, Semendo Indonesia

ABS-12: Karakteristik Peptida Bioaktif Antikolesterol dari Hidrolisat Protein Kedelai Hasil Hidrolisis Bromelin

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Abstract Cholesterol with high levels in blood vessels can cause atherosclerosis, stroke, and sudden heart attack. Isolates soy protein have bioactive peptides that have the potential as anticholesterol. This research aims to determine the optimum conditions of hydrolysis and characterize bioactive peptides from soy protein isolate hydrolysates by the bromelain enzyme. Optimization of hydrolysis conducted using bromelain with conc. of 0,2%; and 0,5% (w/v) and variation in incubation time 0, 1, 2, 3, 4, 5 to 6 hours at 45, 50 and 55 °C. Protein hydrolysates analyzed the degree of hydrolysis (% DH) and tested anticholesterol activity test through HMG-CoA *reductase* inhibition test with pravastatin as a positive control. The profile of soy protein hydrolysate was analyzed with SDS-PAGE (*sodium dodecyl sulphate gel polyacrylamide*). The protein hydrolysate which has the highest anticholesterol activity was fractionated further using filtration gel chromatography (sephadex G-10). The resulting peptide fragments were characterized by molecular weights using LCMS/MS Q-TOF. The results showed the optimum conditions hydrolysis of isolate soy protein were obtained at 2 hours, temperature 45 °C with enzyme concentration 0,5% that is by DH value of 40,22%. The highest anticholesterol activity was obtained from the hydrolysate with percent inhibition value of 82,80% (7.371 ppm). SDS-PAGE analysis results show the appearance of bands under 10 KDa and the results of fractionation of bioactive peptide fragments has a molecular weight of 2779 and 2609 Da.

Keyword: anticholesterol, bromelain, bioactive peptides, isolate soy protein

ABS-13: Effects of LLDPE-g-MA on Mechanical Properties, Degradation Performance and Water Absorption of Thermoplastic Sago Starch Blends

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Abstract The addition of LLDPE-g-MA on the mechanical properties, morphology, performance of degradation and water absorption in thermoplastic Sago starch has been in observation. Thermoplastics Sago Starch (TPSS) was made with the mixture of Sago Starch and Glycerol. Compatibilizer (LLDPE-g-MA) was made by reacting LLDPE and Maleate Anhydride with additional initiator of Benzoyl Peroxide. Concentration of PE-g-MA was varied. Substances were mixed into internal mixer with Haake Polydrive Thermo Brand. Result of Tensile test, Elongation at break,Young's Modulus showing that the occurrence of a maximal peak at a concentration of LLDPE-g-MA. The morphology of sampling surface, with the occurred reaction of adhesion interface or dispersion of LLDPE toward the whole surface with the assistance of compatibilizer as connecting substance between hydrophilic and hydrophobic polymer, which could improve the properties of mechanical and surface area. The formed of Ester groups from the reaction of inter groups of hydroxyl derived from the starch with the groups of anhydride derived from the mixture of compatibilizer. The water absorption and degradation test showed that the sample can be degradated in those three conditions.

KeywordS: Bioplastic, Comptibilizer, Coupling Agent, LLDPE-g-MA, Thermoplastic

ABS-14: Differential Pulse Voltammetry at Glassy Carbon Electrode for Detection of Thiamine at neutral pH

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Abstract Quantitative detection of thiamine has been widely carried out by voltammetry technique in an alkaline solution. In this study, a thiamine detection method was developed in a neutral solution using a differential pulse voltammetry (DPV) technique on a glassy carbon electrode. The optimum conditions for thiamine detection are determined by varying several parameters, including potential pre-treatment, the period of pre-treatment, potential step, and potential pulse. The results showed that the thiamine oxidation peak was detected at a potential of 0.03 V vs Ag / AgCl. The optimum conditions for thiamine detection in a neutral solution using the DPV method were obtained at a potential pre-treatment of -1700 mV vs Ag / AgCl, pre-treatment period of 10 s, a potential step of 25 mV, and a potential pulse of 200 mV. The developed thiamine detection method was provided an acceptable analytical performance including linearity (R2) of 0.9809 in the linear range of 0.6 mM to 1.6 mM, the detection limit of 5.14×10-4 M, the quantitation limit of 1.71×10-3 M, and the precision (% RSD) of 4.4573%. The developed thiamine detection method using the DPV technique is a potential method for the routine analysis of thiamine.

Keyword: detection, differential pulse voltammetry, neutral solutions, thiamine

ABS-15: ACE Inhibitor In-Vitro Activity's Protein Extract of Bambara nut Tempe (Vigna subterranea L)

Abstract Bambara nut (Vigna subterranean L) was one of plant-base protein and bioactive compound source that has good effect for heatlh of heart and blood vessel. The research aims to produce bambara nut tempe, determine the Angiotensin Converting Enzyme (ACE) inhibition activity of its protein extract so it is considered as antihypertensive functional food. Bambara nut is fermented using Rhizopus sp., with variation time 0, 6, 12, 18, 24, 30, 36, 42, and 48 hours. The optimum time determined by degree of hydrolysis and proximate content of the seed and tempe were analyzed. Isoelectric precipitation method was used for protein extraction. Activity of ACE inhibition was determined. The result of this research shows that the optimum condition tempe is tempe with fermentation time 30 hours with degree of hydrolysis value is 93.84%. Tempe which was fermented for 24 hours has ACE inhibition value 90% which is the most optimum one with 77,84 ppm for IC50 with molecular weight of protein is 53 kDa. Moisture, ash, protein, lipid and carbohydrate content of Bambara nut tempe are 35,68; 4,08; 17,80; 6,48; and 35,93% for each parameter. Bambara nut tempe's proximates qualify the SNI 3144-2015 qualifications for tempe. Fermentation increases amount of low molecular weight protein based on SDS-PAGE result.

Keywords: ACE Inhibitor, bambara nut, fermentation, protein, tempe

ABS-16: Rapid Determination of Strontium-90 in Water Sample as Environmental Radiation Monitoring of Nuclear Facilities at Indonesia Using Extraction Chromatography Methods

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Abstract. Environmental radiation monitoring is needed to ensure public safety and security. Environmental Radiation Monitoring in Indonesia aims to determine the ambient concentrations of radioactive substances and monitor radioactive substances in Indonesia or come from outside Indonesia, such as the Fukushima accident or nuclear experiments/CTBT events from other countries. Strontium-90 (^{90}Sr) is a nuclear fission product with a pure beta-emitting radionuclide with a half-life of 28.8 years and commonly found from reactor operation, radioactive waste disposal, radioactive dust fall nuclear and detonation experiments. Strontium-90 can pollute groundwater because the deposition occurs both on land and waters. Strontium-90 is chemically similar to calcium and deposits in bone and blood-forming tissue (bone marrow). This allows radiostrontium to enter the human body through the food chain, especially through water consumption. Water is a major constituent of the human diet and is an important indicator of the transfer of radionuclides from the environment to humans. Recently, Indonesia has three nuclear reactors and plans to build a Nuclear Power plant (NPP) in West Kalimantan. Indonesia has conducted radiation monitoring, especially for ^{90}Sr using conventional separation methods, but this has disadvantages regarding analysis time which requires a long time. Therefore, the rapid method of ^{90}Sr determination is essential. This is in line with the Indonesian government plan to prepare the construction of an NPP in Indonesia, were required the contamination of Sr-90 in water samples must be monitored regularly. The development of this method uses the extraction chromatography method combine with Alpha Spectrometry or Liquid Scintillation Counter (LSC). The resin used in this process from Eichrom, such as a crown-ether resin (Sr), and DGA has shortened the analysis time to be faster, with chemical recovery varies between 85-92%.

Keywords: radiochemistry, ^{90}Sr, extraction chromatography, crown-ether

ABS-17: Adsorption of Amoxicillin on Persimmon Tannin Gel in Aqueous Solution: Equilibrium and Kinetics Studies

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Abstract Amoxicillin concentration exceeding threshold amount effluents negatively impacts the environment; thus, pretreatment is needed. Adsorption is an efficient process to remove contaminants. In this work, we employed persimmon tannin gel to adsorb amoxicillin by batch method. The study aimed to know the adsorption equilibrium and adsorption kinetics. The equilibrium and kinetics of amoxicillin adsorption were investigated by varying contact time, pH, and amoxicillin concentration. The equilibrium data were analyzed using Freundlich and Langmuir isotherm models. Adsorption kinetics were investigated by using both pseudo-first and pseudo-second orders. Results showed that optimum adsorption was attained after 30 minutes of contact time and a pH of 7. Variation of concentration showed the adsorption tended to increase as amoxicillin concentration increase. The maximum adsorption capacity was 66,67 mg/g. The adsorption equilibrium amoxicillin on persimmon tannin gel tends to follow the Freundlich model. The adsorption kinetics agreed to the pseudo-second-order.

Keywords: adsorption, amoxicillin, persimmon tannin gel

ABS-18: Effect of Reaction Time and Stability Properties on Biofabrication of Silver Nanoparticles by Using Aqueous leaf Extract of Rhizophora Stylosa

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Abstract

In this study, Silver nanoparticles (SNP) were synthesized by using leaf aqueous extract of mangrove Rhizophora Stylosa. Effect of reaction time on rate of reduction, stability of colloidal SNP and size of particles were investigated. The formation of colloid nanoparticles is visually indicated by the formation of a yellowish to dark brown color. Reduction process of SNP were monitoring with UV-vis Spectrophotometer Absorbance values were found at wavelength 422-453 nm SPR wavelength and maximum absorbance of reaction reached after 30-minute until 1 hour indicating complete reduction and formation of SNP and included in rapid green syntesis. PSA (Particle Size Analizer) analysis shows that the hydrodynamic size (DLS) is monodispersion with an average 89-125 nm were formed during SNP synthesis reaction. Synthesis of SNP wiht zeta potential value -24.9 and -27.7 nm indicated of SNP good stability within 1 month. Polidispersion indexs showed a value of 0.37 and 0.33 showed a narrow dispersion of particles.

Keywords: Silver nanoaprticles, *Rhizophora stylosa*, mangrove, reaction time

ABS-19: Uric Acid Detection Based on Arrowroot Starch Membrane and Carbon Modified Electrode

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Abstract Electrode was modified using arrowroot starch membrane and carbon for uric acid detection. Arrowroot starch membrane consist of arrowroot starch crosslinked with sodium tripolyphosphate. Polyvinyl alcohol and uric acid was added to the membrane. Dry membrane was mixed with carbon (1:1) and an organic solvent. The mixture was coated in the surface of the electrode. Modified electrode was used to determine uric acid using differential pulse voltammetry. The performance of electrode was affected by the supporting electrolyte used as solvent of uric acid. Modified electrode worked very well in acetate buffer pH 5 and 1 M KCl. Under optimal condition, pencil graphite modified electrode was compared with screen printed carbon electrode modified with arrowroot starch membrane and carbon. Determination of uric acid using pencil graphite modified electrode have linier concentration, limit detection, and sensitivity, respectively, at 100-500 µM, 38 µM, and 0.0453 A/M. While the linier concentration, limit detection, and sensitivity of screen printed carbon electrode modified arrowroot starch membrane and carbon are 75-300 µM, 32 µM, and 0.0954 A/M. Screen printed carbon electrode modified by arrowroot starch membrane and carbon was applied for uric acid determination in human serum sample using calibration curve method. The recovery obtained was 82-114%.

Keywords: Arrowroot starch, modified electrode, uric acid, voltammetry

ABS-20: Synthesis of Composite Electrodes TiO_2/Ti Doped Selenium (Se-TiO_2/Ti) to Degrade Dyes Reactive Green 19

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Abstract The synthesis of TiO_2/Ti and Selenium (Se-TiO_2/Ti) doped TiO_2/Ti composite electrodes has been successfully prepared. Electrode of TiO_2/Ti was synthesized from Ti plates by the anodizing method to grow TiO_2 on the Ti surface, while Se-TiO_2/Ti composite electrode was synthesized by sol-gel and dip-coating methods. The results of characterization with XRD showed that the TiO_2/Ti electrodes produced was in the form of anatase crystals. UV-DRS data shows that TiO_2/Ti and Se-TiO_2/Ti have band-gaps of 3.2 eV and 2.9 eV, respectively. The LSV (Liner Sweep Voltammetry) results showed that TiO_2/Ti was active in the UV wavelength region while the Se-TiO_2/Ti composite was visible. FTIR results showed absorption at wavenumbers 1058 cm^{-1} and 447 cm^{-1}, respectively, indicating Ti-O and Se-O functional groups. The electrodes' surface morphology showed the presence of crystals (Se element) scattered on the surface of the electrodes, and the EDX (Energy Dispersive X-ray) results showed the presence of selenium by 0.80%. Photoelectrocatalytic degradation test of reactive green 19 compounds using Se-TiO_2/Ti electrodes under ultraviolet (UV) and visible (Vis) rays showed the maximum performance at a concentration of 0.5 ppm was 91.43% and 97.14%, respectively.

Keywords: Synthesis, Selenium, Electrodes, Anodizing, dip-coating

ABS-21: Antimalarial Activity of *Cymbopogon nardus* L. Plants in Oenenu Village as Mosquito *Repellent* Agent

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Abstract Infectious and parasitic diseases are among the most common diseases. Based on data from the World Health Organization (WHO) in 2011, infectious and parasitic diseases are the third largest cause of death in the world. One of the plants that have the potential as an antimalarial in the *Cymbopogon nardus* L. (citronella) plant. The local people of the Dawan tribe use this plant as an alternative to mosquito repellent. Research on the extraction by distillation of citronella (*Cymbopogon nardus* L.) as a mosquito repellant agent and its activity as an antimalarial in vitro on parasitic cells P. falciparum strain 3D and statistically analyzed with probit analysis program SPSS version 20 to determine the IC50 value or concentration test material that can inhibit the growth of parasites by as much as 50%. This research was conducted in several stages, namely sample preparation, sample distillation and test the bioactivity of the compound as an antimalarial. The results of this study reported that the compounds contained in lemongrass oil have antimalarial activity with an IC value of 10.608 µg / ml. The average inhibition yield at a dose of 100 µg / mL was 62.94%, 10 µg / ml was 47.49%, 1 µg / ml was 39.16%, 0.1 µg / ml was 25.45%, 0.01 µg / ml was 12.58%.

Keywords: *Cymbopogon nardus* L.; Distillation; Antimalarial activity

ABS-22: Comparative Study of Water Volume and Distillation Duration on Cananga Essential Oil Profiles Resulted from Hydrodistillation and Steam-Water Distillation Methods

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Abstract This research is aimed to investigate the effect of volume of water and duration on two kind of distillation methods: hydrodistillation and steam-water distillation. Essential oil profiles including volatile compounds content, refraction indexes, and essential oil yields, were subjected to be investigated. The essential oils were obtained from the flowers of Cananga odorata distilled in a modified kettle which can be set as a steamer pot or just as a common pan/boiler using cohobation method. Both of distillation methods resulted in different yield and component trending of cananga oils. The volume of water was varied into three conditions (15; 20; 25 L) on both of distillation methods in order to optimize distillation since water was required to extract essential oils continuously in cohobation scheme. Two hour hydrodistillation of 2 kg of cananga flowers resulted in an optimum cananga oil yield on the use of 25 L of water (0.411 %), while steam-water distillation did not show any significant influence on the variation of the water amount in the kettle (0.289-0.383%). The effect of duration of distillation on the cananga oil's profiles has also been investigated. Both distillation processes required seven hour distillation to obtain cananga oil more than 0.05%. In fact, both distillation trends showed a similar curve, which represents an increase of essential oil production in the beginning of distillation up to three hour processes which then decline gradually in the next hour into last seven hour distillation. Volatile components of cananga oils obtained from both of distillation methods also showed a similar content including geranyl acetate, trans-caryophyllene, a-humulene, a-farnesene, benzyl benzoate, and germacrene-D, except linalool which only contains in cananga oil from steam-water distillation. However, all cananga oil products from both distillation methods have met the quality standard requirement for SNI 06-3949-1005 in terms of refractive index value, colour and odor.

Keywords: Cananga oil, hydrodistillation, steam-water distillation

ABS-23: ACUTE AND SUB CHRONIC TOXICITY OF STANDARIZED HERBAL EXTRACT OF *INOCARPUS FAGIFERUS* FOSB AGAINST WISTAR RAT HYPERCHOLESTEROLEMIC

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Abstract This study was to determine the acute and sub chronic toxicity of standardized herbal extract of Inocarpus fagiferus Fosb seeds. Acute toxicity test conducted to mouse to obtain lethal dose while sub chronic toxicity against Wistar rat hypercholesterolemic at liver and renal organs using to histochemical method. Sub chronic toxicity tests were performed on 5 treatment groups i.e., control groups (P_0 and P_1), and treatment groups as like P_2 (high cholesterol diet and 50 mg/kg BW extract), P_3 (high cholesterol diet and 100 mg/kg BW extract), and P_4 (high cholesterol diet and 150 mg/ kg BW extract) with monitoring degeneration necrosis cells liver and renal. After the study all of the rats were euthanized to obtain liver and renal organs for histochemical to be analyzed to obtain data expression degeneration necrosis cell.
The results showed that Lethal Dose (LD50) standardized herbal extract of Gayam seeds was 75.538.4 mg/kg BW of Wistar rats, which means that it is not toxic. The sub chronic toxicity test concluded that the standardized herbal extract of Gayam seeds at a dose of 50 mg / kg BW did not have a toxic effect on liver and kidney cells as indicated by the microscopic expression of degeneration of liver cell necrosis of hypercholesterolemic Wistar rats.

Keywords: Inocarpus fagiferus Fosb, toxicity, lethal dose, histochemical

ABS-24: Angiotensin-Converting Enzyme Inhibitors from *Abelmoschus manihot* (L.) Medik Leaves: a Molecular Docking Study

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Abstract Indonesian herbal medicines are the source of many biological activities, therefore crucial to be developed. Red Gedi (*Abelmoschus manihot* (L.) Medik) leaves are commonly used by North Sulawesi people to treat hypertension. Angiotensin-Converting Enzyme (ACE) inhibitors are the commonly used drug to treat hypertension. This study aims to predict the inhibitory activity of bioactive compounds from Red Gedi leaf extract against ACE using the molecular docking method. Extraction was carried out using ethanol solvent and then further identified using Gas Chromatography-Mass Spectrometer (GC-MS). Interaction of bioactive compounds against ACE was evaluated using PyRx and validated using Autodock Vina with captopril as a comparison. The results showed that there were 37 possible compounds in the ethanol extract of Red Gedi leaves which 3 of them were potential as ACE inhibitors with binding affinity values of -10.9 kcal/mol, -9.8 kcal/mol, and -8.8 kcal/mol and better compared to captopril which had a binding affinity of -5.7 kcal/mol. This study predicted that the Spirost-8-en-11-one, 3-hydroxy, (3ß, 5a, 14ß, 20ß, 22ß, 25R) had the best inhibitory activity. The three bioactive compounds from ethanol extracts of *Abelmoschus manihot* L. Medik can be developed as anti-hypertensive drugs with activity as Angiotensin Converting Enzyme (ACE) inhibitors.

Keywords: *Abelmoschus manihot* (L.) Medik, ACE, Molecular Docking

ABS-25: STUDY ACTIVITY OF MORDENITE BASED Fe, Co, Ni, Cu, Zn CATALYST ON THE REACTION OF GREEN DIESEL PRODUCTION

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Abstract This study aims to see the activity and selectivity of Fe, Co, Ni, Cu, Zn metals with a control in the green diesel production process as well as the character indicators of the catalyst after use. Green diesel is produced by the reaction of HDO (hydrodeoxygenation) and DO (deoxygenation) from oleic acid compounds with the help of a catalyst at 350 ° C using H2 gas with a flow rate of 15mL / minute. HDO (hydrodeoxygenation) and deoxygenation (DO) reactions require a catalyst so that the reaction can run quickly and effectively and obtain optimal results. Fe, Co, Ni, Cu, Zn metals are active for hydrodeoxygenation and deoxygenation reactions because they have a large surface area for binding to H2, have acid-base active sites that improve catalytic performance, have a high acid surface area so that they can effectively catalyze reactions and have a high acid-base ratio. Low B / L which can reduce coke orders. The conversion results obtained from Fe / MOR metal catalyst was 80.07%, Co / MOR was 81.77%, Ni / MOR was 82.83%, Cu / MOR was 81.50%, Zn / MOR was 79.40 %. The results of this study indicate that the metal catalysts of Fe, Co, Ni, Cu, Zn have the ability to measure oleic acid into green diesel products, namely straight chain alkane hydrocarbons in the type of diesel that is free of oxygen compounds.

Key Words: green diesel, catalyst, transition metals, hydrodeoxygenation, deoxygenation and hydrocarbon

ABS-26: Hydrodeoxygenation of Crude Palm Oil Into Bio gasoline With Composite Catalyst Bentonite Cobalt Nitride

Abstract The catalyst was synthesized using natural Bentonite which was modified using cobalt nitride metal with five variations, namely 2, 4, 6, 8 and 10 mEq / g. Bentonite modification is carried out by means of screening which aims to increase the catalytic activity as well as the physical and chemical properties of the catalyst. Bentonite-CoN catalyst is applied in the manufacture of bio gasoline using CPO as raw material. The best catalyst is the catalyst that produces the highest gasoline product seen from the area in the GC-MS analysis, then the best catalyst is characterized using acidity value analysis, XRD, FTIR and SEM-EDS. The initial stage of screening the bentonite was carried out with Na-Bentonite preparation, to open the bentonite layer the success of the preparation was determined by comparing the CEC (Cation Exchange Capacity) value of natural bentonite and Na-bentonite. The CEC value of Na-bentonite showed a higher yield of 279.15, while the CEC value of natural bentonite was 165.85. The greater the CEC value, the greater the distance between the exposed bentonite layers, indicated by the swelling property. XRD results showed that the pilarization process was successful because of a 2θ angle shift from 19.75° to 20.12°. FTIR spectra show the presence of a Co=O group at wave number 984 cm^{-1}. SEM-EDS results showed changes in morphology and elemental composition. The morphology of Bentonite-CoN has larger particles, whereas in Na-bentonite the structure is multilayered. The presence of Co and N elements detected by EDS further confirms that the pilarization was successful. The best catalyst in this study was Bentonite-CoN 6 mEq / g because it has high catalytic activity so that it can produce the most biogasoline products, which is 21.55%.

Keyword : Bentonite-CoN catalyst, CPO, Hydrodeoxygenation, Biogasoline.

ABS-27: Synthesis of Zinc Oxide Nanoparticle as Anticorrosive of Steel Metal

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Abstract Anticorrosive paint is a material that is applied as a coating metal of iron or steel to avoid cause corrosion or rust. The addition of ZnO nanoparticle in paint functioned as a protective coating of the hulls of ships from corrosion. The ZnO nanoparticle was prepared by reaction of Zn(CH3COO)2.2H2O with CTAB surfactant and NaOH. The composition of paint as a coating material was ZnO nanoparticles powder, epoxy, thinner, pigment, and solvent. ZnO nanoparticle powder was characterized by XRD and the performance of ZnO nanoparticles coatings on corrosion was evaluated by linear sweep polarization. The first layer scheme produces the lowest corrosion current. The size of ZnO nanoparticle obtained was 23.29 nm. A thermodynamic study of corrosion of ZnO nanoparticles produced Gibbs energy at transition state (ΔG*) of 74.13 kJ mol-1 at 303 K. The kinetics study obtained activation energy (Ea) of ZnO nanoparticle was higher than the blank. Based on these studies, ZnO nanoparticles showed to be potential material anti-corrosion.

Keywords: activation energy, anticorrosive, CTAB, thermodynamic, ZnO nanoparticle

ABS-28: Optimization of Remediation of Sodium Dodecyl Sulfate (SDS) Detergent Waste Using Local Bacterial Isolates and Activated Charcoal

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Abstract The quality of river water in Indonesia in recent years has been mostly polluted, especially after passing through agricultural, industrial and residential areas. One of the wastes that pollutes river water in residential areas is soap made from the washing process. The detergent contents is Sodium dodecyl sulfate (SDS). The use of SDS (anionic surfactant) will produce waste, which in large concentrations can disrupt ecosystems such as foam. This study aims to determine microbial biodegradation, adsorption capacity of activated charcoal, combining bacteria and activated charcoal to determine the reduction in levels of sodium dodecyl sulfate (SDS) in laundry waste. The research stages included a test of waste treatment, using (1) microorganisms; (2) activated charcoal; (3) microorganisms and activated charcoal. Waste biodegradation using bacterial isolate local was able to reduce SDS levels up to 71.76% for 48 hours at room temperature. Detergent waste adsorption using activated charcoal fulfills the Freundlich isotherm with an adsorption capacity of 0.38 $mg.g^{-1}$, the thermodynamic parameter for SDS is 2.40 $kJ.mol^{-1}$ and is able to reduce SDS levels by 60.50% for 5 hours at temperature. room. The combination of the biodegradation method (48 hours, room temperature) and adsorption (6 hours, room temperature), can reduce SDS levels by 96.20%.

Keywords: Bacteria, Activated Charcoal, Biodegradation, Adsorption, Sodium Dodecyl Sulfate

ABS-29: Isolation of Cinnamaldehydes from Cinnamon Bark Oil (*Cinnamomum burmanii*) and Synthesis of Its Derivative Compound: 2-Hydroxycinnamaldehyde

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Abstract Cinnamaldehyde is the main compound from *Cinnamomum burmanii* and has various benefits in medical fields. This study was initiated by purifying Cinnamaldehyde from Cinnamon bark oil with the salting method using sodium bisulfite. Through the semisynthetic approach, Cinnamaldehyde converted into 2-hydroxycinamaldehyde, which has been shown to have good anticancer activity. In contrast to its activity, the synthesis of 2-hydroxycinnamaldehyde from pure Cinnamaldehyde has not been studied before. In this research, the synthesis design was carried out through 3 reaction steps, including Nitration using nitric acid-acetic acid anhydrous, Reduction in mild condition using NH_4Cl-Fe, and Diazotation-Hydrolysis using $NaNO_2$-HCl. Optimization of the synthesis evaluated to get the best method according to yield and characterized using TLC, GC-MS, UV/Vis, and FTIR spectrophotometry. The isolated Cinnamaldehyde has a purity of up to 100% with a yield of about 36%. The product of 2-Nitrosinamaldehyde from nitration was analyzed with ethanol and n-hexane (1:1) Rf =0,84 and show high purity with 26% yield of product. The reduction product 2-aminocinnamaldehyde (Rf=0,48) and 2-hydroxycinamaldehyde (Rf=0,38) as a product from diazotation-hydrolysis obtained in moderate yield.

Keywords: Cinnamaldehyde, 2-hydroxycinnamaldehyde, Nitration, Reduction, Hydrolysis

ABS-30: Method Development of Aluminium (III) Determination in Antacid Drugs by Microfluidic Paper-based Analytical Device (µPAD) Using Sappan Wood Extract (*Caesalpinia sappan Linn*)

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Abstract The aim of this research is to develop an easy, simple, and cheap method to determine the aluminium content in antacid drugs by Microfluidic Paper-based Analytical Device (□PAD) with natural reagent from the heartwood of *Caesalpina sappan Linn* extract. The principle of this method is based on the measured change in color intensity of the red complex formed between aluminium and brazilein from the heartwood of *Caesalpina sappan Linn* extract on the □PAD. The operational and chemical optimizations were carried out to determine the optimum conditions including sample volume, reagent concentration, and reaction time. The optimum condition obtained are 10 □L for sample volume, 1.6 % (w/v) for reagent concentration, and 10 minutes for reaction time. Under the optimum conditions, a good linearity was found at aluminium concentrations of 10 – 50 ppm (R^2 = 0.9703).

Keywords: aluminium, □PAD, *Caesalpina sappan Linn*, antacid drug

ABS-31: Development of Methods for Monitoring Total Ammonia Content in Fishery Water Using Natural Reagents Based on a Membrane Less-Gas Separation Microfluidic Paper-based Analytical Device (ML-GS µPAD)

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Abstract. This study aims to develop a method for monitoring ammonia levels in fishery water using a Membrane-Less Gas Separation Microfluidic Paper-based Analytical Device (ML-GS µPAD) technique. Ammonia was determined based on the color change of natural acid-base indicators of red rose flower extract in the presence of ammonia. The ML-GS µPAD system was consisted of three layers, namely the donor, spacer, and acceptor layers. The principle of the analysis involved the addition of sodium hydroxide solution to the sample containing ammonia/ammonium in the donor layer, and the produced NH_3 gas diffuses through the spacer to the acceptor layer containing the red rose extract to produce a color change from pink to greenish-blue according to the ammonia/ammonium concentration. The operational and chemical conditions were optimized to achieve sensitivity, selectivity, and validity of the method. Under the obtained optimum conditions, reaction time of 90 seconds and the concentration of red rose extract of 15%, the ML-GS µPAD provided good linearity of ammonia in the range concentrations of 0-100 ppm (R^2 = 0,9993) with good sensitivity shown from the LOD and LOQ values of 7.77 ppm and 16.75 ppm. The development of methods for monitoring ammonia levels was successfully applied to fishery water samples with good results, without significant influence of interfering ions present in samples at the limits of NO_2^- < 100 ppm, SO_4^{2-} ≥ 100 ppm, and CO_3^{2-} < 100 ppm.

Keywords: ammonia, ML-GS µPAD, red rose, fishery water

ABS-32: Development of the GD-µPAD (Gas Diffusion Microfluidic Paper-Based Analytical Device) To Measure Total Ammonia in Saliva Using Secang Wood Extract (*Caesalpinia Sappan L.*)

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Abstract This study aims to develop a method for analyzing total ammonia levels in saliva-based on Gas Diffusion Paper-based Microfluidic Analysis (GD-µPAD). The total amount of ammonia in saliva can be an indicator of the oral microbiome status potentially correlates with gastric cancer problems, periodontal disease or to assess caries risk. The developed GD-µPAD contained 6 unit of detections, where each unit consisting of three rounded stack layers: sample layer (paper layer impregnated with sodium hydroxide solution), hydrophobic PTFE membrane layer for gas separation, and detection layer (paper layer impregnated with *Caesalpinia sappan L* extract). The six units were aligned on a transparent laminated film bag with hot lamination. The analysis process involved converting ammonium to ammonia gas in the sample layer, which then diffuses the ammonia gas through the gas permeable PTFE membrane to the detection layer, resulting in a color change in the natural acid-base indicator of *Caesalpinia sappan L* extract from yellow to purplish red due to changes in pH in the presence of ammonia. The colors formed on the detection layer were processed using ImageJ software to determine the RGB intensity. Operational and chemical conditions were optimized to achieve sensitivity and to test the selectivity and validity of the method. Optimum conditions were achieved under reaction time of 5 minutes, concentration of NaOH of 1 M, and concentration of the extract of 1 % w / v. The GD-µPAD method provided good linearity at the total ammonia concentration of 0-40 ppm (R^2 = 0.9902) with LOD and LOQ values of 3.06 ppm and 10.72 ppm. The development of the GD-µPAD method for the determination of ammonia levels in saliva was not affected by the presence of potassium and calcium interfering ions. Determination of total ammonia in saliva using the developed GD-µPAD is intended to be a very simple and affordable method which operated without the need of laboratory equipment.

Keywords: Ammonia, GD-µPAD, *Caesalpinia sappan*, Saliva

ABS-33: Optimization of the Performance of Carboxymethyl Cellulose (CMC) Membrane-based Biosensor Electrodes on Platinum Wire for Carbaryl Pesticide Analysis

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Abstract The biosensor analyses various pesticide residues with a membrane supporting the Acetylcholinesterase (AChE) enzyme immobilization on the electrodes. This biosensor design obtains the level of biosensor optimization by performing performance tests that include % inhibition, working concentration range, Nernst factor (sensitivity), the limit of detection (LoD), and response time in analyzing carbaryl pesticides. The biosensor electrode is designed by immobilizing the AChE enzyme on a platinum (Pt) electrode, which has been coated with carboxymethyl cellulose (CMC) membrane with a variation of the composition of 5; 10 and 15% and glutaraldehyde (GA) 25%. The values of % inhibition were 0.15 - 60.39%; 0.10 - 64.15% and 0.60 - 52.92% in the working concentration range of carbaryl pesticides, namely 10^{-9} - 10^{-1} mg.L^{-1}. The biosensor electrode composition of CMC 10% and GA 25% gave an optimum performance with a sensitivity value of 17.15 mV/decade, LoD was 10^{-7} mg.L^{-1} and response time was 7 ± 1 minutes. The results showed that the biosensor with a CMC membrane had a good performance in analyzing carbaryl pesticide residues.

Keywords: Acetylcholinesterase, biosensor, carbaryl, carboxymethyl cellulose

ABS-34: Synthesis and Characterization Fe3O4-CuO/Activated Carbon from Palm Oil Shell using FTIR, X-ray Diffraction (XRD) and SEM-EDX Method

Abstract In this study, activated carbon was synthesized from the agricultural waste by-product as raw materials using chemical activation. Synthesis of Fe3O4 and CuO was carried out by sol-gel method and formation of Fe3O4-CuO/activated carbon was conducted by hydrothermal process. Characterizations were carried out by FTIR, XRD and SEM-EDX. The attractive bonding Fe-O and Cu-O were shown at FTIR spectra. The XRD spectra of Fe3O4-CuO/activated carbon showed semi-crystalline phase closed to BCC structure and the particle size showed nanoparticles with average diameter 6.75nm. The results show that iron and copper have successfully doped on the surface of activated carbon.

Keywords: Oil palm shell, Fe3O4-CuO/activated carbon, semi-crystalline phase, Nanoparticles.

ABS-35: Effectiveness of Natural Coagulant of Turi (Sesbania grandiflora) Seed on Wastewater Treatment of Batik Effluent

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Abstract.Batik wastewater from dyeing processing is a source of water pollutants containing dyes, organic compounds such as starch, wax residue and soda ash. Natural coagulants of turi seeds (*Sesbania grandiflora*) with various doses of 0.5, 0.75, 1.0, 1.25, 1.50, 1.75, and 2.0 g affects pH, EC (Electrical Conductivity), TDS (Total Dissolved Solid), turbidity, and Tyndall effect. The performance of this natural coagulant is compared with chemical coagulant PAC (polyaluminum chloride) on batik wastewater treatment. The results showed that on the optimum dose of 0.75 g biocoagulant achieved pH 6.83, EC 1.31 mS/cm, TDS 674 mg/L, the turbidity 13.5 NTU, and light intensity 585 lux. Whereas for PAC with similar dose, the results showed that pH 3.53, EC 1.7 mS/cm, TDS 883 mg/L, turbidity 10.3, and light intensity 1143.3. These results concluded that the biocoagulant has ability to neutralize the pH and reducing TDS and turbidity on the batik effluent.

Keywords: Biocoagulant, Batik wastewater, PAC, Turi (*Sesbania grandiflora*)

ABS-36: The harvesting bio-energy from waste water washing rice and banana leather (*Musa Paradisiaca L.*) using microbial fuel cells

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Abstract The Microbial fuel cells (MFCs) has been created using waste water washing rice and banana leather (*Musa Paradisiaca L.*). This system using as a substrate and $KMnO_4$ solution as a cathode solution in the dual-chamber MFCs which is designed to produce bio-energy. The reactor is also equipped with a salt bridge as a proton exchange membrane. Substrate variations include white rice extract added banana peel waste in a ratio of 90:10, 80:20, and 70:30. The addition of Effective Microorganisms 4 (EM-4) in each composition of waste mixture to examine the most optimum electricity potential. The highest electricity production value is produced by waste composition of 90:10 with the addition of catalyst that is power density is 150.50 mW/m^2 in MFC reactor. MFC technology is proven to reduce COD and BOD levels in waste. In the 90:10 ratio variation without the addition of a catalyst, the percentage reduction for COD and BOD was 7,954% and 14,084%. Meanwhile, for the 90:10 ratio variation with the addition of catalyst, the percentage reduction for COD was 1,886% and BOD was 20,297%.

Keywords: Microbial fuel cells, waste water washing rice, banana leather

ABS-37: A Novel Uranium Measurement Using Extraction Chromatography Separation Technique in Radioactive Minerals Exploration

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Abstract. The government of Indonesia plans to build nuclear power plant (NPP). Prior to build the NPP, it is necessary to analyze the availability of uranium to develop an adequate sustainable uranium supply strategy as the main nuclear fuel. One type of uranium deposit in Indonesia is volcanic, which is associated with alkaline volcanic rocks. In nature, uranium as an isotopes combine with other metals and elements. Therefore a good separation step must be studied to measure uranium concentration in a radioactive mineral exploration sample to obtain an accurate measurement. We use two standard reference materials of International Atomic Energy Agency (IAEA) and three volcanic rocks samples. First, dissolute samples using microwave digestion with variation ratio of 4 strong acids, which are HNO_3, HCl, HF, and $HClO_4$. The next process is to separate uranium from its impurities using the extraction chromatography method by passing it into the UTEVA resin column with a variate flow rate. Further, elution carried out to release the uranium bonds in the chromatography column using various concentration of hydrochloric acid. Furthermore, uranium isotope concentrations were measured using ICP-MS. From the experimental of sample measurement, chemical recovery obtained around 90-96%. This uranium measurement technique is useful for studying the existence of uranium that has undergone geochronological disequilibrium, rock weathering processes and calculate the age of mineralization.

Keywords: radioactive mineral exploration, uranium separation, extraction chromatography

ABS-38: Phytochemical Analysis and Antioxidant Activity of Leaf Extract *Suaeda Maritima* from Sidoarjo, Indonesia

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Abstract *Suaeda martirima* is a plant found around the coast of Sidoarjo, East Java, Indonesia which is known as a vegetable ingredient. Based on ethnopharmaceutical studies, Sidoarjo coastal community believes that consumption of boiled water from Suaeda maritima leaves can treat hepatitis. However, research has not been carried out related to phytoconstituents analysis and their bioactivity. Therefore, in this study, an analysis of the phytoconstituents of the leaf extract of Suaeda maritima was carried out. The results of phytochemical screening showed that the ethanol extract of Suaeda maritima leaves contained alkaloid, anthraquinone, flavonoid, tannin, and terpenoid compounds. The in vitro bioctivity test conducted was the antioxidant activity test. The extract and fraction of Suaeda maritima leaves were tested for their antioxidant activity using the DPPH and phosphomolybdate methods. The positive control used is ascorbic acid. The value of the extract's antioxidant activity was expressed in terms of 50% inhibitory concentration (IC_{50}). The ethanol fraction has a better IC value than the ascorbic acid IC_{50} value.

Keywords: Phytoconstituent, *Suaeda maritima*, DPPH method, Phosphomolibdic method

ABS-39: Quantum Mechanics Computational Studies of Azobenzene Derivatives ((4-aminomethyl) phenylazobenzoic acid (APMB)) with Amino Acid

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Abstract Azobenzene is a molecule recognized as photoswitch molecule due to its photoisomerization properties, and has many applications in molecular device and functional materials. Currently, azobenzene-based biomolecular compounds that using UV/Vis light for photoisomerizing. The photoisomerization of azobenzene derivative to the trans/cis conformation is reversible when two different wavelengths of the light are used. These modifications have been widely used for reversible photoswitching in chemical species and as molecular motors in drug delivery. The goal of this study was to determine the effects of adding amino acid on azobenzene derivative. The Time-Dependent Density-Functional Theory (TDDFT) approach was utilized to describe the spectrum of the trans/cis conformation of azobenzene derivative by using B3LYP/6-31G (d,p) theory and basis set. All calculation show that the addition of amino acid changes the spectrum of the azobenzene derivative in form of a shift in the maximum wavelength. The determination of azobenzene spectrum has also been carried out by the same method and shows that the results are related to the experimental results that have been previously carried out. The maximum wavelength produced by trans-azobenzene is 310 nm and 343 nm by cis-azobenzene. As a results, the derivative azobenzene with amino acid can be used as a photoisomerization molecule candidate and is expected to be utilized in drug delivery.

Keywords: Ab-initio, Azobenzene, Amino Acid, Molecular Switches, UV/Vis Spectroscopy

ABS-40: Performance of Primary Battery Prototype: Cu/Graphene Nano Sheets//Electrolyte//C-π (Graphite, Graphene, N-Graphene)

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Abstract Research on Performance of Primary Battery Prototype was conducted. The aims of this research are to know primary battery prototype preparation method (Cu/Graphene Nano Sheets//Electrolyte//C-□), and to evaluate its performance. This research is an experimental laboratory research. Graphene Nano Sheets (GNS) and N-GNS were synthesized by using modified Hummer and N dopants methodes, respectively. The electrode of Cu/GNS were synthesized with impregnation method. Primary battery prototype (Cu/GBN//Electrolyte//Graphite, Cu/GBN//Electrolyte//Graphene), and Cu/GBN//Electrolyte//N-Graphene were combined with the weight ratio alloy method with a ratio of 1: 1: 1. Primary battery prototype: Cu/GBN//Electrolyte//Graphite, Cu/GBN//Electrolyte//Graphene, and Cu/GBN//Electrolyte//N-Graphene were characterized by using Multimeter tools. The data results show Cu/GBN//Electrolyte//Graphene (394. 4 µS/cm) has the highest conductivity numbers among Cu/GBN//Electrolyte//Graphite (355. 6 µS/cm), and Cu/GBN//Electrolyte//N-Graphene (365 µS/cm). Base on the data conclude the character and performance of primary battery prototype: Cu/GBN//Electrolyte//C-π (Graphite, Graphene, N-Graphene) may be modified with combined electrolyte MnO_2 and NH_4Cl and supporting electrode Cu/GNS and C-π (Graphite, Graphene, N-Graphene).

Keyword: Graphene, Cu/GNS, Electrolyte, N-Graphene, Conductivity

ABS-41: DOSE EFFECT OF BIOCOAGULANT FROM JACK FRUIT SEED (*Artocarpus heterophyllus* L.) ON THE WASTEWATER TREATMENT OF CHEMICAL LABORATORY

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Abstract. Biocoagulation process using jackfruit seed (*Artocarpus heterophyllus* L.) with 150 mesh as a biocoagulant on the wastewater treatment of chemical laboratory has been carried out. The jackfruit seed in the doses of adalah 0.25, 0.50, 0.75, 1.0, dan 1.25 g/ 500 mL was used to treat the wastewater of the chemical laboratory. The effectiveness of the biocoagulation process was in term of pH, electrical conductivity (EC), total dissolved solids (TDS), turbidity (NTU), and light intensity (Lux). Initially, the wastewater of chemical laboratory sample had the parameters as much as pH 3.2, 0.426 mS/cm (EC), 208.3333 mg/L (TDS), 3.33 NTU, dan 873.6667 Lux. The results showed that the biocoagulation process increased pH to 4.0, and decreased TDS by 24.31%, turbidity of 70.39%, electrical conductivity of 0.253 mS / cm, and light intensity of 833.7 lx. These results concluded that the biocoagulant process with jackfruit seeds has ability to reduce wastewater treatment parameters.

Keyword: Bicooagulant, Jack fruit seed (Artocarpus heterophyllus L), Wastewater,

ABS-42: Biogas Production From Tofu Liquid Waste With Effective Microorganisms Biocatalyst In Anaerobic Digester

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Abstract. The energy crisis is a challenge to develop alternative energy sources to sustain the availability of energy sources now and in the future. An alternative energy source that can be used and easy to develop is biogas. The tofu liquid waste from Somber Small Industrial Center (SSIC) Balikpapan is expected to be applied as an alternative energy to replace fossil energy that can be developed in local society. The purpose of this research is to know the characteristic of biogas produced and to find out potential of tofu liquid waste to become biogas. To obtain biogas, all raw material (tofu liquid waste and biocatalyst) are added into the digester tank and fermented for 35 days. The effect of composition tofu liquid waste and composition of Biocatalyst Effective Microorganisms 4 (EM-4) were investigated. The result showed that the optimum temperature conditions was obtained from 25 - 30 ^{o}C and pH after fermentation is 7 and produced bluish-colored flames. Somber Small Industrial Center (SSIC) has great potential in the utilization of tofu liquid waste to biogas because it can produce 63.417 m^3/day of biogas that can be used by the production house for cooking.

Keywords: Biogas, Tofu Liquid Waste, Effective Microorganisms

ABS-43: Synthesis, Characterization, and Potential Test as Antibacterial Complex Compounds $Co(2\text{-}NH_2py)_2(SCN)_2$

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Abstract This study aims to synthesize complex compounds from the central ion of Co (II) with aminapyridine and thiocyanate ions. The complexes obtained were shown to contain Co (II): 2-aminopyridine: thiocyanate 1: 2: 2 based on preliminary analysis by SEM-EDX, DHL, and FTIR. The complex in the form of a blue needle crystal is stable at room temperature and fuses at a temperature of 169 ℃. The antibacterial activity test was carried out using the diffusion method in order to show that the resulting complex compounds could inhibit the growth of S.typhi and S. aureus bacteria better than their precursors.

ABS-44: Heavy Metal Ion Fluorosensors Hg^{2+} and Cd^{2+} From Complex Compound of Mn^{2+} Metal Ion With Pyrazoline Derivative Ligand

Abstract Heavy metals such as Hg^{2+} and Cd^{2+} pose a great risk to human health and the environment. Pyrazoline derivatives can be complexed with transition metals and used as a fluorosensor for Hg^{2+} and Cd^{2+} metal ions because pyrazoline derivatives have fluorescence properties. This study aims to synthesize complex compounds from metal ion Mn^{2+} with a pyrazoline derivative ligand is para-di-2-(1-phenyl-3-pyridyl-4,5-dihydro-1H-pyrazol-5-yl)benzene and its potential as fluorosensor of heavy metals ions Hg^{2+} and Cd^{2+}. The resulting complex compound were characterized by Spectrophotometer Infra Red (FTIR), Spectrophotometer UV-Visible, and Spectrofluorometer. Then, a complex compound fluorosensor study was carried out with the addition of heavy metal ions Hg^{2+} and Cd^{2+} and analysis by spectrofluorometer to determine the type of fluorosensor. The result showed that the synthesis of complex compound was successfully carried out and a brown-yellow precipitate was obtained with a yield of 45% with a melting point of 248,2 °C. Based on the results of characterization with FTIR, it was obtained wave numbers 3400 cm^{-1} (O-H overlaps with C-N), 2851-2920,88 cm^{-1} (C-H pyridine), 1668,67 cm^{-1} (C=N), 1497,52-1595,93 cm^{-1} (C=C), 1025,45 – 1330,66 cm^{-1} (C-N) and 402,19 cm^{-1} (Mn-N). The results of the spectroscopy UV-Visible study at a concentration of $5x10^{-5}$ M obtained two absorption peaks at 246 and 316 nm with molar absorptivity of log ε 4,63 and log ε 4,29. Based on the result of the spectrofluorometer, it was found that the fluorescence intensity was 548 a.u at a wavelength of 503 nm. The result of fluorosensor studies of complex compounds on the addition of Hg^{2+} and Cd^{2+} metal ions indicate that complex compounds with the addition of Hg^{2+} and Cd^{2+} can be used as turn off-on type fluorosensor.

Key Words: Complex Compound, Fluorosensor, Mangan Metal, Pyrazoline

ABS-45: ENKAPSULATION VCO (Virgin Coconut Oil) - CHITOSAN-NATRIUM TRIPOLIFOSFATE: ANALYSIS OF ANTIBACTERIAL PROPERTIES OF Staphylococcus aureus AND Escherichia coli

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Abstract VCO (Virgin Coconut Oil) is currently being consumed by many people because of its usability. However, the obstacle is that VCO is easily oxidized which affects the storage capacity of VCO. To solve this problem, we tried to make VCO which is protected from oxidation by air. This study aims to create and characterize encapsulated VCO using chitosan, and to determine its antibacterial properties. The research stages included making and characterization of encapsulated VCO (chitosan-VCO-tween-NaTPP), and analysis of antibacterial properties. VCO encapsulation of chitosan has been obtained, with the characteristic form of a white-yellowish powder and a distinctive aroma of VCO oil. FTIR characterization of the encapsulated VCO showed the appropriate spectrum for VCO, Tween 80 and NaTPP bonds. The new absorption area is between the wave numbers 1110 cm-1 to 1700 cm-1.m-1. Antibacterial test results for properties of chitosan encapsulation VCO for bacteria *Escherichia coli* ATCC 35218, showed an inhibition zone of 17.25; 17.5 and 18.5 mm (medium category) at the use of concentrations of 15%, 25%, and 50%. Likewise, the test results against *Staphylococcus aureus* ATCC 25923 showed inhibition of the addition of 15%, 25%, and 50% VCO encapsulation: clear zone diameter 17.25; 18.25 and 18.75 mm (medium category).

Keywords: Antibacterial, Encapsulation, Chitosan, VCO

ABS-46: The Effect of Silica Concentration and Chitosan on The Antibacterial Properties of Silica Imobilized With EDTA-Cu and Chitosan

Abstract This research was conducted to determine the effect of volume variations of sodium silicate solution (10, 30 and 50 mL) on the acidity and surface area of silica as a result of processing rice husk ash and the effect of mass variation of chitosan (0.3, 0.5 and 0.7 grams) to the plastic antibacterial properties of EDTA-Cu and chitosan immobilized silica gel composites. The results of the surface acidity test using the titration method showed that the largest surface acidity was at the volume of 10 mL sodium silicate solution (1.4 mmol / g). Meanwhile, the surface area obtained by the methylene blue method shows that the surface area with a volume of 10 mL sodium silicate solution (185.3203 m2 / g) is slightly larger than other volume variations. The results of characterization using FTIR showed the presence of siloxane (≡Si-O-Si≡) and silanol (≡Si-OH) groups in EDTA-Cu immobilized silica which was similar to silica gel. Based on the research results, it is known that the effect of chitosan mass variation on the plastic being synthesized, such as the percentage of elongation with the mass of chitosan 0.3 grams (22%) higher than 0.5 grams (10%) and 0.7 grams (7.5%).). The condensation test also gave the lowest percent condensation at 0.3 gram of chitosan mass. Meanwhile, the degradation test of the synthesized plastic gave varying results from 16.1 to 100%. The antibacterial properties of the synthesized plastic based on the inhibitory test were classified as strong for both Staphylococcus aureus and Escherichia coli and increased with increasing chitosan mass.

Keywords: silica, chitosan, plastic, immobilization

ABS-47: Quantum Mechanics Computational Studies of Azobenzene Derivatives ((4-aminomethyl) phenylazobenzoic acid (APMB)) with Amino Acid

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Abstract Azobenzene is a molecule recognized as photoswitch molecule due to its photoisomerization properties, and has many applications in molecular device and functional materials. Currently, azobenzene-based biomolecular compounds that using UV/Vis light for photoisomerizing. The photoisomerization of azobenzene derivative to the trans/cis conformation is reversible when two different wavelengths of the light are used. These modifications have been widely used for reversible photoswitching in chemical species and as molecular motors in drug delivery. The goal of this study was to determine the effects of adding amino acid on azobenzene derivative. The Time-Dependent Density-Functional Theory (TDDFT) approach was utilized to describe the spectrum of the trans/cis conformation of azobenzene derivative by using B3LYP/6-31G (d,p) theory and basis set. All calculation show that the addition of amino acid changes the spectrum of the azobenzene derivative in form of a shift in the maximum wavelength. The determination of azobenzene spectrum has also been carried out by the same method and shows that the results are related to the experimental results that have been previously carried out. The maximum wavelength produced by trans-azobenzene is 310 nm and 343 nm by cis-azobenzene. As a results, the derivative azobenzene with amino acid can be used as a photoisomerization molecule candidate and is expected to be utilized in drug delivery.

Keywords: Ab-initio, Azobenzene, Amino Acid, Molecular Switches, UV/Vis Spectroscopy

ABS-48: Small-scale biogas production : Utilization of Chicken Manure Waste (*Gallus gallus domesticus*)

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Abstract The Fossil fuels are conventional sources of energy that in their use cannot be renewed and over time will deplete. Therefore, it is very important to take advantage of renewable energy sources that come from nature and can be renewed, an alternative that can be developed is the production of biogas. In this study, the raw material of making biogas is chicken manure waste with the addition of cow manure waste and dragon fruit skin. This study aims to know the nature and characteristics of biogas produced from chicken manure waste and the changes in COD and BOD. Levels in the waste mixture used after the process of making renewable energy and know the best composition of biogas from chicken manure waste with the addition of substrates of cow manure and dragon fruit skin waste. Biogas is obtained by mixing all raw materials into the digester tank for 21 days, with a pH value range of 7.0 – 7.2 and temperature conditions between 20-40°C. Analysis using Gas Chromatography shows that the highest methane gas value of 46.79% is obtained at a composition of 80: 10: 10 (wt. %). Furthermore, the highest heating value results from the composition 80: 10: 10 (wt. %), namely 25965 kJ / kg and 22725 kJ / kg respectively for *High Heating Value* (HHV) and *Lower Heating Value* (LHV).

Keywords: Biogas, chicken manure waste, methane gas

ABS-49: Synthesis of Graphene Nanosheets with Variations of Surfactants and Study of Its Application as Rhodamine B Adsorbent

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Abstract: Coffee is one of the plantation products that has high economic value and can be used as a strategic commodity for the development of the country's economy. On the other hand, coffee grounds contain organic compounds that are harmful to the environment. Coffee grounds waste is also known to have a high enough carbon content, this can be used as an opportunity to use coffee as the main raw material for economical carbon production and as an effort to reduce the resulting waste. In this study, graphene synthesis was carried out from graphite waste coffee and commercial graphite. This synthesis was carried out using a liquid exfoliating method with a variety of surfactants from three types of surfactants (cationic, anionic, non-ionic). The synthesized graphene was characterized using XRD, FTIR, SEM, TEM, Raman spectroscopy, and BET. The results of XRD characteristics showed that there was a decrease in crystal size when modified with surfactants. The synthesized graphene was tested for its adsorption activity as an adsorbent for Rhodamine B compounds. The modification using surfactants also resulted in an increase in the absorption of rhodamine B in water solvents, this was evidenced by the results of UV-VIS spectrophotometric analysis.

Keywords: Graphene, Coffee Ground Waste, Liquid Exfoliation, Adsorbents, Rhodamine B

ABS-50: Potency of Flavonols in Water Extract of Gyrinops versteegii Leaves as Hypocholesterolemia and Natural Antioxidants

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Abstract Gyrinops versteegii leaves have a rich source of flavonoid that possess different biological and pharmacological activities. Hence, present research was design to assayed against to reducing total cholesterol in the blood water extracts of Gyrinops versteegii Leaves in hypercholesterolemic Wistar rats and isolation of the flavonoids content. The compound of flavonoids were isolated through column chromatography followed by spectroscopic techniques for elucidation and were assayed against to antioxidant activity with DPPH method. Experimental results showed that water extract of *Gyrinops versteegii* leaves with an increase dose from 50 mg up to 200 mg / kgBW significantly decline ($p < 0.05$) levels of total cholesterol in the blood with the average ranging from 34,6, 43,0 and 72,2 mg/dl. The results of isolation and spectroscopic identification showed that flavonoids were flavonols and were active as strong antioxidants with IC_{50} = 60.27 ppm.This proves that water extract of *Gyrinops versteegi* leaves with flavonoid flavonol has the potential to hypocholesterolemia and natural antioxidants.

Key word : Gyrinops versteegii, hypercholesterolemic, antioxidants and hypocholesterolemia

ABS-51: TOTAL SYNTHESIS OF EXUMOLIDE B ANALOGUE (CYCLO-FFLPLP) USING COMBINATION OF SOLID AND SOLUTION PHASE

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Abstract. Exumolide B is cyclohexadepsipeptide which isolated from marine fungi *Syctalidium sp* in Exuma Island, Bahama. The structure of exumolide B has five amide bonds and one ester bond. In this study, was carried out replacement of residue 2-hydroxy-4-methylpentanoic acid from exumolide B with leucine led to formation of cyclohexapeptide compound as cyclo-FFLPLP. The cyclo-FFLPLP was synthesized for the first time using the combination of solid and solution phase peptides synthesis. The precursor of linear peptides was synthesized through solid phase method using resin 2-chlorotrityl chloride and Fmoc deprotection strategy. HBTU/HOBt was used as coupling agents in all formation of amide bonds. The cyclic product was obtained via cyclization using HATU as coupling agent and DIPEA base on diluted concentration. The cyclo-FFLPLP was successfully synthesized with yield of 15.49%.

Keywords : exumolide B analogue, cyclohexapeptide, synthesis peptides, solid phase

ABS-52: Validation Performance of Hollow Fiber Liquid Phase Microextraction in Isolation and Preconcentration of Pesticide Residue on Vegetables

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Abstract An extraction method based on hollow fiber liquid phase microextraction combination with high performance liquid chromatography diode array detector (HF-LPME HPLC-DAD) has been developed and demonstrated for analysis of pesticide residue on vegetables. This research aims to know the optimum extraction conditions and validation performance of this method. Diazinon pesticide was chosen as target model analyte. HF-LPME was performed by stacking a droplet of microliter organic solvent through HPLC syringe that covered with polypropylene hollow fiber by directly dipping them into a sample solution and agitating the solution during the extraction process. At the end of extraction, the organic solvent was inserted into HPLC syringe then directly injected into HPLC-DAD on the wavelength of 247 nm. Several of the important extraction parameters were optimized. Optimization results showed that the type of organic solvent (n-hexane), length of hollow fiber (1.5 cm), the volume of sample solution (20 mL), and stirring speed (600 rpm). Validation performance obtained that the limit of detection (LoD) of 100 ppb, percent recoveries in the range of 99% to 100.4%, coefficient variation in the range of 0.6% to 7.2%, and true enrichment factor is 19.982 times. Under optimum extraction conditions, the developed method was applied for extracting diazinon on vegetables. Three different kinds of vegetables were chosen as samples. The research obtained that the percent recoveries of diazinon in green mustard, tomatoes, and cabbage samples using spiking method were 85.8%, 77.4%, and 96.4%, respectively.

Keywords: Diazinon, Hollow fiber liquid phase microextraction, High performance liquid chromatography, Pesticide residue, Vegetable

ABS-53: Photodegradation of dye waste using bentonite-base photocatalyst

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Abstract Liquid waste generated by the textile industry is typically murky, intensely coloured, and hard to treat. As a consequence, it can pollute the aquatic ecosystem. One potential method to overcome this problem is photodegradation to break the dye molecules down. In this paper the synthesis of bentonite-ZnO composite and its application as a photocatalyst are reported. The composite was prepared by sonicating a mixture of zinc acetate and bentonite. The characterization of the composite was conducted using X-Ray Diffraction (XRD) and methylene blue method to determine its surface area, and its degradation capacity as photocatalyst to degrade the dye waste. The diffractogram reveals several peaks with high intensity, i.e. at 2θ = 20,51° (d = 4,32Å) indicating mineral quartz, and at 2θ = 26,28° (d = 3,39Å) showing Illite. The identifying peaks of the ZnO are in the diffraction pattern of 2θ of 36,18° (d = 2,46Å) and 59,64° (d = 1,54Å). The surface area of the bentonite and bentonite-ZnO are 183,0665 and 180,260 m2/g respectively. The optimum conditions obtained for the dye degradation are 100 mg photocatalyst at pH 2 and irradiation time of 45 minutes. Degradation under UV light is more effective with a degradation percentage of 95,66 ± 0,16% than that in the dark, which is 73,28 ± 0,55%. This shows that the composite plays its role as a photocatalyst for the degradation. Keywords: Bentonite-ZnO, Dyeing Industrial Waste, Photodegradation.

Keywords: bentonite, dye waste, photodegradation

ABS-54: Introduction of Aloe vera gel as a natural coagulant for reducing concentration of heavy metals on water purification

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Abstract The process of cleaning water in the Local Drinking Water Companies or PDAM Kawatuna Palu, is generally using chemicals coagulant, such as alum (AlCl3), ferric chloride (FeCl3) and poly aluminum chloride (PAC), known as environmentally unfriendly.. The useful parts of plant can use as coagulant such as gel cactus. Inside the gel of aloe vera contain several substances including polysaccharides and proteins which have ability to coagulate certain kind of metal compounds in water. The research objective was to measure heavy metal content at the coagulation process in PDAM water samples and the artificial sample water after introduced to aloe vera gel as coagulant. Both samples have been treated with the variation of gel concentration 0.1, 0.5, and 1.0 mL. Coagulation results are as follow; the 0.1 mL volume of gel has a good result for coagulating 56.88 % of Mn, Pb, 71.71 %, and 83.01 % Cu. For Cr., the result obtained is strange. In conclusion, the result of the research shown that gel aloe vera have the capacity as coagulant for heavy metals such as Cu, Pb, and Mn, but for Cr needed more study.

Keywords: Aloevera, coagulant, metals, water, purification.

ABS-55: Effect of concentration of the crosslinker agent on the physicochemical properties and citronella release of Alginate/nanocellulose matrix

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Abstract Alginate/nanocellulose have prepare by using ionic gelation technique to encapsulated citronella. In here, effect of different concentration of the crosslinker agent was studied to observe the physicochemical properties and citronella release profile. As the results, increasing concentration of the crosslinker agent increase swelling degree and loading capacity of citronella in the matrix. The citronella release profile showed that increasing concentration of the crosslinker agent lead to slower release.

Keywords: encapsulation, ionic gelation, crosslinker, swelling. loading capacity, release

ABS-56: Investigation of organic fertilizer production on household scale from fish intestine in Thailand and Indonesia

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Abstract : Fish remains or scraps in Asia, especially Indonesia and Thailand become environmental problems for household. Scraps include: intestines, liver, gall bladder, heart, fins, tail, scales, fish heads/gills and bones. The experience of ancestors used fish blood to fertilize the yard plants. They have in heritage as well about to fermented intestine of tuna fish become fish souse call “bakasang” in North Sulawesi, Indonesia or nam pla (tiparos) in Thailand. There are several studies from team, related to bakasang fermentation to produces liquid and solid fertilizer. Therefore, this paper is going to review number of investigations to conclude a statement; “bakasang fermentation is able to give a solution for household fish waste problem to produces liquid and solid organic fertilizer. To complete this aim, there have been done the experiment with reference to fermentation of intestines catfish and tilapia fish waste to produce liquid organic fertilizer. of tilapia fish and catfish were taken from Pathumthani market Thailand and prepared for analyzing involved sciences students of Valaya Alongkon University as training for making liquid organic fertilizer. Analyzing both macro and micro nutrients elements have done in Tadulako University as a part of collaboration research and training between both universities. The experiment is involving with Infrared spectroscopy, UV Spectrophotometer and Atomic Absorption Spectrophotometer were used in this research. The result of research showed significant differences of macro and micro nutrient elements between two samples, not only the level of each element but also the type of element. The only intestine of both fishes were analyzed, with the results were intestine of tilapia with noting, got the biggest concentration 5,38 % N, P 5,93 % and Cat fish Ca, with 25,53 %, Mg was 3.93 ppm Mn and Fe 1.08 ppm . Potassium amount are relatively the same for both, about. From the final investigating result support this review for ensuring with the purpose of statement that: “bakasang fermentation is able to give a solution for household fish waste problem to produces liquid and solid organic fertilizer.”

Keywords: Fertilizer, production, intestines, Tilapia, Catfish.

ABS-57: THE EFFECT OF PAPAIN ENZYME CONCENTRATION ON THE DEGREE OF HYDROLYSIS AND ANTIOXIDANT CAPACITY OF THE CHICKEN SKIN PROTEIN HYDROLYSATE PRODUCTS

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Abstract. Chicken skin is a source of animal protein hydrolyzate which has the potential used as an antioxidant. This study aims to determine the effect of variations in the concentration of the enzyme papain on the degree of hydrolysis, antioxidant capacity, percentage of reduction power (% RP), and amino acid composition of chicken skin protein hydrolyzate products. The hydrolysis process was carried out enzymatically using the papain enzyme with various concentrations of 3%, 4%, 5% (w / w protein-based), pH 7, temperature 50 ℃, and hydrolysis time 6 hours. The degree of hydrolysis was determined by the spectrophotometric method, the antioxidant capacity using the Ferric Reducing Antioxidant Power (FRAP) method which expressed as mg of ascorbic acid equivalent / g sample (mg AAE / g sample) and percentage reduction power (% RP) while the amino acid composition was analyzed using High-Pressure Liquid Chromatography (HPLC). The results showed that the use of variations in the concentration of the enzyme papain had a significant effect ($P < 0.05$) on the degree of hydrolysis, antioxidant capacity, and the percentage of reducing power (% RP). The degree of hydrolysis tends to increase with an increase in enzyme concentration. The products of protein hydrolyzates using enzyme concentrations of 3, 4, and 5% exhibited the degree of hydrolysis 42.76±2.83%, 61.68±0.64, and 72.43±1.95% respectively. Meanwhile, the antioxidant capacity and the percentage of reducing power increased as the enzyme concentration increased from 3% to 4% and tend to decrease when the concentration of enzyme was increased to 5%. Therefore, the use of the enzyme papain 4% gave the highest antioxidant capacity of 8.72 ± 0.30 (mg AAE / g sample) and percentage reduction power of 54.12 ± 1.78 (%) with the degree of hydrolysis 61.68 ± 0.64 (%). The protein hydrolyzate products of the treated chicken skin have mainly consisted of hydrophobic amino acids..

Keywords: Amino acid, antioxidant capacity, chicken skin, FRAP, papain

ABS-58: Synthesis and Potential Characterization of $K_3[Cr(SCN)_6]$ and $KMn[Cr(SCN)_6]$ as KIB Electrode Materials

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Abstract The purpose of this study is to synthesize intercalation materials based on $KM^{I}[M^{II}(SCN)_6]$ complex compound used in KIB cathode. $K_3[Cr(SCN)_6]$ and $KMn[Cr(SCN)_6]$ complex compounds have been successfully synthesized by direct and hydrothermal reaction methods. The synthesized complex compounds have been characterized through melting point, FTIR, UV-Vis, and EDX analysis. Cyclic voltammetry test of the synthesized compounds showed that two compounds had reduction potentials of 0,31 volt and 0,20, respectively. These complex compounds had oxidation potentials of 0 volt and 0,25 volt, which indicate $KMn[Cr(SCN)_6]$ has potential as KIB electrode materials.

Keywords: intercalation materials, $K_3[Cr(SCN)_6]$, and $KMn[Cr(SCN)_6]$.

ABS-59: Polymer electrolyte membrane based chitosan-vanilin/polyethylene glycol for direct methanol fuel cell applications

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Abstract The preparation process of chitosan consists of three steps, namely deproteinization, demineralization, and deacetylation. Furthermore, chitosan modification was carried out using vanillin to produce good interactions in the membrane composite structure. Chitosan-Vanillin/Polyethylene glycol membranes were successfully fabricated by phase inversion technique for variations 5, 10, 15 and 20 (wt. %). The results of water uptake analysis showed the highest value in CS-V/PEG 20, namely 76.40%, while the lowest methanol uptake was 17.80% showed by CS-V/PEG 5. In addition, the best value of ion exchange capacity and methanol permeability was obtained in CS-V/PEG 10 and CS-V/PEG 20 with values of 2.60 mmol/gram and 0.32 x 10^{-5} cm^2/s, respectively. The ion-exchange capacity, water uptake and methanol uptake, methanol permeability are investigated to confirm their applicability in direct methanol fuel cells.

Keywords: Chitosan, vanillin, polyethylene glycol, direct methanol fuel cells

ABS-60: Synthesis and Characterization of Cu-Ni/TiO_2-GO Nanosheet Catalyst with Exposed-(001) TiO_2 and GO from Waste Coffee Ground

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Abstract Coffee grounds are promising source of biomass due to the high growth in coffee consumption. The high carbon element on coffee grounds waste is a concern as the alternative to reduce it. In this study, graphene oxide was synthesized from waste coffee grounds by using modified Hummer's method. TiO_2 nanosheet exposed (001) was synthesized by hydrothermal method with HF 40% that direct of (001). Both of the material was combined by sonochemical method which produced TiO_2/GO characterized by X-ray Diffraction (XRD), Raman Spectroscopy, Transform Infra-Red Spectroscopy (FTIR), Scanning Electron Microscopy (SEM), Transmission Electron Spectroscopy (TEM), and Temperatured-Programmed Desorption with Ammonia (NH_3-TPD). The result of TiO_2 exposed (001) showed that sheet-shape structures and anatase phase. The result of GO represented that stacking of nanoparticles with wrinkles and the oxidation on graphene's surface by $KMnO_4$. The combine of TiO_2/GO can be modified with Cu and Ni. Cu-Ni/TiO_2-GO content ratio 3 wt%, 3 wt%, 84 wt%, and 10 wt%, respectively. The nanosheet character has the opportunity as catalyst for photocatalysis reaction or chemical compound conversion through oxidation or reduction reaction.

Keywords: Waste Coffee Ground, TiO_2-GO, Nanosheet, Catalyst

ABS-61: MODEL DEVELOPMENT FOR NITROUS OXIDE DYNAMICS BASED ON THREE PATHWAYS IN MANGROVE ECOSYSTEM

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Nitrous oxide (N_2O) is one of three greenhouse gases that increase atmospheric temperature dan climate change. Dynamical N_2O models of several ecosystems have been developing to help estimate global budgets in the pursue to mitigate climate change. Most N_2O models are based on two processes which are autotrophic nitrification and denitrification. However, it is doubtful that these two processes are the only N_2O sources in mangrove soils, as both processes are not optimal under fluctuating water content and salinities. Heterotrophic nitrification has been observed to be optimal in a wide range of water content and salinities. In this study, we proposed a simple model that is a modification of a previously stated model that uses three pathways for N_2O production and used this model to estimate the N_2O emission in two locations in Angke Kapuk mangrove (MAK-A and MAK-B), in DKI Jakarta. The model is written and executed using the R language and also implements the FME package to identify the parameters and perform sensitivity analysis, and the hydroGOF package to calculate the an NSE index to measure the model performance. The model is calibrated using data from the subtropical mangrove Mai Po in Hong Kong. The model identified seven parameters with a NSE index of 0,606 for the fitted NH_4-N and for 0,714 N_2O. For estimation used primary measurements of NH_4-N from MAK-A dan MAK-B from September 2019 to January 2020. The model estimates N_2O at MAK-A to be around 250-1143,704 $\mu g\ m^{-2}\ day^{-1}$ and at MAK-A to be 150-859 $\mu g\ m^{-2}\ day^{-1}$. These results are comparable to the measurements in other mangroves. Local sensitivity analysis showed a positive response of NH_4-N to the mangrove NH_4-N absorption parameter at Mai Po and MAK-B but not at MAK-A. Global sensitivity analysis showed a positive correlation between N_2O average and heterotrophic nitrification rate (r=0,890) in Mai Po. However, for both MAK, there is a positive correlation for autotrophic nitrification rate and a negative correlation for mangrove NH_4-N absorption rate. These results indicate the importance of mangroves in regulating NH_4-N and the effect of allochthonous NH_4-N levels on N_2O production. The 3PM model has shown its potential in describing the processes of N_2O production in mangrove sediment.

Keywords: N_2O, flux, mangrove, ammonium, modeling.

ABS-62: ENTHALPY CHANGE FOR PROTEIN COOKING PROCESS IN *DENGKE MAS NA NIURA*

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Abstract Freshwater fish contains high protein which benefits to build, strengthen, and repair or replace human body tissues. Unfortunately, freshwater fish has a strong muddy smell that affects the appetite. One of the freshwater fish dish that can improve the appetiteis *dengke mas na niura* or *naniura* goldfish. *Dengke mas na niura* or *naniura* goldfish is a Bataknese traditional dish from North Sumatera, Indonesia. *Naniura* means uncooked dish, but, it is a naturally cooked process by using various endemic acidic and spices of Batak, such as *andaliman* (the flower of Z. acanthopodium) and *asam cekala* (the fruit of E. elatior). The naturally cooked process for the protein of goldfish in *Naniura* is one of the chemical phenomena called enthalpy change. This study aims to descriptively analyze the enthalpy change of the protein cooking process in *Naniura*. Some studies found that acidic concentration and duration of acidification in the protein cooking process is an endothermic reaction that can increase the temperature inside the goldfish. The temperature raising is positively affecting the heat capacity as one of the factors that influence the enthalpy changes in *Naniura* dish. The value of this study is to encourage the Indonesian community to daily consume freshwater fish as a high protein intake for better health, and at the same time, preserve Indonesian endemic spices biodiversity.

Keywords: enthalpy changes; concentration and duration of acidification; *Naniura* goldfish

ABS-63: Samhong Mustard Cultivation by Utilizing Tilapia Waste in Nuntrient Film Technique (NFT) Aquaponics System Based on Bioflocs, and Its Impact on Water Quality

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Abstract Deswati et al. (2020cde) have initiated a study on the impact of using biofloc technology (BFT) on several water quality parameters in Flood and Drain (F&D) Aquaponic Systems. Furthermore, the results obtained were compared with previous studies (Deswati et al., 2018; 2019; 2020ab), some water quality parameters using biofloc were better than those without using biofloc. BFT in aquaponics is considered the best solution, combining intensive production with waste recycling and water conservation (Klinger, & Naylor, 2012). However, in Indonesia there are still not many studies linking aquaponic and biofloc systems, Furthermore (Avnimelech, 2007) emphasizes that the use of bioflocs in aquaponic systems can provide ideal conditions for bacteria to control water quality which will encourage recycling of nutrients in water. This paper discusses of samhong mustard cultivation by utilizing tilapia waste in NFT-aquaponics system based on bioflocs, and its impact on water quality (DO, BOD, COD, pH, temperature), which previously used the F&D (Flood & Drain)- Aquaponic System. The application of biofloc technology (BFT) in the nutrient film technique (NFT)-aquaponics system is an alternative to the tilapia waste disposal management system. This system works by utilizing bacteria that can convert organic waste into a collection of microorganisms in the form of flocks, which can be reused by fish as natural feed, thereby increasing feed efficiency which affects the weight gain of fish. There are 4 tanks, first, the water from FT (Fish Tank) is flowed to the MFT (Mechanical Filter Tank), BT (Biofilter Tank), ST (Storage Tank), HS (Hydroponics Subsystem), and eventually back to FT, this recirculation is constantly carried out and supported by a pump. The results of the study indicate that the value of water quality is still within the permissible limits, including: DO (5.9800-6.7000 mg/L), BOD (2.4422-3.5798 mg/L), COD (17.7916-20.8982 mg/L), pH (7.20-8.63) and temperature (26.9-29.4°C). At the end of the study, a survival rate of 96% fish was found. This shows that biofloc technology can minimize the mortality rate of cultivated fish, and plants also do not show signs of nutrient deficiency such as stunted growth resulting in stunted growth, yellow, white, and brown discoloration, or necrotic spots on leaves.

Keywords: BFT, NFT-aquaponics system NFT.

ABS-64: Prospective Teacher Understanding in Environment Context and Multiple Representation: Lahan Basah Chemistry as Media for Learning

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Abstract. Johnstone (1991) asserts that the ability to represent is the basis for knowing and understanding chemistry, where the concept of representation consists of 3 (three) levels, namely macroscopic, particulate, and symbolic. Learning resources with environmental integration and representation concepts are chemical learning media that can strengthen their understanding of learning. However, the teacher has not been judged to achieve the essence of learning in the science aspect successfully. This study aimed to develop a chemistry teaching module with a wetland context and discover students' particulate level understanding through the case analysis provided. The Plomp Development Model was the research method chosen to produce valid, practical, and effective products. The description of the research results focused on the product's effectiveness to examine the extent to which participants' learning progress was related to the applied learning concepts. Data collection techniques were used test technique, observation, and documentation. Data analysis used Rasch modeling and descriptive statistics to find out the symptoms of the data, which were then described in the form of statements. The results analyzed using the Rasch model showed that Person Reliability was 0.70 while Item Reliability was 0.97, which means that the consistency of student response patterns was weak (<0.76 = Weak). Students' understanding was still considered weak and needed strengthening, especially understanding environmental contexts and chemical representations. This research can be concluded that learning media is an alternative way of making innovations in learning, including the integration of the concept of chemistry representation, environment, and learning styles.

Keywords: prospective teacher, environment, multiple representations, lahan basah, media

ABS-65: Effect of using Laja Gowah (*Alpinia malaccensis* (Brum.f) Roscoe) oil in Reducing the Number of Staphylococcus aureus Colonies in Hospital Inpatient Rooms

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Abstract Staphylococcus aureus is one of the pathogenic bacteria that causes nosocomial infections in hospitals. The use of essential oil-based antibacterials for hospital rooms was developed. Laja gowah oil is an essential oil isolated from the Alpinia malaccensis plant which belongs to the Zingeberaceae plant group. Laja Gowah including plants that have been used as traditional medicine by the people of Indonesia. The purpose of this study was to determine the antibacterial activity of laja gowah oil in suppressing the number of S. aureus colonies in hospital inpatient rooms through the air diffusion method. Analysis of compound content in laja gowah oil with GC-MS. Analysis of antibacterial activity using the air capture method and continued with the colony count test, Gram staining, catalase test, and coagulase test. Laja gowah oil contains methyl cinnamate, eucalyptol, camphor, and beta-pinene compounds. The results obtained from this study showed a decrease in the number of S. aureus colonies 72% after using laja gowah oil for 48 hours. Based on these results, it can be concluded that laja gowah oil has the ability to suppress the growth of S. aureus bacteria in hospital inpatient rooms.

Keywords: laja gowah oil, staphylococcus aureus, nosocomial infection, antibacterial agent, hospital

ABS-66: Improvement of Student Interest and Learning Outcomes in Chemistry by Using the Schoology Application

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Abstract The aims of this research was to improve student interest and learning outcomes in chemistry by Schoology application. Schoology is one of the Learning Management System (LMS) that makes it easy for teacher and students to interact with each other in the online learning process. The population in this research were all students of class XI IPA who also became a study sample using saturated sampling technique with a total of 55 students. Data collection techniques used a instrument test as much as 20 multiple choice questions and an interest questionnaire test instrument as much as 20 statements developed from 4 categories of students interest in learning. All instruments used have been validated by expert validators. Based on the results of the analysis, it is known that there is an increase in student interest in learning. The highest change occurred in the attention category with an increase of 30.74% from the initial condition. For learning outcomes students using Schoology , the result of the analysis show an increase with t_{count} (5.718) > t_{table} (2.006) at significance α=0.05. It can be concluded that the use of Schoology application in effective learning to increase student interest and learning outcomes in chemistry.

Keywords: chemistry, learning outcomes, schoology, student interest

ABS-67: Antioxidant Activity (DPPH•, ABTS•+) of Fruit Peel Waste Extracts

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Abstract This research aimed to determine the total antioxidant capacity of the fruit peel waste extract, namely palmyra palm (*Borassus flabellifer*), areca nut (*Areca catechu*), lanzones (*Lansium parasiticum*), plantain (*Musa acuminata* x *balbisiana*), kepok banana (*Musa acuminata* x *balbisiana Colla*), peanuts (*Arachis hypogaea* L.), palm (*Elaeis guineensis*), soybeans (*Glycine max* L. (Merr)), and corn (*Zea mays* L.). The method used was the DPPH$^{\bullet}$ and ABTS$^{\bullet+}$ methods. The extraction was carried out by maceration using *n*-hexane, methanol, ethyl acetate, and methylene chloride as a solvent, respectively. The DPPH$^{\bullet}$ method test results show that the most active extracts were MeOH and EtOAc extracts of peanut (*Arachis hypogaea* L) hulls and ethyl acetate extracts of palmyra palm (*Borassus flabellifer*) peels which had an IC_{50} value of 42.24; 51.17; and 55.78 µg/mL, respectively. Meanwhile, for the ABTS$^{\bullet+}$ method, the methanol and ethyl acetate extract of peanut hulls and the ethyl acetate extract of palmyra palm peels show the most reactive with the IC_{50} of 23.15; 30.02; 47.43 µg/mL, respectively.

Keywords: Fruit peels waste, antioxidant, DPPH$^{\bullet}$, ABTS$^{\bullet+}$

ABS-68: Synthesis of $ZnO-TiO_2$ Nanorods By Using Sol-Gel Methods : Studying Their Structures, Optics Properties and Application as Antimicrobe Textiles

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Abstract $ZnO-TiO_2$/Chitosan nanorods were synthesized by sol-gel method from mixture Zinc nitrate dihydrate ($Zn(NO_3)_2.2H_2O$) and Titanium Iso Propoxide (TIP) as precursors with different ratio molar composition of ZnO and TiO_2 at pH = 11.0. Then,addition ofsodium hydroxide (NaOH) and Methylenamine ($C_6H_{12}N_4$) for control pH solution. $ZnOTiO_2$/Chitosan resulting from the characterization of X-ray diffraction (XRD) show that $ZnO-TiO_2$/Chitosan with hexagonal wurtzite structures. The nanorods size of $ZnO-TiO_2$/Chitosan is (35 – 42) nm. Surface topographic information investigated by Scanning Electron Microscopy (SEM) shows the distribution of shapes are nanorods. The interactions Zn-O-Ti were studied on the Fourier Transform-Infrared Spectroscopy (FT-IR) analysis on wave numbers 680 cm-1. The optical properties indicated UV-Vis Diffuse Reflectance Spectroscopy (UV-DRS) shows the result of modification of different precursor compositions of ZnO and TiO_2 giving a smaller value (Eg = 3.24 – 3.25 eV) when compared without doped TiO_2 (Eg = 3.32 eV) and on any difference the composition significantly does not provide different band gap values. $ZnO-TiO_2$ / Chitosan nanorods have optimal antimicrobial properties against *P. aurogenosa* and *S. aureus* bacteria.

Keywords : $ZnO-TiO_2$/Chitosan : Nanorods : Precipitation : Structures : Antimicrobe

ABS-69: Water quality (Macro-Micro Nutrient) on Fish Water, Lettuce (Lactuca Sativa L.) and Tilapia (Oreochromis niloticus) With Aquaponic System Based on Biofloc Technology

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Abstract This study aims to study the effect of the use of biofloc technology on improving macro-micro nutrients in fish water, and the effect of macro-micro nutrients on the growth of lettuce and tilapia in aquaponic systems using biofloc technology. The aquaponics circuit in this system consists of a fish pond tank, a hydroponic plant circuit, and a biofilter tank. Based on the research that has been done, the concentrations of macro nutrient in fish water Phosphate (0.826-11.23 mg/L), Sulfate (24.62-41.94 mg/L), Potassium (1.92-15.66 mg/L), Calsium (5.02-19.59mg/L), micro nutrient in fish water Copper (0.0038-0.032 mg/L), Iron (0.0138-2.03mg/L), and Zinc (0.106-0.894 mg/L). The data obtained is then compared with Government Regulation of the Republic of Indonesia Number 22 of 2021 Classes 3 for water and fish and 4 for plant concerning the implementation of environmental protection and management. In general, the concentrations of Sulfate, Calsium, Potassium, and Copper are below the permitted quality standards, while for Phosphate and Zinc the concentrations exceed the upper threshold of quality standards, and Iron is not required. The results showed that the application of biofloc technology in an aquaponic system could improve water quality, which was supported by the concentration of macro and micro nutrients for lettuce including Phosphate (4.959 mg/L), Sulfate (3.248 mg/L), Potassium (5.115 mg/L), Calsium (68.65 mg/L), Copper (0.0023 mg/L), Iron (0.0442 mg/L), and Zinc (0.485 mg/L) and tilapia including Phosphate (0.928 mg/L), Sulfate (56.90 mg/L), Potassium (44.47 mg/L), Calsium (143.75 mg/L), Copper (0.0047 mg/L), Iron (0.147 mg/L), and Zinc (0.843 mg/L).

Keywords: Aquaponics, Biofloc, Water quality, Makro-micro nutrient

ABS-70: Evaluating the Immunomodulatory Properties of *Cyperus rotundus* Tuber Bioactive Compounds Using a Molecular Docking Approach

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Abstract The tuber of nut grass (*Cyperus rotundus* L.) has long been used by the community to cure several diseases. According to several studies conducted *in vivo*, nut grass tuber extract has many potentials, among others, as anticancer, anti-inflammatory, and antibacterial agents. However, no research on its immunomodulatory activity has been discovered. The purpose of this study was to characterize the bioactive compounds found in nut grass tuber extract and to assess their potential as immunomodulatory agents using an *in silico* approach. The dry powder of nut grass tuber was extracted with n-hexane and methanol, and the bioactive compounds were analyzed using gas chromatography-mass spectrometry (GC-MS). The ability of these compounds as immunomodulatory agents was analyzed using AutoDock Vina. The webserver PASSonline and SwissADME were used to assess the bioactivity of these compounds. As a comparison, prednisolone and levamisole were used. Based on the results of molecular docking, ten bioactive compounds have the potential to be developed as immunosuppressive drugs. Cholestan-3-ol, 2-methylene-,(3ß,5a)- has the lowest binding free energy value, suggesting that it could be developed as an immunosuppressive drug.

Keywords: nut grass tuber, *Cyperus rotundus*, GC-MS, immunomodulator, immunosuppressive drug.

ABS-71: Synthesis of the BETAC4ND5 Ionophore from *p-t*-Butylcalix[4]arene Ethylesteramide

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Abstract The BETAC4ND5 ionophore has been successfully synthesized from *p-t*-butylcalix[4]arene ethylesteramide. The BETAC4ND5 ionophore is a thioamide compound. The BETAC4ND5 ionophore was obtained by tionation of the amide or *p-t*-butylcalix[4]arene ethylesteramide with Lawesson's reagent in dry tetrahydrofuran solvent. The mixture was drained into cold water (-5 ^{o}C) and stirred with a magnetic stirrer for 24 hours at room temperature while nitrogen gas was flowing. The product of the amide tionation reaction is *p-t*-butylcalix[4]arene ethylesterthioamide or the BETAC4ND5 ionophore in the form of a white solid with a yield of 61.23%, t.l. 328-330 ^{o}C and TLC (SiO_2, CH_3OH: CH_2Cl_2 = 1 : 1 v/v, R_f = 0.58).

Keywords: BETAC4ND5 ionophore, tionation, amide, thioamide, *p-t*-butylcalix[4]arene

ABS-72: Medium Activity Liquid Radwaste Treatment by Using Ion Exchange

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Abstract BATAN is currently operating the GA Siwabessy Multipurpose Reactor (RSG-GAS) with a power of 30 MW for various research purposes. Liquid radwaste generated in RSG-GAS is categorized into low-activity liquid radwaste (LALR) and medium-activity liquid radwaste (MALR). MALR contains several medium and long-lived radionuclides, such as Co-60 and Cs-137 with half-lifes of 5.3 years and 30.17 years, respectively. Both of these radionuclides emit high-energy gamma rays that are harmful to workers and the environment. Therefore, before MALR is discharged into the environment, those two radionuclides must be removed first. This research analyzes the separation process of Co-60 and Cs-137 from MALR using an ion exchange apparatus (IOA). PTLR-BATAN has been operating an IOA installation since 2018. The research objective was to determine the circulation time required to separate radionuclides from MALR. The MALR is continuously circulated in the resin tank, and the radionuclide content in the resulting effluent is measured with gamma spectroscopy using a multichannel analyzer. Radionuclides activity measurement was carried out at the beginning and end of the process to determine the decontamination factor. Based on Government Regulation No. 61 Year 2013, wastewater can be discharged into the environment if the waste activity is below 10-6 mCi/L. There are two wastes from RSG-GAS examined in this study, namely R2201B and R2201C. The initial Co-60 and Cs-137 activities of R2201B were 11 Ci/m3 and 12 Ci/m3, while for R2201C they were 33 Ci/m3 and 69 Ci/m3, respectively. The measurement results show that R2201B takes 160 hours circulation time, while R2201C takes 512 hours, with one resin replacement for each. The resin replacement on IOA is indicated based on radiation exposure measurements from outside of resin column. A constant value of radiation exposure indicates that the resin is saturated and is no longer capable of ion exchange. The circulation duration needed for IOA to reach activity below its requirement limit depends on the initial radwaste activity. The higher the initial activity is, the longer the circulation duration needed is.

Keywords: treatment, liquid radwaste, medium activity, resin, ion exchange

ABS-73: In silico Analysis of the interaction of *Clitoria ternatea* (L.) Bioactive Compounds against Multiple Immunomodulatory Receptors

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Abstract Butterfly pea (*Clitoria ternatea* L.) is an edible flower that contains active compounds that have the potential to be used as a medicine for a variety of diseases. An in vitro study found that the flower extract had biopharmaceutical potential as an immunomodulator. The purpose of this study was to identify bioactive compounds extracted from butterfly pea flowers and to assess the potential of compounds targeting TNF-, IL-1, IL-6, and NO receptors via an in silico approach. The dry powder of butterfly pea flower was extracted with methanol and n-hexane and then analyzed using a Gas Chromatography-Mass Spectrometer (GC-MS) to determine the compound content. The immunomodulatory activity of each compound was determined using Autodock Vina and compared to β-glucan and thiopurine. The GC-MS analysis revealed that 48 possible compounds were detected in the methanol extract and 18 possible compounds were detected in the butterfly pea flower n-hexane extract. The activity of the compound content was investigated using SwissADME to determine Lipinski's rule of five and PASS Online for predicting the bioactivity of the compounds. Molecular docking studies revealed that longipinocarvone, ambrosin, 7-Isopropenyl-1,4a-dimethyl-4,4a,5,6,7,8-hexahydro-3H-naphthalen-2-one, and acetic acid,3-hydroxy-6-isopropenyl-4,8a-dimethyl-1,2,3,5,6,7,8,8a-octahydronaphthalen-2-yl ester have the highest binding affinity to receptors for TNF-α, IL-1β, IL-6, and NO. This demonstrates that the butterfly pea flower contains four potential immunomodulatory compounds.

Keywords: butterfly pea, *Clitoria ternatea*, GC-MS, immunomodulator

ABS-74: MOVER-B : Moringa Leaves and Red Ginger Biscuit to Prevent Anaemic and Covid-19 Infection

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Abstract In middle 2021, World Health Organization (WHO) stated that the number of Covid-19 patients have increased to around 173 million people including 3 million people death. In addition, WHO also stated that the anaemia sufferers globally reach 2.3 billion people with the prevalence of anaemia in the world ranging from 40-88%. In Indonesia, anaemic sufferers are consisted 26% children (aged 5-12) and 23% women (aged 13-18 years). Anaemic sufferers are also experiencing in decreasing immunity. The lower a person's immunity, the higher the risk of people to get infected by Covid-19. The efforts to prevent anaemia and increase body immunity should be focused on current research. We designed a kind of products that contains rich iron and immunomodulator sources. MOVER-B was created by formulation of mashed moringa leaves powder and red ginger powder. It is an innovative biscuit that is featured with natural iron sources and immunomodulators. Biscuits as the most favorite snack can be accessed by a wide range of people from children to adult. Chemically, MOVER-B was made on baking, while the substituents was made by drying and milling principles. The result showed that MOVER-B contained 28.73 mg/100 g iron which can be expected to increase iron to human body. We expected that during 21 consecutive days consuming on MOVER-B people might increase Hb in the blood by 1.94 g/dl. In addition, MOVER-B also contained 6-shogaol and 1-dehydro-6-gingerdion which might be expected to inhibit the production of nitric oxide and prostaglandin E2 by activating macrophages to control immunity. MOVER-B formulation was tested on 20 semi-trained panelists (10–60 years old). The result showed that about 16 panelists (80%) give 4-5 of 5 score on overall attribute. All panelists felt a warm aftertaste in their throat after consume this product indicated the effect of red ginger. After extensive research, MOVER-B might be use to prevent anaemia and risk of Covid-19 infection.

Keywords: Anaemia, Covid-19, Mover-B, Immunity

ABS-75: Improving the stability of polymer inclusion membrane in the separation process using alternative base polymers: a literature review

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Abstract Polymer inclusion membrane (PIM) has recently evolved as an alternative separation technique to the conventional solvent extraction as it eliminates the use of toxic solvents, reduces the separation cost, and simplifies the separation process by combining the extraction and back-extraction procedures into just one step. PIM is relatively new generation of liquid membrane which is made by casting solution containing liquid phases and base polymers. The liquid phase consists of an extractant (i.e., anionic, or cationic exchanger) which binds and separates the target analytes following the same principle of solvent extraction and an additional plasticizer/modifier to increase the elasticity of the PIM and ensures the compatibility of membrane components. The base polymer encapsulates the liquid phases within its entangled chains and thus is responsible for the mechanical strength of the PIM. The selection of base polymer can be made based on its compatibility with the extractant and particularly on the purpose of the PIM application, with poly(vinyl chloride) (PVC), cellulose triacetate (CTA) being the most commonly used base polymers. Despite its better performance and stability in comparison to the previous type of liquid membranes, their robustness for applications on an industrial scale is still considered insufficient mainly due to its limited stability in the long-term separation process. This can be attributed to several factors but mainly due to the leaching of the liquid phases into the adjacent aqueous phases during the separation process. In recent years, different approaches have been devoted to improving the stability of PIM while maintaining its performance in the separation process with current focus is on the use of alternative base polymers including single new base polymers, co-polymers, or cross-linking polymers. Thus, the present study aims at summarizing the current literature with particular focus on those proposing the use of alternative base polymers in the fabrication of polymer inclusion membrane and their application for separation of organic and inorganic species. More emphasis is given to the fabrication process of the PIM, the characterization of the morphology, and long-term application. Finally, the performance of the PIM with the alternative base polymers is presented and the long-term stability is compared to the PIM fabricated using the corresponding common based polymers.

Keywords: Polymer inclusion membrane, alternative base polymer, crosslinking polymers

ABS-76: BIOCOAGULATION TEST POWDER OF JAVA ACID (*Tamarindus indica*) AND WINGED BEAN (*Psophocarpus tetragonolobus L.*) IN CHEMICAL LABORATORY WASTE WATER

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Abstract The use of synthetic coagulants can cause pollution. The seeds are biocoagulants, environmentally friendly, able to reduce pollutant numbers. The purpose of this study was to test the biocoagulation power of tamarind and winged bean powder in reducing the number of chemical laboratory wastewater parameters

Tamarind and winged bean powder 100 mesh were used as biocoagulants, test for particle characteristics with BET/BJH and SEM-EDX, chemical characteristics on water content, ash content and protein. Chemical laboratory waste treatment process by means of coagulation using a solution of tamarind seed powder and winged bean 40mg/L, 80mg/L, 120mg/L, 160mg/L. Fast stirring of 150 rpm, 15 minutes and slow stirring 50 rpm 15 minutes. The quality of the filtrate was analyzed TSS, COD, BOD, Pb, Cu and Fe using standardized method.

The results showed that tamarind seed powder 100 mesh has characteristics based on the SEM-EDX test having a particle size of 5000 nm, the BET-BJH test has a surface area of 5,036 m^2/g, pore volume of 0,008 cc/g and pore radius of 15,284 Å. Winged bean powder has a surface area of 13,046 m^2/g, pore volume of 0.023 cc/g and pore radius of 17,033 Å. Tamarind and winged bean powder can act as biocoagulants capable of reducing the number of chemical laboratory wastewater pollutant parameters. Winged bean and tamarind have good biocoagulation power at concentrations of 80mg/L and 120mg/L, able to reduce chemical laboratory waste pollutants above 80% on the parameters of TSS, COD, BOD, Pb, Cu and Fe.

Keywords: Biocoagulants, tamarind, winged bean, waste water

ABS-77: Discovering Reaction Rate of Vitamin C Oxidation by Guided Inquiry Remote Experiments

A remote experimental activity in reaction order determination was applied in the basic chemistry laboratory experiment course. First-year undergraduate students were observed the oxidation reaction of ascorbic acid towards iodine solution and evaluate the reaction order of both reactants. The materials for conducting the laboratory experiment are simple and easy to be found at home. This reaction also provides a remarkable color change from yellow-brown to colorless and will be easier to observe when amylum is used as the indicator of reaction, with color change from deep blue to colorless. A guided inquiry worksheet was prepared to guide the students on designing and conducting the experiment independently at home. Students were also introduced to the calculation of concentration and dilution in real-life problems since the iodine and vitamin C they used were in the form of a mixture with other matrices. Students observed the average rate by observing the color change and evaluated the reaction order by comparing some concentration variation of reactant, then calculated the rate constant. Based on the students' observation, the reaction order of vitamin C and iodine following the second-order reaction, where each reagent concentration affects the reaction rate. This result was in good agreement with other experiments using more advanced and sophisticated methods.

ABS-78: Identification of *Bacillus* sp. from Spent Bleaching Earth (SBE) capable of transforming isoeugenol to vanillin.

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Abstract. Vanillin produced from vanilla pods cannot meet the high demand for natural vanillin due to high costs and insufficient production. There is high interest in developing alternative ways in producing natural vanillin. Thus, biotransformation of natural aromatic compounds into vanillin is one possible method. In this work, *Bacillus sp* obtained from Spent Bleaching Earth (SBE) and showed capability growing on isoeugenol as the primary carbon source. Analysis of DNA sequence from 16S rRNA (~ 1500 bp) amplicon successfully estimated the identities of the five isolates. Bacterial strains were *Bacillus velezensis* FZB42 (B1), *Bacillus proteolyticus* MCCC 1A00365 (B2), *Agitococcus lubricus* DSM 5822 (B3 and B4), and *Bacillus tropicus* MCCC 1A01406 (B5). Transforming of isoeugenol into vanillin were using growing cultures of bacterial at room temperature for 72 hours. A growing culture of *B. velezensis* FZB42 produced 0.421 ± 0.0337 g/L vanillin (4.28%)

Keywords: *Bacillus* sp., biotransformation, isoeugenol, vanillin

ABS-79: Effect of Addition of Bacterium *Pseudomonas aeruginosa* on Biodecolorization of Methylen Blue by Brown-Rot Fungus *Gloeophyllum trabeum*

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Abstract Methylen Blue (MB) is one kind of textile dye from the azo group dyes that has negative impacts on humans and environment, therefore it is very important to determine an effective method to decolorize it. Brown-rot fungus *Gloeophyllum trabeum* has ability to decolorize MB, but its ability was still relatively low and required a long incubation time. In this study, the effect of addition of the bacterium *Pseudomonas aeruginosa* at 2, 4, 6, 8, and 10 mL (1 mL= 9.23 x 10^8 CFU) on the decolorization of MB by *G. trabeum* was investigated. The decolorization of MB by particular *G. trabeum* was 11%. The addition of 8 mL of *P. aeruginosa* into *G. trabeum* culture showed a maximum decolorization result of 88.41% in liquid medium of PDB for 7 days incubation. These results indicated that *P. aeruginosa* could enhance biodecolorization of MB by *G. trabeum*.

Keywords: Biodecolorization, Methylen Blue, *Gloeophyllum trabeum*, *Pseudomonas aeruginosa*

ABS-80: Hybrid Cerium Oxide Doped Monmorilonite/Chitosan Nanocomposites with Hydrothermal Method

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Abstract In this study, nanocomposite films were prepared by using cerium oxide (CeO2), chitosan (CHS), and Montmorillonite (MMT) as a crosslinking agent. The CeO2/CHS/MMT nanocomposite was characterized by FTIR, DRS-UV-Vis dan FTIR. The results of the XRD analysis verified that CeO2 characteristic peaks existed in the prepared nanocomposite. Based on XRD data pure crystal cerium oxide was present in CeO2/CHS/MMT nanocomposite. The results of the DRS-UV CeO2/CHS/MMT nanocomposite obtained absorption at 328 nm with a bandgap energy value of 1.54 eV. The success of the formation of CeO2/CHS/MMT nanocomposites was also proven from the FTIR results showing a shift in peaks and the appearance of new peaks compared to the FTIR results of cerium oxide nanoparticles. Based on the results of the characterization, the resulting nanocomposite has good potential in biomedical applications

Keyword: nanocomposite; biomedical applications;cerium oxide; hydrothermal

ABS-81: Modification of Polyvinylidene Fluoride (PVDF) Membrane with Chitosan (CS) for Dyes Microfiltration

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Abstract Dye waste produced by the textile industry became the largest contributor to the wastewater pollutant. Most of the dye compounds in textile wastewater are toxic and nonbiodegradable, which affect the public health and cause severe environmental concern. During the last few years, various solutions have been explored for minimizing textile wastewater pollution. One way to overcome this problem is the application of membrane technology. Membrane-based water treatment technologies have a great progress compared with other technologies because of high efficiency and low energy consumption. Polyvinylidene fluoride (PVDF) is an ideal membrane-forming material because it exhibits excellent mechanical strength, abrasion resistance and dielectric strength. Unfortunately, PVDF is highly hydrophobic, so it is not efficient for dye filtration. Therefore, the addition of chitosan (CS) to PVDF is expected to increase the membrane hydrophilicity so that the permeability and selectivity of membranes towards the dyes also increase. The aim of the study was to determine the effects of CS with varied concentrations between 1 and 2,5% on the performance of 18% PVDF membranes prepared by phase inversion method. The experiments showed that the PVDF/CS membranes were successfully synthesized by phase inversion method. The ATR-FTIR analysis showed that the CS has been incorporated in the membrane due to the presence of peaks at 3450 cm^{-1} and 1655 cm^{-1}indicating primary amine ($-NH_2$) and carbonyl group (C=O). The hydrophilicity, porosity, and the radius of the largest pore increased as the concentration of CS increased. The mechanical properties of the membranes showed that the increase of CS concentration resulted in lower tensile strength but higher elongation at break. The filtration performance of PVDF/CS membrane towards dyes solution showed better results compared to PVDF pristine membrane. The flux and rejection increased towards RY145 than MB. It was found that the best filtration performance was shown by membrane composed of PVDF/CS 18/1.5, with a rejection value of 79.53% and 93.84% for methylene blue (MB) and reactive yellow 145 (RY145), respectively. Regarding the flux of both dye solutions, values of 10.50 $L/m^2.h$ and 9.94 $L/m^2.h$ were obtained for MB and RY145, respectively. The Flux Recovery Ratio (FRR), as a measure of fouling resistant test of PVDF/CS 18/1.5 membrane showed a value of 73.35% for MB and 67.08% for RY145. So, regarding the physical properties and the performance of PVDF/CS 18/1.5 membrane, it is concluded that this membrane is potential for dye microfiltration.

Keywords: membrane, PVDF, CS, flux, rejection, dye

ABS-82: Oxy-polybrominated Diphenyl Ethers from the Indonesian Marine Sponge *Lamellodysidea herbacea*: X-ray, SAR, and Computational Studies

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Abstract Marine natural polybrominated diphenyl ethers (PBDEs) are promising medicinal potential for anticancer and antibacterial drugs. As part of our continuing study on bioactive substances from Indonesian marine organisms, we reinvestigated the constituents of the marine sponge *L. herbacea* to see the medicinal potential for anticancer and antibacterial drugs through isolation and reaction works as well as computational studies. A major PBDE **1** was isolated in a gram quantity as the most substituted bromine atoms in two phenol rings and the structure was determined through X-ray analysis. We observed that the biological activity of PBDE molecules depends on two functional groups: the presence of phenol and the number as well as the position of bromine atoms. With **1** [2, 3, 4, 5-tetrabromo-6-(3′, 5′-dibromo-2′-hydroxyphenoxy) phenol] in hand, the debromination reaction via the reversibility of electrophilic aromatic bromination with regioselective debromination may be a good way to provide a variety of PBDE molecules possessing the lower number and a variety position of bromine atoms besides the isolation of other analogues as well as modification of phenol by methylation and acetylation. This presentation describes the isolation of natural PBDE analogues (**1**–**7**), modification of phenol by methylation and acetylation reactions to give seven molecules (**8**–**14**), the interesting debromination reaction with the presence of scavenger of bromine to give nine molecules (**1**, **2, 15**–**21**). The new crystal structures and one unpublished ^{13}C NMR of **6** are also reported together with their SAR against HEK293T cells, Gram-positive *Staphylococcus aureus* and Gram-negative bacteria *Klebsiella pneumoniae* as well as their computational study.

Keywords: antibacterial, cytotoxicity, isolation, synthesis, SAR

ABS-83: Chemistry Research in University Environment: Qualitative Comparison Between Experiences in Indonesia and Thailand

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Abstract Asian scientists are notable for their dedication in science and technology throughout the decades. To serve this purpose, university research is well known to be one of the key actors in their innovation systems. Interestingly, the way research is implemented in university, in which chemistry research is not an exception, could be uniquely different among Asia countries. Consequently, the advantages and challenges in one working atmosphere could be different with the others. In this case, I have been privileged to be part of chemistry research in two different Southeast Asia countries during my years as a research assistant in my undergraduate institution in Indonesia and as a master student under the supervision of a distinguished professor in Thailand. Based on those experiences, I formulate some notes about the comparison of chemistry research in university environment between Indonesia in Thailand regarding fundamental aspects such as human resources, collaboration, funding, work ethic, safety and emotional interaction. The purpose of this article is to cover those findings using a qualitative narrative method. This work perhaps may emphasize the importance of revitalizing the era of global collaboration as an opportunity to improve research quality by learning from each other's strength. In addition, for students who are approaching the life as a researcher, this study provides some insights of interactions and reactions they could expect in their journey beyond the test tube.

Keywords: chemistry research, research in university, Indonesia and Thailand, experience comparison, qualitative narrative method

ABS-84: Optimization of high stable mesoporous silica nanoparticles synthesized as drug carrier materials

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Abstract. Mesoporous silica nanoparticles (MSN) have been known as promising drug carrier material. It must have porous structure to accommodate drug molecules and high stability during injection into the body. In this work, high stable and highly porous MSN have been synthesized by varying the synthesis parameters. The variables are reaction temperature, amount of surfactant, and pH condition. Synthesized MSNs have been observed by the Barrett-Joyner-Halenda (BJH) method to investigate its pore size distribution and pore volume. Colloidal stability is measured by identifying spectra characteristics and calculating the rate of absorbance by using a UV-Visible spectrophotometer. Drug release studies have been conducted by in-vitro used curcumin drug models. Changing synthesis parameters have an insignificant effect against the homogeneity of pores distribution. However, small pore size nanoparticles have been obtained in extreme reaction conditions at low temperature, pH, and surfactant amounts. UV-Vis spectra characteristics represent particle size and dispersity of MSN. A peak in UV-Vis spectra represents the existence of small particle size and well-dispersity. High colloidal stability of MSN indicated by low decreasing rate of absorbance. It found that CTAB amount, TEA amount, and temperature significantly influenced the stability of MSN. Results showed that MSN W11, W12, and W13 could be considered the best choice for excellent drug delivery material. The mentioned MSNs have great sensitivity drug release triggered by pH condition.

Keywords: high stability, mesoporous silica nanoparticles, drug delivery, cancer treatment.

ABS-85: Differences in Student Chemistry Learning Outcomes between Offline Tests and Online Tests on Electrolyte and Non-Electrolyte Solution Materials

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Abstract This research aims to determine the difference in chemistry learning outcomes of class XII students between offline tests and online tests on electrolyte and non-electrolyte solutions. This research uses a quasi-experimental method. The subjects in this research were class XII students of SMA Darussalam South Tangerang for the academic year 2020/2021 which consisted of 55 students who were divided into two groups, the first group using an offline test (27 students) and the second group using an online test (28 students). Data were collected using observation techniques and test instruments. The data analysis technique used is the T test. The results show that there are differences in student chemistry learning outcomes between offline tests and online tests on electrolyte and non-electrolyte solution materials in class XII SMA Darussalam South Tangerang in the 2020/2021 academic year.

Keyword : offline test, online test, electrolyte and non-electrolyte solutions

ABS-86: Evaluation of Temperature Effect on Conformation of Protein Interaction E -Cadherin..ADTC5 Complex: Molecular Dynamic Simulation

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Abstract The delivery of peptide-type drugs to the brain can be passed by the BBB (Blood Brain Barrier) via the paracellular route. In this pathway there is a barrier protein which only passes molecules with the size of <11 Å and a molecular mass of <500 Daltons. Epithelium Cadherin is one of the barrier proteins in the pathway. The difficulty of entering the molecule is due to the interaction of E-cadherin...E-cadherin. It has been observed that in the E-cadherin..ADTC5 complex there is an interaction between the amino acid E-cadherin (Phe35, Tyr36, Ile38, Phe51, Ile52, Ile53, Arg55, Val48, Val81) with the amino acid ADTC5 (Ace0, Cys1, Pro4, Val6, and Cys7), this interaction is in the form of 2 hydrogen bonds and 7 hydrophobic interactions. However, the complex is very sensitive to temperature because it can easily change its structure and stability. That is why the docking results obtained must be evaluated by molecular dynamics to confirm its stability in the influence of temperature and water solvent. The temperature used is in the range of 295 K – 320 K with an increase in temperature every 5 K which is computationally investigated. The method used in this research is molecular mechanics based on Newton's equation. The results obtained in this simulation are conformation, total potential energy, radius of gyration, RMSD, RMSF and hydrogen bonding. The results of the analysis show that an increase in temperature can change the conformation and stability of the E-Cadherin..ADTC5 complex.

Keywords: E-Cadherin, ADTC5, Molecular dynamics, Conformation energy .

ABS-87: Analysis of Lithium Insertion and Deinsertion in Photo-charging Battery System

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Abstract A photo-electrochemical battery system is one of the appealing developments of the solar cells. The utilization of a battery system aims to achieve better light energy conversion efficiency to supply a significant amount of the world's energy provided from renewable resources. By handling the photo-intercalation concept of semiconductor that suggested by Tributsch in 1983 [1], we investigated the basic mechanism of the direct energy conversion from light to the chemical energy to be used practically. To investigate the basic fundamental studies of the photo-intercalation reaction, active battery materials and semiconductors were utilized in the photochemical cell. The electrochemical transparent cell was utilized to observe the electrical current response from the energy produced by the reaction under light irradiation. A photo-sensitized LiFePO4 has been prepared to be applied as the working electrode, while a silicon p-type semiconductor has a role as the counter electrode in the three electrodes battery system. The current and potential-changing were observed by multimeter simultaneously. Without any light irradiation, there was no current response observed. Meanwhile, a significant current and voltage change when the light irradiated the cell. Further investigation of chemical state changes of the electrode materials induced by the light energy in the photo-electrochemical system was investigated by X-ray absorption spectroscopy. The shifting of peak profile in the X-ray absorption spectrum was observed which corresponds to the insertion of lithium-ion into Si anode.

Keywords: semiconductor, solar cell, photo-ionic

ABS-88: Potato Starch Substitute from Modified Sweet Potato Starch Affected by Concentration and Reaction Time of Sodium Acetate Anhydride

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Abstract Among commercial starches, potato starch is superior in terms of pasting consistency and excellent binding power. Since the price is expensive compared to other starches, there is an opportunity to produce the affordable one by modifying sweet potato starch to mimic the potato starch. Sodium acetate anhydride (SAA) can modify the physical properties of sweet potato starch by acetylation techniques. This technique would improve the swelling power, solubility, and water-binding capacity, which is very important to mark the functional characteristics of potato starch. This research aimed to obtain the optimum condition of acetylation to produce sweet potato starch with similar characteristics as potato starch. The response surface method (RSM) was applied to model the process and optimize the concentration of SAA and acetylation reaction time by using the central composite design. Adding 11.70 g/100 g, SAA for 13.06 mins in a sweet potato starch solution resulted in the optimum processing condition of acetylation. The produced starch found having the swelling power, water-binding capacity, and solubility, which is not statistically significantly different from commercial potato starch (p-value≥0.05). Even though the physical characteristic has matched well, it is essential to note that the scanning electron micrographs of acetylated sweet potato starch demonstrated the slight granule fusion, as suggested by the FTIR.

Keywords: acetylation, modification, RSM, sodium acetate anhydride, starch

ABS-89: Identification of Arsenic Types in Seaweeds Eucheuma cottoni, Eucheuma spinosum and Gracilaria sp Using LC-ICP-MS

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Abstract Arsenic is a toxic element and naturally contaminate food. In the environment, arsenic exists in the form of inorganic and organic compounds. It is important to identify the type of arsenic in seaweed. This is because seaweed has a high arsenic content. However, each type of arsenic compound has a different level of toxicity. In general, inorganic arsenic is more toxic than organic arsenic. By identifying the type of arsenic in seaweed products, the safety level of the seaweed products can be determined. Measurement of total arsenic levels was carried out using ICP-MS and the identification of the type of arsenic was carried out using the LC-ICP-MS. Types of arsenic identified include arsenite, arsenate, arsenobetaine and dimethylarsinic acid. The total arsenic levels in these three types of seaweed were 5.9139 mg/Kg (Gracilaria sp), 6.2196 mg/Kg (Eucheuma cottoni) and 7.1803 mg/Kg (Eucheuma spinosum). The results of the acquisition of inorganic arsenic levels in these three types of seaweed including Gracilaria sp of 0.0666 mg/Kg, Eucheuma cottoni of 0.07614 mg/Kg and Eucheuma spinosum were not detected. This value meets the requirements of BPOM in 2018 where the inorganic arsenic content of these three types of seaweed is below 1.0 mg/Kg.

Keywords: Arsenic, Arsenic Speciation, Seaweed, LC-ICP-MS

ABS-90: $ZnO/NiFe_2O_4$ Nanocomposite Photocatalysts: Synthesis, Structure, Magnetic and Optical Properties

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Abstract The magnetic nanocomposites of $ZnO/NiFe_2O_4$ were synthesized by a simple hydrothermal method and applied as catalysts for the degradation of Rhodamine B and Methylene Blue simultaneously. The effect on the crystal structure, morphology, optical and magnetic properties of varying the ratio of the ZnO to $NiFe_2O_4$ with the ratio of 1:0.05 (CNi0.05), and 1:0.1 (CNi0.1) was investigated. SEM analysis shows the morphology of the $ZnO/NiFe_2O_4$ were granules, rice, and flat plate-like, respectively. VSM analysis shows the composites have soft ferromagnetic behavior. The composites exhibit an enhanced photocatalytic activity for degradation of Rhodamine B and Methylene Blue in mix solution with degradation percentage achieved 98 % for Rhodamine B and 97 % for Methylene Blue after 3 h irradiation under sunlight using CNi0.05 as a catalyst. Nanocomposites still demonstrated good photocatalytic activity after used five times to degrade dyes and indicate good stability of the nanocomposites as a photocatalyst that can be used repeatedly.

Keywords: $ZnO/NiFe_2O_4$, photocatalyst, magnetic, dyes, simultaneous.

ABS-91: X-ray Computed Tomography on LiNi1/3Co1/3Mn1/3O2 Composite Cathode of All-Solid-State Batteries

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Abstract All-solid-state batteries (ASSBs) using inorganic solid electrolytes are expected to achieve high safety and high energy density. However, in many cases, rate capability of ASSBs is poor as compared with that of the conventional lithium-ion batteries using liquid electrolytes. This is because the contacted interface between active materials and solid electrolyte is insufficient, resulting in high resistance for charge–discharge. It has been confirmed that pressurization improves contact of solid electrolytes and conductivity. However, the effect of pressure on contact in composite electrode and battery performance is not understood enough. In this study, we investigated the effect of pressure-induced three-dimensional structure on the electrochemical properties of ASSBs. ASSBs were prepared at various stack pressures using a composite cathode, which contains active materials LiNi1/3Co1/3Mn1/3O2 (NCM), solid electrolyte Li10GeP2S12 (LGPS), and acetylene black. The charge–discharge measurements were performed in ASSBs of NCM|LGPS|In-Li, which indicates that the capacity increases as the stack pressure increases. To analyze the factors behind electrochemical results in terms of internal structure, we performed X-ray computed tomography (CT) using a homemade operando measurement cell. This measurement system allows us to analyze the three-dimensional structure of cathode during electrochemical measurements changing applied pressure. From this CT data, we succeeded in quantifying the changes of the porosity, tortuosity, and the contacted state of active material by changing the pressure. Quantitative analysis revealed that pressure-induced porosity, contacted state, and tortuosity correlate with the pressure-induced charge–discharge properties. In addition, we could discover the unique voids widen horizontally around active materials.

Keywords: ASSBs, X-ray CT

ABS-92: Preparation and Electrical Properties of La-Sr-F-S compounds for Fluoride Ion Conductor

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Abstract Fluoride-ion batteries using solid-state electrolytes exhibit the high theoretical energy density and one of the candidates for next-generation rechargeable batteries. In fluoride-ion batteries, the ion carrier is monovalent fluoride ion, which can realize the multi-electron transfer reactions of counter cations in active materials of fluoride compounds. However, it is far from practical use because there is no solid electrolyte which has high ionic conductivity and a wide electrochemical potential window like lithium-ion conductor. The previously reported fluoride-ion conductors such as PbSnF4 and La0.9Ba0.1F2.9 contain one type of anion, fluoride ions. To our best knowledge, there is few report on solid electrolyte materials containing multiple-anion compounds. In the field of material sciences, multiple-anion compounds have recently attracted attention, and novel structures with multiple anions have been reported. Compared with existing materials such as oxides and fluorides, mixed-anion compounds have the possibility to exhibit innovative functions due to their specific crystal and coordination structure. Therefore, using multiple-anion compounds could realize much higher physical properties than ever before. In this study, we prepared La-Sr-F-S compounds including fluoride and sulfides ions as anions by solid-state reaction under vacuum. The crystal structure of the prepared sample was characterized by X-ray diffraction. Electrochemical Impedance Spectroscopy measurement was performed. Moreover, Cyclic Voltammetry was performed to evaluate electrochemical potential window. In the synthesis, F－- deficient and F－-excess type of La-Sr-F-S compounds were successfully prepared by controlling the weight ratio of starting materials. Electrochemical Impedance Spectroscopy indicate that the prepared La-Sr-F-S compound exhibits 2.95×10-5 S cm-1 at 423 K. The electrochemical potential window is more than 4 V.

Keywords: Fluoride ion battery, Solid electrolyte, Mixed-anion compounds

ABS-93: Preparation and Electrical Properties of La-Sr-F-S compounds for Fluoride Ion Conductor

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Abstract Fluoride-ion batteries using solid-state electrolytes exhibit the high theoretical energy density and one of the candidates for next-generation rechargeable batteries. In fluoride-ion batteries, the ion carrier is monovalent fluoride ion, which can realize the multi-electron transfer reactions of counter cations in active materials of fluoride compounds. However, it is far from practical use because there is no solid electrolyte which has high ionic conductivity and a wide electrochemical potential window like lithium-ion conductor. The previously reported fluoride-ion conductors such as PbSnF4 and La0.9Ba0.1F2.9 contain one type of anion, fluoride ions. To our best knowledge, there is few report on solid electrolyte materials containing multiple-anion compounds. In the field of material sciences, multiple-anion compounds have recently attracted attention, and novel structures with multiple anions have been reported. Compared with existing materials such as oxides and fluorides, mixed-anion compounds have the possibility to exhibit innovative functions due to their specific crystal and coordination structure. Therefore, using multiple-anion compounds could realize much higher physical properties than ever before. In this study, we prepared La-Sr-F-S compounds including fluoride and sulfides ions as anions by solid-state reaction under vacuum. The crystal structure of the prepared sample was characterized by X-ray diffraction. Electrochemical Impedance Spectroscopy measurement was performed. Moreover, Cyclic Voltammetry was performed to evaluate electrochemical potential window. In the synthesis, F－- deficient and F－-excess type of La-Sr-F-S compounds were successfully prepared by controlling the weight ratio of starting materials. Electrochemical Impedance Spectroscopy indicate that the prepared La-Sr-F-S compound exhibits 2.95×10-5 S cm-1 at 423 K. The electrochemical potential window is more than 4 V.

Keywords: Fluoride ion battery, Solid electrolyte, Mixed-anion compounds

ABS-94: ANALYSIS AND SIMULATION OF FLARE GAS RECOVERY IN OIL REFINERY PLANT FOR IMPROVING PLANT ENERGY EFFICIENCY

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Abstract Due to its significant environmental impacts and economic losses, flaring activities in PT.XYZ as Indonesian oil company still remain important issue. While there are currently available solutions to reduce the impact, the implementation of these technologies generally brings additional question regarding the technical, economic and environment aspect. In this work, the technical and economic performances of the proposed Flare Gas Recovery ranging from 0.5, 1.0, and 1.5 MMSCFD in PT.XYZ to produce fuel gas are assessed. The study is carried out using the process simulator Aspen HYSYS V.11 and the economic analysis is being analyzed. Recovered Flare gases are utilized as fuel gas supplement for Combined Cycle Power Plant (CCPP) in PT.XYZ and greatly expected to bring a significant improvement in the savings of fuel gas requirements, reduce the CO2 emission and remove the negative impact of flaring to environment. Alternative technology using Liquid Ring Compressor (LRC) with amine solvent as the liquid ring for recovering flare gas is also assessed to find better economic. The result showed that flare gas recovery system significantly reduce the fuel costs while LRC technology providing more flexibility in achieving cost efficient project requirements.

Keywords : Flare gas, Flare gas recovery, simulation, energy efficiency

ABS-95: Direct Observation of Dendrite Formation in AgI-Ag2O-P2O5 Glass Electrolyte Using X-Ray Computed Tomography

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Abstract All-solid-state batteries (ASSBs) using metal anodes have not yet been practically used due to safety problems from metal dendrite formation. In order to use metal anode in solid electrolytes, it is necessary to understand the reaction mechanism of dendrite formation. The previous study revealed that metal dendrites grow along grain boundaries in crystalline solid electrolytes.1) However, there is no report on direct observation of dendritic growth in amorphous solid electrolytes. To elucidate the mechanism of dendrite formation in solid glass electrolytes, we observed direct three-dimensional images during electrochemical reactions of all-solid-state cells with operando X-ray computed tomography (CT). In this study, as a model case of dendrite formation in ASSBs using metal anode, a battery cell with AgI-Ag2O-P2O5 glass electrolyte was selected. AgI, Ag2O, and P2O5 were mixed at mole ratio of 1:1:1. The mixed powder was calcined at 520 °C for 2 hours. After that, glass electrolyte was obtained by quenching AgI-Ag2O-P2O5 melt to room temperature. X-ray diffraction measurements of the synthesized material revealed the amorphous phase. We prepared Ag|AgI-Ag2O-P2O5|Ag cell in a diameter of 0.24 mm. The CT scans were performed before and after the chronopotentiometry measurement. Before the electrochemical measurement, the CT images showed the micro-cracks in the glass solid electrolyte. After the measurement, Ag metal grew from the point of the initially presented crack. Ag metal formation induces additional cracks. Ag metal dendrite formation causes stress in the solid electrolyte, resulting in the additional crack formation.

Keywords: Dendrite Formation, Glass Electrolyte, X-Ray Computed Tomography

ABS-96: The Relationship Between Scientific Attitude and Creative Thinking Skill in Chemistry Education Student at Mataram University

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Abstract : The purpose of the study is to describe the relationship between scientific attitude and creative thinking skills in Chemistry Education students at Mataram University. The type of this research is an ex-post facto quantitative study. The study population was 160 students with a total sample of 114 students of the Chemistry Education Study Program of the Teacher Training and Education Faculty of Mataram University. The sampling method was done by using *proportionate stratified random sampling*. The Data collection of scientific attitude using questionnaire and tests of creative thinking skill. The method used for data analysis was *descriptive statistical analysis* and *inferential statistical analysis*.The result of *descriptive statistical analysis* showed that the categories for students' scientific attitudes is included in avearge category of 54,95 wiith the highest score on the curiosity attitude indicator, as well creative thinking skills included in the medium category obtained an average of 11,16 with the highest on the fluency indicator. Inferential statistical analysis was used prerequisite tests and hypothesis tests. The results of the hypothesis test used *Pearson Product Momen*t correlation which showed the value of r_{xy} = 0.30; coefficient of determination of 9,1 %; and t_{count} = 3,341 > t_{tabel} = 1,585.. In conclusion, there is a positive and significant relationship between scienticif attitude and the creative thinking skill on students with low level of correlation.

Keywords: Scientific attitude, creative thinking skill, student of chemistry education, relationship.

ABS-97: ESTRADIOL AND TESTOSTERONE CONCENTRATION OF RASBORA HARLEQUIN (*Trigonostigma heteromorpha*)

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Abstract Rasbora harlequin (Trigonostigma heteromorpha) is the most widely distributed species of the genus Trigonostigma and is a favorite ornamental fish species in Indonesia. This study aims to determine the content of the hormones estradiol and testosterone in ornamental fish Rasbora harlequin which consists of various age groups. 20 test fish with maintenance age consisting of 20, 6, 3 and 1 month were analyzed for their levels of estradiol and testosterone hormones. Reproductive hormones, especially estradiol and testosterone, have been detected in ornamental fish Rasbora harlequin since the size of 24.75 mm. There is a positive correlation between age and reproductive hormone concentrations between 6-20 months. All test fish contained estradiol and testosterone and could not be sexed based on hormone content. It is necessary to make observations from the time the larvae are to know accurately at what size hormones and the reproductive system begin to develope.

Key words: Estradiol, Testosterone, Rasbora harlequin, Trigonostigma heteromorpha.

ABS-98: Mixed-anion Doping on Chloride-based Lithium-ion Conductor

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Abstract Practical use of all-solid-state batteries requires solid electrolytes having higher conductivity, atmospheric stability, electrochemical stability and flexibility. High ionic conductivity of solid electrolytes has been discovered mainly for oxide-based and sulfide-based materials, but they have problems in the point of moldability and atmospheric stability, respectively. In recent years, it has been reported that the lithium halide solid electrolytes have high lithium-ion conductivity, and the materials search area is expanding. Li3YCl6, Li3YBr6 and Li3InCl6, which show the room-temperature ionic conductivity is 10-3 S / cm and high moldability, have been reported as lithium halide solid electrolytes. At present, most of the lithium halide solid electrolytes are single-anion compounds, and there are not reports on mixed-anion compounds as lithium-ion conductors. In this study, we tried to control the polarizability of anions as a factor to improve lithium-ion conductivity using mixed-anion doping. We synthesized mixed-anion compounds by doping oxygen, sulfur and selenium into Li3InCl6. Li3InCl6, Li3InCl5.4O0.3, Li3In0.9Cl5.4O0.15, Li3In0.82Cl5.4O0.03, Li3InCl5.4S0.3, Li3InCl5.4S0.6 and Li3InCl5.4Se0.6 samples were synthesized by a mechanochemical method and a solid phase reaction in an Ar atmosphere. The samples were analyzed by X-ray diffraction and AC impedance measurements. The addition of mixed anion to the chloride-based solid electrolytes causes negative effects for the lithium-ion conduction.

Keywords: lithium halide solid electrolytes, mixed-anion compounds

ABS-99: Synthesis of Graphene Nanosheet from Coffee Ground Waste and its Incorporation to Mixed Phase TiO_2 as Photocatalyst

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Abstract The increasing level of Indonesia coffee consumption produced a significant amount of coffee ground waste as landfill, leading to serious environmental problems on account of phenol derivatives and acidic compounds as its constituents. Containing high carbon content, coffee ground is a favorable biomass candidate to convert into carbon-based material, such as graphene nanosheet (GN). Having wide surface area, graphene derivatives can be used to modify surface of many materials, such as TiO_2. The aim of this study is to synthesize graphene-modified TiO_2 with a mixed anatase:rutile phase (9:1) and to compare its photocatalytic activity with unmodified TiO_2. TiO_2 was synthesized by sol-gel method, with titanium butoxide (TBOT) as its precursor. TiO_2 then was calcined at 700 ^oC for 3 hours to create a mix in its phase. Graphene oxide (GO) was synthesized using a modified Hummers method, and further reduced by hydrothermal treatment in teflon-lined autoclave at 180 ^oC for 2 hours to obtain graphene nanosheet. TiO_2 was modified with graphene nanosheet using similar hydrothermal treatment, with variations of graphene mass content. TiO_2/GNs synthesized were characterized with Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), X-Ray Diffraction (XRD), Fourier Transform Infra-Red spectroscopy (FTIR), Raman spectroscopy, Brunauer-Emmett-Teller (BET) surface area analysis, and Ultraviolet-Diffuse Reflectance Spectroscopy (UV-DRS). Several materials showed drops in their energy gap using UV-DRS analysis, mainly for TiO2 (3.00 eV), and the ones combined with GN of 2 % (2.78 eV) and 4 % (2.94 eV) weight percentage. XRD analysis of the mixed phase TiO_2 also showed peaks of both anatase and rutile phases, with the latter phase percentage reaching 11%. Overall, the synthesized photocatalyst materials presented promising potential to be applied as photocatalysts.

Keywords: Mixed Phase TiO_2, Graphene nanosheet, photocatalyst, biomass, coffee ground waste

ABS-100: Synthesis Of TiO2 Exposed Facet (001) Modified with Graphene Oxide as a Photocatalyst For Anthracene Degradation

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Abstract Anthracene is a compound that is classified as an organic pollutant. Anthracene is easy to move because it can form colloids in the air and facilitate its dispersion in soil and water environments. Anthracene has a negative impact on ecological systems as well as living things, because it has high toxicity, carcinogenicity and mutagenicity. To degrade anthracene, TiO2 can be used as a photocatalyst in an effort to reduce this organic pollutant. In this study, the photocatalytic activity of TiO2 for the degradation of anthracene was enhanced with the help of HF in synthesizing TiO2 into TiO2 anatase with a dominant facet (001). The photocatalytic activity can also be increased by modifying the dominant facet TiO2 (001) with graphene oxide to reduce the electron-hole recombination rate. The graphene oxide used in this study was produced from graphite derived from the pyrolysis of coffee grounds. TiO2 was characterized using XRD, SEM, TEM, BET, FTIR, Raman, XPS, and UV-DRS. Meanwhile, the results of the photocatalytic reaction will be analyzed using a UV-Vis spectrophotometer.

Keywords: TiO_2, Photocatalyst, Anthracene, Graphene Oxide.

ABS-101: Critical Thinking Analysis of Chemistry Students and Its Relationship with SRL on Online Learning

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Abstract This study aims to analyze students' critical thinking and examine its relationship with self-regulated learning (SRL) in online learning. The research subject was active chemistry students with a total of 85 people spread over 3 semesters, namely the 2nd semester (N = 30), the 4th semester (N = 33), and the 6th semester (N = 22). Critical thinking indicators used are accuracy, making assumptions, developing hypotheses, testing hypotheses, and developing conclusions, whereas a total of 5 SRL indicators include metacognitive skills, time sharing, environmental structuring, persistence, and seeking help. The results showed that the average score of the juniors' critical thinking (X = 85.91; SD = 3.22) was higher than the freshmen (X = 81.67; SD = 3.02) and the sophomore (X = 57 .97; SD = 14.68). The same thing is also happened in SRL where the juniors have higher SRL scores on all indicators compared to the sophomore and the freshmen. The analysis of each SRL indicator shows that the highest score is shown in the metacognitive skill and the lowest score is shown in the indicator of seeking help. Students with high SRL scores tend to have high critical thinking scores. The results of this analysis conclude that the SRL score has a relationship with students' critical thinking scores during online learning.

Keywords: critical thinking, self-regulated learning, online learning, chemistry students

ABS-102: Synthesis of Phenolipid Compounds Obtained by Lipophilization of Gallic Acid with Ricinoleic Acid and Its Activity Assay as an Antioxidant, Antimicrobial, and Emulsifier Agent

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Abstract Synthesis of ricinoleic acid-based phenolipid compounds has been carried out in this study by lipophilization of gallic acid with ricinoleic acid. Before lipophilization was carried out, ricinoleic acid was methylated first. The resulting methyl ricinoleic was then reacted with gallic acid using $ZnCl_2$ as catalyst at 70-80 ^oC for 6 hours in a reflux system. The synthesized product was characterized using TLC with a mixture of chloroform:methanol (93:7) used as the eluent. The phenolipid compounds obtained from the reaction showed higher Rf value (0.84) compared to the Rf value of methyl ricinoleic (0.76) or ricinoleic acid (0.58). Characterization of the synthesized product using FTIR showed a new strong absorption band at wave number 758.06 cm^{-1} which indicated the presence of an aromatic C-H group (bend). This indicated that the phenolipid was produced. Antioxidant activity test of phenolipid compounds using DPPH method showed the inhibition percentage value of 33% at concentration of 2 mM. This value lower than the inhibition percentage value of BHT (89.6%) that used as control. The emulsifier test of the synthesized phenolipid compounds showed good emulsion stability up to 24 hours observation, with water in oil (W/O) type of emulsion formed. The phenolipid compound showed medium antibacterial activity against *Staphylococcus epidermidis* and *Propionibacterium acnes*, which produced inhibition zone up to 18 mm using paper disc method, but did not show antifungal activity against *Candida albicans*.

Keywords: lipophilization, gallic acid, ricinoleic acid, antimicrobial, antioxidants

ABS-103: A Molecular Screening Approaches in Investigation of Ability Bioactive Compounds from *Curcuma zedoaria* as HER2 Inhibitors

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Abstract Breast cancer is the most commonly diagnosed cancer among women and leading the second most cause of cancer death worldwide in 2020. Human Epidermal Growth Factor Receptor 2 (HER2) is part of four members of the HER2 receptor family leading to proliferation, differentiation, and inhibition of apoptosis. Overexpression of HER2 associate with a more aggressive disease with higher recurrence rates. The various bioactivity of the active substances from natural compounds has been tested as inhibitors, including White Turmeric (*Curcuma zedoaria)*. In several studies, extracts and essential oil of this plant showed promising antioxidant properties and cytotoxic against breast cancer cell lines. Therefore, this study predicts the potential of bioactive compounds of *C. zedoaria* targeting HER2 through molecular docking simulations. The conformational stability formed is the main parameter in the docking affinity assessment. The result showed that six out of 33 compounds from *C. zedoria* had potential as HER2 inhibitors. The binding affinity of dihydrocurcumin, curcumin, tetrahydrodemethoxycurcumin, zerumin A, demethoxycurcumin and bisdemethoxycurcumin were 7,4359 kcal/mol, -6,8372 kcal/mol, -6,6454 kcal/mol, -6,3360 kcal/mol, -6,3148 kcal/mol and -6,3148 kcal/mol, respectively. The inhibitory action of the compounds was also validated by comparing it with the reference compound lapatinib. Further research is needed to validate the above data.

Keywords: HER2, inhibitor, *Curcuma zedoaria*, molecular docking.

ABS-104: Synthesis of alginate-PVA-bentonite-charcoal (APBC) biocomposites for methylene blue (MB) dye sorption

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Abstract Biocomposites were synthesized by dispersing bentonite (Bent) clay and charcoal in a composite biopolymer namely alginate (Alg) - PVA and cross-linked with Ca^{2+} (APBC). The synthesized biocomposites were characterized by various instrumental techniques like FTIR, XRD, SEM and EDAX. Methylene blue (MB) dye sorption capacities of the biocomposites APBC was examined by batch process. Various adsorption influencing factors viz., contact time, the dosage of the sorbent, pH of the medium, temperature, were studied. Freundlich and Langmuir isotherm models were adopted to examine the adsorption equilibrium. Kinetics of the sorption process was carried out by pseudo-first-order and pseudo-second-order models. The regeneration studies were carried to know about the reusability of the biocomposites.

Keywords: Alginate, bentonite, composite, adsorption, methylene blue

ABS-105: Study Application of Fe3O4/Graphene Oxide from Biomass Sources as Paraquat Adsorbent

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Abstract Paraquat is an effective herbicide that widely used for weed and grass control. However its use can cause harm to the environment, especially human health. Various ways have been done to overcome this problem, one of them is adsorption method which considered more effective than other methods. Graphene Oxide (GO) is a nanomaterial that often used as an effective adsorbent. In this study, GO was synthesized by utilizing biomass graphite such as coconut shell charcoal and coffee ground waste. Fe_3O_4 added to GO to increase adsorption activity. Fe_3O_4/GO characterized by X-ray Diffraction (XRD), Raman Spectroscopy, Transform Infra-Red Spectroscopy (FTIR), Scanning Electron Microscopy (SEM), Transmission Electron Spectroscopy (TEM), and Vibrating Sample Magnetometer (VSM). Fe_3O_4/GO ratio is 3:1. The adsorption activity of Fe_3O_4/Graphene Oxide was analyzed using UV-Vis.

Keywords: Adsorption, Biomass, Herbicide, Fe_3O_4, Graphene Oxide, Paraquat

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ABS-106: Biflavonoids from Indonesian *Araucaria hunsteinii* K. Schum leaves

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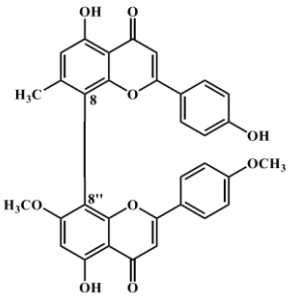
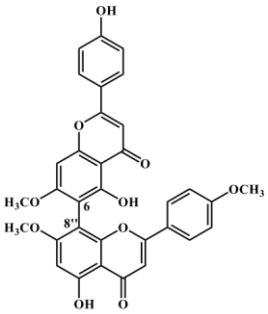
Abstract Biflavonoids are dimeric flavonoid which is connected via C-C or C-O-C bonds. These secondary metabolites have been recognized for various biological activities, including anti-inflammatory, antibacterial, antiviral, antifungal, antidiabetic, antioxidant, and anticancer. *Araucaria* consists of 19 species and eight species have been reported to produce biflavonoid, that primarily found in its leaves. *Araucaria hunsteinii* growing in Bogor Botanical Garden, West Java, was expected to contain biflavonoids that have never been reported. In this research, biflavonoids isolation was performed by macerating the driedpowdered leaves using acetone, followed by fractionating through Sephadex LH-20 column chromatography (CC) and silica gel CC to afford two isolated compounds. The chemical structure of both metabolites was deduced from IR, UV-Vis, 1D- and 2D-NMR spectral data, and identified as 4',7,7''-tri-O-methylcupressuflavone (**1**) and 4''',7,7''-tri-Omethylagathisflavone (**2**). These biflavonoids are found in another species of *Araucaria*, but they were first discovered in *A. hunsteinii*.

Keywords: agathisflavone, *Araucaria*, *Araucaria hunsteinii*, biflavonoid, cupressuflavone



4',7,7''-tri-*O*-metilkupresuflavon (1)



4''',7,7''-tri-*O*-metilagathisflavon (2)

ABS-107: Synthesis and Molecular Docking of 5-(2-Fluorophenyl)-3-(naphthalene-1-yl)-1-phenyl-1*H*-pyrazole as Potential Anti-breast Cancer Agent

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Abstract Pyrazole is heterocyclic azo derived compound due its various biological activities such as anticancer, antimicrobial, antioxidant and antiinflamation. This research aims to synthesize pyrazole derivatives containing fluorophenyl, verify the toxicity value and predict its anti-breast cancer activity. The compound of 5-(2-fluorophenyl)-3-(naphtalene-1-yl)-1-phenyl-1*H*-pyrazole was successfully synthesized in two step. In the first step, the pyrazoline was synthesized by one-pot cyclized reaction and assisted by microwave irradiation. Within the second step, pyrazole was synthesized via oxidative aromatization reaction of pyrazoline with glacial acetic acid under conventional heating. The activity was evaluated by molecular docking simulation of synthesized compound against ERα (PDB ID:3ERT) using AutoDock 4.2.6. In this work, structure of predicted molecule was confirmed by UV, FTIR, GC-MS, 1D and 2D NMR spectroscopy data analysis. Furthermore, the toxicity was evaluated by Brine Shrimp Lethality Test (BSLT) for pre-screening of anticancer drugs analysis showed that the compound was toxic with LC_{50} values of 49.07 µg/mL. Based on the molecular docking study, a new fluorinated pyrazole compound showed potential inhibition against ERα with binding affinity and Ki value of -10.77 Kcal/mol and 12.69 nM. Thus, fluorinated pyrazole compound is promising candidate as anti-breast cancer agent through antagonis activity to ERα.

Keywords: anti-breast cancer, fluorinated pyrazole, oxidative aromatization reaction, toxicity

ABS-108: Synthesis of Ricinoleic Acid-based Lipoamide Compounds and Their Cytotoxic Assay Against HeLa Cells

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Abstract In this study, ricinoleic acid was esterified with dry methanol in reflux system using KOH as catalyst. Methyl ricinoleate was then reacted with amino acid to produce lipoamides through amidation process. Two variations amino acids were used in this study, namely glycine and phenylalanine. Characterization of lipoamides formed using FTIR showed that there were overlapping N-H and O-H stretch bands at wave numbers 3445.47 cm^{-1} for glycine-ricinoleate lipoamide and 3434.06 cm^{-1} for phenylalanine-ricinoleate lipoamide. FTIR spectrum also showed medium absorption peak of C-N at the wave number 1217.90 cm^{-1} for glycine-ricinoleate lipoamide and 1217.59 cm^{-1} for phenylalanine-ricinoleate lipoamide. These indicated that the amide bonds were formed via the amidation process. Cytotoxicity assay of lipoamide compounds using MTT method against HeLa cells showed that the IC_{50} value of glycine-ricinoleate lipoamide was 120 µg/mL which was considered quite active, while the IC_{50} value of phenylalanine-ricinoleate lipoamide was 250 µg/mL which was classified as weak cytotoxicity properties.

Keywords: ricinoleic acid, lipoamide, amidation, MTT assay, HeLa cells.

ABS-109: Biogasoline production from crude palm oil (CPO) via hydrodeoxygenation (HDO) over molybdenum nitride pillared bentonite

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Abstract Crude palm oil (CPO) contains free fatty acids that can be converted into biogasoline through hydrodeoxygenation (HDO) using heterogeneous catalysts such as natural bentonite. The acidity and catalytic activity of bentonite can be improved through the pillarization process. Before pillarization, bentonite is activated using saturated NaCl to assist the pillarization process. The activation of natural bentonite into Na-bentonite increasing the CEC value from 165.85 to 279.15 mEq/100 grams and indicates that the pillarization will easily occur. Pillarization was done using Mo6+ -with various concentrations of 2, 4, 6, 8, 10 mEq/grams and 0.5 ammonium nitrate solution and then calcinated at 400°C for 2 hours and reduced at a temperature of 350°C for 2 hours using H2 atmosphere. The product was called molybdenum nitride pillared bentonite. Catalysts were applied to hydrodeoxygenation reaction using cylinder reactor with a temperature of 350°C for 2 hours and atmosphere H2 with a flow rate of 2 mL/seconds. The products are characterized using GC-MS instrument, and catalysts that obtained the largest biogasoline fractions are characterized using XRD, FTIR, SEM-EDX instrument, and acidity analysis. The largest fraction of biogasoline was obtained in the 8 mEq/grams molybdenum nitride pillared bentonite catalyst with a total area of 29.16%. XRD analysis showed that the pillarization process resulted in a diffraction angle shifting from 5.80° to 12.88°. FTIR analysis shows the presence of vibrations from the functional groups of Mo=O and N-H. SEM analysis showed a change in heterogeneous morphological surface and black spots indicating increased pores, and EDX analysis showed increasing elemental content of Mo from 0 % to 29.26 % and N from 0 % to 0.49 % after pillarization. The analysis of acidity using the gravimetry method showed increasing acidity from 0.005 mmol/gram to 0.13 mmol/gram. The catalyst characterization indicates that the pillarization of Na-bentonite into molybdenum nitride pillared bentonite has been successfully done and potentially used as a catalyst for HDO reactions.

Keywords: molybdenum nitride pillared bentonite, crude palm oil, biogasoline, hydrodeoxygenation

ABS-110: Analysis of Piperenamid A Content in Black Betel Leaf Extract (*Piper acre* Blume) from East Kalimantan using HPLC

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Abstract One of the medicinal plants that grows in East Kalimantan and can be used by the community as medicine is black betel (Piper acre Blume). Based on existing research, black betel leaf has antioxidant, antimicrobial, and cytotoxic activities. Black betel leaf contains secondary metabolites of alkaloids, saponins, flavonoids, and tannins. One of the compounds contained in black betel leaf is piperenamide A. This study aims to determine the content of piperenamide A in the ethanolic extract of black betel leaf based on different growing locations using HPLC (High Performance Liquid Chromatography). Betel leaf samples were taken from 5 different growing locations in East Kalimantan. The extraction method used is maceration and uses 96% ethanol as a solvent. Determination of piperenamide A content in ethanolic extract of black betel leaf using HPLC column C18, maximum wavelength 259 nm and aqueous mobile phase: acetonitrile with a flow rate of 1 mL/minute. The results showed that the retention time of piperenamide A compounds from 5 different growing locations was 3,923 in a row; 3,895; 3,822; 3,911; and 3,923 minutes. The obtained levels of piperenamide A in the ethanol extract of black betel leaf at 5 different growing locations were 2.63; 40.33; 20.88; 148.46; and 1.66 ppm.

Keywords: Ethanol extract, black betel, piperenamid A, HPLC

ABS-111: Validation Of Method Analysis Heavy Metal Level Copper (Cu) with Na_2O_2 Dry Digestion in Sediment CRM BCR 667 by Atomic Absorption Spectrophotometry

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Abstract Validation of Method Analysis Heavy Metal Level Copper (Cu) with Na_2O_2 Dry Digestion in Sediment CRM BCR 667 by Atomic Absorption Spectrophotometry have done. Validity test was conducted on the linierity test, determining the limit of detection (LoD) and limit of quantitation (LoQ), accuracy test and precision test. The linierity of the standard Cu curve is 0.9996 with LoD value of 0.0412 mg/L and LoQ value of 0.1344 mg/L. Accuracy test is done by calculating the percent recovery is 101.43%. Precision test results method acquired %RSD is 1.93%. The Cu level in the sediment CRM BCR 667 is 58.63 mg/kg. This result is not significant different with the Cu level in certificate is 60 mg/kg. Based on the validity test concluded that dry digestion with Na_2O_2 valid to use in Cu level analysis in sediment

Keywords: AAS, Dry Digestion, Cu, Sediment, Na_2O_2

ABS-112: Catalytic Cracking Of Nyamplung Oil (*Calophyllum Inophyllum L.)* into Biofuel Using NiCr/HZ Catalyst

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Abstract Nyamplung oil (*Callphyllum Inophyllum L*.) can be used as raw material for biofuel because it has a high oil content in the seeds and is non-edible oil. The conversion of nyamplung oil into biofuel is carried out by a catalytic cracking process. Natural zeolite which is converted into a hierarchical form (HZ) can be used as a catalyst support in the catalytic cracking of nyamplung oil. To increase the catalytic ability, Ni and Cr metals can be impregnated. The purpose of this study was to determine the characteristics of the NiCr/HZ catalyst and the optimum conditions for catalytic cracking of nyamplung oil including time and temperature. Hierarchical zeolite was synthesized by desilication process with 0.5 M NaOH and activation with 1 M CH_3COONH_4. Then impregnated with NiCr metal and characterized using XRD and SAA instrumentation. The catalytic cracking process for nyamplung oil was carried out by varying the temperature (325, 350, and 375^oC) and time (1, 2, and 3 hours). The product was analyzed for its compound content using GCMS instrumentation. The XRD results of the NiCr/ZH catalyst showed the appearance of peaks of Ni and Cr metals at 2θ: 17.32 and 27.73^o. The results of SAA characterization showed that the surface area, total pore volume, and average pore diameter of the NiCr/HZ catalyst were 85.5232 m^2/g, 0.1023 cc/g, and 4.7869 nm. The optimum conditions for the catalytic cracking process of nyamplung oil were obtained at a temperature of 375oC and a time of 3 hours with a gasoline selectivity of 30.87%; kerosene 32.76%; and diesel 34.62%.

Keywords: Catalytic cracking, nyamplung oil, NiCr/HZ, natural zeolite, gasolin

ABS-113: Effect of Temperature Variation on the Structure of Gene-Translated Thermostable Lipase by Molecular Dynamic Simulation

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Abstract Molecular modelling has increasingly been used to investigate the structural dynamics, properties, and thermodynamics of biological systems. This study aims to evaluate the structural dynamics of gene-translated lipase structure from PLS 80, a novel bacterium previously isolated from undersea fumaroles, subjected to various temperatures. Prediction using SWISS-MODEL showed that lipase of PLS 80 had the highest homology (97,65%) with lipase 2DSN, with Global Model Quality Estimation (GMQE) and Qualitative Model Energy Analysis (QMEAN) values of 0.99 and 0.7, respectively. The lipase 2DSN was then as the template. The temperature simulation was conducted using AMBER (Assisted Model Building with Energy Refinement) software at 300, 350, and 400 K for 50 ns. The parameters used for evaluation were RMSD (Root Mean Square Deviation), the radius of gyration (Rg), total energy, number of hydrogen bonds, RMSF (Root Mean Square Fluctuation), and SASA (Solvent Accessible Surface Area). Although produced by a thermophile, the simulation showed that the lipase had the lowest RMSD, Rg, and total energy when at 300 K. Higher temperature increased the Rg and reduced the number of hydrogen bonds in the molecule. The RMSF data showed that residues Ala100, Lys135, Arg211, Arg227, Trp252, Leu274, Phe287, Thr303, Arg327 and Arg375 were conformationally less rigid than other residues in the structure. Some residues (Phe13, Arg31, Arg150, Arg 176, Asn 193, Pro229, Arg271, Tyr279, Val291, Arg300, Gly324, Pro325 and Met 348) gave significant changes in the RMSF values when the temperature was increased. The SASA values of polar and non-polar residues at 300 K and 350 K only differed slightly, while the values at 400 K showed a more significant increase. Visual evaluation of the lipase structure indicated that the □-sheet structures only shifted slightly at various temperatures. However, conformational changes were observed in the □-helix and turn/loop structures. At 350 K, the lipase had an additional □-sheet, while some turn/loop structures frayed to coil structures. These structural differences may explain the optimum lipase activity at around thermophilic temperature.

Keywords: Molecular dynamics simulation; lipase; thermophilic; halophilic

ABS-114: Production of Electricity and Bioethanol with Microbial Fuel Cell (MFC) Technology on Molasses Substrate

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Abstract Microbial Fuel Cell (MFC) is a microbial-based technology that converts chemical energy into electrical energy through metabolic processes. This research aims to determine the effect of electrolyte solution on electricity production and determine the content of bioethanol as a by-product of electricity production using Gas Chromatopraphy-Mass Spectrometry (GC-MS) with a fermentation process using Saccharomyces cerevisiae in molasses substrate. This research method uses a double chamber consisting of an anode and a cathode chamber connected through a proton exchange membrane (PEM). This research showed that the addition of 0.2 M $KMnO_4$ electrolyte solution obtained a maximum current of 1.20 mA and a potential difference of 480 mV with a power density of 2935.0318 mW/cm^2. The addition of 0.2 M $K_3(Fe(CN)_6$ electrolyte solution obtained a maximum current of 1.65 mA and a potential difference of 320 mV with a power density of 2690.4458 mW/cm^2. The results of the GC-MS analysis showed the presence of bioethanol.

Keywords: Microbial Fuel Cell (MFC), Bioethanol, Molasses

ABS-115: Red Algae (*Eucheuma cottonii*) as A Substrate in Microbial Fuel Cells (MFCs) Technology to Generate Electrical Energy

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Abstract The continuous use of oil and gas fuels cause a global energy crisis and environmental pollution, so it is necessary to use renewable energy sources that are environmentally friendly. Microbial fuel cells (MFCs) is a technology that can generate electricity by converting chemical energy into electrical energy using microorganisms as a catalyst. The aim of this research is to determine the potential of red algae (*Euchuema cottonii*) as a substrate in MFCs to generate electrical energy. This research used dual-chamber MFCs, in anode chamber contain hydrolyzed red algae cellulose, peptone, yeast extract, yeast, KH_2PO_4, and methylene blue (this mixture is autoclaved before being put into the anode chamber) while in cathode chamber contain KMnO4 0.2 M as electrolyte solution. This reactor used Nafion^{TM} 117 membrane as proton exchange membrane. Electrical measurement carried out every 4 hours for 48 hours. The highest power density at 16 hours using red algae as a substrate is 1091.326 mW/cm^2 with value of current 690 mV and potential difference 0.31 mA.

Keywords: Microbial Fuel Cells , *Eucheuma cottonii*, renewable energy, electrical energy

ABS-116: Isolation and Identification of Anticancer-Protein-Producing Symbiotic Bacteria From Green Algae *Caulerpa lentillifera*

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Abstract Green algae symbiotic bacteria can be used to search for anticancer compounds. This study aims to identify the type of symbiotic bacteria from *Caulerpa lentillifera* that has the potential to produce bioactive proteins as anticancer. Bacteria were isolated using Nutrient Agar (NA) media with pour-plate technique and purified by streak plate method, then bacteria with different morphological characteristics were identified by biochemical tests and physical properties of gram. Proteins from bacterial cells were extracted with buffer A through a freeze/thaw and sonication process, then an antioxidant test was performed using the DPPH method and a toxicity test using the Brine Shrimp Lethality Test (BSLT) method. The results showed 2 isolates of symbiotic bacteria, namely *Bacillus circulans* (gram-negative) with protein content of 357.41 mg, IC_{50} 6.1730 ppm and LC_{50} 9.758 ppm, and *Enterobacter aglomerans* (gram-positive) with protein content of 416.43 mg, IC_{50} 5.0386 ppm and LC_{50} 11.694 ppm. The two symbiotic bacteria from *C. lentillifera* were proven to contain proteins that have potential as anticancer agents.

Keywords: *Caulerpa lentillifera*, symbiotic bacteria, protein, toxicity

ABS-117: Synthesis and Evaluation of Polyisobutylene (PIB)-Based Fuel Additives for Controlling Carbon Deposit in Motorcycle Engine

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Abstract Polyisobutylene (PIB)-based deposit-control additives are polymeric substances functioned as additives in engine fuel to prevent gum and sludge formation in the combustion process and to reduce the release of impurities associated with serious performance and environmental issues. In this work, two types additives were synthesized by modifying polyisobutylene with diethylenetriamine (PIBDETA) and pentaethylenehexamine (PIB-PEHA). We performed characterization using Fourier transform-infrared (FT-IR) spectroscopy, UV-vis spectrophotometer, thermogravimetric analysis and liquid chromatography–electrospray ionization-quadrupole time-of-flight-tandem mass spectrometry (LC–ESI-QTOF-MS/MS) to evaluate the chemical properties of the products. The generation of intake valve deposits (IVD) and combustion chamber deposit (CCD) were observed to ascertain the performance synthesized dispersants to control the formation of deposit in motorcycle engine. The results showed that PIB-DETA has better performance to control the generation of both IVD and CCD than PIB-PEHA. Compared with commercially available PIBA, these two dispersants have less different performance and are potential for industrial application.

Keywords: Deposit-control additives, combustion chamber, intake valve, motorcycle, polyisobutylene

ABS-118: Phytochemical Profiling of *Gynura procumbens* Leaves and Stem Extracts Using UHPLC-Q-Orbitrap HRMS

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Abstract *Gynura procumbens*, which is known as longevity spinach or sambung nyawa in Indonesian, generally grows in tropical and subtropical Asian countries. Some biological activities have been published for this medicinal plant. The biological activities are significantly influenced by the metabolites' composition, concentration, and plant parts. In this work, we identified the metabolites in 70% ethanol extract of the leaves and stem using UHPLC-Q-Orbitrap-HRMS. Clustering of leaves and stem extract was performed using the principal component analysis (PCA) with the peak area of detected peaks as a variable. Thirty-one metabolites were identified, and the number of identified peaks in the leaves is higher than in the stem. The putatively identified compounds are from phenolics, fatty acids, oxo monocarboxylic acids, porphyrins, and chlorophyll fragments. The PCA results show that the leaves and the stem extracts can be grouped, indicating that the composition and the detected compounds' concentration are quite different.

Keywords: *Gynura procumbens*, metabolomics, phytochemical profiling, UHPLC-Q-Orbitrap-HRMS

ABS-119: Preliminary kinetic studies on the degradation of the textile dye Methyl Blue by *Trichoderma asperellum* LBKURCC1 laccase without mediators

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Abstract Laccases are multicopper containing oxidases that can catalyze the oxidation of a wide variety of phenolic compounds, benzenethiols, diamines and aromatic amines without requiring hydrogen peroxide. Several fungal laccases can degrade synthetic dyes, and therefore are important for bioremediation of dye containing waste. Methyl Blue (MB), also known as Aniline Blue or Acid Blue 93, is a widely used textile dye in the denim industry, and other textile types. MB is carcinogenic, therefore the degradation of MB in textile waste effluents is important for the environment. The aim of this research is to determine the kinetics of the enzymatic degradation of MB by *Trichoderma asperellum LBKURCC1* crude laccase extracts at room temperature (±30˚C), without addition of any mediator molecules. MB solutions with concentrations of 25 ppm and 50 ppm were incubated in the dark with crude extracts of the laccase enzyme (activity 0.007 U/mL or 0.014 U/mL). The absorbance of the colored solution was measured at 594 nm, at various time points. Preliminary results show that MB was degraded by the laccase crude extracts following Michaelis-Menten kinetics. Increasing the MB concentration two-fold increased its degradation rate by *Trichoderma asperellum LBKURCC1* laccase. Likewise increasing the enzyme activity also increased the degradation rate of MB by the laccase. A buffer control (pH 5.5) of 50 ppm MB solution without addition of enzyme showed no decrease in color after five days incubation at room temperature (±30˚C). After five days incubation at room temperature, the addition of 0.014 U/mL laccase activity could decrease 69% of the 50 ppm MB solution color. However, a heat denatured laccase solution could decrease 39% of the same MB solution color, showing that the crude enzyme may contain non-enzymatic components that can also contribute to the degradation of MB.

Keywords: Laccase, *Trichoderma asperellum*, Methyl Blue, Aniline Blue, Acid Blue 93.

ABS-120: Isolation, Fractionation and Characterization of Xanthine Oxidase from Goat's Milk

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Abstract Xanthine oxidase is an enzyme of the oxide reductase group that works to catalyze the hydroxylation of hypoxanthine to xanthine and then to uric acid. This study aims to isolate and characterize the xanthine oxidase enzyme from goat's milk. Xanthine oxidase enzyme was isolated from fresh goat's milk with the addition of NaCl and centrifuged to obtain a crude extract of the enzyme which was then fractionated using ammonium sulfate. Characterization were carried out to determine the optimum condition of the enzyme, namely the determination of optimum time and pH. The results showed that the crude extract of the enzyme had a specific activity of 0.0019 mU/mg. The highest specific activity was found at a saturation level of 20-40% ammonium sulfate of 0.0327 mU/mg. The dialysis enzyme had a specific activity of 0,0402 mU/mg. The optimum activity was found at pH 6 and incubation time of 25 minutes. Goat's milk can be used as a source of xanthine oxidase enzyme in purpose to looking for gout drug agents.

Keywords: Xanthine Oxidase, Isolation and Characterization, Goat's Milk, Optimum pH, Optimum Incubation time

ABS-121: The Effect of the Concentration of $KHCO_3$ Electrolyte for conversion of CO_2 to Methanol using Membrane Electrode Assembly (MEA)

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Abstract The electrochemical conversion of CO_2 into methanol using Membrane Electrode Assembly (MEA) has been done. The MEA consists of Pt/C catalyst in cathode and Cu_2O-ZnO/C catalyst in anode. The electrode were made using the spraying method and then characterized using Cyclic Voltammetry (CV) and Electrochemical Impedance Spectroscopy (EIS) methods to determine the ECSA and conductivity values. The Cyclic Voltammetry (CV) curve indicated that ECSA value on the Pt/C electrode as 378.69 cm^2/g and the Cu_2O-ZnO/C electrodes as 209.89 cm^2/g with scan rate of 50 mV/s. The Electrochemical Impedance Spectroscopy (EIS) analysis was performed to obtain the conductivity value of the electrodes. The value of the electrical conductivity of the electrode with Pt/C catalyst was 1,15 x 10^{-3} S/cm and for electrode with Cu_2O-ZnO/C catalyst was 0.80 x 10^{-3} S/cm. The result of the conversion of CO_2 to methanol was measured using a methanol analyzer with maximum methanol percentage achieved at 1 M $KHCO_3$ as 15.75 b/v%.

Keywords: CO_2 Conversion, MEA, $KHCO_3$, Pt/C, Cu_2O-ZnO/C

ABS-122: Hydrogen Production from Aluminum Waste with Sodium Activator Using Aluminum-Water Method

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Abstract The production of hydrogen as one of the fuel cell fuels is a challenge in producing hydrogen with high purity. The production of hydrogen gas from aluminum waste using the aluminum-water method was successfully by adding sodium activator with varying concentrations and NaOH as a catalyst to damage the oxide layer so that aluminum reacts with water to produce hydrogen gas. The best conditions in the aluminum-water reaction of 1 g aluminum with sodium activator of 1.5 mL water volume, 7% w/w sodium content, 60 mesh aluminum particle size, and temperature of 25˚C. The production of hydrogen using sodium activator at the best conditions produces hydrogen gas of 502 mL when NaOH catalyst added produced hydrogen gas of 862 mL. The highest reaction rate of hydrogen gas production by adding sodium activator to the selected conditions is 65 mL/minute, while the addition of NaOH as catalyst was 160 mL/minute.

Keywords: Hydrogen Production, activator natrium, Alumunium-water, NaOH.

ABS-123: Study of Isolation Geographics Based on Profile of Weight and Type Kihung Fish (Channa Lucius) Protein From Rowo Ijo Lake, Bukit Bangkai Sites

Abstract Study of Isolation Geographics Based on Profile of Weight and Type Kihung Fish (Channa Lucius) Protein From Rowo Ijo Lake, Bukit Bangkai Sites Susilo , T.B1., Sobah, N.2, Sasmita, R.2, Mustikasari, K.1 1Chemistry Dept., Faculty of Mathematical and Sciences, Lambung Mangkurat University, 2Biology Dept., Faculty of Mathematical and Sciences, Lambung Mangkurat University CP. tbsusilo@ulm.ac.id The prehistoric site of Lake Rawoijo, that was located at the east of Bukit Bangkai site, the lake were suspected of geographically isolated so that it is thought to cause a adaptation of morphology and genetic makeup. The research aimed to compare the morphology and protein profiles of kihung fish (Channa lucius) from Lake Rawoijo and Banjar District. Comparison of kihung fish morphology is analyzed by describing morphological sightings as well as morphometric and meristic calculations, protein levels are measured by the Lowry method, SDS-PAGE method and elaborated using the UPGMA method. The results of an observation of the kihung morphology have a brighter body color and all the thick fins SDS-PAGE with irregular patterns, while the fish from Banjar District has a dark brown body color, all the fins are thin with a pattern that does not too irregular. The optimum protein levels of Rawoijo Lake are dissolved in a row from sample 1; 2 3 4 5 that is 2,117; 2,619; 2,931; 6,974; 7,601 mg/ml, while in the sample from Banjar District 1,704; 2,874; 2,369; 1,532; 1,921 mg/ml, respectively. Based on profile SDS-PAGE, suspected proteins are fructose-bisphosphate aldolase A, aldolase, phosphoglycerate kinase, creatine kinase, enolase, actinin, glutamic dehydrogenase, actin protein, desmin, and albumin, respectively. Band expression fish protein origin Lake Rawoijo was nudge thicker than the fish protein band from Banjar District. The results of UPGMA method showed that have a low kinship level, based on protein profile.

Keywords: Morphology, Protein profile, Channa lucius, Geography isolation, Lake Rawoijo

ABS-124: Production of Functional Edible Film from Modified Starch of Banana's Hump (*Musa Balbisina L*) and *Kappaphycus alvarezii* Seaweed as Stabilizer

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Abstract This study aims to produce and analysis the characteristics of edible films from modified starch of banana's hump and determine the effect of adding the concentration of *Kappaphycus alvarezii* seaweed as a stabilizer. The core stages of this research started from the extraction and modification of banana's hump starch by autoclaving-cooling method, extraction of *Kappaphycus alvarezii* seaweed as stabilizer, making edible film by varying the concentration of stabilizer (0.5% – 2.0%), and analysis the characteristic of functional edible films. The results showed that modified starch of banana's hump can be used in the production of edible films using *Kappaphycus alvarezii* seaweed 2% as the best stabilizer concentration. The characteristic value of the edible film is that has a thickness of 0.20 mm, water vapor transmission rate of 3.15 g/24 hours.m^2, tensile strength of 4.30 Mpa, elongation of 26.38%, and can be degraded in the environment for 6 days. The resulting edible film is a biodegradable packaging so that it can be eaten together with the product, because the modified starch of banana's hump can have added value, namely functional value for digestive health. The use of stabilizer from seaweed can also improve the mechanical and microbiological characteristic of the edible film.

Keywords: edible film, modified starch of banana's hump, *Kappaphycus alvarezii* seaweed

ABS-125: The Effectiveness of Electroflotation Process and *Tamarindus indica* seeds as a Biocoagulants on the Treatment of Leachate

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Abstract The treatment of leachate using electroflotation process with the aid of *Tamarindus indica* seeds has been studied. In this regard the dose was varied by 0.025, 0.05, 0.1, 0.15, and 0.2 g/500 mL. The electroflotation process was performed with stainless steel electrodes as cathode and titanium electrode as anode at DC constant voltage of 40V for 30 mins. The effectiveness of electroflotation and biocoagulation (EB) process were evaluated by the decreasing of total dissolved solids (TDS), electrical conductivity (EC), turbidity and the increasing of dissolve oxygen (DO). The initial condition of twenty times of diluted leachate sample has 719 mg/L, 1 mS/cm, 2.97 NTU and 2.3 mg/L respectively for TDS, EC, turbidity and DO. The results showed that the EB process has 584 mg/L; 0.84 mS/cm, 0.15 NTU and 3.8 mg/L respectively for TDS, EC, turbidity and DO with a dose of 0.05 g biocoagulant /500 mL leachate. Those results showed that the EB process could be used on the treatment of leachate.

Keywords: Leachate, Electroflotation, Biocoagulant, *Tamarindus indica*

ABS-126: Tartrate-Niacinamide Ligand Selectivity in the Crystallization of Mn(II) and Cd(II) Complexes

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Abstract Tartrate-niacinamide ligand selectivity in an aqueous solution has been observed in the crystallization of Mn(II) and Cd(II) complexes. These complexes were crystallized at room temperature using a layered solution technique with a solvent mixture of H2O-CH3OH. The reactions were conducted in a molar ratio of M(II):tartrate:niacinamide (M = Mn, Cd) 1:1:2. Reactions with a molar ratio of 1:1:0 of the same metal ion (using tartaric acid or KNa-tartrate) were also prepared as data comparison. Analysis of the crystals by infrared spectroscopy and powder-X-ray diffraction showed that in a presence of both tartrate and niacinamide, Mn(II) forms Mn(II)-tartrate complex, whereas Cd(II) forms Cd(II)-niacinamide complex. In the Mn(II) complex, the tartrate acts more predominantly than the niacinamide, although the molar ratio of niacinamide was doubled than that of tartrate. In contrast, the niacinamide acts more predominantly than the tartrate in the Cd(II) complex. It is suggested that the tartrate-niacinamide ligand selectivity in the crystallization of Mn(II) and Cd(II) complexes was probably due to the use of tartrate salt and in accordance with the HSAB concept. In addition, powder-XRD analysis confirms that there was no indication of tartrate-niacinamide mixed ligand complex crystallized by both metal ions.

Keywords: ligand selectivity; tartrate; niacinamide; metal complex; layered solution.

ABS-127: Synthesis of Isatin Derivatives Catalyzed by Iron (III) Triflate

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Abstract Isatin is a special heterocyclic compound because of its various biological activities. This research aims to synthesis isatin derivatives catalyzed by iron (III) triflate, $Fe(OTf)_3$. In this study, $Fe(OTf)_3$ catalyst were synthesized using Fe^{3+} ions and Lewis acid and characterized by Fourier transform infrared (FTIR) spectroscopy, X-ray diffraction (XRD), and transmission electron microscopy (TEM). The result of the characterization showed that the catalyst $Fe(OTf)_3$ were successfully formed. Furthermore, $Fe(OTf)_3$ catalyst were applied in the synthesis of isatin derivatives. The product is obtained in two steps under conventional heating, isatin-3-hydrazone is synthesized by condensation of the keto group of isatin with hydrazine monohydrate and then reacts with aromatic aldehydes to produce isatin derivatives. The synthesis results were described by physicochemical analysis and characterized using UV-Vis spectrophotometry, FT-IR, and GC-MS. The characterization results support that the isatin compound derivative were successfully synthesized.

Keywords: $Fe(OTf)_3$, Isatin, Isatin-3-hydrzone

ABS-128: Synthesis of Porous g-C_3N_4 Nanosheets and Its Application as a Photocatalyst for Methylene Blue Degradation

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Abstract Graphitic carbon nitride (g-C_3N_4) is an organic semiconductor photocatalyst, possessing a unique layered structure, remarkable thermal and chemical stability, and tunable bandgap. However, the bulk g-C_3N_4 has a low specific surface area, which limits its active site and contributes to the fast electron-holes recombination. In this work, we prepared a series of porous g-C_3N_4 nanosheets with an enhanced photoactivity toward methylene blue (MB) degradation. The porous g-C_3N_4 nanosheets were prepared using citric acid as a pore-forming agent. The resulting porous g-C_3N_4 nanosheets were then characterized using XRD, FTIR, SEM, N_2-sorption, UVDRS, and PL analysis. An appropriate amount of citric acid results in suitable pore size and surface area. The photocatalytic test using MB degradation exhibits a higher conversion of MB on porous g-C_3N_4 nanosheets compared to the bulk g-C_3N_4. The Langmuir–Hinshelwood kinetics analysis also reveals the higher MB degradation rate on porous g-C_3N_4 nanosheets than that of bulk g-C_3N_4. The larger surface area, suitable pore size, more exposed active sites, and suppressed charge carriers recombination are predicted as the main factors that contribute to the enhanced photocatalytic performance.

Keywords: carbon nitride, photocatalysis, photodegradation, dye, water treatment.

ABS-129: Synthesis TiO membrane for wastewater treatment

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Abstract The need for clean water is a necessity to sustain human life. This need will continue to grow along with the increase in human population, but does not require appropriate water and waste treatment processes. Zirconia and titania-based membrane technology is a promising technology in water and sewage treatment processes, because the air quality produced is good and stable against chemical reactions, high temperatures and mechanical stress. The aim of this research is to synthesize, characterize and apply a membrane combination of zirconia and titania $(Zr_{1-x}Ti_x)O2$ with Al_2O_3 as substrate for water and sewage treatment. Samples were synthesized using sol gel, dip coating and sintering methods. Then proceed with the characterization of the structure, morphology through XRD, XRF and SEM tests. The sample performance test was carried out by means of the water flux test.

ABS-130: Total Phenolics and Flavonoids Level and DPPH method Antioxidant of n-Hexane, Ethyl Acetate and Methanol Extracts of Sargassum sp.

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Abstract *Sargassum* sp. is a kind of seaweed that is widespread in Indonesian waters, although its bioactive compounds are not yet fully utilized. The antioxidant activity of secondary metabolites of *Sargassum* sp. in South Sulawesi waters will be investigated in this research. The extraction method involves a multilevel maceration approach using n-hexane, ethyl acetate, and methanol solvents, followed by evaporation to concentrate and dry the sample. The resulting extract was then analyzed for phytochemistry, total phenolics and flavonoids levels, and antioxidant activity using the DPPH method. The results of this research indicate that the extracts of n-hexane, ethyl acetate and methanol from *Sargassum* sp. contains total phenolics and flavonoids with levels respectively 13.0597; 21.1265; 16.2816 mg GAE/g sample and 129.6739; 161.7391; 145.4348 mg QE/g sample. n-hexane, ethyl acetate and methanol extracts of *Sargassum* sp. has antioxidant activity with IC50 values respectively 134.2009; 114.1173; 122.1069 ppm. The IC50 value of n-hexane, ethyl acetate and methanol extracts of *Sargassum* sp. is in the medium category for antioxidant activity.

Keywords: Total Flavonoids Level, Total Phenolics Level, Antioxidant, DPPH, *Sargassum* sp.

ABS-131: Total phenolic content and antioxidant, toxicity, and anticancer activities of Indonesian Zingiberaceae rhizomes extracts

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Abstract Zingiberaceae has widely used by Asians as a treatment for various diseases. Phytochemical studies show that Zingiberaceae have bioactivity as antioxidant, antibacterial, antifungal, anticancer, antiviral, and anti-inflammatory. This research aims to compare the total phenolic content and antioxidant, toxicity, and anticancer against MCF-7 breast cancer cell lines activities of five *Curcuma* (Zingiberaceae) grown in Bogor, Indonesia. Plants used in this research were temu kunci (*C. rotunda*), temu putih (*C. zedoaria*), temu mangga (*C. mangga*), temu giring (*C. heyneana*), and temu hitam (*C. aeruginosa*). The rhizomes of all plants were macerated using acetone, ethanol, and methanol. Total phenolic content from all rhizomes extracts was determined using Folin-Ciocalteu analysis. Moreover, antioxidant activity was measured following DPPH assay, toxicity was determined using the BSLT method with *Artemisia salina* shrimp larvae, while anticancer activity was analyzed by MTT assay against MCF-7 breast cancer cell lines. Acetone extract of temu kunci (TKEA) had the highest total phenolic content (72.52 mg GAE/100 g). Furthermore, TKEA also showed the most active extract as an antioxidant (IC_{50} = 205.41 ppm) and the highest toxicity against *A. salina* larvae (LC_{50} = 16 ppm). In addition, ethanol extract of temu giring (TGEE) was found to be the most active extract to inhibit MCF-7 cell proliferation (IC_{50} = 0.65 ppm). These results reveal that TKEA and TGEE are potential extracts for further development as antioxidant and anticancer agents.

Keywords: anticancer, antioxidant, total phenolic content, toxicity, Zingiberaceae

ABS-132: Preliminary Investigation of Synthesized Phenolipid Compounds Obtained from The Esterification of Protocatechuic Acid

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Abstract Despite the excellent antioxidant, antimicrobial and other bioactivities of protocatechuic acid, its application is very limited due to the low solubility in oil-based solvents. Hence, in order to improve the hydrophobicity, the phenolic acid derivatives can be reacted with fatty acids via Fischer esterification reaction to obtain phenolipid compounds which can be utilized in the production of food or cosmetic. Herein, we investigate the esterification of protocatechuic acid with ricinoleic acid. The lipophilic substance, ricinoleic, was chosen owing to its wide array of bioactivities. The reaction results were confirmed using thin layer chromatography and the structure was investigated using Fourier-Transform Infrared and Liquid Chromatography-Mass Spectrometry. Altogether, the phenolipid compounds from the esterification has been successfully synthesized. We recommend further studies to determines their antibacterial activity, antioxidant activity, toxicity and emulsifier properties.

Keywords: Phenolipid, Ricinoleic acid, Fischer Esterification, FT-IR, LC-MS

ABS-133: Development and Validation of Performance Assessment Instrument in Making Standart Solutions for Titration

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Abstract Performance assessment had been required to identify the college students skill in laboratory objectively. This study aims to develop a good performance assessment instrument in making standart solutions for titration. The research method used development and validation through 4 stages : Identify the indicators to be measured, develop the instrument, validation by the expert, and evaluation to see the practicality of using the instrument. The validation results described that 17 of 23 performance aspects were valid with value CVR 1, and the rest were invalid with value CVR 0.6 below the critical point (0.736). Meanwhile, the overall assessment validations were valid with value CVI 0.90. Based on questionnaires on several lecturer on analytical chemistry practicum, they all agreed that performance assessment, which had been developed, was effective and feasible to use.

Keywords: Performance assessment, Task and Rubric, Standart Solutions, Titration

ABS-134: Study *in vitro* of Potention of Ricinoleic Acid Ester Conjugates Synthesized by Steglich Esterification with Tocopherol using *Brine Shrimp Lethality Test* (BSLT) as Anticancer Agent

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Abstract Chemotherapy, the most reliable cancer therapy is relatively easy use and overall work, however that chemicals still have poor side effects and pharmacological deficiencies such as affinity to cancer cells are low due to limited bioavailability. This triggered the use of natural compounds such as unsaturated fatty acid as a chemotherapy agent. Unsaturated fatty acid as ricinoleic acid was known to have therapeutic activities as antimicrobial, anti-inflammatory, antiproliferation, and anticancer. The Esterification Steglich method was used to synthesize a conjugate ester of ricinoleic acid with tocopherol through couplings reaction with coupling reagent DCC and DMAP as a catalist. The characterization of product were using TLC showed Rf value of 0.40 (ricinoleic acid), 0.53 (ester-ricinoleic acid), and 0.73 (tocopherol). Purification of ester conjugate product was performed using silica gel column chromatography with petroleum ether: etyl acetate (9:1, v/v) as eluent. Purification of ester-ricinoleic acid produces second fraction with Rf value of 0.59. Characterization by FT-IR showed a new absorption at wavenumber of 1760 cm^{-1} – 1690 cm^{-1} for C-O ester and more sharp peak of C-H aromatic in 870 cm^{-1} – 675 cm^{-1}. Antioxidant activity assay of ester conjugate produce IC_{50} value of 4.152 ppm for ester-ricinoleic acid and 0.625 ppm for tocopherol. Ester conjugate of ricinoleic acid with tocopherol expected to have anticancer activity by toxicity assay using BSLT test showed LC_{50} value of 58.344 ppm. This result indicates ester conjugate of ricinoleic acid with tocopherol has potential as anticancer agent. Further test can be done to support the data above.

Keyword: anticancer agent, bslt, ricinoleic acid, steglich esterification, and tocopherol

ABS-135: Phytochemical Screening and Antioxidant Properties of Leaves of the *Araucaria* Genus from Indonesia

Abstract The genus *Araucaria* belongs to the family *Araucariaceae*. It has 19 plant species including *Araucaria hunsteini, Araucaria columnaris*, and *Araucaria cunninghammi*. The family *Araucariaceae* includes a group of cornifera or cypress plants. Several genera of *Araucaria* have been used as traditional medicinal plants such as antiseptics for respiratory infections, rheumatism, teeth, ulcers or other skin diseases. A plant can function as a traditional medicine because it contains active compounds, namely secondary metabolites. Secondary metabolites are organic compounds synthesized by plants and are a source of medicinal compounds, classified into alkaloids, terpenoids, steroids, phenolics, flavonoids and saponins. Therefore, this study aimed to determine the content of active compounds contained in the leaves of *A. hunsteini, A. columnaris*, and *A. cunninghammi* plants. The method used in this study is a phytochemical screening method to detect the content of secondary metabolites such as alkaloids, flavonoids, steroids, terpenoids, saponins, and tannins. In addition, for the screening test for compounds with antioxidant properties, the spraying method with DPPH reagent (2,2-diphenyl-1-picrylhydrazil) was used and the results were positive if the spot showed yellow color. The yield of acetone extract of the three plants were 0.85% (*A. columnaris*), 1.64% (*A. cunninghammi*) and 3.07% (*A. hunsteini*). Phytochemical analysis showed that the acetone extract of the three plants contained flavonoids, steroids, terpenoid, phenolics, and tannins. The compound marker tests that showed the strongest to the weakest antioxidant properties were A. hunsteini, A. columnaris, and A. cunninghami.

Keywords: Araucaria, phytochemical, antioxidant, DPPH

ABS-136: Photodynamic activity of a new sensitizer from dregs of green tea and its antibacterial adjustment against *Escherichia coli* ATCC 8739

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Abstract The study on photodynamic inactivation for food decontamination has become an emerging trend in the last decade. One of the main concerns is the development of natural sensitizer which is more acceptable by the consumers. We have recently investigated the potency of photosynthetic pigments obtained from dregs of green tea which showed antibacterial effect under illumination of red LED (light-emitting diode) lamp. Here, we studied: (i) the alteration of pigments composition in the dregs extract as the consequences of photodynamic reaction, and (ii) the magnitude of its antibacterial activity when adjustment of illumination time was applied. The sensitizer was irradiated by red LED lamp for 0, 10, 20, 30, and 40 minutes, and subsequently pigments separation and quantification were carried out using analytical high-performance liquid chromatography. Meanwhile, the broth culture of *Escherichia coli* ATCC 8739 was treated with the sensitizer and illuminated by red LED lamp for the equivalent series of time, then the number of viable cells were counted. The results revealed that pheophytins *a* was sluggishly degraded during early period of irradiation, fulfilling the characteristic of sensitizer which is able to regenerate itself during photodynamic reaction and radical formation. In the other hand, the carotenoids (lutein and *beta*-carotene) were depleted rapidly as the consequence of radical formation. The bacterial assay showed nonlinearity in the correlation between illumination time and antibacterial effect since prolonged irradiation causes photobleaching of the sensitizer. These finding gave contribution to uncover the mechanism behind antibacterial activity of the dregs extract and determine the adequacy of treatment for reduction of targeted bacteria.

Keywords: antibacterial, *Escherichia coli*, green tea, photodynamic, sensitizer

ABS-137: MEDAQ AU TRADITIONAL ETHNOSCIENCE STUDY: IDENTIFICATION OF CHEMICAL CONCEPT FROM INDIGENOUS KNOWLEDGE OF THE LOMBOK PEOPLE

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Abstract The Medaq Au tradition of the Lombok people, which is currently almost forgotten, has the value of local wisdom and is rich in sources of indigenous knowledge. The integration of this indigenous knowledge into chemistry learning activities has not been widely reported. One of the reasons is the difficulty of teachers in identifying chemical concepts from the community's indigenous knowledge. Therefore, this study aims to identify and describe chemical concepts derived from indigenous knowledge in the Medaq Au tradition of the Lombok people. Descriptive research with a focus on indigenous knowledge of the Medaq Au tradition was carried out in the North Lombok area. Interview, observation and documentation techniques were used for data collection and then analyzed descriptively. The results showed that the chemical concepts identified in the Medaq Au tradition include: chemical reactions, thermochemistry, organic compounds and colloids. It is hoped that the results of this study will contribute to the development of school chemistry teaching materials and as an effort to preserve the Medaq Au tradition of the Lombok community

Keywords: Ethnoscience, chemistry, Medaq Au, indigenous

ABS-138: DEVELOPMENT OF COMPUTATIONAL CHEMISTRY-BASED LABORATORY WORK MODULE FOR ANTIOXIDANT TESTING

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Abstract This research is a type of research and development that aims to determine: (1) the validity of the computational chemistry-based chemistry laboratory work module developed. (2) The practicality of the developed computational chemistry-based chemistry laboratory work module. (3) The effectiveness of the developed computational chemistry-based plaboratory work module. The research design used is a 4D model (define, design, develop, and disseminate). The population in this study were 80 students who had passed the computational chemistry course and 72 students who had passed the advanced organic chemistry course at the Chemistry Education Study Program, Faculty of Teacher Training and Education, University of Mataram. So, the total population used is 152 students. The research sample was 21 students who were taken by purposive sampling technique and then used as respondents for a limited trial. The results showed that the validity value of the three validators obtained using the Aiken index was V = 0.91 which indicated that the computational chemistry-based chemistry plaboratory work module in the antioxidant compound test was very valid. Meanwhile, the level of practicality can be seen from the student responses which show a positive response with average practicality of all components of 86% which shows that the computational chemistry-based chemistry practicum module on antioxidant compound material is very practical to use. Furthermore, in terms of module effectiveness, the score is 80% which indicates the effective category. This value is obtained based on the level of student understanding of the developed module, which can be seen from the value obtained by students in answering questions in the module. Based on these data, it can be concluded that the computational chemistry-based chemistry practicum module on the antioxidant compound test developed is very valid, very practical, and very effective for use in the learning process.

Keywords: Development, laboratory work Module, Computational Chemistry, Antioxidants

ABS-139: THE DEVELOPMENT OF COMPUTATIONAL CHEMISTRY LABORATORY MODULE ON GREEN CORROSION INHIBITION TOPIC

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Abstract Research has been carried out on the development of a chemical practicum module to test the corrosion inhibition of natural compounds derived from purines based on computational chemistry. The research objectives are first, to determine the validity of the developed computational chemistry practicum module. Second, determine the practicality and effectiveness of the developed computational chemistry practicum module. The research development model by Borg & Gall which consists of three stages: introduction, development, and evaluation is used in the research. The population used in this study consisted of 80 undergraduate students of Chemistry Education, FKIP, Mataram University who had passed computational chemistry and physical chemistry II courses. A total of 30 students were taken as samples with purposive sampling technique as respondents in the practicum module test. The average validity value by the three validators using the Aiken index is V = 0.85 which indicates that the chemistry lab module developed is very valid. The results of the limited trial showed that students gave a positive response to all module components with an average practicality of 86%. Effectiveness can be seen from the score of student learning outcomes where the average score is 80.33. It shows that the developed chemistry practicum module is effective in improving learning outcomes. In conclusion, the computational chemistry practicum module for the corrosion inhibition test of natural inhibitors developed is categorized as very valid, practical, and effective for use in learning activities.

Keywords: Development, Practicum Module, Computational Chemistry, Corrosion Inhibitor

ABS-140: Synthesis and Anticancer Activity of 3,4,5-Trihydroxy-*N*-Alkyl-Benzamide Derivatives of Gallic Acid Against Lung A549 Cancer Cells

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Abstract Gallic acid (3,4,5-Trihydroxy benzoic acid) is one of the active agent which markedly induced the apoptosis in human lung cancer cell lines. The impressive anti-lung cancer activity of gallic acid prompted us to conduct research that is aimed to synthesize six 3,4,5-Trihydroxy-*N*-alkyl-benzamide derivatives of gallic acid, and to examine its anticancer activity against lung cancer A549 cells. Our synthesis was designed by amidation of carboxyl group of gallic acid with a series of alkylamine to produce six compounds of 3,4,5-trihydroxy-*N*-alkyl-benzamides, namely 3,4,5-trihydroxy-*N*-methyl-benzamide (**2**); 3,4,5-trihydroxy-*N*-ethyl-benzamide (**3**); 3,4,5-trihydroxy-*N*-butyl-benzamide (**4**); 3,4,5-trihydroxy-*N*-*sec*-butyl-benzamide (**5**); 3,4,5-Trihydroxy-*N*-*tert*-butyl-benzamide (**6**) and 3,4,5-trihydroxy-*N*-hexyl-benzamide (**7**). Anticancer activity of the synthesized 3,4,5-trihydroxy-*N*-alkyl-benzamides against lung A549 cells were examined by MTT cell proliferation assay. Data were analyzed by linear regression analysis of probit method to generate IC_{50} value. The results were compared with gallic acid as an original compound and doxorubicine as a positive control. Six compounds of 3,4,5-trihydroxy-N-alkyl-benzamides were successfully synthesized from gallic acid and alkylmines by amidation reaction. Compared to gallic acid (IC_{50}: 23.2 µM) and doxorubicine (IC_{50}: 31.1 µM), -*N*-methyl-, -*N*-butyl-, -*N*-*sec*-butyl-, -*N*-*tert*-butyl-, and –*N*-hexyl-benzamides exhibited a greater anticancer activity against lung A549 cells with IC_{50} ranging of 5.4 µM to 22.5 µM. Our results clearly demonstrate that the gallic acid derivative of alkyl amides gallate as a promising candidates for the new anti-lung cancer agents.

Keywords: Synthesis, anticancer, gallic acid, 3,4,5-trihydroxy-*N*-alkyl-benzamide, lung A549 cells.

ABS-142: Synthesis of Lignosulfonates From Sugarcane Waste (Bagasse) as Surfactants

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Abstract Lignosulfonate was carried out with an acid catalyst p-TsOH through a reflux reaction at 150 0C for 5 hours with a yield of 30%. The characterization of isolated lignin was carried out through FTIR spectroscopic analysis, showing the type of lignin, namely alkaline lignin which was characterized by the formation of phenol OH bond stretching vibrations at wave number 3227.35 cm-1, aliphatic CH bond stretching vibrations at wave number 2900.40 cm-1, stretching vibration of aromatic C=C bonds at wave number 1521.22 cm-1. while the 1H-NMR analysis showed the presence of syringyl monomer which confirmed the form of lignin in the form of alkaline lignin. TGA analysis showed alkaline lignin from bagasse lignin has 3 stages in the degradation process. IFT analysis showed that the interfacial tension value of 0.2% (w/w) lignosulfonate was 6.594 mN/M against 5000 ppm synthetic Brine NaCl.

Keywords: Lignosulfonate, Bagasse, Surfactant

ABS-143: Preparation Of Nano-titania-supported Triflic Acid Catalyst For Synthesis Of 2,4,6-triarylpyridines

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Abstract: Nitrogen-containing compounds are found in nature and have an important role in medicine. One of them is a derivative of 2,4,6-triarylpyridines which has antibacterial, anti-inflammatory, anti-fungal, antioxidant, and anti-malarial activity. The synthesis of 2,4,6-triarylpyridines derivates was successfully carried out with the Multicomponent Reaction System (MCR) and solvent-free. 2,4,6-triarylpyridines compound derivative was synthesized using a TiO_2 / TfOH heterogeneous catalyst. TiO_2 is the most popular catalyst because it is safe, environmentally friendly, and does not cause toxicity.In this study, 2,4,6-triarylpyridines was synthesized by MCR with benzaldehyde, acetophenone, and NH_4OAc (compound 1) and 4- cloroacetophenone, benzaldehyde and NH_4OAc (compound 2). The results of the optimization of the reactions that have been carried out, obtained the optimum conditions at a reaction time of 120 minutes, a temperature of 90 ° C, and a catalyst weight of 5%. The yield percentage obtained under optimum conditions was found in compound 1 of 46,63 % and compound 2 of 48,45%. The yield was obtained after the compound was recrystallized using hot ethanol. The characterization of TiO_2.TfOH catalysts was confirmed using FT-IR, XRD, and SEM-EDX. While the characterization of the 2,4,6-triarylpyridines compound derivate products was confirmed by TLC, FT-IR, Uv-Vis, and GCMS.

Keywords: 2,4,6-triarylpyridines, TiO_2.TfOH, Multicomponent Reaction System (MCR), heterogeneous catalyst, solvent-free.

ABS-144: THE DEVELOPMENT OF COMPUTATION CHEMISTRY LABORATORY WORKS MODULE FOR ANALYSIS SPECTRA UV-VISIBLE OF NATURAL COMPOUNDS IN DYE SENSITIZED SOLAR CELL

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Abstract The research is a development research that aims to examine the validity and practicality of the computation chemistry laboratory works module for analysis spectra UV-Visible of natural compounds in dye sensitized solar cell. The design of the research was 4D (Define, Design, Development, Dissemination). The population were 80 student of chemistry education study program, Faculty of Teacher Training and Education, University of Mataram who have complete computation chemistry courses. 20 students was taken as the the practicality respondents for the computation chemisty laboratory works module with random sampling technique. The result of this research showed that the validity value obtained using the Aiken index was V= 0,9 with the reliability was R= 0,98 with a highly valid category was suitbale to be applied. The practicality of computation chemistry laboratory works module could be seen from the student's responses with an average practicality of 91% showed highly practical category. Based on the data, it could be concluded that the computation chemisty laboratory module on development was highly valid and highly practical to the applied.

Keywords: development, computation chemisty practicum module, Analysis spectra UV-Visible, Dye Sensitized Solar Cell.

ABS-146: Reducing Textile Dyes from Liquid Waste using ZnO/Silica Aerogel Nanocomposite

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Abstract Dye waste has become the biggest source of water organic pollution in recent years due to the increasing pace of the textile industry in Indonesia. The problem of increasing organic pollutants produced from dyes get a lot of attention because the difficulty natural degradation of dyes in water. Textile dyes that are often used are remazol red and methylen blue. One of the most effective waste treatment techniques is photocatalyst. ZnO is a semiconductor that can be used as a photocatalyst. But, the weak compatibility of ZnO can cause aggregation. Therefore the weakness of ZnO was overcome by adding silica aerogel matrix to produce ZnO/Silica aerogel nanocomposite materials. This study aims to determine the ability of ZnO/Silica aerogel nanocomposite in reducing the levels of remazol red and methylen blue dyes. The effect of irradition variations (UV light, sunlight, and without radiation) will also be observed in this study. The silica aerogel was synthesized using sol-gel method and then composited with $ZnCl_2$ using molten salt method to produce ZnO/Silica aerogel nanocomposites. The result showed that ZnO/Silica aerogel nanocomposites were able to degrade methylen blue better than remazol red. The percentage of degradation methylene blue in the variation of sunlight, UV light, and without radiation respectively is 97.2%, 94.24%, and 86.50%, while in remazol red with the same variation the percentage of degradation is 10.86%, 13%, and 13.46%.

Keywords: Textile dyes, remazol red, methylen blue, ZnO/Silica aerogel nanocomposite, photocatalyst

ABS-147: A NEW COMPUTIONAL CHEMISTRY MODULE FOR DYE-SENSITIZED SOLAR CELLS

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Abstract This research is a type of research and development that aims to determine: 1) the validity of the developed computational chemistry-based practicum module; 2) the practicality of the developed computational chemistry-based practicum module; and 3) the effectify of the developed computational chemistry-based practicum module. The development research design used is the D&D (Design and Development Research) research model. The population in this study amounted to 80 students of Chemistry Education, Faculty of Teacher Training and Education, the University of Mataram who have passed computational chemistry or photochemistry courses in the 2020/2021 academic year. The sample in this study amounted to 40 people, with the number of sample comparisons for computational chemistry and photochemistry classes was 3:1, where the sample is taken at random and has been determined. The results obtained in the test of the validity of the practicum module conducted by three expert validators is the Aiken index of V = 0.88, which indicates that the practicum module developed is in the very valid category. Furthermore, the practicality test conducted by distributing student response questionnaires showed a score of 82%, which indicates that the module is efficient to use. The last test is effectiveness test showed a score of 71.6%, which indicates that the module is effective to use. Therefore, based on the results of this study, it is concluded that the computational chemistry-based practicum module to test the effectiveness of Lawsone compounds and their derivatives as sensitizers in dye-sensitized solar cells was in the very valid category, very valid practical category, and effective to use as learning materials in computational chemistry.

Keywords: Development, Practical Module, Computational Chemistry, Lawsone Compounds, DSSC

ABS-148: STUDY OF THE METHOD OF MAKING OUW NATURAL CLAY-TiO_2 COMPOSTES FOR APPLICATIONS IN LINEAR ALKYLBENZEN SULPHONATE SURFACTANT DEGRADATION REACTIONS

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Abstract A study of the method of making Ouw natural clay TiO2 composites and photocatalytic applications on *Alkylbenzene Sulfonate* surfactant linear degradation reactions has been carried out. The method used is the method of impregnation and pilarization. The calcination temperature study was also carried out. The variations in temperature that are used are 200, 250 and 300°C. Characterization was done using X-ray diffraction. The characterization results showed that the pilarization method at a temperature of 250°C had the highest peak of montmorillonite-TiO2 phase whereas the highest peak of impregnation phase method was obtained at the application of 200°C calcification temperature. The LAO-TiO2 composite method of pilarization temperature of 250°C successfully degraded Linear Alkylbenzene Sulfonate surfactant by 89.2% with adsorption capacity of 0.357 mg/g while LAO-TiO2 composite calcination temperature impregnation method 200°C degraded Linear Alkylbenzene Sulfonate surfactant by 80.75% with adsorption capacity of 0.323 mg/g.

Keywords : ouw natural clay, pilarization, impregnation, photocatalytic, degradation

ABS-149: UTILIZATION AND MODIFICATION OF PINEAPPLE SKIN WASTE AS ELECTROLYTE POLYMER MEMBRANE IN DIRECT METHANOL FUEL CELL (DMFC) FUEL CELLS

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Abstract Fuel cells are one of the world's main commodities today. In general, a fuel cell consists of a cathode, anode, and an electrolyte polymer membrane. The latest development of fuel cells is the use of polymer electrolytes as a separator between the cathode and anode components. Due to environmental issues and the widespread use of fuel cells, the separator in the form of a biodegradable electrolyte polymer is an interesting research to develop. This research has a future goal to produce an electrolyte membrane that can be applied to a Direct Methanol Fuel Cell (DMFC) fuel cell that is easily biodegradable, which is based on pineapple which is abundant in nature. Therefore, this study aims to make an electrolyte polymer membrane material for applications in direct methanol fuel cell (DMFC) fuel cells by utilizing modified pineapple peel waste with the addition of sulfonate groups. To realize this goal, in the first stage of this research, the emphasis is on optimizing the nata de pina membrane by adding sulfonate groups with various concentrations of sulfuric acid during sulfonation. and the next stage is to test the optimum performance of sulfonated nata de pina membrane, so that an electrolyte polymer membrane can be produced with characteristics suitable for application in direct methanol fuel cell (DMFC) fuel cells. The membrane was further characterized by measuring the ion exchange capacity, contact angle, functional group analysis by FTIR, degree of swelling, mechanical properties, proton conductivity, morphological analysis by SEM and sulfur content analysis by SEM-EDS. The characterization results show that the best nata de pina membrane is a membrane sulfonated with 1.08 N sulfuric acid, with a proton conductivity of 1.85 x 10-2 S/cm, an ion-exchange capacity value of 3.85 mEq/g, a degree and swelling of 118.55 %. The mechanical strength of the resulting membrane was significantly increased and the arrangement of the cellulose fiber arrangement remained regular. It can be concluded that pineapple peel as an environmentally friendly natural resource can be used for the manufacture of electrolyte membranes.

Keywords: Membrane, Nata de Pina, Sulfonated Nata de Pina, Fuel cell,

ABS-150: Organic Rectifier Diodes based On Polyaniline Doped Cloric Acid as p-type Organic Semiconductor

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Abstract Polyanile has been widely recognized as one of the most widely developed conductive polymers today. This is because, Polyanine has good chemical stability and a wide conductivity range. In this study, polyaniline with the oxidation level of emeraldine salt was synthesized by the rapid mixing method until a green powder of polyaniline emeraldine salt (PANI-ES) was obtained. To confirm this shape, UV-Vis absorption test was carried out, where PANI-ES gave strong absorption peaks at 310 nm and 610 nm which are an indication of the electronic transition of the $\pi \rightarrow \pi *$(benzenoid) dan $\pi \rightarrow \pi *$((quiononoid) levels. successively. This is interesting because the shoulder is observed at a wavelength of 456 nm which is an indication of the presence of triplet electrons due to the formation of polarons which will become red in the charge transfer process. The study of the p-n junction was carried out by pairing PANI-ES as p-type and n-type silicon wafers. The i-v curve shows the characteristics of the rectifier diode with a threshold voltage of 0.45 volts.

Keyword: Polyaniline, Organic Semiconductor, Diode

ABS-151: BIOSYNTHESIS OF Ti*doped* ZnO NANOPARTICLES USING THE FUNGUS *Aspergillus Niger*-MEDIATED

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Abstract Nanotechnology is a technique for providing nano-sized materials with several advantages for applications in the fields of advanced materials, transportation, medical and pharmaceuticals, cosmetics, textiles, electronics, and renewable energy. The biosynthesis of Ti doped ZnO nanomaterials using fungal cells mediated Aspergillus niger is a new development of metal oxide nanosynthesis processes, because it is economical and environmentally friendly. The purpose of this study was to compare the process of synthesizing Ti doped ZnO extracellularly and intracellularly in understanding the function of the bioactive components of A. niger as reducing agents and capping agents. From the UV–vis spectrometer analysis, it was shown that the nanomaterial formed at (λ max)= 314 & 330 nm with a crystal size of 27-29 nm when analyzed by XRD at 2θ= 32º, 34º , 36ºwith a hexagonal Wurzit structure. FTIR analysis showed functional groups, including carboxylic acids, aromatic rings, amines and Zn-O-Ti at a wave number of 438 nm-1. Ti-ZnO nanomaterials can be used as antimicrobial agents in textile fibers.

Keywords: Biosynthesize, Ti doped ZnO, *A. niger*, Mediated, Extracellular,

ABS-152: Stationary Phase Performance Based on CaO/SiO_2 gel on Thin Layer Chromatography for Xantone Derivative Compounds

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Abstract The stationary phase in chromatography is still dominated by silica gel. In some cases, silica gel has several weaknesses and limitations in the elucidation process for compounds with varying levels of functional group polarity and compounds that act as zwitter ions. In this research, the use of CaO combined with SiO_2 gel as a stationary phase has been studied, which is then studied for its performance as thin layer chromatography (TLC). Based on the FTIR spectra, it was confirmed that there were clearly silanol and siloxane groups of SiO_2. while for CaO, it shows the presence of features that may indicate the formation of $CaCO_3$ and Ca(OH)2. This data is also supported by x-ray diffractograms of CaO, SiO_2 and CaO/SiO_2 (50%). The results of the TLC performance test showed that the Rf value of 1,3,6 trihydroxy xantone (THX) decreased linearly as the CaO content in the stationary phase increased and the maximum CaO content reached 60% to still be able to elucidate THX. Meanwhile, the same performance as commercial preoative TLC was achieved when the CaO content reached 20% with a solvent combination in the form of ethyl acetate: n-hexane (7:3).

Keyword: CaO, CaO/SiO_2, Silica Gel, Cromatography, TLC

ABS-153: Optimizing parameters of Xylenol Neodymium Imprinted Polymers (Nd-IPs) for Neodymium (III) Ions Adsorption

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Abstract Performance evaluation of metal Neodymium Imprinted Polymers (Nd-IPs) throughthe polymerizationofmethylmetaacrylatewithdivinylbenzene in thepresenceof a metal complexNd(III)-Xylenol Orange (XO) has beeninvestigated.Theadsorption capability towardsNd(III) ion were optimized based on ion retention parameters, such aspH, contact time, concentration, adsorption isotherm, and kinetic studies.ThesynthesizedNd-IPsobtained Nd(III)adsorptioncapacityreached30.36 mg.g^{-1} at a pH of 5 with 20 minutes contact time. TheisothermstudiesshowedthepreferenceofFreundlichisothermover Langmuir isotherm. Theselectivity coefficient of Nd-IPs to ion Nd^{+3}/La^{+3} are 1.35 and 1.38, then selectivity coefficient value obtained 1.35 and 1.40 for Nd^{+3}/Y^{+3}.

Keywords: Adsorption, ion imprintedpolymer, neodymium (III), Nd-IPs

ABS-154: Bacterial Inactivation Kinetic of a Photocatalytic using Bi-doped TiO_2 immobilized Kaolinite under Visible Light

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Abstract Bismuth-doped TiO_2 immobilized kaolinite (Bi-TiO_2-K) were prepared via sol-gel method, then calcined at 450^{o}C using kaolinite as the matrix and Bi $(NO_3)_3$ as the Bi^{3+} cationic source. The obtained Bi-TiO_2-K photocatalyst were characterized using X-ray diffraction (XRD), infrared absorption spectrometry, diffuse reflectance spectroscopy, energy-dispersive X-ray spectroscopy (EDX) and and scanning electron microscopy (SEM). The photocatalytic activity of the Bi-TiO_2-K was investigated on the inactivation of *Escherichia coli* and *Staphylloccus aureus* bacterial in water solution under visible light irradiation. The inactivation of the *Escherichia coli* and *Staphylloccus aureus* bacterial rate in the Bi-TiO_2-K photocatalyst were found to be the ambient temperature, working solution optimum at pH 7.0. and 4,5 respectively. Under visible light irradiation for 180 min, the Bi-TiO_2-K photocatalyst had higher bacterial inhibition efficiency as compared to unmodified Bi-TiO_2 photocatalyst. After 180 min irradiation time was required to achieve bacterial reduction for an average bacterial inoculum size of 9.5×10^6 CFU mL^{-1}. The inactivation bacterial kinetic studies revealed that the Bi-TiO_2-K photocatalytic activity indicated the reaction followed the pseudo-first-order kinetics. The irradiation time reaction followed the Langmuir-Hinshelwood (L-H) model as the rate of bacterial growth inhibition increased with an incremental increase in bacterial inoculum quantity. The L-H constant Kc was 1.6324 mg $L^{-1}\cdot h^{-1}$ while K_{ads} was found 0.164 mg^{-1}. The best photocatalyst showed prominent percent inhibition of *Escherichia coli* and *Staphylloccus aureus* bacterial in 180 min. Finally, Bi doped TiO_2-K could be an efficient photocatalyst for bacterial strain inactivation.

Keywords: Bi-TiO_2-K, photocatalytic, kinetic, antibacterial inactivation, visible light

ABS-155: Total Content of Phenolic, Antioxidant and Anti-inflammmatory Activity of Algae Ethanol Extract *Caulerpa racemosa*

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Abstract Caulerpa racemosa (*C.racemosa*)is a group of green macroalgae that thrives in the waters of Lemukutan, West Kalimantan, and has not been utilized by the local community. This study aimed to determine the total phenolic content, antioxidant activity and anti-inflammatory activity of the ethanolic extract of *C.racemosa*. Determination of the total content of phenolic compounds using the Folin Folin Ciocalteu method, testing the antioxidant activity using the DPPH method (2,2-diphenyl-1-picrylhydrazyl) and the indicator of the color change of the sample with the addition of the radicals measured by UV-Visble spectroscopy. Anti-inflammatory testing was carried out by in vitro red blood cell membrane stabilization method. The results showed that the phenol content of the ethanolic extract of *C.racemosa* was 9.65 mg/g extract, with an antioxidant activity (IC50) of 89.79 ppm, classified as a strong antioxidant, with the comparison antioxidant vitamin C having an IC50 of 7.16 ppm. The percentage of stability by the ethanolic extract of *C.racemosa* at all concentration variations, 50, 100, 150, 200 and 250 ppm had potential activity in stabilizing red blood cell membranes with an IC50 of 220 ppm.

Keywords: antioxidant, anti-inflamatory, *Caulerpa racemosa*, DPPH

ABS-156: THE OXIDATION OF FATTY ACIDS OF NYAMPLUNG KERNEL OIL BY $KMnO_4$ AS AN OXIDANT

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Abstract The content of nyamplung kernel oil is dominated by unsaturated fatty acids, and one of the highest unsaturated fatty acids in nyamplung kernel oil is oleic acid. The high oleic content in the nyamplung kernel oil makes this plant potential to be oxidized to mono and dicarboxylic acid. This study aims to know the percent conversion of the results of the fatty acids nyamplung kernel oxidation, the characteristics of the fatty acids nyamplung kernel oil oxidation based on *Fourier Transform Infra-Red* (FT-IR) analysis, and the characteristics of the fatty acids nyamplung kernel oil based on its melting point. The oxidation of fatty acids of the nyamplung kernel oil used the oxidation method using a $KMnO_4$ oxidizer. The oxidation product of nyamplung kernel oil fatty acids, which was assumed to be azelaic acid, produced a yield of 53 %. The oxidized fatty acids characterization based on FT-IR has obtained O-H bond absorption at 3447.38 cm^{-1} wavenumber. At 1698.06 cm^{-1} wavenumber shows the characteristic absorption of the C=O carbonyl group of the carboxylic acid group. The C-O bond absorption at 1111.19 cm^{-1} wavenumber. The methylene group (CH_2) at 2935.97 cm^{-1} wavenumber. The solid of oxidized fatty acids has obtained white color with a melting point of 114.9 °C.

Keywords: Unsaturated fatty acids, nyamplung kernel oil, oxidation, $KMnO_4$

ABS-157: Jamu Kunyit Asam During Storage In Room Temperature, Refrigerator, Freezer: Physical And Organoleptic Changes

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Abstract Jamu is a traditional Indonesian herbal drink that is useful for maintaining health and beauty. One of the well-known jamu in Indonesia is jamu kunyit asam. This study aims to determine the physical and organoleptic changes that occur in jamu kunyit asam in colorless transparent plastic bottles, dark plastic bottles, colorless transparent glass bottles, and dark-colored glass bottles stored at room temperature, refrigerator, and freezer. This study is using factorial design with temperature, type, and color of the bottle as the factors. The results showed that storage caused physical changes such as pH, total dissolved solids, and brix value; and also organoleptic such as taste, aroma, and gas. Based on the results obtained, the best storage is using dark glass packaging at freezer temperature which can be stored for up to 48 days.

Keywords: jamu kunyit asam, organoleptic, physical properties, storage

ABS-158: Literature Review of the Potential of ZnO Semiconductors and Curcumin Sensitizers in Photocatalytic Degradation of Dye Pollutants

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Abstract Photocatalysis is a promising technique for the degradation of various organic pollutants by sunlight. Semiconductor sensitization is an alternative to maximize photocatalytic degradation under visible light. ZnO semiconductors are known to be good semiconductors. Curcumin dye from turmeric is known to have the ability to absorb light well. This study aims to analyze the performance of photocatalytic degradation of dye pollutants with sensitized semiconductors, analyze the potential of ZnO as a photocatalyst, and analyze the potential of curcumin as a sensitizer in photocatalytic degradation. Photocatalytic degradation can proceed under visible light when using sensitized semiconductors. Semiconductor sensitization does not affect semiconductor crystallinity so that the degradation activity remains effective. ZnO semiconductors show good performance in photocatalysis and achieve more than 90% degradable pollutants under UV light. Curcumin can absorb light better than other dyes and binds easily to semiconductors. The use of curcumin as a photosensitizer can help the process of photocatalytic degradation under visible light. The use of curcumin-sensitized ZnO has the potential to increase the photocatalytic degradation activity of color pollutants.

Keywords: curcumin, photocatalytic degradation, sensitization, ZnO

ABS-159: Synthesis and Characterization of Superhydrophobic Coatings From Silica-HDPE Composite and Its Potential Application for Windshield

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Abstract Condensation that occurs on the front of the windshield is a process that can be disturbing to the driver because the driver's visibility to the road is slightly blocked. Therefore, this research aims to reduce these disturbances by modifying the windshield surface using a superhydrophobic coating made of silica-high density polyethylene (HDPE) composite. Composite synthesized by mixing the two materials at a temperature of 110 °C. Furthermore, two surface treatments had conducted, namely porous and non-porous treatments. The highest water contact angle value of the non-porous silica-HDPE composite was around 110.6±1.2°, while the porous composite was about 139.5±0.9°. The surface morphology obtained from various literature shows that the hydrophobicity of the composite can be increased by forming pores on the surface, using nanometer-sized silica, and multiplying the silica concentration. The composite can potentially apply because of its relatively small refractive index, good tensile strength, and micro sliding angle.

Keywords: antifogging, contact angle, refractive index, superhydrohobic

ABS-160: Analysis of *Muntingia calabura* Extracts as Potential Interleukin-6 Inhibitor

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Abstract Lung inflammation is a normal response to noxious substances or gases in patients with Chronic Obstructive Pulmonary Disease (COPD), which can usually be treated with anti-inflammatory drugs. Drugs that can inhibit the production of interleukin-6 (IL-6) are anti-inflammatory drugs for patients with COPD. This study aims to identify bioactive compounds in *Muntingia calabura* that can inhibit IL-6. *In silico* virtual screening was performed, followed by *in vitro* assays to evaluate anti-inflammatory effects of *Muntingia calabura* herb extracts, to further be developed as raw material for COPD herbal medicine. Computational modeling approach showed that *ent*-11α-hydroxy-15-oxo-kaur-16-en-19-oic acid in *A. lavenia*, steroid and triterpenoid group compounds in *A. conyzoides* were compounds that may potentially act as IL-6 inhibitor. MTT assay on RAW 264.7 cells indicate that the herb extracts did not show cytotoxicity to macrophages. Further, both aqueous and ethanol extracts of *Muntingia calabura* did not affect the viability of LPS-induced macrophages. A preliminary evaluation showed a potential reduction in IL-6 levels with aqueous extract of *Muntingia calabura* but a similar finding was not found with another cytokine, which was IL-1. This study warrants further investigation to further evaluate the potential of *Muntingia calabura* and its bioactive compounds in regards to their potential as interleukin inhibitor, particularly IL-6.

Keywords: COPD, cytokine, interleukin-6, *Muntingia calabura*

ABS-161: Screening of Active Compounds from Soursop Leaves, Mimosa, Cogongrass, and Pandanus as Inhibitor of Xanthine Oxidase *in Silico*

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Abstract Xanthine oxidase is a common enzyme known to be implicated in a wide range of pathological disorders such as gout, hyperuricemia, inflammation, oxidative stress, and cardiovascular disease. Therefore, xanthine oxidase inhibitors have found an important role in the treatment of these fatal diseases. Currently, many treatment methods use herbal plants as an alternative to treat gout. The active compounds contained in these plants act as xanthine oxidase inhibitors. In this study, an in-silico docking study of natural compounds derived from soursop leaves, mimosa, cogon grass, and pandanus fragrant leaves were conducted as a xanthine oxidase inhibitor. The parameters used were binding affinity energy (ΔG), inhibition constant (Ki), the interaction between amino acid residues, and binding site similarity values (%BSS). The results of this study indicated that (*E*,*E*)-pandanamine from pandanus had the highest potential as an XO enzyme inhibitor with ΔG of -9,28 kcal/mol, Ki 0,16 µM, and the value of binding site similarity (% BSS) is 88,89%. In addition, this active compound also belongs to the category of strong inhibitor, non-carcinogenic, and has a low level of oral toxicity. Furthermore, this active compound can be isolated from fragrant pandan leaves for further research in vitro to determine its potential as a gout drug.

Keywords: active compound, docking, gout, inhibitor, xanthine oxidase.

ABS-163: TiO2 Doped Natural Dye of Caesalpinnia Sappan L on Cotton Fabrics

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Abstract Sappana (Caesalpina sappan, L) has been known as one of natural dyes in textiles and foods. Textile products with reddish sappana dyes produced various color range from orange, pink and purple depend on the processes. This research aimed to develop TiO2 doped sappana-based natural dyes for fabric dyeing. The sapanna dye and it's color was measured by colorimetric methods on Uv-Vis spectrophotometer. The testing of the material includes a standard color detection test on the solution and washing resistance on cotton fabrics. The coloring product was depend on the mordanting agent and the immersion frequency. The result showed that TiO2 dopped sappana dye had a higher absorbance in Uv-Vis Spectrometer. The coloring result is also better than the standard sappana dye on cotton. The washing resistence showed 'good and "very good" result by 4-5 point of the test.

Keywords: Caesalpina sappan, L, colorimetry, natural dye, TiO2, Uv-Vis spectrometry

ABS-164: Decolorization Photocatalytic of Methylene Blue Using TiO_2- Doped Fe(III) Under Visible and Sunlight Irradiation

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Abstract Purpose of this research is degradation of methylene blue using TiO_2-Doped Fe (III) photocatalyst and study the effect of catalyst doses, pH and time irradiation. TiO_2-Doped Fe (III) prepared by sol gel method. The type of light used is halogen lamp and sunlight. The photocatalytic process is done through photodegradation in 25 mL of methylene blue 20 mg/L with 50 mg photocatalyst and irradiated for 50 minutes. Variation time radiation performed for 5, 10, 20, 30, 40, 50, 60, 90 and 120 minutes. The concentration of methylene blue before and after irradiation were measured using a UV-Vis spectrophotometer at λ 664 nm. The result showed that sunlight irradiation give the best degradation compared to UV light, time irradiation optimum of sunlight is 50 minutes with 96,81% degradation and the reuse effectiveness of TiO2-N/zeolite until the fourth usage results degradation above 50%.

Phenol is one of the essential organic pollutants released into the environment because of its high stability and toxicity. It is harmful to organisms, environment and posing a serious threat to human health at low concentration. This research investigated the photocatalytic degradation process of phenol using a TiO_2-Fe catalyst under visible light irradiation and additional H_2O_2. The effect of various conditions process was applied, including different catalyst doses (0.2, 0.4, 0.6, and 0.8 gr/L), pH (3, 6, 8, and 11), reaction times (60, 90, 120, 150 and 210 minutes) and the presence of H_2O_2. The degradation process was studied at an initial concentration of phenol 5 mg/L. This study has been decreasing phenol content (90.51%) with catalyst doses 0.3 g/ 500 ml sample solution, pH solution 11, reaction time 210 minutes and H_2O_2 concentration 30%. This final phenol concentration after photodegradation under halogen light was 0.18 mg/L, while sunlight irradiation was 0.11 mg/L. This result is below government regulation as per Permen LH RI No. 5/2014 i.e. 0.5 mg/L. Therefore, this process possible to remove phenol in aqueous such as industrial wastewater or other resources.

Keywords: TiO_2-Fe, Phenol, H_2O_2, Halogen-ray, Sunlight, photodegradation

ABS-165: Biosensor Performance of Phenol Analysis Using Microbes Consortium of *Bacillus sp*. and *Pseudomonas sp*.

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Abstract Amperometric biosensor for phenol and its derivatives detection have been introduced using various approaches, such as single enzyme, bi-enzyme and single microbe. However, the main problem of using enzyme is its stability, meanwhile single microbe for detecting phenol, like using *Bacillus sp*. is limited in sensitivity. A novel biosensor based on microbial consortium of *Pseudomonas sp*. and *Bacillus sp*. mixture was immobilized on the working electrode part of screen printed carbon electrode (SPCE). Both bacteria were able to produce biofilm, it could be applied for biosensing technique. The electrocatalytic response towards phenol was evaluated using cyclic voltammetry between -1 to 1 V, with scan rate 100 mV/s. The result showed good linearity between 6.4 - 63.9 mg/L (R2 = 0.91 -0.98). The average sensitivity and limit of detection (LOD) were obtained at 0.95±0.22 µA/ppm and 19.71±10.26 ppm respectively.

Keywords: *Bacillus sp*, biosensor, *Pseudomonas sp*, phenol, voltammetry cyclic.

ABS-166: ISOLATION OF CHLOROPHYLL a FROM KIRINYUH LEAVES (*Chromolaena odorata L.*) AS CORROSION BIOINHIBITOR IN MILD STEEL

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Abstract Chlorophyll *a* (Chl *a*) is a natural pigment that is usually found in many green plants. The structure of chl *a* that have conjugated double bonds and elements of nitrogen (N), Oxigen (O) that can form complex soluble compounds with metal ions capable of inhibiting corrosion in metal. In this research, chl *a* was isolated from kirinyuh leaves (*Chromolaena odorata L.*). Chl *a* extraction using acetone was selectively precipitated with dioxane and water. Chl *a* yield percentation from 200 g of dried kirinyuh leaves were 1,43%. The separation of chl *a* was conducted by using various chromatographic techniques, such as sucrose column chromatography with petroleum ether : diethyl eter as a solvent and gravitasional column chromatography with *n*-hexane : ethyl acetate as a solvent. Chl *a* was tested using thin layer chromatography to prove the purity of the chl *a* that provides a red stain under UV 365 nm. The identification of chl *a* have been confirmed by UV-Vis at 400-700 nm and FTIR. The UV-Vis absorption spectrum of chl *a* showed that maximum of Soret band was at 433 nm, while the Q band was at 655 nm. As observed from the functional groups of Chl, -CH2 stretching of aliphatic groups at 290 cm^{-1}, C=O vibration at 1634 cm^{-1}, C-O vibration at 1257 cm^{-1}, and C-N vibration at 1444 cm^{-1}. Chl *a* was tested as corrosion inhibitor of mild steel (SAE/AISI Grade 1022) in 3% brine solution and seawater. The inhibition tests were carried out using the methods of weight loss and microscope to see the surface of mild steel. The result showed that chl *a* produced smaller corrosion rate, which are 0,0036 mm/y with an inhibition efficiency of 60% in 3% brine solution and 0,0096 mm/y with an inhibition efficiency of 77,89% in seawater.

Keywords: chlorophyll *a*, kirinyuh leaves, corrosion inhibitor, mild steel.

ABS-167: Analysis Anti-inflammatory of Novel Bromoalkyl-1,4-benzoquinones using Primary Cultured Rat Hepatocytes

Abstract Few studies reported on the synthesis and comparison effect of bromoalkyl-1,4-benzoquinone for anti-inflammatory activity. Here, we aimed to synthesis a series of 1,4-benzoquinone derivatives having bromoalkyl substituent by facile decarboxylative reaction using bromoalkanoic acid in the presence of water solvent. Structure analysis were carefully determined using 1H- and 13C-NMR and HETCOR basis. It is confirmed that the proton attached at the C-2 quinone ring substituted with bromoheptil- or bromodecyl- revealed singlet aromatic proton at C-6 at around 6.53 ppm. The appearance of a new multiplet signal at 1.34-1.43 ppm suggested the elongation of bromoalkyl varied from 4-10 carbons. Anti-inflammatory activity using rat hepatocytes was evaluated based on suppression of nitric oxide (NO) induced by IL-1b interleukin. Four compounds having bromoheptil- and/or bromodecy-1,4-benzoquinones were applied on primary hepatocytes and showed a significant NO suppression with IC50 varied from 13.7-18.5 uM. There is no significant difference in its activity even additional methyl substituent is attached to the C-6 quinone skeleton.

Keywords: benzoquinone, decarboxylative reaction, inflammation, nitric oxide, rat hepatocytes