ICICS 2022 (ic)2S

10th

INTERNATIONAL CONFERENCE OF THE INDONESIAN CHEMICAL SOCIETY 2022

Kendari, 12th October 2022

INTERNATIONAL CONFERENCE OF

10th THE INDONESIAN CHEMICAL SOCIETY 2022

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Contents

International Conference of the Indonesian Chemical Society 2022

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Forewords

The main task of a lecturer, besides teaching and doing community service, is conducting research. The research results that have been carried out need to be socialized and published in the appropriate forum. The international conference of the Indonesian chemical association is the right place to disseminate various research results on the chemical family and those related to chemistry.

ICICS 2022 will be held in Kendari on the initiative and collaboration between the Indonesian Chemical Association and Halu Oleo University chemists. ICICS is a routine activity carried out once a year with the implementation in rotation by universities that have been approved.

ICICS raised the **sustainable mining, environment, industry, and health** theme this year. However, your valuable works and ideas in all branches of chemistry, such as mining, isolation and chemical synthesis, including chemistry education, instrumentation and applied chemistry, whether related to energy, food, materials, environment, life, industry and health, are welcome to be presented at this conference.

The implementation of this year's conference, considering that COVID-19 has not yet fully ended, the meeting will be held in a hybrid manner by allowing participants to present their research results online and offline. Therefore, the number of online participants is limited to minimize the spread of COVID-19, which will add to the problem

The keynote speakers presented at this activity were Prof. Akrajas Ali Umar, PhD from Malaysia, and Prof. Dr Seitaro Mitsudo from Japan, Assoc. Prof. Suzi Malan, PhD from Canada and the Regent of Konawe Kery Saiful Konggoasa and the Regent of North Konawe, Dr Ir. H. Ruksamin, S.T., M.Sc., IPM. ASEAN Eng. Nine invited speakers came from various leading universities in Indonesia. In this activity, no less than 40 universities presented their writings.

I hope this activity can bring together chemists from all over Indonesia with partners from other countries such as Japan, Malaysia and Canada. The committee has tried their best in organizing this activity, but if there are still shortcomings in the implementation, please understand.
Welcome to the seminar and enjoy yourself.

Ahmad Zaeni
Chairman of the Committee

International Conference of the Indonesian Chemistry Society 2022

Kendari, 12th October 2022

Opening Ceremony

Time	Agenda
07.00-08.00	Registration of participants
08.00-08.40	**Opening ceremony**
	1) Mondotambe dance
	2) Indonesia Raya
	3) Forewords from Committee's Chairman
	4) Welcome Speech from Rector of Universitas Halu Oleo

Plenary Session

Time	Keynote Speaker
08.40-09.10	Muhammad Zamrun F., Rector of Universitas Halu Oleo, Indonesia (Moderator: La Ode Ahmad)
09.10-09.30	coffee break
09.30-10.00	Akrajas Ali Umar, Universiti Kebangsaan Malaysia
10.00-10.30	Seitaro Mitsudo, University of Fukui, Japan
10.30-11.00	Suzi Malan, The University of British Columbia (Moderator: Analuddin)
11.10-11.35	Kery Saiful Konggoasa, Regent of Konawe District
11.35-12.00	Ruksamin, Regent of North Konawe District (Moderator: Armid)
12.10-13.00	lunch break

Parallel Session

Parallel Session A (Sustainable Organics)

No.	Time	Code	Presenter	Join
			1st Session	
1	13.00-13.20	A00A	I. Sahidin Modified research targets in increasing publication and student participation in the study on marine natural products compounds	Online
2	13.20-13.30	A001	Reni Yunus Phytochemical analysis, rappelant and larvacidal potency test of Langsat (Lansium domesticum) against Dengue hemorrhagic fever vectors	Offline
3	13.30-13.40	A002	Nasriadi Dali Highly selective and sensitive determination of Pb(II) ions using ion selective electrodes (ISE) coated with the BEC6ND1 ionophore as membranes	Offline
4	13.40-13.50	A003	Nur Naila Al-CMC-durian seed starch-based eco-friendly superabsorbent as a water retention agent	Offline
5	13.50-14.00	A004	Maulidiyah Examination of high antifungal activity (*Candida albicans* and *Aspergillus niger*) over acetone extract from lichen *Usnea* Sp.	Offline
6	14.00-14.10	A005	Zakaria Toxicity test using the brine shrimp lethality test (BSLT) method on extract of stem bark, stem wood, and leaves on bayur plants (*Pterospermum diversifolium*)	Offline
			2nd Session	
7	14.10-14.20	A006	Dian Wardana Esterification of palm fatty acid dsitillate (PFAD) into methyl ester based on amberlist catalyst in continous reactor	Online
8	14.20-14.30	A007	Ade Heri Mulyati Determination of physicochemical, micro-biological, and shelf life of cookies and brownies from cempedak (*Artocarpus champeden*) seed flour	Online

No.	Time	Code	Presenter	Join
9	14.30-14.40	A008	Siti Warnasih Antioxidant activity and identification of secondary metabolite compounds of ketapang (Terminalia catappa L.) leaf extract by LC-ESI-QTOF-MS/MS	Online
10	14.40-14.50	A009	Ni Made Puspawati The potency of extract methanol of *Protium javanicum* Burm.F leaves in inhibiting lipid peroxidation in wistar rats exposed to cigarette smoke	Online
11	14.50-15.00	A010	Laily Nurliana The synthesis of methyl ester nitrate from ketapang seed oil (*Terminalia catappa* L.)	Offline
12	15.00-15.10	A011	Indriani Isolation and characterization of flavonoid derivative of ethyl acetate extract of kemerakan sapenit (*Bauhinia latisiliqua*) and its activity as antioxidant	Online
	15.10-15.30		Break	
			3st Session	
13	15.30-15.50	A00B	Asrial	Online
14	15.50-16.00	A014	Sernita Sernita Anticancer assay of methanol extract of *Gracilaria salicornia* originating from the Hari islands, Southeast Sulawesi, against MCF-7 cancer cells in vitro	Offline
15	16.00-16.10	A015	Henny Dwi Yanti Varicosenone, a new steroid with a flexible side chain from the Indonesian nudibranch *Phyllidia varicosa*	Online
16	16.10-16.20	A016	Hasbullah Syaf Growth analysis of post-nickel mining reclamation plants fed with modified organic matter on Kabaena island (studies on kusambi, angsana, and wola plants)	Offline
17	16.20-16.30	A017	Sernita Sernita Anticancer assay of methanol extract of *Gracilaria salicornia* originating from the Hari islands, Southeast Sulawesi, against MCF-7 cancer cells in vitro	Offline

No.	Time	Code	Presenter	Join
18	16.30-16.40	A018	Rurini Retnowati Green methodology using *Capsicum annuum* var. Grossuum extract for identification of animal fats	Online
			4st Session	
19	16.40-16.50	A019	Nazarul Spatial mapping of flood vulnerability levels in the Langkumbe watershed (DAS) of North Buton regency	Offline
20	16.50-17.00	A020	Isnaini Bis (-2-ethyl hexyl) phthalate compound as antibacterial from sponge *Stylotella* sp	Offline
21	17.00-17.10	A021	Nirmala Febriani Activity of chlorophyll B from green kastuba leaves (*Euphorbia pulcherrima*) as an organic inhibitors of carbon steel corrosion	Online
22	17.10-17.20	A023	Rosdiana Eso Infrared spectroscopy analysis and chemical properties of inceptisols (cambisols) for agricultural development land	Offline
			Closing	

Parallel Session B (Biochemistry)

No	Time	Code	Presenter	Join
			1st Session	
1	13.00-13.20	B00A	Tatas H.P. Brotosudarmo Separation and characterization of fucoxanthin carotenoid isomers from edible brown seaweed	Online
2	13.20-13.30	B001	Dwita Oktiarni Isolation and characterization of cellulolytic enzyme obtained from macrotermes gilvus gut in Indralaya peatlands, Indonesia	Offline
3	13.30-13.40	B003	Catur Joko Widodo Widodo Control of Begomovirus in Cayenne Pepper (Capsicum frutescens L) with Barrier Combination Design	Offline

No	Time	Code	Presenter	Join
4	13.40-13.50	B005	Febriani Febriani Identification of polypeptide antibiotic in methanol fraction produced by a thermo-halophilic bacterium from Pria Laot Sabang 76 isolate	Online
5	13.50-14.00	B006	Catur Joko Widodo Widodo Control of begomovirus in cayenne pepper (Capsicum frutescens L) with barrier combination design	Offline
6	14.00-14.10	B007	Muzuni Muzuni Characterization of type 1 L-Asparaginase encoding gene of thermohalophilic bacteria CAT3.4 isolate from Wawolesea hot springs North Konawe Southeast Sulawesi	Offline
			2st Session	
7	14.10-14.20	B009	Fina Khaerunnisa Frima Purification and characterization of recombinant α-Amylase BmaN1 from *Bacillus megaterium* NL3	Online
8	14.20-14.30	B010	Agus Setiawan Composition and diversity of vegetation types in three agroforestry patterns	Offline
9	14.30-14.40	B012	Nurhadi Syahputra Pohan Antibacterial properties and toxicity of gagatan harimau (*Paraboea leuserensis* B.L. Burt) ethanol extract	Online
10	14.40-14.50	B013	Amin Fatoni Electrochemical glucose biosensor fabrication using Chitosan-NiFe2O4 cryogel	Online
11	14.50-15.00	B014	Miranda Nur Methylene blue increases electric current with a microbial fuel cell system using leachate and pottery membranes	Offline
12	15.00-15.10	B015	Istri Ratnadewi Immobilization of endo-β-1,4-d-xilanase using alginate/nanocellulose for xilooligosacharide production	Offline
	15.10-15.30		Break	
			3st Session	

No	Time	Code	Presenter	Join
13	15.30-15.50	B016	Nur Arfa Yanti Antimicrobial and antioxidant activity of bacterial cellulose-based edible film from sago liquid waste incorporated with spices	Offline
14	15.50-16.00	B017	Ari Asnani The effect of combined natural dyes on the color fastness of natural color batik	Online
15	16.00-16.10	B018	Muhammad Istianandar Effect of nickel on energy produced by plant microbial fuel cell using *Ipomoea aquatica*	Offline
16	16.10-16.20	B020	Kangkuso Analuddin Carbon and nutrients organics deposition by mangroves of Rhizophoraceae family growing in the coral triangle, Southeast Sulawesi	Offline
17	16.20-16.30	B021	Ali Bonto Effect of nickel on energy generated by plant microbial fuel cell using *Amaranthus caudatus*	Offline
18	16.30.16.40	B022	Nurnaningsih Hamzah Medicinal plants dan their uses by the community around KPH Gantara Southeast Sulawesi, Indonesia	Offline
			4st Session	
19	16.40.16.50	B023	Ari Asnani Isolation and identification of phytase producing microorganism from Segara Anakan Cilacap	Online
20	16.50.17.00	B024	Taufik Walhidayah Antimicrobial and antioxidant activity of bacterial cellulose-based edible film from sago liquid waste incorporated with spices	Offline
21	17.00-17.10	B025	La Ode Muh Munadi Plant species in oil palm plantation area Kolaka Regency, Indonesia	Online
22	17.10-17.20	B039	Sitti Wirdhana Ahmad Species richness, diversity and BMWP index of invertebrate assemblages in wetland ecosystem, Konawe Regency, Southeast Sulawesi, Indonesia	Offline
			Closing	

Parallel Session C (Computational Chemistry & Chemical Engineering)

No	Time	Code	Presenter	Join
			1st Session	
1	13.00-13.20	C00A	Muhamad Abdulkadir Martoprawiro Past, present, and future of the Indonesian Chemical Society (HKI)	Offline
2	13.20-13.30	C001	La Agusu Preparation of micrometer Li1.05Mn1.95O4 by ceramic method using the manganese ore as Mn sources	Offline
3	13.30-13.40	C002	Arie Hardian Synthesis of SnO2-ZnFe2O4 composite ceramics as magnetics photocatalyst for methylene blue degradation	Offline
4	13.40-13.50	D001	Alimin Alimin Kinetics and thermodynamic equilibrium of nickel metal ions sorption on carbon nanofibers irradiated by ultrasonic energy	Offline
5.	13.50-14.00	D003	Ikhsan Mustari Chemoselective hydrogenolysis biomass-derived furfuryl alcohol into 1,5-pentanediol over TiO2-ZrO2 supported bimetallic ruthenium-tin catalysts	Online
6.	14.00-14.10	D004	Parsaoran Siahaan Validation of the carboxymethyl chitosan… vitamin C interactions on the electronic level by DFT approach	Online
			2nd Session	
7	14.10-14.20	D005	Tribidasari A. Ivandini Surface study of boron-doped diamond electrodes related to its electrochemical properties	Offline
8	14.20-14.30	D006	Dwi Febriantini Effect of solvent on antifoam performance for delayed coker unit	Offline
9	14.30-14.40	D008	Mochamad zakki Fahmi Nitrogen-phosphorus modified carbon dots for quantitaive sensing of histamine	Offline
10	14.40-14.50	D009	La Agusu Mn3O4 resistive inks synthesized from the manganese ore for application in printed electronics technology	Offline

No	Time	Code	Presenter	Join
11	14.50-15.00	D010	La Agusu Study on the mineral change of manganese ore due to thermal treatment	Offline
12	15.00-15.10	D011	Paulus Abram Introduction of dragon frut peel (*Hylocereus polyrhizus*) as an adhesive for meking briquettes from ketapang (*Terminalia catappa* L)	Online
	15.10-15.30		Break	
			3rd Session	
13	15.30-15.50	C00B	I Wayan Warmada Sustainable mining practices: The role of chemists and geochemists in the sustainable mining industry.	
14	15.50-16.00	D012	Meytij Jeanne Rampe Surface struktur and chemical composition of coconut shell charcoal using nira aren (Arenga pinnata) acid activation	Online
15	16.00-16.10	D013	La Ode Aman The secondary metabolites potential of genus sinularia soft coral as anticancer through inhibition of DYRK2, CDK4 and PD-1: Docking molecular simulation	Offline
16	16.10-16.20	F021	Alimin Alimin Production and characterization of nickel oxide nanostructures loaded on carbon nanofibers using liquid phase adsorption-thermal oxidation	Offline
17	16.20-16.30	F023	Agung Bagus Pambudi Pore structure and properties of geopolymer membrane from metakaolin: Effect of metal oxide	Online
18	16.30.16.40	F024	Adi Darmawan Effect of cetyltrimethylammonium bromide (CTAB) content on Hydrophobicity of thin layer silica derived from Sodium Silicate (Na2SiO3) and Dimethoxydimethylsilane (DMDMS)	Offline
			4st Session	
19	16.40.16.50	G001	Ika Kusuma Nugraheni The application of Acid catalyst in reducing free fatty Acids number in liquid waste of instant noodle industry	Online

No	Time	Code	Presenter	Join
20	16.50.17.00	G002	Yasmin Annisa Optimization of ulvan biopolymer extraction from *Ulva* Sp. using ultrasound microwave extraction as a biodegradable plastic material	Online
21	17.00-17.10	G003	Dwiprayogo Wibowo Highly adsorption-photoactive tablet-shaped graphite-TiO2 composites for handling organic dyes pollutant	Offline
22	17.10-17.20	G004	Darmawan Mukharror Analysis of hydrocarbon gas onshore pipeline accidents in Indonesia as the basis for failure frequency assessment in a quantitative risk assessment	Online
			Closing	

Parallel Session D (Analitycal Chemistry)

No	Time	Code	Presenter	Join
			1st Session	
1	13.00-13.20	D00A	Muhammad Nurdin Nickel mining and its environmental impact	
2	13.20-13.30	E001	Budi Putra Development of hydrazine sensor based on modified glassy carbon electrode	Online
3	13.30-13.40	E002	Irdhawati Irdhawati Carbon paste electrode modified with natural bentonite for analysis of ion Pb(II) in sea water at Serangan beach, Bali	Offline
4	13.40-13.50	E003	Rudi Heryanto The development of portable visible spectrophotometer for discrimination of the origin of Java tea	Offline
5.	13.50-14.00	E004	Isnaini Rahmawati Enhanced luminol electrochemiluminescence for hydrogen peroxide detection using gold Nanoparticles@Polyaniline-modified boron-doped diamond electrode	Offline

No	Time	Code	Presenter	Join
6	14.00-14.10	E005	Wulan Tri Wahyuni Optimization of uric acid detection with Au nanorod-decorated graphene oxide (GO/AuNR) using response surface methodology	Online
			2st Session	
7	14.10-14.20	E006	Restiara Pramesti Effect of rapid and slow stirring on floc growth in biocoagulation of peat water with jackfruit seeds (*Artocarpus heterophyllus* L.) as measuring by DinoCapture 2.0	Offline
8	14.20-14.30	E007	Sofia Loren Butarbutar Water cooling quality analysis of RSG-gas research reactor and interm storage spent fuel (ISSF)	Online
9	14.30-14.40	E008	Ni Putu Eka Radianti Optimization of biodiesel synthesis from nyamplung (*Calophyllum inophyllum* Linn) seed oil by enzymatically using response surface methodology	Online
10	14.40-14.50	E009	Eviomitta Rizki Amanda Molecularly imprinted polymer chitosan-Sodium Tripolyphosphate: synthesis and application for extraction of antibiotic residues in agricultural products	Online
11	14.50-15.00	E010	Khairuddin Khairuddin Hexadesiltrimethylammonium (HDTMA) surfactant modified cellulose in DGT system for determination of phosphate concentration in aquatic environment	Online
12	15.00-15.10	E011	Muhammad Reska Study on the use of natural fiber on adsorption method using pineapple (*Ananas comosus*) and flax (*Cannabis sativa* ssp.) leaf fiber in leachate treatment	Offline
	15.10-15.30		Break	
			3st Session	
13	15.30-15.50	D00B	Mashuni Biosensor validation in pesticide analysis	
14	15.50-16.00	E012	Farikhatul Fitria Green approach of peat water treatment (coagulation) using azadirachta indica seed	Online

No	Time	Code	Presenter	Join
15	16.00-16.10	E013	Muhammad Ramadhan Synthesis of Fe3O4-SiO2/GO as adsorbent batik's dye remazol turquoise blue G-133 and remazol red RB-133: Equilibrium, kinetics and thermodynamics mechanism	Offline
16	16.10-16.20	E016	Nurrahmi Handayani Synthesis and characterization of Di(2-ethylhexyl) phthalate molecular imprinted polymer nanofibers (DEHP MIPs-NF)	Online
17	16.20-16.30	E017	Mohamad Rafi Phytochemical profile and antioxidant activity of Intsia bijuga with different extraction methods	Offline
18	16.30.16.40	E018	Ani Mulyasuryani Molecularly imprinted polymer (MIP) based on chitosan in the development of electrochemical sensors for the detection of 4-aminophenol	Offline
			4st Session	
19	16.40.16.50	E019	Hanandayu Widwiastuti Effect of number of template and pH on the voltammetry determination of paracetamol using starch/PVA modified carbon electrode	Offline
20	16.50.17.00	E020	Halimahtussaddiyah Ritonga Preparation of chitosan-succinate hydrogel as soil conditioner for soybean plant (*Glycine max* L Merril)	Offline
21	17.00-17.10	E022	Dina Lestari Chemical composition and antimicrobial activity of essential oil of *Pogostemon cablin* collected from Southeast Sulawesi, Indonesia	Offline
22	17.10-17.20	E023	Arie Hardian Textile wastewater treatment using polypyrrole membranes with the basic component of polyphenol oxidase from white oyster mushroom	Offline
23	17.20-17.30	E024	Arie Hardian Formaldehyde electrochemical sensor using Chitosan-Glutaraldehyde/ZnO-Nanoparticles electrode	Offline
			Closing	

Parallel Session E (Material Science)

No	Time	Code	Presenter	Join
			1st Session	
1	13.00-13.20	E00A	Hamzah Fansuri	Online
2	13.20-13.30	F001	Roza Linda Nano Silica from North Rupat beach sand	Offline
3	13.30-13.40	F002	Endang Tri Wahyuni Doping TiO2 with Cr and Cu elements from electroplating wastewater for improving the photocatalyst activity under visible light for dye degradation	Offline
4	13.40-13.50	F003	Eko Sri Kunarti The effect of sulfur concentrations as a dopant on TiO2/Fe3O4 photocatalytic efficiency of Cr(VI) ions reduction	Online
5.	13.50-14.00	F004	Saiful Saiful Bio-cellulose antibacterial membrane as a mask filter material to protect against bacteria and viruses	Offline
6	14.00-14.10	F005	Desinta Dwi Ristiana Adsorption of Cu(II), Mn(II), and Zn(II) on Chitosan modified Silica/natural magnetic particles: Kinetic and isotherm approach	Online
			2st Session	
7	14.10-14.20	F006	Yulia Mariana Tesa Ayudia Putri Synthesis of NiCo MOF-74 on anodized nickel oxide porous as an anode catalyst for urea/H2O2 fuel cell	Offline
8	14.20-14.30	F007	Muhammad Nurdin High performance for photocatalytic degradation of Methylene blue based on pillared clay S-TiO2	Offline
9	14.30-14.40	F008	Maulidiyah Utilization of Fe-TiO2 as a heterogeneous catalyst for biodiesel production from coconut oil	Offline
10	14.40-14.50	F009	Muhammad Nurdin Photoanode solar cell utilizing Sulphur-TiO2 Nanocomposite with doctor blade coating technique	Offline

No	Time	Code	Presenter	Join
11	14.50-15.00	F010	Nurul Hidayat Aprilita 8-hydroxyquinoline modified coal bottom ash-silica sand as an adsorbent for methyl violet 2b DYE	Online
12	15.00-15.10	F011	Zul Arham Synthesis and characterization of TiO2@Carbon dots nanocomposites using electrolysis potential variation	Offline
	15.10-15.30		Break	
			3st Session	
13	15.30-15.50	E00B	Irmina Kris Murwani	
14	15.50-16.00	F012	Afiten Rahmin Sanjaya Preparation of Graphene/MnO2-modified Nickel foam for supercapacitors	Offline
15	16.00-16.10	F013	Muhammad Nurdin Electrocatalytical performance of Graphene modified Sulphur-TiO2 Nanocomposite for determination formaldehyde compound	Offline
16	16.10-16.20	F014	Icheu Dini Widia Sari Potential of Nanosuspension based TiO2/Carbon as the antifungal agent of *Phytophthora palmivora* of cocoa fruit rot	Offline
17	16.20-16.30	F015	Nuryono Nuryono Mechanical and antibacterial property improvement of mineral trioxide aggregate by adding cuo nanoparticles	Offline
18	16.30.16.40	F016	Muhammad Zakir Muzakkar Syntesis and characteristic of TiO2/Ti electrode doped Sulfur (S) calchogenic material	Offline
			4st Session	
19	16.40.16.50	F017	Maulidiyah Photocatalytic inactivation of pathogenic microorganisms using Nanospray TiO2 incorporation silver dioxide	Offline
20	16.50.17.00	F018	Dwi Febriantini Gallic acid-assisted synthesis of novel ZrO2 nanoparticle and its properties	Offline

No	Time	Code	Presenter	Join
21	17.00-17.10	F019	Ida Ayu Gede Widihati Effectiveness of ZnO-PILC as a heterogen catalyst for alpha-toceferol synthesis	Offline
22	17.10-17.20	F020	Retno Ariadi Lusiana Synthesis and characterization of sulfonated poly ether sulfone/Chitosan membranes as creatinine transport	Offline
			Closing	

Parallel Session F (Education and Live Science)

No	Time	Code	Presenter	Join
			1st Session	
1	13.00-13.20	J005	Sulistyo Saputro Transformative learning approach using think pair share (tps) learning model to empower students' collaboration and communication skills in buffer solution	Offline
2	13.20-13.30	J002	Elsa Sriwahyuni Analysis of learning objectives flow in chemistry class X Kurikulum Merdeka to achieve scientific literacy on green chemistry in sustainable development	Online
3	13.40-13.50	J004	Rusmansyah Rusmansyah Improving self-regulated learning and student learning outcomes with the flipped classroom-Edmodo model	Online
4	13.50-14.00	H001	Nuralifah Nuralifah Nitric oxide (NO) and Malondialdehyde (MDA) levels in DM model rats after administration of teak leave ethanol extract (*Tectona Grandis* L.)	Online
5	14.00-14.10	H002	Darwin Ismail Analysis of river quality and sustainability status of Konaweha river management for raw water supply in Kendari city	Offline
			2st Session	
6	14.10-14.20	I002	Zainal Abidin Sago: The future of Indonesia's national sugar self-sufficiency	Online

No	Time	Code	Presenter	Join
7	14.20-14.30	E025	Uswatun Hasanah Development of cinnarizine analysis method in human blood plasma using UPLC MS/MS	Online
8	14.30-14.40	E026	Fitri Handayani Hamid Characterization of cocoa pod husk bio-oil and its application as antifungal in improving the cocoa seeds quality	Offline
9	14.40-14.50	B026	Gusti Ayu Kade Sutariati Growth response of hot pepper (Capsicum annuum L.) on the application of liquid organic fertilizer plus biological agents and AB-Mix in a hydroponic system	Online
10	14.50-15.00	B027	Muhsin Diversity of vesicular arbuscular mycorrhizas (VAM) on agricultural land in karst area, Central Buton, province Southeast Sulawesi, Indonesia	Offline
11	15.00-15.10	B028	Tri Novia Yuliana The effect of various sterilization method and volume containers towards phytochemical contens of *Phyllantus urinaria*	Online
	15.10-15.30		Break	
			3st Session	
13	15.30-15.40	J006	Suyanta Practicum-based learning video: How is the product development and thee quality of the product?	Offline
14	15.40-15.50	B029	Sri Anggarini Rasyid Imunomodulator test of purified extract of pokea shellfish (*Batissa violacea celebensis* Martens 1897) on phagocytic activity of macrophages in mice BALB/c	Online
15	15.50-16.00	B030	Sri Ambardini Growth and accumulation of metallic mercury (Hg) in cashew (*Anacardium occidentale* L.) seedlings planted in post gold mining Bombana soil with concentration treatment of cow manure	Offline
16	16.00-16.10	B031	Iis Afrisa Hamid Electric potential of tofu production liquid waste using microbial fuel cell methode with pottery membrane	Offline

No	Time	Code	Presenter	Join
17	16.10-16.20	B032	Nur Sila Alisi Effect of activated sludge in degradation of wastewater contained detergent	Offline
18	16.20.16.30	B035	Hasnah Natsir Phytochemical screening and antioxidant activities of *Moringa* seed methanol extract	Online
			4st Session	
19	16.30.16.40	B036	Trivadila In vitro kinetics of pancreatic lipase inhibition by asam gelugur and kunci pepet water extracts	Offline
20	16.40.16.50	B037	Habibi Hidayat Identification of chemical compounds from *Moringa* seeds (*Moringa oleifera*) as an anti-bacterial agents	Offline
21	16.50-17.00	B038	Siti Masruroh The inhibition alpha-glucosidase of bheta-sitosterol from spons (*Haliclona* sp.)	Online
			Closing	

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Kendari, 12th October 2022

Abstracts

Keynote & Invited Speakers

Abstract

Akrajas Ali Umar
University Kebangsaan Malaysia

Until this abstracts book is published temporarily, the abstract has not been submitted to the committee.

Microwave energy utilization for sustainable mining and society

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Japan is a country where many weather disasters occur. In recent years, heavy rains have caused floods every year, and extreme heat has caused many health and economic activity risks. It is not easy to clarify the relationship between climate change due to global warming and these disasters, but it is believed that reducing global warming will reduce these risks. Therefore, the Japanese government has declared that it will aim to become carbon neutral by 2050, balancing greenhouse gas emissions and absorption. This is not something that only Japan should tackle, but the world needs to work on it. To create a sustainable society in which future generations can live more prosperously and with peace of mind, we need to work on technological development that will enable a carbon-neutral or decarbonized society.

In Japan, GX (Green Transformation) and in the European Union (EU) as EGD (European Green Deal), a new growth strategy has been announced to realize carbon neutrality and make it sustainable. Among these, it is required to promote the use of renewable energy such as solar power and wind power generation. In 2019, the iron and steel industry accounted for 40 % of the CO_2 emissions in the industrial sector in Japan, followed by the chemical industry at 15%, accounting for about half of these two sectors. It is important to promote the reduction of these CO_2 emissions.

We have been conducting research focusing on microwave energy as a new energy alternative to thermal power. There are various definitions of microwaves, but roughly speaking, it is a general term for electromagnetic waves with frequencies as high as 300 MHz to 300 GHz. It is sometimes called by dividing the frequency band into more detailed millimeter waves and submillimeter waves. The most common microwave frequency in use is 2.45 GHz. It is mainly used in household microwave ovens. Oscillators called magnetron oscillators can be used at low cost. Fukui University is also developing an electron tube called a gyrotron that can oscillate higher frequency electromagnetic waves. Material heating experiments were conducted using the developed 300 GHz gyrotron.

Microwave energy has several characteristics. One is that it is an energy with a low environmental impact. Renewable energy can be used because it can be generated mainly with electricity only. In addition, there is no generation of gas such as CO_2 like combustion. The next characteristic is that heating can be performed selectively. By carefully choosing the materials, you can heat only what you want without heating the entire furnace like conventional heating. In addition, since heat is generated internally by the object itself, heat conduction is not required, and the temperature of the entire object can be raised in a short period of time. This allows a short process time. Most interestingly, selective heating can create a non-thermal equilibrium state within the

material. In this way, when there is a flow of energy, a peculiar phenomenon occurs. Phenomena called non-thermal effects of microwave heating are often attributed to this non-equilibrium heating.

In this presentation, we will report on the application of microwave heating in the ceramics field that we have been working on and the non-thermal effects that appear there. We also report on research on microwave nickel smelting and recycling recently initiated in collaboration with Haluoleo University. In addition, we plan to report on the decomposition of plastics and the recovery of hydrogen using microwaves.

Abstract

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Until this abstracts book is published temporarily, the abstract has not been submitted to the committee.

Abstract

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Until this abstracts book is published temporarily, the abstract has not been submitted to the committee.

Peran pemerintah daerah dalam pengelolaan pertambangan yang berkelanjutan untuk kesejahteraan masyarakat (kasus Kabupaten Konawe Utara)

Ruksamin
Pemerintah Daerah Kabupaten Konawe Utara

Kegiatan usaha pertambangan mineral berperan penting dalam memberikan nilai tambah secara nyata dalam pengembangan industri hulu yang menopang bergeraknya kegiatan-kegiatan industri hilir untuk mendukung pembangunan Nasional dan khususnya di daerah Sulawesi Tenggara guna meningkatkan taraf kesejahteraan rakyat. Usaha pertambangan mineral juga memperkenalkan teknologi, manajemen modern, dan penyerapan tenaga kerja, sebagai sumber devisa negara dan meningkatkan pendapatan asli daerah. Pada sisi lain, kegiatan pertambangan mempunyai karakteristik tidak dapat diperbarui, mempunyai resiko relatif lebih tinggi dan pengusahaannya mempunyai dampak lingkungan yang relatif lebih tinggi dibandingkan pengusahaan komoditas lain pada umumnya seperti kerusakan/pencemaran lingkungan baik air, darat, dan udara, kebisingan, serta konflik sosial. Oleh karena itu, pentingnya penerapan pengelolaan pertambangan yang berkelanjutan perlu disadari oleh setiap elemen bangsa, karena persoalan lingkungan merupakan permasalahan bersama. Pengelolaaan pertambangan mineral harus terjamin hak warga negara terhadap hak lingkungan yang baik dan sehat, sebagaimana diatur di Pasal 28 H ayat (1) Undang-Undang Negara Republik Indonesia Tahun 1945 bahwa "Setiap orang berhak hidup sejahtera lahir dan batin, bertempat tinggal, dan mendapat lingkungan yang baik dan sehat serta berhak memperoleh pelayanan kesehatan." Undang-Undang Nomor 3 Tahun 2020 tentang Mineral dan Batubara telah menetapkan sumber daya mineral dan batu bara (minerba). Namun diharapkan daerah tetap akan mendapatkan manfaat, bahkan diharapkan lebih besar, dari pengelolaan minerba pasca-penerbitan UU No. 3/2020. Walaupun pemerintah daerah sudah tidak memiliki kewenangan dalam pengelolaan pertambangan, dalam hal menjaga kegiatan pengusaan pertambangan agar tetap memperhatikan kelestarian lingkungan, pemerintah daerah masih bisa meningkatkan kegiatan pengawasan dan pembinaan lingkungan agar sesuai dengan yang sudah direncanakan dalam UKL/UPL dan/atau AMDAL dari kegiatan usaha agar benar-benar dilaksanakan oleh para pelaku usaha pertambangan di daerah. Jika didapati terdapat hal-hal yang melanggar maka pemerintah daerah dapat memberikan rekomendasi kepada pemerintah pusat untuk pencabutan izin lingkungan kegiatan pengelolaan pertambangan, dan jika berada di kawasan industri maka pemerintah daerah berhak untuk tidak menerbitkan dan/atau mencabut izin lingkungan yang sudah diberikan.

A00A

Modified research targets in increasing publication and student participation in the study on marine natural products compounds

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Sulawesi Tenggara Province has 651 islands (361 named, 290 unnamed), 74.25 % of the area is sea (www.Bangwilsultrablog). This causes the province to be rich in marine natural resources, especially non-fish (sponges and soft corals). The study of chemical and pharmaceutical aspects of sponges and soft corals from Southeast Sulawesi is still very limited. Therefore, this paper describes the study of chemical and pharmaceutical aspects of sponges and soft corals at Universitas Halu Oleo. The First method included isolation pure compounds, structure elucidation and biological activities. The second method consists of compounds profiling by LC-MS/MS, isolation pure compounds, structure elucidation and biological activities. The results showed that the first method with only pure compounds as research target, produced in little data and few students who could be involved, such as in sponge research (*Xestospongia* sp and *Clathria* sp). The second methods with changes in research targets by adding profiling using LC-MS/MS in addition to compound purification resulted in more data and more students involved so that the opportunity for publication was greater, such as in soft coral research (*Nepthea* sp and *Lobophytum* sp).

Keywords: research targets, publication, student participation, marine natural resourches, Southeast Sulawesi

B00A

Separation and characterization of fucoxanthin carotenoid isomers from edible brown seaweed

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Fucoxanthin is a carotenoid which currently gaining popularity as a function food and pharmaceutical benefit. Previously, it was reported that the inhibitory activity of 13-*cis* and 13'-*cis* fucoxanthin isomers on cancer cell growth was stronger than that of the all-*trans* form. An average amount between 1.70 to 7.89 mg/g d.w. of fucoxanthin can be extracted brown seaweed of *Sargassum* species, which are naturally grown on almost of Indonesia's coast. While in 2019, the production of *Sargassum* has reached to 1340 tons with value of 304,000 USD for alginate purpose. Therefore, a strategic processing of the brown seaweed to produce highly valuable bioactive compound has attracted our research group to study. Recently, our research group has successfully developed simultaneous purification of fucoxanthin isomers by open-column and high-performance liquid chromatography techniques. We developed the method prior to study the effect of drying on the recovery of fucoxanthin and its isomers, which have potential bioactivity and health benefits for humans. Here, our methods will be presented and reviewed.

C00B

Sustainable mining practices: The role of chemists and geochemists in the sustainable mining industry

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The use of mineral resources has become fundamental to human activities, from housing to household appliances, industrial equipment to energy, and high technology to space exploration. Mining has provided the basics of life for humanity. The mining industry produces energy, metals, and minerals essential for economic prosperity and a better quality of life. As important as these benefits are, mining activities generate social and environmental impacts for communities and require more responsible mining practices. This involves mining with sustainable management, for example, by applying ICMM mining principles.

In sustainable mining activities, it is necessary to consider the presence of critical metals in certain ore deposits, such as REY in coal and tin deposits, scandium and cobalt in laterite nickel deposits, and REY+Sc in bauxite deposits. In Indonesia, several critical metals are interesting to be processed. The concentration of these metals vary in several mines in Indonesia. Some of the available data include: the average content of Co elements in the Ni-laterite sample is about 0.15% with Ni 2.10%. Meanwhile, the total REY content of coal ranges from 2.4 to 118.4 ppm. The REY+Sc content in some bauxite in the world is about 463 ppm.

The above critical metals are usually present as by-products and typically discarded because processing techniques are not yet available at the mining site and because miners only focus on processing the primary metals. The application of the circular economy principle is one way that can be applied in sustainable mining practices. The processing method that can be used to realize a circular economy of a mining material is to implement a total extraction or recycling and reuse of metals (from waste) in order to get zero waste. In this case, the role of chemists and/or geochemists is to characterize mining materials to seek breakthroughs in more efficient mining materials or mineral processing.

Keywords: Sustainable, mining, byproduct, circular economy, total extraction.

D00A

Nickel mining and its environmental impact

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In the last few years, natural resource management activities in Indonesia have mostly been carried out on mineral and ore resources, this is proven by the existence of various mining industries. Based on United States Geological Survey data in 2016, Indonesia is the 6th largest nickel producer in the world with a production of 168,500 metric tons. This was supported by the Government of Indonesia through the Ministry of Energy and Mineral Resources in 2017 by building 13 mineral processing and refining facilities (smelters). The Southeast Sulawesi Province is the largest supplier of Nickel mining potential at 47.6%. To date, there are 18 Nickel mining companies operating in Southeast Sulawesi. The distribution of nickel mining areas in Southeast Sulawesi covers the districts of Kolaka, North Kolaka, Konawe, North Konawe, South Konawe, Bombana, and Button. This review aims to analyze the Nickel mining activities in Indonesia, especially Southeast Sulawesi and their impact on the environment. Some negative impacts from Nickel mining activities in North Konawe-Southeast Sulawesi have been reported, namely 1) Road damage 60.7%; 2) River, swamp pollution 78.6%; 3) Air pollution 64.3%; 4) Agricultural land disturbance 92.9%; 5) Plantation area disturbed / reduced by 75%; 6) Reduced agriculture / plantation productivity of 78.6%; 7) Flora damages 89.3%, and fauna 71.4%; 8) 75% no health empowerment and 57.1% no health improvement; 9) Changes in community behavior / norm 64.3%. This data is supported by the occurrence of flash floods in North Konawe in 2019. By 2020, an estimated 71.7 million tons of nickel ore will be absorbed by domestic processing and refining plants. Then from the factory products, around 24% will be absorbed by the domestic stainless steel industry. Based on the negative impacts reported there needs to be a serious effort in designing an environmental improvement program.
Keywords: Nickel, environment, Indonesia, Southeast Sulawesi

D00B

Biosensor validation in pesticide analysis

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The use of pesticides in agricultural processing to control pests and diseases can leave pesticide residues on crops that endanger health and environmental safety. Therefore, a reliable, practical, and sensitive pesticide detection tool is needed. Biosensors are one of the tools of choice for pesticide analysis that are fast, simple and mobile. Analysis of the method validation of a measuring instrument needs to be done to produce optimal performance. A biosensor is an analytical device which combines a biological component (acetylcholinesterase enzyme AChE)) and a physical transducer (potentiometer) to detect a target compound (pesticides). Optimization of pesticide biosensing performance was carried out by designing a biosensor working electrode with gold wire coated with Ag nanocomposite membrane, reduced graphene oxide (rGO) and AChE enzyme immobilized chitosan. The method of detecting pesticide residues with biosensors utilizes an enzyme activity inhibition mechanism using a potentiometer transducer. This research has succeeded in assembling one type of potentiometric biosensor based on Ag/rGO/chitosan@AChE and glutaraldehyde as a crosslinking agent for pesticide determination and validating its performance. Based on the results of the validation of the performance of the biosensor, the working concentration range was obtained at the concentration of the pesticide solution 1×10^{-8} - 1 μg L^{-1}. The proposed biosensor is sensitive to low pesticide concentrations with a detection limit (LoD) of 1×10^{-7} μg L^{-1} and good reproducibility with an average %RSD of 2% and a response time of 5 minutes. The development of this pesticide biosensor is expected to be used for routine analysis of food safety control from pesticide residues, which is simple, fast, mobile and accurate.

Keywords: acetylcholinesterase, biosensor, pesticide, potentiometer, validation

INTERNATIONAL CONFERENCE OF

10th THE INDONESIAN CHEMICAL SOCIETY 2022

Kendari, 12th October 2022

Abstracts

Parallel Session A

A001

Phytochemical analysis, rappelant potency test and larvicidal power of langsat (*Lansium domesticum*) against Dengue hemorrhagic fever vectors

Reni Yunus, Anita Rosanty, Andre Gunawan

Dengue hemorrhagic fever (DHF) cases are still high in Indonesia. Likewise, in Southeast Sulawesi, especially in Kendari City, there are still reported cases of DHF until 2020. Various efforts to control DHF continue to be carried out, but cases persist every year. The use of reppelents and larvicides is an effective way to reduce exposure to dengue vector bites. Langsat plant (*Lansium domesticum*) can be an alternative choice for natural vector control of dengue fever. This is because vector control using plants is an environmentally friendly control method.

The purpose of this study was to determine the phytochemical content and to determine the effectiveness of langsat (*Lansium domesticum*) as a reppelant and larvicide against *Aedes aegypty* which are the main vectors of dengue disease. This type of research is Experimental Laboratories research with a *shot case study design*. Subjects were divided into two groups, namely the treatment group and the control group.

The results showed that there were chemical compounds in the form of alkaloids, triterpenoids, tannins and phenols from the *Lansium domesticum*. Rappelent lotion preparations based on langsat skin extract (Lansium domesticum) at concentrations of 10% and 20% are effective in providing protection as a prevention against the bite of *Aedes aegypti mosquito* which is the vector of DHF. Larvicide test showed that Lansium dosmeticum infusion at concentrations of 20%, 40%, 60%, 80% and 100% could cause the death of Aedes aegypti larvae by 15%, 50%, 58%, 67%, 82%, respectively. The LC50 value is 47.571%.

A002

Highly selective and sensitive determination of Pb(II) ions using ion selective electrodes (ISE) coated with the BEC6ND1 Ionophore as membranes

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The research on the determination of highly selective and sensitive Pb(II) ions using ion selective electrodes (ISE) coated with the BEC6ND1 ionophore as a membrane has been successfully carried out. ISE was designed using a membrane composition [(BEC6ND1 ionophore : PTCPB : DOS : PVC) (3 : 2 : 60 : 35 % w/w)]. The ISE-BEC6ND1 ionophore has good characteristics where it shows a sensitivity value of 29.395 mV/decade in the Pb(II) ion concentration range of 10^{-9} - 10^{-1} M with a detection limit of 10^{-7} - 10^{-3} M. The response time is about 4 - 8 minutes with a relative standard deviation (RSD) of 0.21. The ESI-BEC6ND1 ionophore also shows the average value of selectivity coefficient (K_{ij}) < 1. These results indicate that the presence of Fe(II), Zn(II), and Cd(II) ions as interfering ions in the analyte solution does not affect the performance of the ESI-BEC6ND1 ionophores in detecting Pb(II) ions. The ESI-BEC6ND1 ionophore that has been developed shows good selectivity, sensitivity, stability, and reproducibility, so the ESI-BEC6ND1 ionophore is promising to be used as a Pb(II) ion detector in the environment.

Keywords: BEC6ND1 ionophore, calix[6]arene, ISE-Pb(II), membrane, selective.

A003

Al-CMC-durian seed starch-based eco-friendly superabsorbent as a water retention agent

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Aluminum Carboxymethyl Celullose Durian Seed Starch (Al-CMC-DSS) is a polymer superabsorbent. We synthesized and tested its ability as a water retention agent for agricultural soils. Al-CMC-DSS was synthesized by reacting NaCMC and durian seed starch with $Al_2(SO_4)_3.18H_2O$ crosslinker. Al-CMC-DSS was then characterized using FTIR, SEM, water absorption capacity (WAC), deswelling, and water evaporation rate. The characteristics of Al-CMC-DSS was supported by FTIR spectrum as evidenced by the carboxymethyl group at wave numbers around 1610-1680 cm^{-1}. In the Al-CMC-DSS spectrum, it can be seen that there are -OH and -CH groups stretching at wave numbers 3300-3600 cm^{-1} and 2850-2970 cm^{-1}. Morphological results showed that Al-CMC-DSS has a rough surface. The best combination of cellulose and durian seed starch was found in the superabsorbent with a ratio of 1:1 which showed a WAC value of 26 g/g and deswelling ratio of 227.77%. Al-CMC-DSS superabsorbent with a concentration of 0.08% was proven to reduce the average evaporation rate of water in the soil by 11.2%.

Keywords: superabsorbent; durian seed starch; cross-linking; NaCMC; water retention.

A004

Examination of high antifungal activity (*Candida albicans* and *Aspergillus niger*) over acetone extract from lichen *Usnea* Sp.

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Lichen *Usnea* Sp. is a natural product that has the potential to be developed as medicines. The aim of study was to determine the antifungal activity of acetone lichen extract of *Usnea* sp. against *Candida albicans* and *Aspergillus niger* fungies. The research method includes (1) preparation of acetone lichen extract and diffractic acid compound, (2) determination of antifungal activity based on the dry weight of fungal cells (3) testing of minimum inhibitory concentration (MIC) of acetone extract and diffractic acid compound. The antifungal activity test showed that each sample concentration had a lower cell dry weight as the concentration of the test sample increased. The value of the MIC of the acetone lichen extract against *C. albicans* at a concentration of 500 ppm and *A. niger* at a concentration of 750 ppm were 92.9% and 96.8%. While, the diffractic acid compound MIC value on 750 ppm againts *C. albicans* and *A. niger* were 92.4% and 94%, respectively.

Keywords: Lichen *Usnea sp*.; diffractic acid; antifungal; *Candida albicans*; *Aspergillus niger*

A005

Toxicity test using the brine shrimp lethality test (BSLT) method on extract of stem bark, stem wood, and leaves on bayur plants **(***Pterospermum Diversifolium)*

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Ethnobotanically, the leaves of P. diversifolium are used as a medicine for itching and the root bark is used as fish poison. The traditional use of natural materials should be followed by scientific studies. This study aims to determine the toxicity of the stem bark, stem wood, and leaf tissue extracts of P. diversifolium using the Brine Shrimp Lethality Test (BSLT) method. Extraction using maceration method with ethanol solvent for 3 x 24 hours. The macerate was filtered and the extract obtained was evaporated until a crude extract was obtained. The three ethanol extracts obtained were tested for toxicity and obtained LC_{50} values of stem bark = 4441.19 ppm, stem wood = 4710.85 ppm, and leaves = 3306.73 ppm. All extracts were declared non-toxic because the LC_{50} value was more than 1000 ppm.

Keywords: P. diversifolium, toxicity, bayur

A006

Esterification of Palm Fatty Acid Distillate (PFAD) into Methyl Ester based on Amberlist catalyst in continous reactor

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Palm Fatty Acid Distillate (PFAD) is a by-product (residue) from the processing of CPO into cooking oil with a very high content of free fatty acids (FFA). Therefore, PFAD must be discarded and cannot be further processed into food products. The purpose of this research is to utilize PFAD as a raw material in the manufacture of biodiesel as a renewable energy source. In this research, the esterification process of PFAD with methanol into fatty acid methyl ester (FAME) has been carried out in a semi-continuous reactor using a heterogeneous catalyst, amberlist which is an ion exchange resin. The concentration of the catalyst used was 8% by weight of the substrate and the process conditions were at a temperature of 115°C for 4 hours. The conversion rate was observed by taking aliquot samples every 30 minutes and analyzing the change of its acid number. The catalyst that has been used is purified for reuse up to 3 repetitions. The results showed that the use of catalysts up to 3 repetitions obtained FAME products with yields of 98.27%, 97.82%, and 98.58%, respectively. There is a correlation between the reaction rate calculated from the change in acid number to the resulting yield. Overall, the catalytic activity remained stable for 3 times the use of the catalyst.

Keywords: amberlist, biodiesel, esterification, PFAD.

A007

Determination of physicochemical, microbiological, and shelf life of cookies and brownies from Cempedak (*Artocarpus champeden*) seed flour

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Cempedak fruit seeds contain carbohydrates, protein and minerals. Cempedak seed waste can be processed into flour that is ready to be used for various food products. The use of cempedak seeds as flour is one of the efforts to reduce the use of wheat flour so that it can support the national food security program. Processed foods that can be made from this cempedak seed flour are cookies and brownies. This study aims to determine the physical, chemical and microbiological quality of cempedak brownies flour and cookies resulting from substitution of cempedak seed flour. Cempedak seed flour brownies and cookies were characterized by physical, chemical and microbiological characteristics. Cookies and brownies are made of 5 formulas (wheat flour: cempedak seed flour) namely F1 (100:0), F2 (75:25), F3 (50:50), F4 (25:75), F5 (0:100). The results showed that the yield of cempedak seed flour was 31.69%. Characteristics of cempedak seed flour for chemical (%) moisture content 10.41; ash 0.48; fat 3.20; protein 9.02; carbohydrates 65.69; minerals (mg/kg) Ca 25,21; Na 10.98; K 60.18; Fe 13.1. Microbiological characteristics (colonies/gram) ALT 3.05×104, mold 5; E. coli (APM/gram) <3; Bacillus cereus 0. Characteristics of F3 baked brownies and F3 cookies for chemical (%) moisture content 20.88 and 1.82; ash 1.80 and 1.39; fat 30.10 and 22.42; proteins 8.08 and 5.07; carbohydrates 32.30 and 51.12; minerals (mg/kg) Ca13.68 and 16.01; Na 91.05 and 68.23; K 41.95 and 53.97; Fe 3.09 and 5.05. Microbiological characteristics (colonies/gram) ALT 3.5×103 and 1.9×103, molds 5 and 5, E. coli (APM/gram) <3 and <3. The shelf life of cempedak seed flour packaged in PP packaging is 350 days, LDPE is 19 days, and HDPE is 201 days; F3 baked brownies and F3 cookies were packaged in metalized plastic packaging for 166 days and 325 days, respectively.

Keywords: Cempedak Seed Flour, Brownies, Cookies, Shelf Life

A008

Antioxidant activity and identification of secondary metabolite compounds of ketapang (*Terminalia catappa* L.) leaf extract by LC-ESI-QTOF-MS/MS

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One of the secondary metabolites contained in ketapang leaves are flavonoids which are reported to have potential as natural antioxidants. The difference in the type of solvent is one factor that affects the yield of the active substance content, where the use of the best solvent will guarantee the extraction process. Therefore, this study was designed to determine a suitable solvent to optimally extract the active compound in obtaining the highest antioxidant activity and to identify the metabolite profile of the ketapang leaf extract that acts as an antioxidant. This research begins with the extraction of the maceration method using various solvents such as aqua dest, 96% ethanol, 96% isopropanol, and 96% methanol, then the extracts were determined for the total flavonoid, and antioxidant activity using the DPPH method, then the extract with the best activity was identified of secondary metabolites by LC-ESI-QTOF-MS/MS. The results showed that methanol solvent was the best treatment with the highest antioxidant activity which had an IC50 value of 22.4567 ppm and total flavonoid content of 46.2407 mgQE/g. The compounds identified in the methanol extract were 12 metabolites of the flavonoid group, including catechin, gambirin B3, quercetin, rutin, isorhamnetin, quercitrin, naringenin, procyanidin A2, kaemferol, crisimarin, apigenin, and crisiliol. Based on this, it was concluded that methanol was the best solvent to extract flavonoid compounds from ketapang leaves which were proven to have strong antioxidant activity.

Keywords: *antioxidant, flavonoid, ketapang leaf, Terminalia catappa* L.

A009

The Potency of Extract Methanol of *Protium javanicum* Burm.f Leaves in Inhibiting Lipid Peroxidation in Wistar Rats Exposed to Cigarette Smoke

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Cigarette smoke is one source of oxidant that can induce stress oxidative leading to lipid peroxidation. The lipid peroxidation marked by increasing malondialdehyde and decreasing superoxide dismustase level. This research aim to investigate effect of administering leaves extract of *Protium javanicum* Burm.f (tenggulun) on malondialdehyde (MDA) and superoxide dismustase (SOD) levels in Wistar rat exposed to cigarette smoke. The experimental test was carried out using the randomized post-test only control group design. A total of 30 Wistar rats were randomized into six treatment groups: the normal control group (P0), the negative control group was only exposed to cigarette smoke; (P1); the positive control (vitamin C 50 mg/kg BW) and exposure to cigarette smoke (P2); the treatment groups (P3;P4 ;P5) were given methanol extract of tenggulun leaf at a dose of 50, 100, and 200 mg/kg BW respectively and exposure to cigarette smoke. The cigarette smoke exposure was performed using 3 cigarettes per day for 14 days. On the 15th day, each of the blood rats was taken for analysing the MDA and SOD levels. The data obtained were statistically analyzed. The result suggested that intake of methanol extract of tenggulun leaf at the given dose significantly inhibited lipid peroxidation by decreasing MDA and increasing SOD levels in blood Wistar rats exposed to cigarette smoke as compared to negative control. The ability of the extract to inhibit lipid peroxidation depends on the dose given and a dose of 200 mg/Kg BW exhibited the best result.

Keywords: cigarette smoke, lipid peroxidation, *Protium javanicum* Burm.f (tenggulun)

A010

The synthesis of methyl ester nitrate from ketapang seed oil (*Terminalia catappa* L.)

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The synthesis of methyl ester nitrate from ketapang oil (*Terminalia catappa* L.) have been carried out. This study aims to determine the yield of methyl ester nitrate from ketapang seed oil and to determine the characteristics of methyl ester (ME) and methyl ester nitrate (MEN). In this study, ketapang seed oil was obtained from the soxhlet extraction process followed by an evaporation process to separate the oil from the solvent. Methyl ester nitrate can be produced from ketapang seed oil by esterification, followed by transesterification and nitration reactions. Evaporated oil is esterified using methanol with a mole ratio of oil: methanol (1: 6), then the transesterification process using methanol with a mole ratio (1:15) gives a yield of 86%. The transesterification product was then nitrated using HNO_3 and H_2SO_4 for 4 hours with a yield of 83%. Characterization of ketapang seed oil ME using GC-MS characterization showed the presence of methyl palmitoleate ($C_{17}H_{32}O_2$), methyl palmitate ($C_{19}H_{34}O_2$), methyl oleate ($C_{19}H_{36}O_2$), methyl 13-octadecanoic ($C_{19}H_{36}O_2$), methyl stearate ($C_{19}H_{38}O_2$), and methyl 18-nonadecanoic ($C_{21}H_{42}O_2$). Characterization MEN using a FTIR spectrophotometer showed the presence of a C-ONO_2 group at wave number 1550 cm-1, NO_2 group at wave number 1365 cm-1 and a C-N group at wave number 1118 cm-1.

Keywords: Esterification, ketapang seeds (*Terminalia catappa* L.), methyl ester nitrate, nitration.

A011

Isolation and characterization of flavonoid derivative of ethyl acetate extract of kemerakan sapenit (*Bauhinia latisiliqua*) and its activity as antioxidant

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Various bioactivities on natural compounds, the potential antioxidant can provide a broad spectrum in their utilization and development into medicinal raw material. One of the plants that has the potency for antioxidant activity is the Kemerakan Sapenit (*Bauhinia latisilqua*) plant. The purpose of this study was to isolate, to characterize and to determine the antioxidant activity of isolated compound in the ethyl acetate extract of the stem bark of *B. latisilqua*. This research includes extraction, fractionation, purification and elucidation of secondary metabolite structure as well as testing the antioxidant activity of isolated compound. Extraction was carried out by maceration technique, fractionation and purification using liquid vacuum chromatography and gravitation column chromatography. The elucidation of the structural compound was determined by analysis of the UV, IR and NMR spectra. Antioxidant test was carried out using the DPPH (1,1-diphenyl-2-picrylhydrazyl) method. Based on the analysis of spectral data, the isolated compound was a flavan-3-ol derivative, a catechin. Antioxidant test on catechin compound showed an IC_{50} value of 35.01 **µg** /ml. The test result showed a very strong antioxidant activity (IC_{50} for positive control, vitamine C, of 42.94 **µg** /ml).

Keywords: Kemerakan Sapenit, *Bauhinia latisiqua*, 1,1-diphenyl-2-picrylhydrazyl, flavan-3-ol, catechin.

A014

Anticancer assay of methanol extract of *Gracilaria salicornia* originating from the Hari islands, southeast Sulawesi, against MCF-7 cancer cells *in vitro*

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Gracilaria salicornia is one of the red algae found in the Hari Islands, Southeast Sulawesi waters. There has been no research report on the chemical content and activity of anti-cancer MCF-7 cells. This study aimed to explore the methanol extract of *G. salicornia* on the cytotoxic effect of MCF-7 cells. *G. salicornia* was extracted using methanol. The methanol extract was tested for phytochemical using the colorimetric methods, toxicity test using the toxicological evaluation brine shrimp lethality assay (BSLT) method, and cytotoxic test with anticancer against MCF-7 cells using the MTT method. *G. salicornia* methanol extract contains alkaloids, phenolics, and steroids/terpenoids. The toxicity value of the methanol extract of *G. salicornia* LC_{50} was 561.26 mg/L, and the IC_{50} cytotoxic value of the methanolic extract of *G. salicornia* was 414.6 mg/L.

Keywords: *Gracilaria salicornia*, BSLT, MTT, cytotoxic, cell MCF-7.

A015

A steroid with a flexible side chain from the Indonesian nudibranch *Phyllidia varicosa*

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Our marine library (35 samples) consisted of EtOAc and H_2O layer were obtained from different place collection in Indonesia showed interesting source and biological activity against brine shrimp *Artemia salina* on the nudibranch *Phyllidia varicosa* (LC_{50} 23.39 µg/mL for EtOAc layer). *Phyllidia varicosa* is one of the marine natural product that has not been widely studied so it has the potential to produce new compounds for the drug candidate. Further chemical investigation on the sea slug, a steroid with a flexible side chain (**1,** 0.96 mg) was isolated from the cytotoxic hexane layer (LC_{50} 4.67 ± 0.91 µg/mL) using microscale separation and HPLC. Compound **1** was elucidated using NMR including ^{1}H, ^{13}C, COSY, HSQC, HMBC, NOESY, HRESIMS as well as quantum chemical calculation of NMR chemical shifts. The relative configurations of **1** assigned by NOESY on the tetracyclic were secured by the calculations, while the flexible side chain gave four possibilities of stereocenters which were further also distinguished by the calculations. This is the first report isolation of **1** in nudibranch and a new approaching of stereochemical determination using DFT calculations of NMR chemical shifts challenged by the flexible side chain of **1**. Further detail isolation and structure determination of **1** will be discussed in the presentation.

Keywords: DFT calculation, flexible natural products, stereochemistry, cytotoxic

A016

Growth analysis of post-nickel mining reclamation plants fed with modified organic matter on Kabaena island (studies on Kusambi, Angsana, and Wola plants)

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The soil condition after nickel mining for land reclamation is deplorable due to the lack of topsoil arrangement and low nutrient content. One of the efforts to increase the growth of reclaimed plants is administering modified organic matter in high doses. This study aimed to analyze the growth of reclaimed plants fed with high doses of organic fertilizer. The research was carried out in the IUP area of PT. Anugrah Harisma Barakah on Kabaena Island used three test plants, namely Kusambi (*Schleichera oleosa*), Angsana (*Pterocarpus indicus*), and Wola (*Vitex cofassus*), from 2019 to 2022. The plants planted in the hole of one bucket of the PC 200 Excavator are then stored with 7 kg of modified organic matter and stored for 12 days at field capacity. After that, they planted as many as 5 trees of each plant to observe growth. Observed plant growth includes plant height, stem diameter and canopy width every six months. Preliminary soil analysis includes pH, C-organic, N-total, P_2O_5, K_2O and soil moisture. Soil observations observed per six months include pH, C-organic and soil moisture. Analysis of plant growth and its effect on organic matter and soil conditions was analyzed with correlation. The results showed that the reclaimed plants were tested for linear growth. There is a positive relationship between reclaimed plants' growth and organic matter application. *Schleichera oleosa* plants provide good growth compared to *Pterocarpus indicus* and *Vitex cofassus.*
Keywords: Reclamation of nickel mines, reclaimed plants, pH, moisture and C-organic.

A018

Green methodology using *Capsicum annuum var. grossuum* extract for identification of animal fats

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The use of natural reagents from plant extracts for chemical analysis is one of the approaches in the development of low-cost and environmentally friendly green identification. This study aims to identify animal fats by UV-vis spectrophotometric method using natural coloring reagents from the extract of *Capsicum annuum var. grossuum* as an alternative to the carcinogenic diazonium reagent. Animal fat samples (LH1, LH2, LH3, LH4) used are the result of rendering crude fat. *C. annuum* extracts were obtained by the maceration method using n-hexane, ethylacetate, and methanol as solvents, and then the extract components were analyzed using LC-MS/MS. An animal fat identification test was carried out by analyzing the respective UV-vis spectra profiles of the four animal fats, *C. annuum* extracst, and the mixture of animal fat and coloring extracts. The result of the LC-MS/MS analysis of these extracts showed the presence of β -carotene compound in all extracts. This is suspected to be the contribution of natural dyes from the extracts. The UV-vis spectrum profile of those extracts displayed absorption bands with maximum wave lengths of 353, 449, and 467 nm (n-hexane); 287, 452, and 662 nm (ethylacetate); and 223 and 291 nm (methanol). Spectrophotometric analysis of the animal fats LH1, LH2, LH3, and LH4 without the extracts exhibited different UV-vis spectrum profiles. The addition of extracts to the animal fats also showed different profiles of the UV-vis spectrum, but the profile obtained was different from the UV-vis spectrum profile of animal fats without the addition of *C. annuum* extract reagent. According to the findings, the types of animal fats LH1, LH2, LH3, and LH4 can be identified using UV-vis spectrophotometry with ethylacetate as a solvent and the natural coloring of *C. annuum* extracts.

A019

Spatial mapping of flood vulnerability in the Langkumbe watershed (DAS) of North Buton regency

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This study aims to map the level of flood vulnerability in the Langkumbe Watershed (DAS) North Buton Regency through a spatial approach. The research method used is attributed analysis (score and weight). The variables used in this study were land height, slope, rainfall, soil type, land use type, and distance from the river. The spatial analysis used is the overlay method. The results show that the Langkumbe watershed is divided into four classes of flood vulnerability; a safe area covering about 11,749.41 ha (28.78%), a slightly vulnerable area covering about 16,592.33 ha (40.64%), a vulnerable area covering about 11,702.53 ha (28.66%), and a very vulnerable area covering about 785.68 ha (1.92%). In Bonegunu District, about 1,104.46 ha is included in the vulnerable category and about 167.78 ha in the very vulnerable category. The District of West Kulisusu covered about 9,842.21 ha is included in the vulnerable category and about 617.90 ha in the very vulnerable category. In North Kulisusu District, an area of 755.87 ha is included in the vulnerable category. The Districts of Maligano and Wakorumba are included in the safe category, but a few areas are slightly vulnerable.

Keywords: Langkumbe watershed, flood vulnerability, spatial analysis.

A020

Bis (-2-ethyl hexyl) Phthalate as Antibacterial from Sponge *Stylotella sp.*

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Sponges are marine biota that make up coral reefs that live on the bottom of the waters and have an important role in marine ecosystems. Sponges have bioactive components that have not been widely used by the community. This study aimed to analyze the content of secondary metabolites and the antibacterial activity of the sponge *Stylotella sp.* antibacterial activity test against Gram negative (-) *Escherichia coli* bacteria and Gram positive (+) *Staphylococcus aureus* bacteria was carried out using the well diffusion method. The results of antibacterial testing with various concentrations of 50, 100, 150 ppm of the isolates showed that the zone of inhibition against *E. coli* was 11.3; 12; and 13 mm while for *S. aureus* bacteria were 12.3; 13; and 14 mm. The results of antibacterial testing with a concentration of 600 ppm of sponge extract showed an inhibition zone on *E. coli* bacteria. and *S. aureus* in the amount of 13.3 and 14 mm, respectively. The test results showed that the sponge extract and isolate were in the intermediate category and were resistant to *E. Coli* bacteria. and *S. aureus*.

Keywords: antibacterial, sponge extract, *Escherichia coli, Staphylococcus aureus.*

A021

Activity of chlorophyll *b* from green kastuba leaves (*Euphorbia pulcherrima*) as an organic inhibitors of carbon steel corrosion

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Chlorophyll is one of the secondary metabolites found in the leaves of green kastuba (*Euphorbia pulcherrima*). Several studies have shown that chlorophyll has the potential as a corrosion inhibitor. Therefore, in this study chlorophyll *b* activity was tested as an organic inhibitor of carbon steel corrosion. The method used to determine the corrosion rate in this study is the weight loss method which pays attention to the mass lost before and after immersion in a corrosive medium. Meanwhile, the characterization of the steel surface was carried out using an optical microscope. The test results showed that the use of bioinhibitors from kastuba leaf extract was more optimal than chlorophyll b in inhibiting the corrosion rate. The value of the inhibition efficiency on the methanol extract of kastuba leaves was 66,08 % with a corrosion rate of 0,0311 mm/y on seawater corrosive media and 75,9 % with an efficiency value of 0,0011 mm/y on 3 % salt water corrosive media. Meanwhile, chlorophyll *b* has an inhibitory efficiency value of 47,6 % with a corrosion rate of 0,0257 mm/y on seawater corrosive media and 57 % with an efficiency value of 0,0103 mm/y on 3 % salt water corrosive media.

Keywords: kastuba leaf, chlorophyll, inhibitors.

A023

Infrared spectroscopy analysis and chemical properties of inceptisols (Cambisols) for agricultural development land

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This study aims to develop the Inceptisols (Cambisols) properties to provide basic information for agricultural development. The soil type occupies a significant and vital part of the farming land, especially in Kendari City, Indonesia. 30 samples of soils take from three selected sites under the canopy of a tree with different profiles where Cambisols occur on limestone parent material. We examined the FTIR spectroscopy and studied physical, magnetic, and chemical properties to be used as a reference in soil management and recommendation for balanced fertilization. Average total nitrogen of soil contents ranges from 0.202% to 0.597% at profile 1, from 0.098% to 0.482% at profile 2 and from 0.106% to 0.397% at profile. Therefore, Soil pH H20 of the soil from the three profiles ranged from 5.7 to 6.95, with respectively average at each profile respectively 6.555, 5.916, and 6.254, showing a slightly alkaline reaction. So, the salinity levels in soils are classified as poor saline for all soils profile. The sand fraction is the dominant mechanical fraction in all profiles and does not vary much along the soil profiles, again comprising about 60 to70%. The clay fraction, although small in amount, is relatively enriched in the lowermost parts of these soils and rapidly increases approaching the C horizon. In contrast, the chemical element content obtained oxides of Si, Al, Fe, Mg, Ti, Ca, S, Na, K, P, Mn, Ni, Co, and Cr. Dominating Si with the trends increasing upward consistently on all sites indicated massive soil development in the study area. Whereas Al, Fe, and Mg trend increasing downward of depth were highly attributed to limited leaching and slow rates of weathering. Magnetic susceptibility trends in all sites increase upward, expressing the enrichment of the magnetic mineral and indicating prolonged pedogenic processes. FTIR spectroscopy analysis shows progressive kaolinization, which appears in all profiles. The change of clay mineral montmorillonite with the presence of FeAlOH and Al2OH (918 cm^{-1}) due to symmetrical stretching vibration of the Si-O group and OH bending region to form kaolinite with two or more OH stretching vibrations (3700cm^{-1} - 3620 cm^{-1}) increasing an upward trend. Although cambisol development limited leaching and weathering, the progressive kaolinization throughout the soil horizons was attributed to high mineralization soil development in the study area.

Keywords: inceptisols (Cambisols), physical and chemical properties, FTIR spectroscopy, magnetic susceptibility.

INTERNATIONAL CONFERENCE OF

10th THE INDONESIAN CHEMICAL SOCIETY 2022

Kendari, 12th October 2022

Abstracts

Parallel Session B

B005

Identification of Polypeptide Antibiotic in Methanol Fraction Produced by a Thermo-halophilic Bacterium from Pria Laot Sabang 76 Isolate

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Antibiotics can be produced from the extremophiles bacteria. The goal study was to isolate and purify of the polypeptide groups of antibiotics from PLS 76 isolate thermo-halophilic bacteria. The assay of the antibiotic class with ninhydrin spray on TLC plate was indicated a class of the antibiotic. The antibiotic activity were tested using the disc diffusion Kirby-Baeur method. Purification of antibiotic was performed by Preparative Thin Layer Chromatography. The results of the characterization of the antibiotic class with ninhydrin reagent was showed that the antibiotic from PLS 76 isolate was an antibiotic from the polypeptide group. Supernatant activity tested against *E. coli* and *S. aureus* showed that both have inhibition zone from methanol fraction inhibited *E. coli* and *S. aureus* growth of about 12 mm. The purified antibiotics (Fraction A) showed the activity 7 mm inhibition zone against for *E. coli* and *S. aureus*. The Quadrupole Time-of-Flight (QTOF) Mass Spectometer data indicated that the antibiotics structure from PLS 76 with the similarity of Polymyxin B2 antibiotic. The antibiotics produced from PLS 76 isolate belongs to a polypeptide group.

Keywords: antibiotic, thermo-halophilic bacterium, polypeptide antibiotic, methanol fraction.

B006

Control of *Begomovirus* in Cayenne Pepper (*Capsicum frutescens* L.) with *Barrier* Combination Design

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Begomovirus is one of the causes of disease from the plant virus group, also known as the geminivirus. Gemini virus can infect various plants, including chili plants. Yield loss caused by the geminivirus causes chili plants not to produce, especially if infection occurs in young chili plants. The whitefly-vector insect determines the spread of the geminivirus in the field. Control of vector insect populations in crops is important to reduce infected plants. Barriers around chili plantations can be used as a barrier to vector spread in the field. The study aimed to evaluate the strategy of controlling the geminivirus using barrier plants. The aim of the study was to evaluate the strategy of controlling the geminivirus by using barrier plants. The research method used was a randomized block design (RBD) with seven treatments. Research has several treatments that is controlled without a barrier, transparent white plastic barrier, covered with screen, kenikir (*Cosmos caudatus* Kunth and zinnia/tagetes flowers (*Zinnia elegans*), basil (*Ocimum basilicum*), scallion (*Allium ampeloprasum*), sorghum (*Sorghum bicolor* L.) and corn (*Zea mays.* L) were made into three groups each. The results showed that the barrier between sorghum and corn suppressed the lowest whitefly population (0.27 head/leaf), significantly different from the control. The highest number of vector populations was in control (13.40 heads/leaf). The lowest incidence and severity of disease were in the barrier of kenikir and zinnia/tagetes flowers (20% and 5.33%), while the control (100% and 78.67%). The highest chili production was in the barrier of kenikir and zinnia flowers/tagetes (3.40 kg/plot), and the lowest was in control (2.56 kg/plot). Barrier kenikir and zinnia/tagetes flower (B3) were most effective in suppressing the spread of Begomovirus in cayenne pepper in the field.

Keywords: barrier, begomovirus, chili, disease incidence, kenikir

B007

Characterization of type 1 L-Asparaginase encoding gene of thermohalophilic bacteria CAT3.4 isolate from Wawolesea hot springs North Konawe Southeast Sulawesi

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This study aims to determine the molecular characteristics of type 1 L-Asparaginase encoding gene of thermohalophilic bacteria CAT3.4 isolate from wawolesea hot springs north konawe southeast sulawesi. This research is an exploratory type of research. Characterization was carried out by amplifying the *ansA* gene sequences encoding type 1 L-Asparaginase from CAT3.4 isolates with *polymerase chain reactions* (PCR) technique using AsnBac1-F1 (5'-ACGCGATTCTTTTGGCCGG-3') and AsnBac1-R1 (5'-CAGTGAAGAGGT GCATGGTATG-3') primers. Amplified PCR products were then used for sequencing templates using the Sanger method. The amino acids coding region (CDS) obtained were characterized bioinformatically using the NCBI website for BLASTn analysis, *BioEdit* program for restriction sites and hydrophobicity profile analysis, MEGA X program for phylogenetic tree analysis and *Expasy translate* program for the analysis of amino acid sequence of type 1 L-Asparaginase. The characterization results showed that the gen had high similarity with the *ansA* gene sequences owned by 20 strains of *Bacillus subtilis* with 99.00% -100% similarity, the gene also had high sequence relatedness with *ansA* gene from *Bacillus subtilis* strain SRCM103629 and *B.subtilis* strain GOT9, can be identified using the restriction enzymes MluI and BstI as a species differentiator of the producing organism, the CDS encoding 329 amino acids with the dominant composition of polar amino acids (54.1%) and having an amino acid hydrophobicity profile which is dominated by hydrophilic region. All of these characters confirmed that the characterized gene was *ansA* gene encoding type 1 L-Asparaginase of the species *Bacillus subtilis*.

Keywords: Gene Characterization, Type 1 L-Asparaginase, CAT3.4 Isolate, Bioinformatics Analysis.

B009

Purification and Characterization of Recombinant α-Amylase BmaN1 from *Bacillus megaterium* NL3

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α-Amylase (E.C 3.2.1.1) catalyzes the hydrolysis of internal α-1,4-glycosidic bond of polysaccharides. α-Amylases are used in various industrial purposes such as textiles, detergent, paper, food, and pharmaceutical. A bacterium associated with a sea anemone *Bacillus megaterium* NL3 from the land-locked marine Lake Kakaban, Derawan Island, East Kalimantan, produces a unique α-amylase BmaN1. BmaN1 is the first α-amylase known to have different catalytic residues among members of the GH13 family. BmaN1 was produced in *Escherichia coli* BL21(DE3) as an inactive inclusion body due to the presence of transmembrane helical region at C-terminal of BmaN1. The aims of this study were to express, purify, characterize of the truncated BmaN1 which has no transmembrane helical region at C-terminal. BmaN1ΔC was produced in *E. coli* ArcticExpress (DE3) as a soluble protein with molecular weight of 49 kDa based on SDS-PAGE analysis. BmaN1ΔC has been purified to homogeneity with 12-fold purification with specific activity of 325.5 U/mg. The purified of BmaN1ΔC has an optimum activity at pH 6.5 and 50°C in 2% soluble starch. BmaN1ΔC has more than 70 % activity in pH 4.5 to 9.5 and 60 % activity in temperature 40°C to 80°C. Despite *B. megaterium* NL3 is a marine bacterium, interestingly the purified of BmaN1ΔC had the highest amylolytic activity without NaCl. BmaN1ΔC retained about 79%, 51%, and 17% activity on the presence of 0.5 M, 1.0 M, and 2.0 M NaCl, respectively. In conclusion, these results indicated that BmaN1ΔC is potential to be used in starch processing industry since its ability to hydrolyze soluble starch in broad pH, temperature, and salt concentration range.

Keywords: α-amylase, BmaN1ΔC, GH13 family, *Bacillus megaterium* NL3, catalytic residue

B010

Composition and Diversity of Vegetation Types in Three Agroforestry Patterns at Privately Forest of KTH Matabundu, Southeast Sulawesi

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This study aims to determine the composition of vegetation and the diversity of stands of three agroforestry patterns in KTH Matabundu. Data collection was carried out on each observation plot of each of the three agroforestry patterns. Determination of the observation plot by purposive sampling based on different types of plants. For each agroforestry pattern, five plots measuring 20 m x 20 m were made, then vegetation analysis was carried out. Parameters observed in this study included the name of the plant species, the number of individuals and the diameter of the stand. To determine species composition, observational data and field measurements were analyzed by calculating relative density, relative frequency, relative dominance and Important Value Index. Meanwhile, the level of species diversity was calculated through the species diversity index (H) using the Shannon-Wiener formula, species evenness index (E) and species richness index (R). The results showed that there were 46 types of stands identified. At the tree level, five stands were found in the agroforestry pattern A and B and seven stands in the agroforestry pattern C. At the pole level, there were six stands in the agroforestry pattern A and five stands in the agroforestry pattern B and C. At the sapling level, five species were found in agroforestry pattern A and C, while in agroforestry pattern B only three types of plants were found. The tree with the highest significance index (INP) in agroforestry pattern A was Jati (Tectona grandis) with INP 145, agroforestry pattern B was Jabon (Neolamarckia cadamba) with INP 124 and agroforestry pattern C Jati putih (Gmelina arborea) with INP 102. This type of plant is the dominat species, it can be seen in the value from vegetation analysis. The highest species diversity for the tree level was found in the C agroforestry pattern with 1.7 H, while the pole level in the A agroforestry pattern with 1.5 H and the sapling level in the C agroforestry pattern with 0.7 H. The tree species evenness index was dominated by agroforestry C with 0.9 E, while the pole level was dominated by agroforestry C with 0.9 E and the sapling level was dominated by agroforestry C with 0.4 E. The tree species richness index was dominated by agroforestry C. with 1.5 R, the pole level is dominated by agroforestry pattern A with 1.5 R, the tree level is dominated by agroforestry pattern A with 1.5 R. From the results, it can be concluded that the privately forest by system agroforestry at KTH Matabundu, was still in the middle good category.

Keywords: Agroforestry, Biodiversity, Composition

B012

Antibacterial properties and toxicity of gagatan harimau (*Paraboea leuserensis B.L.Burt*) ethanol extract

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Gagatan harimau plant (*Paraboea leuserensis* B.L.Burt) is one of the plants used to increase body stamina. In this study, the antibacterial activity and toxicity of the ethanolic extract of the leaves of *P. leuserensis* B.L.Burt were examined. Antibacterial activity test was conducted using disc diffusion and microdilution methods against *S. aureus* and *S. mutans* bacteria. Meanwhile, the toxicity test was conducted using BSLT method. It was found that, the results of antibacterial activity test of *P. leuserensis* B.L.Burt ethanol extract showed activity against *S. aureus* ATCC 25923 with an inhibition zone diameter of 7.1 mm. The ethanolic extract of *P. leuserensis* BLBurt was able to inhibit and kill *S. aureus* ATCC 25923 with MIC values of 1250 ug/mL and MBC 5000 ug/mL. The toxicity of the ethanolic extract of *P. leuserensis* B.L.Bur leaves was low with an LC_{50} value of 624.0508 ppm

Keywords: daun gagatan harimau (*Paraboea leuserensis* B.L.Burt), antibacterial, toxicity.

B013

Electrochemical glucose biosensor fabrication using Chitosan-$NiFe_2O_4$ cryogel

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The number of diabetics continues to increase in the world. In 2019, around 463 million adults (20-79 years) were living with diabetes and by 2045 the diabetes will increase to 700 million. The importance of diabetes diagnosis requires an effective, efficient, and economical glucose detection tool such as a glucose biosensor. This study aims to determine the potential of Chitosan-NiFe2O4 composites for improving the performance of glucose biosensors by electrochemical detection. The electrochemical method used was cyclic voltammetry using three electrodes system. Chitosan was used as the GOD enzyme immobilization supporting material on the working electrode. Modifications were made using $NiFe_2O_4$ nanoparticles to improve the conductivity of the electrodes. The results showed the optimum condition for glucose measurements were a scan rate of 0.15 V / sec, a concentration of $NiFe_2O_4$ 30mg / mL, a buffer pH of 8, a buffer concentration of 0.2M, and a temperature of 45 ° C. Chitosan-$NiFe_2O_4$ composites at optimal conditions were used to measure standard glucose with a range between 5-25mM, and showed the r : 0.9692, the limit of detection and limit of quantification were 4.88 and 16.28 mM, respectively.

Keywords: chitosan, cryogel, glucose biosensor, nickel ferrit nanoparticles

B014

Methylene blue increases electric current with a microbial fuel cell system using leachate and pottery membranes

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Microbial fuel cells (MFC) can produce clean energy through the oxidation of biodegradable organic matter using various species of bacteria as biocatalysts. The MFC system in this study was made in a dual chamber consisting of an anode chamber containing leachate and a cathode chamber containing a potassium permanganate solution. The leachate sample was used as a substrate and a source of microbes. This study compares variations in the concentration of methylene blue in producing electrical energy. Methylene blue is used as an electron mediator agent for microbes in leachate which can increase the electrical power of the MFC system. The methylene blue used was divided into three different concentrations, namely concentrations of 200 M, 300 M, and 400 M. The results showed that the addition of methylene blue with a concentration of 400 M produced the highest current of 37.1 mA, while at a concentration of 200 M it produced 23.26 mA and at a concentration of 300 M it produced 33.93 mA. Based on the results of these measurements, the addition of high concentrations of methylene blue can increase the electric current in the MFC system so that the electrical energy produced will be even greater.

B015

Immobilization of Endo-β-1,4-D-Xylanase using Alginate/ Nanocellulose for Xylooligosaccharide production

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Free endo-β-1,4-D-xylanase cannot be used more than once, so it needs to be modified by immobilizing the enzyme. Endo-β-1,4-D-xylanase was obtained from termite abdomen sources by isolation, ammonium sulfate purification, and dialysis methods. Endo-β-1,4-D-xylanase was immobilized with an alginate/nanocellulose matrix. This study aims to determine the activity, protein content, and repeated use of immobilized Endo-β-1,4-D-xylanase. This study used variations of Alginate/nanocellulose (0; 2.5; 5; 7.5; 10) %. Protein levels of Endo-β-1,4-D-xylanase were tested using the Bradford method and activity using the Miller method. The total protein bound to the immobilized Endo-β-1,4-D-xylanase was stated with the immobilized yield data. The immobilized yield with the composition of Alginate Nanocellulose (ANC) (0%) was 45.33% greater than the other compositions. Immobilized Endo-β-1,4-D-xylanase activity is efficient. ANC 5% produces an efficiency of 62.384% at the 12th hour, which is greater than the other ANC compositions.

Keywords: Endoxylanase; Nanoparticle, Xylooligosaccharide

B016

Antimicrobial and antioxidant activity of bacterial cellulose-based edible film from sago liquid waste incorporated with spices

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Bacterial cellulose-based edible films from sago liquid waste incorporated with spice extracts have been developed to obtain functional food packaging. This study aims to determine the antimicrobial and antioxidant activity of edible films fortified with spices, namely ginger, garlic and turmeric. The manufacture of edible films was carried out using the casting method. The measurement of antimicrobial activity was carried out by the disc diffusion method using 3 indicator bacteria (*Escherichia coli* ATCC 35218, *Staphylococcus aureus* ATCC 25923, and *Bacillus cereus* ATCC 14579) and 2 indicator fungi (*Candida albicans* IPBCC 88,030 and *Aspergillus flavus* ATCC 10231), Antioxidant activity was measured by the DPPH method. The results showed that bacterial cellulose-based edible film fortified with spices (ginger, garlic and turmeric) could increase antimicrobial and antioxidant activity. The edible film fortified with garlic had the best antimicrobial activity, while the edible film fortified with turmeric had the best antioxidant activity. Therefore, the addition of spice extract to edible films can increase its function as food packaging

Keywords: Antimicrobial, Antioxidant, Bacterial cellulose, Edible film, Spices.

B017

The effect of combined natural dyes on the color fastness of natural color batik

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Exploration of native Indonesian plants as natural dyes for batik aims to qualitatively determine the colors produced from various plants for batik coloring. The results of this exploration are expected to further enrich the types of plants as sources of natural dyes and increase color variations. Based on this, we investigated the use of jolawe fruit skin (*Terminalia bellirica*), ketapang leaves (*Terminalia catappa*), and mahogany bark (*Swietenia mahagoni*) for batik coloring. The research was conducted experimentally with the first factor being the type of natural dye (W1 = jolawe, W2 = ketapang, W3 = mahogany) and the second factor was the type of fixator (F1 = $KAl(SO_4)_2{\cdot}12H_2O$, F2 = CaCO3, F3 = FeSO4). The characterization of natural dyed batik includes a color reflectance test (R%), a color fastness test to sunlight (SNI ISO 105-B01-2010), a color fastness test to commercial washing (SNI ISO 105-C06:2010), and a color fastness test to dry/wet rubbing (SNI ISO 105-X12:2012). The results showed that the use of the fixator was able to change the color direction in which the Fe-based fixator produced a darker color. The combination of two natural dyes, namely Mahogany-Jolawe and Mahoni-Ketapang showed an increased color fastness value compared to the use of its single natural dye. Based on color visualization, the use of a combination of natural dyes can improve color quality while enriching batik color variations.

B018

Effect of nickel on energy generated by plant microbial fuel cell using *Ipomea aquatica*

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Plant Microbial Fuel Cell (PMFC) is an alternative energy that is environmentally friendly and is a renewable energy with technology that can produce electrical energy through the degradation process of organic matter by microorganisms and utilizing exudate from plants. The PMFC work system is also used as metal remediation in water that is absorbed by plants. The PMFC reactor consists of a chamber, electrodes (capture electrons from microbes), an electrolyte solution, and a membrane or salt bridge. The electrode that is often used is a graphite sheet. To improve PMFC performance, nutrients are added to plants so that the exudate produced can be maximized and utilized by microorganisms. The results showed that the PMFC chamber without metal has a high voltage and current compared to the PMFC chamber that uses metal. The condition of plants without metal had more leaves, strong stems and many roots compared to plants using metal which had wilted leaves, brittle stems and lacked roots.

Keywords: PMFC, *Microbial Fuel Cell, remediation*, electricity

B020

Carbon and nutrients organics deposition by mangroves of Rhizophoraceae family growing in the coral triangle, Southeast Sulawesi

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Mangroves play important roles to support the productivity of the coastal and marine ecosystems in the coral triangle areas of Southeast Sulawesi. This study aimed to elucidate the deposition and export of carbon and nitrogen by mangroves of the Rhizophoraceae family growing in the coastal region of Southeast Sulawesi. The leaf litterfall decomposition was investigated in mangroves of the Rhizophoraceae family including *Rhozhophora apiculata*, *R. mucronata* and *Ceriops tagal*. About 30 samples of leaf litterfall from each mangrove species were placed in the habitat of these mangroves, while 3 samples from each species were monthly collected. The carbon and nitrogen contents in the leaf litterfall of each mangrove species were determined, while total carbon and nitrogen input and export by mangroves were calculated. The leaf litter decaying of *R. mucronata* is much faster than that *R. apiculata* and *Ceriops tagal*. It showed that about 97.78% of leaf litter of *R. mucronata* was almost decayed within 6 months indicating the faster decomposition of organic carbon and nutrients from leaf litter of *R. mucronata* mangrove. On the other hand, it was less than 80% of the leaf litter of *R. apiculata* and *Ceriops tagal* decayed within 6 months indicating the later decomposition of organic carbon and nutrients from *R. apiculata* and *Ceriops tagal*. However, the leaf litters of these two mangrove species need almost 8 months to fully decomposed. Late decomposition of leaf litter indicates delaying for these mangroves in storing the carbon and nutrients in the coastal and marine ecosystems of Southeast Sulawesi. The regression model equation of the leaf litter decomposition for *R. mucronata* is y= 32.24-5.18, R^2 = 0.941, while regression model of leaf litter decomposition in *R. apiculata* is y= 33.81-4.28, R^2 = 0.986. Moreover, the regression model of leaf litter decomposition of *Ceriops tagal* is y= 33.23-4.31, R^2 = 0.991. These differences in R^2 values of regression models in leaf litter decomposition of three different mangroves indicate differences in their decomposition mechanisms. Yearly input of organic carbon from mangrove litters was estimated to range from 10.99 to 14,30 tons/ha, while yearly input of organic ranges from 0.34 to 0.52 tons/ha. However, the yearly export of organic carbon from the leaf litter of mangroves was estimated to range from 10.99 to 3,30 tons/ha, while the yearly export of organic nitrogen ranges from 0,01 to 0,52 tons/ha. Therefore, the present study highlighted the huge carbon and nutrient deposition by mangroves, which maintain the coastal and marine productivity in this coral triangle area, a hotspot of biodiversity.

Keywords: organic carbon; organic nitrogen, mangroves litterfall, Southeast Sulawesi; coral triangle

B021

Effect of nickel on energy generated by plant microbial fuel cell using *Amaranthus caudatus*

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Plant microbial fuel cell (PMFC) is a renewable technology in producing plant-microbial-based electrical energy in a fuel cell. In addition to producing electrical energy, this technology has the potential for remediation of heavy metal contamination in water or soil. In this study, the potential remediation of the heavy metal Ni(II) in water and the resulting electrical energy was tested. There are symptoms of toxicity of Ni(II) heavy metal ions to the morphology and average reef of amaranth plants such as a decrease in the number of leaves, plant height tends to be inhibited, rotting of the roots and stems of plants. This result indicates the occurrence of the Ni(II) metal remediation process in the spinach plant. The growth of spinach plants without adding Ni(II) heavy metal ions tends to increase. The measurement of the average value of voltage and current strength in PMFC chambers without heavy metals is higher than that of PMFC chambers with heavy metals. The results of this study provide a new insight in the study of PMFC insertion for the remediation of heavy metal contamination of Ni(II) in water and the potential of electrical energy produced.

Keywords: PMFC, Heavy metal, remediation, electricity, Microbial Fuel Cell

B022

Medicinal plants dan their uses by the community around KPH Gantara Southeast Sulawesi, Indonesia

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The use of medicinal plants by the community around the KPH Gantara area, Muna Regency, Liwu Metingki Village has been entrenched, but knowledge regarding the use has not been well disclosed. The purpose of this study was to examine the use of medicinal plants by the community around the KPH Gantara area, especially in the village of Liwu Metingki. Exploration data collection was carried out through field observations and interviews with communities living around the KPH Gantara area. Meanwhile, the community's description of the use of medicinal plants was obtained by using an interview process with seventeen respondents. The results showed that there were 31 types of plants from 17 families that had the potential as medicinal plants to cure 18 types of diseases. Most of the plants have a habitus as trees (39%), where 69% of local people use leaves as traditional medicine. The boiling process is the most widely used processing method (43%) to obtain the benefits of these medicinal plants, where the disease most commonly treated is internal disease (37.5%). These findings indicate that the sustainable management of KPH Gantara can support the vital role of forest ecosystems for public health. From the results of this study, it is hoped that the community will understand the importance of medicinal plants, so they try to protect them and make conservation efforts by planting them in their yards.

Keywords: *Euphorbiaceae, Walacea, internal disease, leaf*

B023

Identification of phytase producing microorganism from Segara Anakan Cilacap

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Enzymatic degradation of phytic acid using phytase can be an alternative method of reducing phytic acid levels in plant feed ingredients because the enzyme reacts specifically to the substrate. The abundant source of the phytase enzyme is microorganisms. Actinobacteria from the Segara Anakan Cilacap area have been reported to have hydrolytic enzyme activity. Based on this, the isolation and identification of microorganisms which has the potential to produce phytase from the mangrove area of Segara Anakan Cilacap area have been carried out. The screening of the phytase enzyme was measured based on the reaction between the aqueous extract from microorganisms with Na-phytate substrate in Na-acetate. Identification of microorganisms that have the potency to produce phytase was carried out based on the 16S rRNA gene. The identification steps included isolation of genomic DNA, amplification of the 16S rRNA gene with 27F and 1492R primers, sequencing, editing, and alignment using the nucleotide BLAST program. The research results showed that the three microbial isolates with the highest phytase activity were K-2C, K-3E, and P-6B. Species identification showed that isolate K-2C had 99.02% similarity with *Streptomyces griseorubens* strain NBRC 12780, isolate K-3E had a similarity of 98.03% with *Pluralibacter gergoviae* ATCC 33028, and isolate P-6B has a similarity of 99.64% with *Ochrobactrum intermedium* strain NBRC 15820. The results of this study indicate that the Segara Anakan Cilacap area has the potential as a source of indigenous microbes for phytase production.

B024

Antimicrobial and antioxidant activity of bacterial cellulose-based edible film from sago liquid waste incorporated with spices

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Bacterial cellulose-based edible films from sago liquid waste incorporated with spice extracts have been developed to obtain functional food packaging. This study aims to determine the antimicrobial and antioxidant activity of edible films fortified with spices, namely ginger, garlic and turmeric. The manufacture of edible films was carried out using the casting method. Antimicrobial activity was measured by disc diffusion using three indicator bacteria (*Escherichia coli* ATCC 35218, *Staphylococcus aureus* ATCC 25923, and *Bacillus cereus* ATCC 14579) and two indicator fungi (*Candida albicans* IPBCC 88.030 and *Aspergillus flavus* ATCC 10231), Antioxidant activity was measured by the DPPH method. The results showed that bacterial cellulose-based edible film fortified with spices (ginger, garlic and turmeric) could increase antimicrobial and antioxidant activity. The edible film fortified with garlic had the best antimicrobial activity, while the edible film fortified with turmeric had the best antioxidant activity. Therefore, adding spice extract to edible films can increase its function as food packaging.

Keywords: Antimicrobial, Antioxidant, Bacterial cellulose, Edible film, Spices

B025

Plant species in oil palm plantation area Kolaka regency, Indonesia

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Plant species in the world concentrate on areas that can meet the requirements of life, both on residential land, grazing land, forest land, agricultural land, and even plantation land. The study of plant species was carried out in an oil palm plantation area in Kolaka Regency. The research location is an immature and mature oil palm plantation area by looking at the Summed dominance ratio, species diversity, species dominance, and evenness of a plant. Plant species in the immature oil palm plantation area amounted to 5,060 individuals and plant species in the oil palm plantation area produced 2,251 individuals with the highest Summed Dominance Ratio in each area, namely the species *Calopogonium mucunoides* Desv. Diversity index, dominance, and evenness in each oil palm plantation area for different species, possibly influenced by light intensity, habitat, and ecosystem. The results of the study in this study can be concluded that the diversity of plant species is quite varied, especially in immature oil palm plantation areas.

B039

Species richness, diversity and BMWP index of invertebrate assemblages in wetland ecosystem, Konawe regency, Southeast Sulawesi, Indonesia

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Macroinvertebrates play an essential role in the aquatic ecosystem and are widely used as a bioindicator for water quality assessment. The objective of this study was to compare the pattern of macroinvertebrates community structure and performances of biotic indices on some water bodies affected by different land-use impacts. Macroinvertebrate samples were collected by D-frame net using hand and kick sampling methods from five-station in Konawe District, Southeast Sulawesi, Indonesia, in August 2021. Two categories of land use sources of pollutants, namely fish ponds and settlements and settlements and nickel mineral processing industries. Abiotic variables include water temperature, pH, DO, conductivity, salinity, TDS, velocity, and turbidity measured at each station. A total of 806 individuals belonging to twenty-three genera, seventeen families, and nine orders were assessed. The most abundant group found was Mesogastropoda (77%), followed by Hemiptera and Basommatophora (7%) each, Odonata (3%), and Coleoptera and Decapoda (2%) each. Mesogastropoda group was found very abundant in a slow waterway which was dominantly influenced by the fish pond with the water surface covered by aquatic plants. Two locations that are estimated to significantly affect the impact of dense settlement and the mining industry are dominated by the mesogastropoda group with a Simpson's (dominance index) 0.71 and 0.38. While the other two locations, namely a tiny pool affected by human settlements and an unmanaged fish pond, are dominated by several groups, namely Hemiptera, Decapoda, Basommatophora, and Mesogastropoda, with Simpson's (dominance index) 0.11 and 0.17. Tests using the Biological Monitoring Working Party (BMWP) and the BMWP-Viet version index categorize the condition of water bodies from moderate to very polluted, in line with the observed species richness and the characteristics of water bodies with different turbidity and velocity values. Biotic indices for bioassessment require adaptation to geographical conditions through in-depth research, including developing multimeric methods to produce more accurate biological indicators for water resources management and conserving aquatic biodiversity.

Keywords: Macroinvertebrates, biotic indices, wetland ecosystem, bioassessment.

INTERNATIONAL CONFERENCE OF

10th THE INDONESIAN CHEMICAL SOCIETY 2022

Kendari, 12th October 2022

Abstracts

Parallel Session C

C001

Preparation of Micrometer $Li_{1.05}Mn_{1.95}O_4$ by Ceramic Method Using the Manganese Ore as Mn Sources

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$Li_{1.05}Mn_{1.95}O_4$, as a member of spinel structure lithium manganese oxide ($LiMn_2O_4$), has been recognized as a candidate of high-performance cathode material of lithium-ion battery for electric vehicle or hybrid electric vehicle applications. $Li_{1.05}Mn_{1.95}O_4$ has been synthesized by ceramic method from Li_2CO_3 and nano size Mn_3O_4 as a precursor. Here, Mn_3O_4 nanoparticles were firstly extracted from the manganese ore by using a co-precipitation method. Then, the cylindrical pellet form of mixture of Li_2CO_3 and Mn_3O_4 powders was sintered at 600, 700, 800 and 900 °C for 8 h. XRD data show that $Li_{1.05}Mn_{1.95}O_4$ has formed at temperature starting at 700 °C. The average crystalline size was estimated about ~20.3 nm. The SEM images (Fig. 1) shows the particle size ranging for 0.5 to 2 micrometers. The electrical conductivity is the order of 13.6 to 45.5 mS/cm. Thermal analysis with DSC gives the lowest onset of 46.39 °C obtained at sintering temperature of 900 °C and the lowest enthalpy change of -39.76 J/g with sintering temperature of 700 °C.

Keywords: Manganese ore leaching, lithium manganese oxide, ceramic method, Li-ion battery

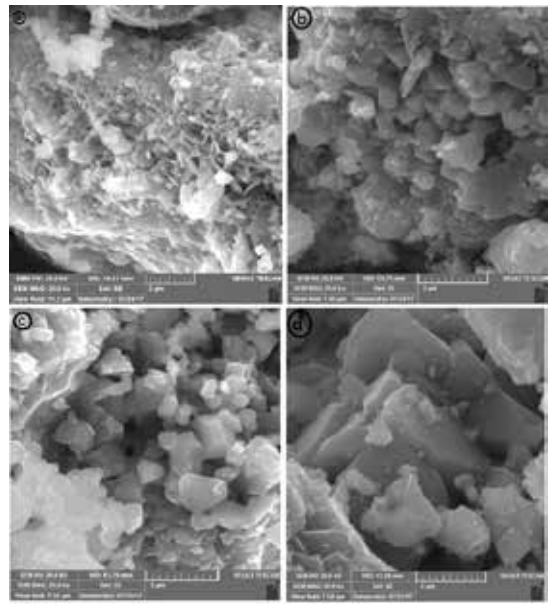

Figure 1 SEM images of $Li_{1.05}M_{0.95}O_4$ sintered at different temperatures: (a) 600 °C, (b) 700 °C, (c) 800 °C and (d) 900 °C.

C002

Synthesis of SnO_2-$ZnFe_2O_4$ composite ceramics as magnetics photocatalyst for methylene blue degradation

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Methylene blue is one of the many waste dyes produced and has a threshold value of 5 mg/L. The composite ceramics of SnO_2-$ZnFe_2O_4$ have been synthesized by the coprecipitation method for methylene blue degradation with the irradiation of UV light. Analysis of X-ray diffraction patterns from SnO_2-$ZnFe_2O_4$ composite ceramics was observed only from the $ZnFe_2O_4$ crystal system with average crystallite size is 7,36 nm. The results of the Scanning Electron Microscope (SEM) analysis showed that the surface morphology of SnO_2-$ZnFe_2O_4$ composite ceramics was heterogeneous and agglomerated with the results of Energy Dispersive X-Ray (EDS) showing the composition of Sn, 7.14%, Zn 4.93% and Fe 52.96%, and O 49.33%. The measurement results from Surface Area Analyzer (SAA) obtained a specific surface area of SnO_2-$ZnFe_2O_4$ of 78.339 m^2/g. The test results of magnetic properties by external magnetic fields show weak magnetic properties. The most optimum results of photodegradation of SnO_2-$ZnFe_2O_4$ composite ceramics were at pH 10 and 120 minutes of irradiation time with percent degradation of 95.95%. With these results, the composite ceramic SnO_2-$ZnFe_2O_4$ has the potential to overcome methylene blue dye waste.

Keywords: composite ceramics, photocatalyst, magnetic photocatalyst, SnO_2-$ZnFe_2O_4$, solder waste.

D001

Kinetics and thermodynamic equilibrium of nickel metal ions sorption on carbon nanofibers irradiated by ultrasonic energy

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We studied kinetic and thermodynamic equilibrium of nickel metal ions sorption on Carbon Nanofibers (CNFs) irradiated by ultrasonic energy. In this work we investigated effects of the heavy metal initial concentration, and pH interaction between the heavy metal ions and CNFs Nanofibers using liquid phase adsorption technique under ultrasonic energy irradiation. These data were then used for studying thermodynamic aspects such as sorption capacity and sorption energy and also kinetic parameters such as kinetic model, reaction order and rate constant of sorption of the heavy metal on CNFs. We found that the increase of heavy metal initial concentration was proportional to amount of the heavy metal adsorbed onto CNFs. The highest uptake of heavy metal ions amount onto CNFs in equilibrium (q_e) was 244.00 $mg.g^{-1}$ that was achieved at the pH of 8. Both Langmuir and Freundlich isotherms were used in this work in order to find the best-fitted isotherms model. The sorption equilibrium of the heavy metal ions on CNFs tends to be best fitted by the Langmuir isotherm. Based on Langmuir isotherm, we found that the maximum sorption capacity (q_m) and sorption energy ($\sim\Delta G^o$) of the metal ions on CNFs were 316.456 $mg.g^{-1}$ and -1.029 $kJ.mol^{-1}$, respectively. Sorption kinetics of the heavy metal on CNFs was examined by both pseudo-first and pseudo-second orders. We obtained that the kinetics coincided well with the pseudo-second-order having rate constant (k) of 0.00625 $g.mg^{-1}.min^{-1}$.

Keywords: carbon nanofibers, nickel, kinetic, thermodynamic, ultrasonic

D003

Chemoselective hydrogenolysis biomass-derived furfuryl alcohol into 1,5-pentanediol over TiO2-ZrO2 supported bimetallic ruthenium-tin catalysts

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Chemoselective hydrogenolysis using noble-metal-based catalyst is one of the most challenging in biomass-derived transformations into fuels and chemical platforms. Furfuryl alcohol (FFalc) is one of the important furanic compound that can be converted to 1,5-pentanediol (1,5-PeD). Herein, supported bimetallic ruthenium-tin (Ru-Sn; Ru/Sn molar ratio of 3.0) catalysts on metal oxides and its mixtures (the weight ratio of oxides was 0.5); *c.a.* TiO_2 anatase (TiO_2(A)), ZrO_2, γ-Al_2O_3, SiO_2, and TiO_2(A)-γ-Al_2O3, TiO_2(A)-ZrO2, and TiO_2(A)-SiO_2 were prepared and applied for the synthesis of 1,5-PeD from FFalc under mild conditions (413 K, 1.0 MPa H_2, 3 h) in batch reaction system. Ru-Sn(3.0)/TiO_2(A) catalyst gave 22% 1,5-PeD yield, while Ru-Sn(3.0)/ZrO_2 produced 45% 1,5-PeD. When Ru-Sn(3.0)/TiO_2(A)-γ-Al_2O_3, Ru-Sn(3.0)/TiO_2(A)-ZrO_2, and Ru-Sn(3.0)/TiO_2(A)-SiO_2 catalysts were employed, the highest 1,5-PeD yield (71%) was obtained over Ru-Sn(3.0)/TiO_2(A)-ZrO_2 catalyst, accompanied by Ru-Sn(3.0)/TiO_2(A)-γ-Al_2O_3 (43% 1,5-PeD), whereas Ru-Sn(3.0)/TiO_2(A)-SiO_2 catalyst did not produce 1,5-PeD under the same reaction conditions. Therefore, it can be conlcluded that the addition of ZrO_2 to TiO_2(A) in Ru-Sn(3.0)/TiO_2(A)-ZrO_2 catalyst enhanced signicantly the yield of 1,5-PeD. The effect of metal oxide compositions, physico-chemical properties of catalysts, and reaction parameters on the conversion of FFalc and yield of 1,5-PeD is under investigation.

Keywords: chemoselective hydrogenolysis; ruthenium-tin catalyst; metal oxide supports; furfuryl alcohol; 1,5-pentanediol

D004

Validation of the carboxymethyl chitosan…vitamin C interactions on the electronic level by DFT approach

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The conformations of the molecule of carboxymethyl chitosan (CMC) which is one of the chitosan (CS) derivatives used as an encapsulation that regulates the delivery of vitamin C have been validated until to electronic level. The capacity of CMC in delivering vitamin C through the system which is affected by its solubility in water, mainly depend on the contribution of the energy binding of CMC...CMC complex and the energy binding of CMC...vitamin C complex . The aim of this paper is to validate the effect of electron distribution on the interactions in CMC...vitamin C complex. The CMC model is a dimer, CMC-2, and subsequently substituted by carboxyl group, $-CH_2COOH$, on the $-NH_2$ and -OH results in N-CMC-2, O-CMC-2, and N,O-CMC-2. By using B3LYP theory and 6-31** as the basis set, the Density Functional Theory (DFT) method have validated the potential energy of the active site system on the electronic level. The results obtained in this research are structures, interaction energy, HOMO-LUMO and its derivatives.

Keywords: carboxymethyl chitosan, encapsulation, carboxyl group, stability, interaction energy, DFT.

D005

Surface study of boron-doped diamond electrodes related to its electrochemical properties

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Polycrystalline boron-doped diamond (BDD) films are well-documented as the best alternatives to substitute the conventional solid electrodes due to its superior properties. In addition to its excellent physical and chemical stability, very low capacitances as well as exceptional wide potential windows of water splitting are also reported, which generated from sp^3 coordination as the intrinsic characteristics of diamond structure. Further study related to its surface characteristics was performed to discover other advance properties suggested that the surface terminations as well as crystal orientations play important roles to the electrochemical properties. Meanwhile, modification of the surface using some metal types and other molecules suggested that certain steps need to be taken to generate a stable modification on the BDD surface.

Keywords: boron-doped diamond, termination, surface orientation, modification, and electrochemical properties.

D006

Effect of solvent on antifoam performance for delayed coker unit

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Antifoam plays a significant role in maintaining the continuous removal of gases through the delayed coker process in a crude refinery unit. However, a holistic review of the basics and desired selection criteria for the various types of antifoams for delayed coker process is limited on literature. Therefore, this study analyzes the selection solvent for PT Pertamina (Persero) commercialized antifoam's properties and performance in terms of solubility, dispersibility, surface tension, viscosity, defoaming rate, thermal stability, defoaming performance stability, hazard potential, and chemical inertness. Therefore, this review provides valuable insight into the existing and potential antifoams that can be used in delayed coker unit along with their typical antifoam capabilities, benefits, and drawbacks.

Keywords: antifoam, delayed coker, refinery, solvent.

D008

Nitrogen-phosphor modified carbon dots for quantitaive sensing of histamine

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Present study reported the preparation of nitrogen-phosphor modified carbon dots (NP-CDs) through pyrolysis method and further applied for sensitive detection of histamine via UV-Vis absorption technique. Several characterizations, by XRD, Raman, FTIR, AFM, and PL; confirming well-formation of NP-CDs its and all optical properties owed by this nanomaterial. The parameters of analytical method were next used to evaluate performance of histamine detection, where prove the NP-CDs quite perform good accuracy and selectivity against of histamine with LOD and LOQ values were 19.20 and 64 mg/L, respectively. Recovery rate was observed ranging from 89-106%. Even successfully detected histamine by UV-Vis Spectrophotometry, NP-CDs still maintained its photoluminescence properties that it offers more distinct advantages compared to previous methods including low cost, simple, sensitive and selective.

Keyword: nitrogen-phosphor carbon dots, histamine detection, characterization, UV-Vis spectrophotometry, validation

D009

Mn_3O_4 resistive inks synthesized from the manganese ore for application in printed electronics technology

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Research on the resistive inks has increased in number in the last decades due to its recognition in printed electronics and future flexible electronics. Flexible electrodes, for example, that can be fabricated by printing method require materials that are available in the format of inks. Furthermore, the manganese oxide has been recognized as the main compound of lithium-ion battery. We report the facile method, i.e. direct extraction of Mn3O4 nanoparticles from manganese ore taken from Kumbewaha Village, Siontapina District, Buton RegencyMn_3O_4 nanoparticles can be well-dispersed with high stability as a resistive ink in different medium such as aquades, ethanol, and Triton-X. The ink has been coated on the cotton fabric by dip method for resistivity measurement. Figure 1 shows (a) XRD data of the as synthesized Mn_3O_4, (b) dispersed ink, (c) cotton based smart textile prepared from Mn_3O_4 ink, and (d) SEM image of smart textile. It gives a resistivity of about 91 Ω.cm. It is promising as the materials for application in printed and flexible electronics technologies. Performance of Mn3O4 inks in different medium will be compared.

Keywords: Manganese ore, nanoparticles, resistive ink, printed electronics, flexible electronics

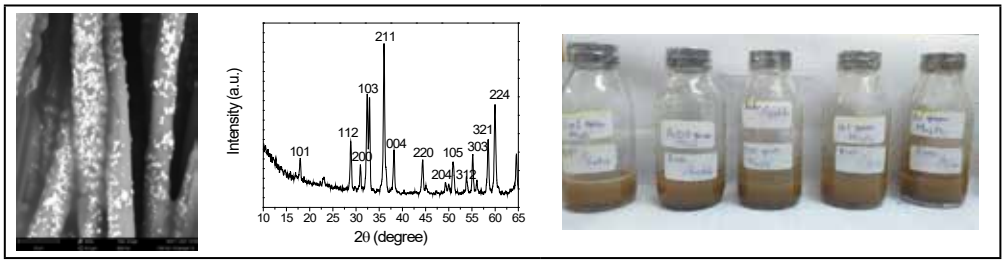

Figure 1 Performance of Mn3O4 ink (a) XRD data of the as prepared Mn_3O_4 nanoparticle, (b) ink, (c) example of smart textile based on Mn_3O_4 ink, and (d) SEM image of smart textile.

D010

Study on the mineral change of manganese ore due to thermal treatment

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The manganese ore of Kumbewaha Village at Buton Island, by our research group, has been intensively studied to produce Mn_3O_4 nanoparticles. Usually, it involved a leaching process in acidic environment and accompanied by a precipitation process in alkaline condition. It is very promising to be used as an electrode material of Li-ion battery in the spinel of $Li_xMn_{2-x}O_4$. However, direct production of Mn_3O_4 from manganese ore by involving grinding and heating process is an interesting challenge. Here, we report a mineralogical change induced by different calcination temperature of manganese ore. Temperature treatment was done under atmospheric condition from 200 °C to 1000 °C. They were examined by using XRD, susceptibility meter, and SEM-EDX. XRD data shows that the pyroluliste phase (MnO2) dominate mineralogical content of manganese ore and change to be hausmanite (Mn3O4) and MnO at temperature of 400 to 600 °C. At the end, the bixbyte phase (Mn2O3) become a major mineral at higher temperature of 700 to 1000 °C. Magnetic susceptibility also increases rapidly accompanying the mineralogical alteration of manganese ores. The nano size Mn_3O_4, Mn_2O_3 and MnO_2 can be directly produced by grinding the manganese ore and followed by heating at a desired temperature.

Keywords: Manganese ore, mineralogy, phase transformation, magnetic susceptibility

D011

Introduction of dragon fruit peel (*Hylocereus polyrhizus*) as an adhesive for making briquettes from ketapang fruit charcoal (*Terminalia catappa* L)

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Red dragon fruit peel containing pectin about 16-20%, it is one of the hydrocolloids compounds that can be used as a gelling agent and an adhesive in the manufacture of charcoal briquettes. Fruit shell is a biomass waste that can be used as charcoal briquettes. Ketapang fruit shell wich is the main substances in this study, contains lignocellulose, including lignin 43.46%, cellulose 6.60% and hemicellulose 24.70% which are the raw materials in the manufacture of charcoal briquettes. So, the of aims the study to identify the characterization of charcoal briquettes produced from ketapang fruit shell and adhesive by red dragon fruit peel. The concentrations of adhesive used are 15%, 20% and 25% in 100 g of charcoal briquette raw material. The best result of adhesive used is 15%. In terms of Indonesian National Standard (SNI) on each measurement including density 0.7095 g/cm3, calorific value 8.601.23 cal/g, water content 6.533%, ash content 3.004%. There are some values doesn't meet the standard including compressive strength of 3.0951 kg/cm2, the volatile matter content of 32.383% and the bound carbon content of 64.513%.

Keywords: briquette, charcoal, ketapang dragon fruit.

D012

Surface struktur and chemical composition of coconut shell charcoal using nira aren (*Arenga pinnata*) acid activation

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Coconut shell is a very abundant waste of copra manufacture in North Sulawesi, Indonesia. Pyrolysis coconut shell charcoal is very potential as a raw material for bio-adsorbent for health. Making bio-adsorbent activated carbon made from coconut shell using acetic acid activator from fermented palm sap (*Arenga pinnata*). Coconut shell pyrolysis was carried out at a temperature of 400-600^{o}C and acetic acid activator was obtained by fermenting palm sap for 6 months. The results of SEM (Scanning Electron Microscopy) analysis showed pore diameters of 11.3 μm, 9.75 μm, 8.70 μm, 8.23 μm, 7.01 μm, and 6.9 μm. The EDS (Energy Dispersive Spectroscopy) test showed the purity of the charcoal with the elemental composition of carbon (C) reaching 91.12% atoms, 8.20% O atoms, 0.50% Al atoms, and 0.16% Ca atoms. The percentages of moles of C atoms are 99.56 moles, 0.27 mole % Al, and 0.17 mole % Ca. Activation of palm sap acid increases the purity of coconut shell charcoal as bio-adsorption.

Keywords: palm sap acetic acid, coconut shell charcoal, SEM, EDS

D013

The secondary metabolites potential of genus sinularia soft coral as anticancer through inhibition of DYRK2, CDK4 and PD-1: Docking molecular simulation

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Secondary metabolites have become the object of research for the purpose of finding new drugs because of their biological activity. Marine organisms, including soft corals, are important sources of secondary metabolites with diverse biological properties. Soft corals are coral reef ecosystem invertebrates from the phylum Coelenterata that can produce secondary metabolites with large structural diversity providing various biological activities including antioxidant, antibacterial, anti-malarial and cytotoxic properties [1]. In their activity as anticancer candidates by inhibiting the enzyme of (dual tyrosine kinase 2 (DYRK2), cyclin dependent kinase 4 (CDK4) and Programmed cell death 1 (PD-1) are yet not reported. This research aims to study the anticancer potential of secondary metabolites of soft corals from the genus sinularia by applying molecular docking techniques. A total of 123 secondary metabolites of 20 species of soft coral genus sinularia provided by the Maebashi Institute of Technology and Nara Institute of Science and Technology database [2] were studied for their interactions with three different cancer receptors, namely dual tyrosine kinase 2 (DYRK2), cyclin dependent kinase 4 (CDK4) and Programmed cell death 1 (PD-1). The results of molecular docking simulations by using autodock [3] show that secondary metabolites of soft corals of the genus sinularia with ID C00023756, C00007271, C00040308 have interaction affinities for the CDK4 enzyme of C00023756 -10.92, -10.85, and -10.82 kcal per mole, respectively, while the native ligand (2PU) is only -10.10. kcal per mole. The three test ligands with the highest interaction affinity for the PD-1 enzyme were C00007271, C00041541, and C00041544 at -10.49, -10.38, -10.28 kcal per mole, respectively. Compound 8YZ which is a native ligand of PD-1 gives an affinity of -11.38 kcal per mole. The secondary metabolites of soft corals of the genus sinularia which were predicted to give better inhibition of the enzyme DYRK2 than curcumin (native ligand) were C00007271, C00041544, and C00023756 at -12.37, -12.08 and -11.65 kcal per mole, respectively, whereas curcumin was only able to provide interaction affinity. of -10.06 kcal per mole. In conclusion, it was found that compounds that have potential as anticancer are C00007271 (a secondary metabolite of the species Sinularia dura, Sinularia maxima, and Sinularia gibberosa), C00023756 (Sinularia dura), C00040308 (Sinularia flexibilis), C00041541 (Sinularia gibberosa), and C00041544 (Sinularia gibberosa).

Keywords: anticancer, genus sinularia, secondary metabolite, soft coral.

F021

Production and characterization of nickel oxide nanostructures loaded on carbon nanofibers using liquid phase adsorption-thermal oxidation

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We reported production and characterization of nickel oxide (NiO) nanostructures loaded on Carbon Nanofibers (CNFs) using Liquid Phase Adsorption-Thermal Oxidation. Prior to thermal oxidation, we employed liquid phase adsorption (LPA) irradiated by ultrasonic energy under ambient temperature using Ni(NO3)2·6H_2O as a precursor of NiO. Then, as prepared Ni(II)@CNFs were thermally calcined at 573 K under air atmosphere for 2.5 hours. Formation of NiO nanostructure was characterized by XRD, SEM-EDX and FTIR techniques. The appearance of characteristic peak on XRD patterns indicate that NiO nanostructures have been successfully produced on CNFs. NiO nanostructures formed on CNFs were clearly observed on SEM image. Based on EDX data, we found contents of Ni and O loaded on CNFs. In addition, the presence of Ni-O peak on FTIR spectra suggests that the nickel oxide nanostructures have been loaded onto CNFs.

Keywords: carbon nanofibers, nickel oxide, liquid phase adsorption, ultrasonic energy, thermal oxidation

F023

Pore structure and properties of geopolymer membrane from metakaolin: Effect of metal oxide

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In this research, kaolin-based geopolymer membranes were prepared with different type of metal oxide. Hydrogen peroxide (H_2O_2) was used as foaming agent to introduce porosity on geopolymer structure. Water glass and sodium hydroxide mixture were added as alkaline activators to induce geopolymerization process. The fabricated composite then characterized with FTIR spectroscopy, X-ray diffraction and porosity analysis. The prepared membrane revealed different type of metal oxide produce varied porosity and pore strucuture on geopolymer membrane with copper oxide-based membrane exhibited more dense and non-porous structure while zinc oxide and titanium dioxide have more porous and lighter structure. The kinetics study of oxygen evolution from H_2O_2 decomposition revealed that the highest O_2 evolution rate was achieved with NiO and CuO with value of 81.85 and 19.3 $\mu l.s^{-1}$. NiO and CuO displayed higher decomposition rates than ZnO and TiO2 that led to less porous structure of membrane.

Keyword: geopolymer, pore structure, metal oxide

D024

Effect of cetyltrimethylammonium bromide (CTAB) content on hydrophobicity of silica thin layer derived from Sodium silicate (Na_2SiO_3) and Dimethoxydimethylsilane (DMDMS)

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Modification of the surface hydrophobicity of the material has been carried out through hydrophobic thin layer silica coating. This study aims to obtain a thin layer and xerogel silica from precursors Na_2SiO_3 and Dimethoxydimethylsilane (DMDMS) with the addition of the surfactant Cetyltrimethylammonium Bromide (CTAB) and determine the correlation between CTAB content and the hydrophobic character of thin layer silica and silica functional groups. DMDMS is a silica precursor which has a methyl group so that it can function as a hydrophobic directing agent. Preparation of silica xerogel and silica thin layer using the sol-gel method with varying amounts of CTAB. A thin layer of silica was coated on a glass plate by dip-coating method and calcined at a temperature of 150°C for 1.5 hours at an increasing rate of 2°C/min. Meanwhile, xerogel was obtained by drying silica sol at room temperature and then calcined and characterized using FTIR. The results showed that the composition of CTAB added to DMDMS-Na_2SiO_3 had a significant influence on the hydrophobic properties of thin films and silica xerogels, where the greater the amount of CTAB added, the greater the contact angle obtained. The largest water contact angle was obtained at 0.06 gram CTAB composition with angles of 116.8°, 142.2°, and 143.9° for each thin layer, non-calcined xerogel, and calcined xerogel. The results of the FTIR analysis showed that the ratio of (C-H)/(Si-O-Si cyclical) groups increased with increasing CTAB composition.

Keywords: cetyltrimethylammonium bromide (CTAB); Silica Thin Layer, Sodium Silicate (Na_2SiO_3), Dimethoxydimethylsilane (DMDMS)

G001

The application of acid catalyst in reducing free fatty acids number in liquid waste of instant noodle industry

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One of the problems in instant noodle industrial waste is the processing of liquid waste generated from the frying process. This waste contains oil mixed with solids and water from noodle production. The oil content in the waste can be modified for other products. This study aims to conduct pretreatment of noodle waste using an acid catalyst for reducing the number of Free Fatty Acids. The research was carried out by varying the sulfuric acid concentration by 1.25%, 1.55%; 1.85%; 2.15%, and 2.45% of the weight of the waste used. ALB reduction was carried out by the esterification method. The results showed that using a 2.45% catalyst reduced ALB up to 1.41% with three esterification treatments and gave a yield of 34%. This value is the best compared to the use of other acid catalyst concentrations. After getting the lowest number of FFA, this treatment continued by transesterification using a base catalyst. The chromatography results showed that these two processes could bring out methyl esters.

G002

Optimization of ulvan biopolymer extraction from Ulva Sp. using ultrasound microwave extraction as a biodegradable plastic material

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The high level of petroleum-based plastic pollution encourages the use of biodegradable plastics which is made from sustainable natural resources. Seaweed can be a suitable source because of the availability of abundant, cheap and renewable source for this this case. As a biocompatible polymer, ulvan suitable to apply in various fields, one of which is as a biodegradable plastic material. This study aimed to optimize the extraction of ulvan from Ulva sp. And emphasized its use for biodegradable plastic manufacturing applications with using the Ultrasound Microwave Extraction (UME) method. Ultrasound Microwave Extraction is a combination of two non-conventional extraction methods that can be applied to the ulvan extraction process. Extracted ulvan was characterized to determine protein content, moisture content, molecular weight and HPLC analysis to show the composition of ulvan monosaccharides. The impacts of four independent variables including ultrasound temperature (X1, 40 – 80°C), ultrasound time (X2, 30 – 60 min), microwave power (X3, 100 – 800 W) and microwave time (X4, 10 – 30 min) were investigated through Box-Behnken experimental design. Response Surface Methodology (RSM) Box-Behnken design was used to select process conditions from a combination of factors that produce optimal responses. The optimum parameters obtained are expected to increase the extraction product of ulvan biopolymer compared to other methods.

Keywords: Ulva Sp, ulvan, ultrasound microwave extraction, biodegradable plastic.

G003

Highly adsorption-photoactive tablet-shaped graphite-TiO_2 composites for handling organic dyes pollutant

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Designing effective adsorption-photocatalyst over graphite-TiO_2 nanocomposites tablet with facile synthesis and low cost exists challenges for handling organic dyes pollutant. Herein, we discover an advanced adsorption-photoactive based on a TiO_2 framework incorporated with graphite through a tablet-shaped and physical mixing method. In addition, it was printed using metal chips for highly adsorption-photocatalyst against organic dyes. The mass compositions have been evaluated to compare the high degradation performance against mass variations of composites in degrading organic dyes namely methyl orange (MO) and methylene blue (MB). The results demonstrated that the 1:2 mass variation of graphite-TiO_2 produced an enhancement in adsorption-photocatalytic degradation of organic dyes. The degradation rate of MO dye was 93.99% after treatment with UV light irradiation for 60 min, and the reaction rate constant was k = 0.01726 min^{-1}. Meanwhile, the MB dye was also exhibited good performance with a percentage degradation of 80.22% and a reaction rate constant of k = 0.00947 min^{-1}. This constant was much higher than that of two mass variations (1:1 and 2:1) graphite-TiO_2 due to the improvement in the availability of good sites for graphite adsorption and separation of electron-hole pairs of TiO_2. Moreover, the graphite-TiO_2 tablet exhibits excellent reusability and a reasonable degradation for wastewater treatment.

Keywords: TiO_2; graphite; adsorption; photocatalyst; organic dyes.

G004

Analysis of hydrocarbon gas buried onshore pipeline accidents in Indonesia as the databases for failure frequency evaluation in a quantitative risk assessment

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The pipeline has been widely used for transporting hydrocarbon gas and liquid throughout Indonesia since the 1970s. Approximately 18,687 km of the gas pipeline has been built in Indonesia, as of May 31, 2022. However, the growth of pipeline installation is subjected to several threats which can cause pipeline failures. Despite there are thousands of kilometers of pipeline infrastructure built in Indonesia, there are no data on these pipeline failures have been collected or analyzed. Quantitative Risk Assessment (QRA) is often used to measure the risk level of an onshore pipeline installation. In QRA evaluation, the frequency of a pipeline incident is often calculated by a generic failure frequency approach. Most of these generic failure frequencies are obtained from a foreign country or other region incident databases which may not be suited to Indonesia's experience. As a consequence, quantitative risk assessments for onshore pipelines may not represent the frequency assessment of the Indonesian case. In addition, a better understanding of the initiating causes and pipeline failure characteristics should provide important information to improve operation, maintenance, and inspection activities for existing onshore pipelines and as a guideline in selecting the design criteria for new onshore pipelines. The objective of this paper is to provide the basis of data for the determination of failure frequency for onshore pipeline risk assessment. Accident data from 1,057.9 km of buried onshore gas pipelines within 30 years (1976 – 2005) in Indonesia were gathered and assessed in order to provide the cause of failures as well as the effect of pipeline age and diameter on the generic failure rate. This research reveals the average failure rate of 5.36E-04/km-year of onshore pipelines in Indonesia. Data analysis from buried onshore pipeline accidents in Indonesia also showed that 52.9% of the accident were related to the pipeline rupture where the remaining corresponded with pipeline leaking. The study concluded that baseline failure frequencies from this analysis can be used for buried onshore pipeline quantitative risk assessment purposes. Further pipeline failure research for a relatively current period (e.g., from 2005 to 2022), type of installation (e.g., buried or non-buried), and other applications of the pipeline (e.g., offshore pipeline) should be conducted as a way forward for this study to have a more complete database for Indonesian pipeline accidents.

INTERNATIONAL CONFERENCE OF

10th THE INDONESIAN CHEMICAL SOCIETY 2022

Kendari, 12th October 2022

Abstracts

Parallel Session E

E001

Development of hydrazine sensor based on modified glassy carbon electrode

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Hydrazine is a toxic compound which has neurotoxin, mutagenic, carcinogenic, and hepatotoxic properties. In this work, a glassy carbon electrode (GCE) has been modified with the composite of electrochemically reduced graphene oxide (ErGO) and poly(3,4-ethylenedioxythiophene)-poly(styrenesulfonate)(PEDOT:PSS) for the purpose of hydrazine detection. The proposed sensor exhibits a well electrochemical and analytical performance investigated with the optimum parameters for the measurement using cyclic voltammetry (CV), differential pulse voltammetry (DPV), and square wave voltammetry (SWV) techniques. In particular DPV and SWV techniques displayed a linear relationship in the concentration range of 100 – 200 μM of hydrazine based on GCE modified ErGO/PEDOT:PSS. Furthermore, both techniques were used to obtain the value the detection limit (LoD) and quantitation limit (LoQ) for hydrazine detection as 10 μM and 50 μM for DPV and 15 μM and 60 μM for SWV. In addition, this proposed hydrazine sensor displayed a good selectivity due to its recovery range in the range 95 – 120% with an acceptable reproducibility and stability indicated by % RSD value of less than 5 %. In conclusion, this proposed sensor for hydrazine detection based on GCE modified ErGO/PEDOT:PSS shows a potency to be applied in real analysis.

Keywords: electrochemically reduced graphene oxide, hydrazine, PEDOT:PSS, voltammetry, water analysis.

E002

Carbon paste electrode modified with natural bentonite for analysis of ion Pb(II) in sea water at Serangan beach, Bali

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In this research, a modified bentonite carbon paste electrode was used for Pb (II) ion analysis using the anodic stripping voltammetry technique. The aim of this research is to increase the sensitivity of Pb (II) ion measurements. Optimized parameters were determined such as a natural bentonite composition in carbon paste, deposition time, deposition potential, and scan rate. The range of linear concentration, detection limit, quantitation limit, repeatability, and percent recovery was validated. The results were obtained with the optimum composition of natural bentonite at 12%. The optimum deposition time with carbon paste electrode (CPE) was 120 seconds and with natural bentonite modified carbon paste electrode (CPE-B) was decreased to 90 seconds, the optimum deposition potential with CPE was at -0.43 V, and with CPE-B was at -0.23 V, the optimum scan rate using CPE and CPE-B had the same value at 15 mV/s. Pb (II) ion measurements were obtained in the range of 10 - 2000 μg/L using CPE and 5- 2500 μg/L using CPE-B. The detection limit of CPE was found at 0.372 mg/L and decreased to 0.166 mg/L using CPE-B. The quantitation limit of CPE was 0.958 mg/L and decreased to 0.525 mg/L using CPE-B. The repeated measurements for both CPE and CPE-B produced Horwitz ratio values were less than 2. CPE-B at the optimum measurement conditions was used to measure the concentration of Pb (II) ions in a seawater sample taken from 3 different locations. The results were obtained at 1.97 ± 13, 1.354 ± 4.76, and 1.080 ± 3.28 mg/L. According to the Decree of the Ministry for the Environment No. 51/2004 concerning Sea Water Quality Standards, the value has exceeded the maximum limit of 0.1 mg/L.

Keywords: anodic stripping voltammetry, bentonite, Pb(II) ion, seawater, Serangan beach.

E003

The Development of Portable Visible Spectrophotometer for Discrimination of the Origin of Java Tea

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The quality of herbal products depends on the quality of its raw material which can be affected by various physical, chemical, and geographical aspects. The objective of this study was to develop a portable visible spectrophotometer using consumer electronics and combined with chemometrics for discrimination the origin of Java tea. The spectrophotometer was constructed by using LED as a light source, optical layer of DVD as a grating, web camera as a detector and the *Theremino spectrometer* software as signal processor. The analytical performance of portable spectrophotometer was measured using parameters such as linearity and percent recovery toward analysis of permanganate standard. Furthermore, the spectrophotometer also was used to discriminate Java tea from two origin i.e Bogor and Sukabumi. Results showed that the analytical performance of portable spectrophotometer was not different with reference instruments (Hitachi U-2800). It has linearity with coefficient of determination (R^2) was 0.989 and percent recovery that showed accuracy was 100.33%. In addition to that, spectrophotometer was used to generate spectrum of java tea extract from Sukabumi dan Bogor and analyzed using chemometrics. Based on those spectrums, the origin of java tea sample can be grouped well using the principal component analysis (PCA) method and the principal components can provide information of 95% of the total variance.

Keywords: quality herbal material, portable spectrophotometer, theremino spectrometer, chemometrics, Java tea.

E004

Enhanced luminol electrochemiluminescence for hydrogen peroxide detection using gold nanoparticles@Polyaniline-modified boron-doped diamond electrode

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A hydrogen peroxide (H_2O_2) detection was successfully developed using luminol electrochemiluminescence (ECL) phenomenon at a boron-doped diamond (BDD) electrode. In order to improve the ECL signals, the surface of the BDD was decorated with gold nanoparticles (AuNPs). Prior to the AuNPs decoration, polyaniline (PANI) was modified on the BDD surface for the framework to attach and maintain the stability of the AuNPs on the BDD surface. AuNPs@PANI was successfully modified at BDD electrode confirmed by the electrochemical and FE-SEM EDX characterization. At an optimum potential of +0.6 V and 1 mM of luminol concentration at pH 9, the luminol ECL at the modified BDD electrode resulted better performance, as seen from the sensitivity 29.31 a.u. μM^{-1} cm^{-2} for the modified electrode, which is around 4 times better than the unmodified BDD electrode (5.71 a.u. μM^{-1} cm^{-2}). In addition, the lower detection limit at 2.08 μM can be achieved. The sensor displayed a good performance for H_2O_2 samples measurements in a commercial toothpaste matrix shown by 88 to 102% recoveries.

Keywords: electrochemiluminescence, H_2O_2, BDD, gold nanoparticle, luminol.

E005

Optimization of uric acid detection with Au nanorod-decorated graphene oxide (GO/AuNR) using response surface methodology

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A modified glassy carbon electrode (GCE) was developed based on synthesized graphene oxide (GO) decorated gold nanorods (AuNR) composite (GO/AuNR) for sensitive electrochemical sensing of uric acid (UA). The electrochemical performance of GO/AuNR/GCE for UA detection was investigated employing the differential pulse voltammetry (DPV) technique. Central composite design (CCD) was applied to obtain the optimum composition of GO and AuNR composite, which provide the highest possible UA oxidation peak current. The optimum condition was obtained at GO concentration of 5 mg mL^{-1} and AuNR volume of 10 mL. At the optimum condition, GO/AuNR/GCE showed acceptable analytical performances for UA detection with good linearity (concentration range of 10–90 μM) and both a low detection limit (0.4 μM) and quantitation limit (1.0 μM). Furthermore, the proposed sensor exhibits superior stability, reproducibility, and selectivity using ascorbic acid (AA), dopamine (DA), urea, glucose, and magnesium as interference. Finally, practical use of GO/AuNR/GCE was demonstrated by successfully determining the content of UA in human urine samples with the standard addition approach.

Keywords: AuNR, electrode, graphene oxide, sensor, uric acid

E006

Effect of rapid and slow stirring on floc growth in biocoagulation of peat water with jackfruit seeds (*Artocarpus heterophyllus* L.) as measuring by DinoCapture 2.0

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A biocoagulation process has been carried out using jackfruit (*Artocarpus heterophyllus L.*) seeds with a particle size of 250 mesh in peat water treatment. One of the factors to improve the biocoagulation process is mixing with rapid and slow stirring. In this study, rapid stirring was carried out for 5, 10, and 15 minutes and slow stirring was carried out for 15, 20, 25, and 30 minutes. Floc formation analysis was carried out using a digital microscope connected to a computer. The images of the flocs formed on the photos were analyzed using the DinoCapture 2.0 software. The results showed that the longer the rapid stirring time, the larger the floc formed, but the number of floc formed decreased. On the other hand, the shorter the amount of time that is accelerated, the smaller the size of the floc formed and the smaller the floc formed. The optimum time for rapid stirring was 5 minutes, and slow stirring was 30 minutes, with floc sizes spread evenly at 0.2 - 0.8 mm. Other results showed that the biocoagulation process with jackfruit seeds on rapid stirring for 5 minutes and slow 30 minutes had increased the TDS parameters and light intensity by 205 mg/L (5.67%) and 1001 Lux (35.27%) and decreased turbidity to 18.37 NTU (46.20%) and the pH of the solution to be 5.5.

Keywords: biocoagulation, peat water, DinoCapture 2.0, floc, jack fruit seed (*Artocarpus heterophyllus L.*),

E007

Water cooling quality analysis of research reactor RSG-GAS and interm storage spent fuel (ISSF)

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Water quality control is very necessary to maintain the reactor safety. Therefore, it is required to understand well the important parameters of water quality ad their influences on the corrosion of fuel and reactor systems. One of the activities that can be carried out is the corrosion surveillance program for the multipurpose reactor RSG GAS and ISSF. This activity has been commenced since 2006 by using a series of disc coupons. The materials of coupons are $AlMg_2$, $AlMg_3$, dan SS 314. $AlMg_2$ is used as a fuel cladding for the RSG-GAS. The method used for water chemistry analysis in these two pools is monitoring and measuring pH, temperature, and conductivity of cooling water. pH, temperature, and conductivity of cooling water are the main parameters used to characterized water quality. This research obtains pH, temperature and conductivity of primary coolant are beyond the operating condition limit, or in other words the water quality management is very good. Meanwhile, at ISSF, the monthly average pH of pool water is always in the range of the minimum and maximum pH values in normal operating conditions. The average temperature of water pool is relatively stable every month and is still below the maximum operating condition limit. The results of conductivity of pool and canal water are also relatively stable every month and are always below the maximum conductivity allowed.

Keywords: water chemistry, pH, conductivity, cooling water temperature, RSG GAS and ISSF.

E008

Optimization of biodiesel synthesis of nyamplung oil by enzymatically using response surface methodology

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The need for fuel oil in Indonesia is increasing along with technological developments, while petroleum energy reserves are decreasing every day and cannot be renewed. Therefore, to anticipate this, it is necessary to have alternative renewable energy such as Biodiesel. Biodiesel is a fuel consisting of a mixture of monoalkyl esters derived from long-chain fatty acids or oil, which are renewable from nature. One source of oil that can be used as an alternative energy source to be processed into biodiesel is plant (vegetable) oil such as oil from nyamplung (*Callophylum innophylum Linn*) seeds. The nyamplung plant is very potential when used as a raw material for biodiesel production due to the high oil content in the seeds (40-73%), and is a non-edible oil so that it does not compete with food needs. This study aims to optimize the reaction results by observing various conditions that are influenced by several variables, namely reaction time, reaction temperature, molar ratio of substrate (oil/ethanol) and amount of enzyme. Design Expert v.13 software is used to observe the interaction between variables through Response Surface Methodology (RSM) which can affect the optimum synthesis conditions obtained. The recommended model to get optimal results is a quadratic model with a p-value of 0.0083; lack of fit with a p-value of 0.1640 and an R-squared value of 0.7760. The optimum conditions produced by this method are reaction time of 4.419 hours, reaction temperature of 52.457 , molar ratio of oil to ethanol of 1: 5.825 w/v and the amount of enzyme is 3.795 g with the percentage of predicted and actual biodiesel yields are 75.387.and 74,285%, respectively

Keywords: biodiesel, nyamplung oil, optimization, RSM, Design Expert v.13.

E009

Molecularly imprinted polymer chitosan-sodium tripolyphosphate: Synthesis and application for extraction of antibiotic residue in agricultural products

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Low concentration of antibiotic residue in a complex matrix of agricultural products make the analysis of residue become a challenging task. Molecularly imprinted polymer (MIP) is a smart sorbent that which was succesfully used in this study for sample preparation stage. A chitosan-based molecularly imprinted polymer (Chi-MIP) was successfully used for extraction tetracycline residue from egg and milk samples. 0.1 gram of Chi-MIP was put into a bag-shaped cellulose filter paper size 2 x 2 cm. The sorbent is added to the solution containing the tetracycline. The extraction process is carried out using hotplate magnetic stirrer and at the end of the extraction process, the analyte is desorbed in an organic solvent with the aid of ultrasonicator. The desorbed analyte was then analyzed using a UV-Vis spectrophotometer at the wavelength 267 nm. The optimization parameters showed optimal results, namely ethyl acetate as desorbing organic solvents, extraction time of 12 minutes, and desorption time of 3 minutes. The results of the method validation on the egg matrix with the standard addition method showed a linearity range of 1-5 mgL^{-1}, correlation coefficient (R^2) of 0.99; percentage of recovery 99.14%; precision 1.62%; LoD 0.29 mgL^{-1}; LoQ 0.98 mgL^{-1}; and an enrichment factor of 3.27 times.

Keywords: antibiotic residues; chitosan; milk; molecularly imprinted polymer; tetracycline

E010

Hexadesiltrimethylammonium (HDTMA) surfactant modified cellulose in DGT system for determination of phosphate concentration in aquatic environment

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High concentrations of phosphate in the aquatic environment can cause algae explosions which can lead to an imbalance in the aquatic ecosystem. Therefore, it is necessary to determine the bioavailability of phosphate to determine its concentration in water. One of the effective methods currently used in determining the bioavailability of phosphate in aquatic environments is the Diffusive Gradient in Thin Films (DGT) method. In this study, modification of the cellulose adsorbent as a binding layer for the DGT system was carried out by adding surfactant hexadecyltrimethylammonium (HDTMA) with a concentration of 100 ppm. Characterization of HDTMA modified cellulose was carried out by FT-IR and SEM spectroscopy. Diffuse and adsorbed phosphate concentrations were determined by UV-Vis spectroscopy. The results of the analysis of HDTMA surfactant modified cellulose with FTIR showed the presence of OH, C-H (Aliphatic), CH_2, C-O, and C-O-C groups. The presence of O-H and C-O bonds in the modified cellulose indicates that the resulting sample tends to be more polar. Based on the SEM test results showed HDTMA surfactant was clearly bound to cellulose. The analysis of the effect of pH on the DGT method was carried out through a phosphate solution test with variations of pH 3, 5, 7, 9 and 11 for 6 hours then the cellulose-HDTMA gel was eluted using 0.25 M H_2SO_4. The results of the analysis of the effect of pH showed the highest phosphate adsorption in the test solution with a pH of 3.

Keywords: phosphate, DGT, cellulose, HDTMA.

E011

Study on the Use of Natural Fiber on Adsorption Method Using Pineapple (*Ananas comosus*) and flax (*Cannabis sativa ssp.*) Leaf Fiber in Leachate Treatment

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Activated carbon is the most popular and effective adsorbent material, but the process of making activated carbon requires high temperatures (500-1000 °C). This study aims to test the effectiveness of natural fibers as an alternative to the use of activated carbon. The results of the FTIR analysis of natural fibers from pineapple (Ananas comosus) and hemp (Cannabis sativa ssp.) leaves with varying concentrations of NaOH, namely 0.3 M, 0.5 M, 0.7 M, 1 M, and without delignification with NaOH. The concentration of NaOH can affect the delignification process because it can dissolve lignin in natural fibers. The results of pineapple leaf fiber analysis using FTIR showed the –OH group with the greatest intensity at wave number 3332.70 cm-1 and the C-O group at wave number 1029.66 cm-1 with a NaOH concentration of 0.3 M. For flax leaf fiber the intensity of the cluster - The largest OH at wave number 3336.86 cm-1 and the C-O group at wave number 1028.66 cm-1 with a NaOH concentration of 0.7 M. The wave number of pineapple leaf fiber shows a decrease in the intensity of the C=O group as the NaOH concentration increases while the leaf fiber hemp did not show a significant decrease in the intensity of the C=O group.

Keywords: bioadsorption, leachate, fourier transform infrared spectroscopy, (*Cannabis sativa ssp. Sativa*), (*Ananas comosus*)

E012

Green Approach of Peat Water Treatment (Coagulation) Using *Azadirachta indica* Seed

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This study aimed to evaluate the effect of different rapid mixing times on peat water coagulation process using *Azadirachta indica* seed. Peat water and *Azadirachta indica* seed were mixed rapidly in 5, 10, and 15 minutes, then mixed slowly in 30 minutes, afterward, jar-test was carried out for settlement. The floc formed was put into a petri dish, then captured and measured with a Dino-Lite digital microscope equipped with Dino-Capture 2.0 software. At the rapid mixing time of 5 minutes, the total floc was higher than the rapid mixing time of 10 and 15 minutes. However, the floc size was decreased with the increase of rapid mixing time. Small size of floc (i.e under 0.2 mm) was formed higher in 5 minutes of rapid mixing time. Then the floc size was increased with the increased of rapid mixing time. The peat water characteristic after coagulation, was carried out by measure the pH, turbidity, TDS. The pH was changed from 5 to 6.9 – 7.5 pH. Turbidity removal (97%) was optimum in 5 minutes. Whereas the TDS removal (13%) was optimum in 5 minutes. To monitor the effectiveness of coagulant (*Azadirachta indica* seed), measurement of the sludge volume index (SVI) and sludge mass (SM) was done in this study. Furthermore, to determine the behavior of particulate materials (i.e *Azadirachta indica* seed), pH of point zero charge was determined using pH drift method. Where, *Azadirachta indica* seed has a 6.5 pH of pzc.

Keywords: azadirachta indica seed, coagulation, floc and floc size, peat water, dino-lite and dino-capture 2.0 software.

E013

Synthesis of Fe_3O_4-SiO_2/GO as Adsorbent Batik's Dye Remazol Turquoise Blue G-133 and Remazol Red RB-133: Equilibrium, Kinetics and Thermodynamics Mechanism

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The synthesis of Graphene Oxide (GO) from shell of palm oil from agricultural industrial waste located in Southeast Sulawesi has successfully implemented with a rendament of 54.14%. The formed GO then applied as adsorbent of Batik's dye Remazol Turquoise Blue G-133 and Remazol Red RB-133. GO composted using Fe_3O_4 (rendament 78.9%) which isolated from iron sand from Bugel Beach, Kulon Progo, D.I. Yogyakarta, and Na_2SiO_3 13% with the sol-gel method to created Fe_3O_4-SiO_2/GO. The successful synthesis of Fe_3O_4-SiO_2/GO composites exhibited by SEM-EDX with the presence of silica and GO on the Fe_3O_4 surface. There is likewise diffraction of crystallinity (0 0 2) indistinguishable to GO in the XRD Fe_3O_4-SiO_2/GO retention band, as well as the presence of stretch vibrations of C-O-C and Fe-O-Si bonds at wavelengths 1384 and 1076 cm^{-1}, respectively. Besides founded on the VSM analysis consequences of the Fe_3O_4, there was a decrease in magnetization of up to 17.31 emu/gram subsequent covered utilizing silica and GO. Based on the adsorption aftereffects of Remazol Turquoise Blue G-133 and Remazol Red RB-133, Fe_3O_4-SiO_2/GO is better to occur at pH 8 and 6, respectively. As well as showing an increase in q_e and EA alongside the expansion in concentration, time, and temperature. Remazol Turquoise Blue G-133 more following the Temkin isothermal (R^2 0.9611) with K_T $4.72x10^{-1}$ $L.g^{-1}$ and b_T $2.75x10^{-1}$ $kJ.mol^{-1}$ and interparticle diffusion kinetic model (R^2 0.9936) with a k_{id} of $5.83x10^{-1}$ $mg.g^{-1}.min^{-1/2}$ and a theoretical capacity constant of $-2.18x10^{-1}$ $mg.g^{-1}$, and in view of Elovich kinetics models got a desorption limit (β) of $5.67x10^{-1}$ $g.mg^{-1}$ and occurred spontaneously shows with Δsy -86.0 $kJ.mol^{-1}$ exothermically indicated from ΔH -42.2 $kJ.mol^{-1}$ and ΔS $1.42x10^{-1}$ $J.mol^{-1}$ K^{-1}. Remazol Red RB-133 more followed the Temkin isothermal (R2 0.9955) with K_T $1.01x10^{-1}$ $L.g^{-1}$ and b_T $1.21x10^{-1}$ $kJ.mol^{-1}$ and the second-order pseudo kinetic model (R2 0.9926) with k_2 $1.39x10^{-2}$ $g.mg^{-1}.min^{-1}$ and the hypothetical capacity limit (q_2) $11.0x10^{-1}$ $mg.g^{-1}$, and based on the Elovich kinetics model obtained β of $6.24x10^{-1}$ $g.mg^{-1}$ and occurred spontaneously with $\Delta\bar{G}$ -42.4 $kJ.mol^{-1}$ exothermically indicated from ΔH -19.1 $kJ.mol^{-1}$ and ΔS $7.57x10^{-2}$ $J.mol^{-1}$ K^{-1}.

Keyword: Fe_3O_4-SiO_2/GO, graphene-oxide, adsorption, remazol, magnetics.

E016

Synthesis and characterization of Di(2-Ethylhexyl)Phthalate molecular imprinted polymer nanofibers (DEHP MIP-NFs)

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In this study, di(2-ethylhexyl)phthalate molecularly imprinted polymer nanofibers (DEHP MIP-NFs) were prepared through a combination of precipitation polymerization techniques to produce MIPs and electrospinning as a facile method for preparing fibrous materials and imprinting surface molecules. The method of incorporation MIPs and NIPs into nanofibers was carried out in two different ways: dispersion/conjugation of MIPs microparticles to polyacrylonitrile (PAN) nanofibers and coating of PAN nanofibers by the imprinted polymers. MIPs were produced using methyl methacrylate (MMA) as a functional monomer, ethylene glycol dimethylacrylate (EGDMA) as a crosslinker, benzoyl peroxide (BPO) as an initiator, acetonitrile as a porogen, and DEHP as a molecular template. Non-DEHP imprinted polymers (NIPs) were also prepared as controls. The structure and morphology of the prepared MIP-NFs and NIP-NFs were investigated using FTIR spectroscopy, optical microscopy, and SEM characterization. The results showed that both MIPs and NIPs were spherical particles and had a shape with a micron size of approximately 0.5 μm. The adsorption peaks at 1728 cm^{-1} and 1159 cm^{-1} in the MIPs and NIPs spectra indicated the presence of C=O strain and C-O vibrations of methacrylic acid and showed that MIPs and NIPs have the same chemical structure. The absence of DEHP absorption peaks in the MIPs spectrum indicates that DEHP has been successfully desorbed from MIPs. This DEHP MIP-NFs composite will be further developed for the application of selective separation of DEHP-contaminated wastewater.

Keywords: DEHP, molecularly imprinted polymer, polyacrylonitrile, nanofiber.

E017

Phytochemical profile and antioxidant activity of *Intsia bijuga* with different extraction methods

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Intsia bijuga, known as *kayu merbau* in Indonesia, is mainly found in the forests of Papua and belongs to the Fabaceae. This plant is known to contain phenolic and flavonoid compounds and is useful as an antioxidant. In this study, we compared the three extraction methods on the phytochemical profiles (total phenolic and flavonoid content, and FTIR spectra) and their antioxidant capacity. The extraction techniques compared are maceration, sonication, and reflux methods. Total phenolic and flavonoid levels as well as antioxidant capacity obtained, showed slightly different results from each other, but there was no significant difference between the three extraction methods used. The FTIR spectra showed almost similar spectral patterns in each extract, but there were differences in the intensity of the absorbance values at wave numbers 3360 (-OH), 1620 (C=C), 1454 (C-H sp3), and 1156 (C-O) cm^{-1}. These results indicate a slight difference between the three extraction methods. For grouping based on the extraction method, absorbance spectrum data from FTIR (4000-400 cm^{-1}) was used using principal component analysis (PCA). Before PCA, the FTIR spectrum was preprocessed data using baseline (offset & linear) and standard normal variate. Based on PCA, *I. bijuga* wood extract with three different extraction methods can be grouped into groups of extraction methods. The three extraction methods used gave slightly variable results in the value of total phenolic, total flavonoid, and antioxidant capacity. However, the composition profiles can be distinguished using FTIR and PCA spectra.

Keywords: antioxidant, chemometrics, extraction, FTIR spectra, *Intsia bijuga*,

E018

Molecularly Imprinted Polymer (MIP) Chitosan-Based in The Development of Electrochemical Sensor for The Detection of 4-Aminophenol

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Abstract. Molecularly Imprinted Polymers (MIPs) have specific recognition capabilities so that they have been widely used for the manufacture of electrochemical sensors with high selectivity. In this research, an electrochemical sensor has been developed for the detection of 4-aminophenol (4-AP) by modifying the screen printed carbon electrode (SPCE) with chitosan-based MIP. MIP is made of 4-AP as a template, a mixture of polyvinyl alcohol (PVA) - chitosan (CH) as a base polymer and glutaraldehyde and sodium tripolyphosphate as crosslinkers. MIP characterization was based on membrane surface morphology, FT-IR spectrum and electrochemical properties of the modified SPCE. The results showed that MIP was able to selectively accumulate analytes on the electrode surface, MIP with glutaraldehyde as a crosslinker was able to increase the signal. Under optimum conditions, the anodic peak current from the sensor increases linearly with the concentration of 4-AP in the range from 0.5~35 M with a detection limit (S/N = 3) of 2 M. In addition, the developed sensor exhibits high selectivity with an accuracy of 94.11%.

Keywords : 4-Aminophenol, chitosan, glutaraldehyde, sodium tripolyphosphate, polyvinyl alcohol

E019

Effect of number of template and pH on the voltammetry determination of paracetamol using starch/PVA modified carbon electrode

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Paracetamol is one of the most widely used fever and pain relievers and its consumption reaches thousands of tons per year. However, this drug is known to have been used illegally and not according to its function. BPOM (The Indonesian Food and Drug Authority) identified that paracetamol was found in packaged coffee drinks. Several methods have been used to determine paracetamol, including spectrophotometry, colorimetry, LC, and HPLC. However, these methods require procedures that are quite complicated and require time, so an easy and fast analysis method is needed. Therefore, in this study, electrochemical detection of paracetamol will be carried out. This method was chosen because it is easy to use, high sensitivity, and the analysis takes a short time. To increase the sensitivity and selectivity, the electrode was modified using paracetamol - starch/PVA membrane. The sensitivity of the measurement can be improved by modifying the working electrode, by adding a selective membrane composed of polymers, crosslinkers, and templates. By adding paracetamol template, it is expected to improve the electrode selectivity. The purpose of this study was to determine the effect of template membrane composition and pH on paracetamol measurement. The effect of both parameters was analyzed on 500 μM paracetamol in phosphate buffer (PBS). The potential applied was 0 – 1.0 V at scan rate of 2.5 mV/s. The results showed that the best starch/PVA membrane composition is PC-6 using 0.03 g paracetamol as a template and STPP as crosslinker. The highest peak current of measurement was obtained in pH 8 (219 μA) and the peak current decreased in alkaline pH solution.

E020

Preparation of Chitosan-Succinate Hydrogel as Soil Conditioner for Soybean Plant (Glycine max L merril)

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Research on making chitosan hydrogel crosslinked with succinic acid as soil conditioner for soybean (Glycine max L.) plants was successfully conducted. The aims of study are determine the characteristics and effect of composition comparisons in producing hydrogels and to determine the physicochemical properties of soil such as humidity, temperature, pH, absorbed potassium levels, C-organic content and cation exchange capacity. Functional group characterization and morphology were carried out using FTIR and SEM. FTIR analysis showed the presence of functional groups, OH, CH_3, COOH, NH_2, and C=O. SEM analysis shows the hydrogel surface in each composition and concentration of chitosan-succinate of different pore or cavity sizes thus influences the degree of swelling and crosslinking degree. The application of chitosan-succinate hydrogel for the improvement of soybean plants with a composition of 2 g chitosan crosslinked succinic acid 0.4% have a significant impact after 72th day of plantation. Soil pH values between 7.1-7.4, humidity of 39%, soil temperature in the range of 26-29^{o}C, absorbed potassium levels of 23,29 ppm, soil organic content of 4.37%, and cation exchange capacity of 22,03 meq/100g. In addition, the effect of the use of hydrogels on soybean plants reveal high, maximum number of leaves and fruit measuring after 72 days, 126 cm, 34 strands and 28 pieces. The results showed that the hydrogel synthesized by chitosan and succinic acid has the potential as soil conditioner.

Keywords: Chitosan, hydrogel, physicochemical properties, soil conditioner, succinic acid.

E022

Chemical Compound and Antimicrobial Activity of Essential Oil of *Pogostemon cablin* Collected from Southeast Sulawesi, Indonesia

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Pogostemon cablin (Blanco) Benth. belongs to the Lamiaceae family. The plant is widely distributed in South and South-East Asia countries, including Indonesia. It is a main source of essential "patchouli" oil that is primary used in cosmetics industry, especially parfumery. Hence, several countries have been cultivated the plant for its fragrant leaves that accumulated the oil. In Indonesia, *P. cablin* is cultivated in more than ten regions, including Southeast Sulawesi. According to the Ministry of Agriculture Republic Indonesia annual report, the production of patchouli oil from Southeast Sulawesi is significantly increased and ranked 1st in 2021. However, reports on its quality and chemical composition have yet fully investigated, requiring more research. The present study aimed to investigate the chemical composition of patchouli oil collected from three districts of Southeast Sulawesi that are Kolaka, North Kolaka, and East Kolaka using GC-MS analysis. The study also evaluated the antimicrobial activity of the oil against *Staphylococcus aureus, Escherichia coli,* and *Candida albicans* using agar well diffusion method. As many as 27 compounds were successfully identified from the oils. Of these, patchouli alcohol (51.28 to 26.12%), δ-guaiene (15.46 to 9.67%), α-guaiene (16.67 to 7.49%), and seychellene (9.34 to 5.66%) were found as major compounds. The oils also exhibited antimicrobial activity against *S. aureus* with inhibition zones of 11.25 to 14.47 mm at concentrations ranging from 25 to 100%. The activity was compared to chloramphenicol as the positive control with inhibition zone of 11.25 to 15.13 mm at concentration ranging 100%. The oil obttaine by Dean-Stark showed antimicrobial activity against *E. coli* and *C. albicans* with inhibition zones of 10 t0 4.50% as compared to chloramphenicol (10.75 to 12.24)

E023

Textile wastewater treatment using polypyrrole membranes with the basic component of polyphenol oxidase from white oyster mushroom

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In this research, polypyrrole (PPy) membranes have been synthesized with polyphenol oxidase (PPO) as the base materials isolated from white oyster mushroom, as a biocatalyst in the processing of textile wastewater. PPy membranes were synthesized by electropolymerization of Pyrrole (Py) with the electrodeposition method (the composition of 0.05 M Py and crude PPO white oyster mushroom extract of 35% (v/v) in citrate buffer pH = 7). The electrolysis was carried out with a potential = 6 V; current = 1.063-1.142 A; the amount of immobilized PPO in the PPy = 16.57 - 48.97 %, and the PPO activity of 1,640 - 4,160 U; 0.35 mM phenol as a substrate. Membrane application to textile wastewater with discontinuous flow rate (decrease in pH = 14.86%; phenol = 6.80%; COD = 10.80%; BOD and TSS = 2:00% = 20.65%) and the use of membranes with a continuous flow rate (decrease in pH = 23.97%; phenol = 26.09%; COD = 11.54%; BOD = 2.46%; and TSS = 65.65%). The physical performance of membrane application to textile wastewater was studied with discontinuous flow rates obtained (flow rate = 48.19 - 51.50 L/h, flux = 3191.6 - 3387.5 $L.m^{-2}.h^{-1}$ and permeability = 319.2 - 338.7) and a continuous flow rate was obtained (flow rate = 48.19 L/h, flux = 3191.6 $Lm^{-2}.h^{-1}$ and permeability = 319.2 $Lm^{-2}.h^{-1}$.bar). Scanning Electron Microscopy (SEM) image shows the morphology of the membrane film of PPy/PPO white oyster mushroom extract that has been studied in the use of membranes before and after application of textile wastewater.

Keywords: white oyster musroom, membrane, PPy/PPO, textile wastewater

E024

Formaldehyde electrochemical sensor using Chitosan-Glutaraldehyde/ZnO-Nanoparticles Electrode

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It is necessary to develop sensitive, selective, and accurate analytical sensor technology for the determination of formaldehyde because formaldehyde is very dangerous to health. The use of formaldehyde as food preservatives has long been prohibited by the government, but there are still some sellers using formaldehyde. In this research, we studied the use of glassy carbon electrodes and copper electrodes coated with chitosan-ZnO nanoparticles crosslinked with glutaraldehyde for the application of formaldehyde biosensors in food. Chitosan is a biodegradable natural polymer and the addition of ZnO nanoparticles to the chitosan-glutaraldehyde modification is expected to increase the stability and sensitivity of the working electrode as a formaldehyde biosensor with the cyclic voltammetry method. The profile of the cyclic voltammogram of the standard formaldehyde solution (1, 2, 3, 4, 5 mg/L) showed a typical pattern using a glassy carbon electrode and a chitosan-ZnO/glutaraldehyde electrode with a scan rate of 25 mV/s, 50 mV/ s, 75 mV/s, and 100 mV/s. The results of the analysis the samples of wet noodles have been achieved at a scan-rate of 100 mV/s and potential range -1000 to 1000 mV obtained formaldehyde concentrations in the range of 1-5 mg/L.

Keywords: sensor, formaldehyde, chitosan-glutaraldehid/ZnO nanoparticles, voltammogram

INTERNATIONAL CONFERENCE OF

10th THE INDONESIAN CHEMICAL SOCIETY 2022

Kendari, 12th October 2022

Abstracts

Parallel Session E

F001

Nano Silica from North Rupat Beach Sand

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The synthesis of silica nanoparticles has been successfully carried out using the coprecipitation method from North Rupat beach sand. North Rupat Beach sand was taken from three different locations, namely Pesona Beach, Beting Aceh Beach and Lapin Beach. Silica nanoparticles were synthesized using the coprecipitation method, where the sand was reacted with 7M NaOH. The solution that passes the filter is then added with 37% HCl dropwise until pH 6-7 and a white silica precipitate is formed (pH 1-2). The nanosilica obtained from the Pesona Beach sand sample is very fine with a brown color, identical to the color of the sand. The nanosilica obtained from the sand sample of Pantai Beting Aceh is very fine, with a whiter and more lustrous color. The nanosilica from the Lapin Beach sand sample is also very fine with a gray color but brighter than the initial color of the sample. The XRD result show that the nanosilica which were synthesized from Beting Aceh Beach has a crystalline phase (anhortic), the nanosilica from Lapin Beach has crystalline phase (cubic), and the nanosilica from Pesona Beach has crystalline phase (cubic).

Keywords: silica, nanosilica, sand, coprecipitation.

F002

Doping TiO_2 with Cr and Cu elements from electroplating wastewater for improvement the photocatalyst activity under visible light

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This paper focuses on the study on the electroplating wastewater utilization as the source of Cr and Cu dopants for improving TiO_2 activity under visible light. The doping was performed by using sol-gel method by interacting titania tetra iso-propoxide (TTiP) with the Cr and Cu containing wastewater with various concentration of Cr and Cu obtained by diluting the wastewater. The doped TiO_2 photocatalysts were characterized by means of FTIR, XRD, SRUV/Visible, and TEM machines. The effect of the doping on the activity of TiO_2 in the presence of visible irradiation was evaluated through the degradation of anionic surfactant of linier alkyl benzene sulphonate (LAS) in the laundry wastewater. The results of the research reveal that the electroplating wastewater contains of Cr and Cu about 2000 mg/L and 20 mg/L respectively. The Cr and Cu in the wastewater have been successfully doped into TiO_2 structure that can reduce the gap energy of TiO_2 entering into visible region. The most effective narrowing gap is shown by TiO_2-Cr/Cu with Cr and Cu loaded as much 20 and 0.2 % respectively. It is also found that the doping Cr and Cu into TiO_2 has improved significantly the activity under visible light in the LAS degradation. and the highest enhancement is resulted by the doped photocatalyst of TiO_2-Cr/Cu (20/0.2). Furthermore, the highest photodegradation of LAS having 100 mg/L in 50 mL can be achieved by applying TiO_2-Cr/Cu (20/0.2) photocatalyst, pH 5, 60 mg of photocatalyst mass, and 60 minutes of the reaction time, that is about 60 %. It obviously inferred that the electroplating wastewater can be utilized to prepare a more valuable material.

Keywords: electroplating wastewater, doping, Cr and Cu, TiO_2, visible light, linier alkyl benzene sulphonate, photodegradation.

F003

The Effect of Sulfur Concentrations as a Dopant on TiO_2/Fe_3O_4 Photocatalytic Efficiency for Cr(VI) Ions Reduction

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The Fe_3O_4/TiO_2-S composite was successfully synthesized and applied as a magnetic photocatalyst for the reduction of Cr(VI) ions under visible light. The synthesis of Fe_3O_4/TiO_2-S photocatalyst material was carried out in two successive steps. First was the synthesis of Fe_3O_4 through the sono-precipitation method, and the second one was TiO_2-S coated on Fe_3O_4 material using the sol-gel method. Various sulfur concentrations of 1, 3, 5, and 7% were designed to study the effect of sulfur existence on the photocatalytic activity of the material. The formation of Fe_3O_4 and TiO_2 was confirmed by the diffraction patterns obtained from the XRD analysis. Meanwhile, the TEM image showed that the photocatalyst had a spherical form. It is revealed from the SR UV-Vis analysis results that Fe_3O_4/TiO_2-S materials with varying concentrations of sulfur, 1, 3, 5, and 7% were responsive to visible light. According to the photocatalytic activity results, the Fe_3O_4/TiO_2-S 5% achieved the best performance in reducing Cr(VI) by up to 98.38% and 66.75% under visible and UV light irradiation, respectively.

Keywords: Cr(VI), Fe_3O_4/TiO_2-S, magnetic photocatalyst, reduction, sulfur

F004

Biocellulose antibacterial membrane as a mask filter material to protect against bacteria and viruses

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The antibacterial filtration membrane that has been developed in this study is an alternative filtration membrane made from bio-cellulose to improve mask performance and has antibacterial properties. In this study, cellulose was obtained from nata de coco as the basic material for manufacturing filtration membranes. The membrane filter was made using the phase inversion method. The antibacterial properties of membrane masks were obtained by adding an antibacterial extract from red betel leaf (*piper crocatum*), which contains active compounds as antibacterial. The filtration membrane was characterized by mechanical properties, porosity, swelling degree, membrane structure and for the performance of the aerosol filtration membrane as a mask material and its antibacterial properties.

Keywords: filtration membrane, mask, antibacterial, bio-cellulose, nata de coco

F005

Adsorption of Cu(II), Mn(II), and Zn(II) on Chitosan Modified Silica/Natural Magnetic Particles: Kinetic and Isotherm Approach

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The demand for water pollutant removal makes the necessity for a more efficient adsorbent. Herein, a silica-coated natural magnetic particle (SiO_2/NMP) was modified with chitosan (Chi) for adsorption of Cu(II), Mn(II), and Zn(II). The NMP was prepared from iron sand as a cheap and non-hazardous material for preparing magnetic adsorbent. The adsorption factors were investigated, namely pH, time, and concentration of metal ions. The evaluation was based on two kinetic mechanisms (pseudo-first and pseudo-second order) and two adsorption isotherm models (Langmuir and Freundlich isotherms). The correlation coefficients (R^2) demonstrated that all metal ions' adsorption kinetics and isotherm on Chi/SiO_2/NMP matched with the pseudo-first order mechanism and Freundlich model, respectively.;:

F006

Synthesis of NiCo MOF-74 on anodized nickel oxide porous as an anode catalyst for urea/H_2O_2 fuel cell

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The need for electricity in Indonesia is increasing, therefore alternative energy sources which is environmentally friendly, efficient, and have unlimited availability are desired. Fuel cell is a device that can convert chemical energy into electrical energy with high efficiency. Urea fuel cells are very interesting to be developed due to their abundant sources, which could come from factory and animal or human wastes. Meanwhile, nickel has been known as an effective catalyst for urea electro-oxidation reaction. In this research, NiCo MOF-74 will be synthesized on the surface of porous NiO film (p-NiO) using solvothermal method. Characterization by XRD and SEM-EDX confirmed the presence of NiCo MOF-74 on the surface of p-NiO with an optimum Ni:Co of 4:1 urea catalytic activity. The use of Ni_4Co_1 MOF-74/p-NiO as a catalyst in the urea electro-oxidation process was then compared with Ni foil, p-NiO, and Ni_4Co_1/p-NiO, and the highest current density value was obtained using Ni_4Co_1 MOF-74/p-NiO. At an optimum concentration of 3 M KOH and 1 M urea, a current density value of 110 mA cm^{-2} can be produced with the maximum power density of 4131 μW cm^{-2}. A good stability was also obtained in the 12 hours application of the developed fuel cell with an average current density of 5700 μA cm^{-2}.

Keywords: NiCo MOF-74, porous NiO, urea, fuel cell

F007

High Performance for Photocatalytic Degradation of Methylene Blue Based on Pillared Clay S-TiO_2

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We investigated methylene blue adsorption capacity and photodegradation removal efficiency using an S-TiO_2@clay composite by irradiating a commercial Tungsten halogen lamp in a reactor. The same experimental conditions were applied to clay and pristine TiO_2 as a reference. Morphology surface area, chemical bonding, and optical properties of those samples were characterized by using FESEM, FTIR and UV-Vis DRS tehcniques. The S-TiO_2@clay composites showed a high surface area and an even pore distribution compared to natural clays and pristine TiO_2. The results indicate that the composite was successfully pillared on natural clay. These results exhibit that S-TiO_2 composite pillared natural clay (S-TiO_2@clay) presented better results in the methylene blue dye adsorption-photodegradation process, with an adsorption and degradation efficiency were 93.87% and 94.94%, respectively. While, the tests performance in the absence of natural clay of the degradation efficiency was 88.46%. In the other hand, the tests performed in the natural clay only for adsorption efficiency was 86.41%. These results showed the evidence that the combination methods of adsorption-photodegradation were very efficient in removing methylene blue dye.

Keywords: natural clay; S-TiO_2 composite; methylene blue; adsorption-photodegradation.

F008

Utilization of Fe-TiO_2 as a heterogeneous catalyst for biodiesel production from coconut oil

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The conversion of coconut oil into biodiesel has been conducted using the Fe-TiO_2 heterogeneous catalyst via transesterification reaction. The heterogeneous catalyst was prepared with the sol-gel method using TTIP as a TiO_2 source and $Fe(NO_3)_3$ as a Fe source and calcined at a temperature of 500 °C. The heterogeneous catalyst was characterised by Fourier Transform Infra-Red (FTIR), X-ray Diffraction (XRD) and Ultraviolet-Visible Diffuse Reflectance Spectroscopy (UV-Vis DRS). Moreover, the influences of reaction conditions on biodiesel yields were also studied. The esterification reaction showed that the free fatty acid content decreased by 1.43% at 60 °C. The biodiesel production results were analyzed using Gas Chromatography-Mass Spectroscopy (GC-MS). Biodiesel properties, such as density, viscosity, acid number, water content, iodine number, saponification number and cetane number were compared using the American Society for Testing and Materials (ASTM-6751). The use of Fe-TiO_2 heterogeneous catalyst is very promising to be a green catalyst in biodiesel production reaction.

Keywords: Fe-TiO_2; heterogeneous catalyst; coconut oil; biodiesel

F009

Photoanode Solar Cell utilizing Sulphur-TiO_2 Nanocomposite with Doctor Blade Coating Technique

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TiO_2 -sulphur nanocomposites have been prepared and used as a photoanode Dye-Sensitized Solar Cell (DSSC). The effect of sulphur precursor levels using variations in the concentration of thiourea on the structural and optical properties of the sample has been investigated. The preparation of photoanode using doctor blade method. The photoanode was characterised by Field Emission Scanning Electron Microscopy (FESEM), X-ray Diffraction (XRD) and Ultraviolet-Visible Diffuse Reflectance Spectroscopy (UV-Vis DRS). The surface morphology of TiO_2 -sulphur nanocomposite shows a good porous structure, fully and tight. Photoanode with the addition of 1.0 M thiourea doping has the highest reflexes and absorption in the visible light region. TiO_2 -sulphur nanocomposites produces an energy gap of 2.8 eV. A typical lattice plane indicates the anatase TiO_2 phases present in nanocomposites. The effect of sulphur precursor concentration on device performance parameters has also been investigated. DSSC which uses a concentration of thiourea 0.5 M samples, showed the highest power conversion efficiency, of 1.34%. Increased efficiency comes from better charge injection of the N719 dye into the TiO_2-sulphur photoanode.

Keywords: photoanode, nanocomposite, sulphur, TiO_2, DSSC.

F010

8-hydroxyquinoline modified coal bottom ash-silica sand as an adsorbent for methyl violet 2B dye

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8-hydroxyquinoline modified coal bottom ash-silica sand as an adsorbent for methyl violet 2B dye has been conducted. This study includes of activation of coal bottom ash using HCl (ADPSA) and modification of activated coal bottom ash using 8-hydroxyquinoline (ADPSM). The characterization of the adsorbent was conducted using XRF, FTIR, and XRD. The study parameters that affect the adsorption process include the mass of the adsorbent, contact time, initial concentration of dye, and the pH of the solution. The adsorption and desorption of adsorbent on methyl violet 2B was analyzed using UV-Visible spectrophotometer. Desorption studies includes various desorption solutions such as distilled water, HCl pH 3, HCl pH 4, NaCl 0.1 M, and NaCl 1 M. The characterization results show that the activation and modification of coal bottom ash has been successfully prepared. The adsorption of the cationic dye methyl violet reached the optimum condition at pH 7 for ADPSA and ADPSM. The optimum mass for ADPSA is 1 gram with a contact time of 30 minutes, while the optimum mass for ADPSM is 0.5 grams with a contact time of 10 minutes. Adsorption kinetics of cationic dye methyl violet 2B with ADPSA and ADPSM follows a pseudo-second order (Ho and McKay) with rate constants of 2.13 and 2.21 g mg^{-1} min^{-1}, and the adsorption isotherms for ADPSA and ADPSM followed Langmuir isotherm with adsorption maximum capacity were 6.06 and 12.94 mg g^{-1}, respectively. The adsorption energies for ADPSA and ADPSM were 31.32 and 32.95 kJ mol^{-1}, respectively. The most effective desorption study is using HCl pH 3 as a desorption solution for methyl violet 2B dye.

Keywords: adsorption, bottom ash, hydroxyquinoline, methyl violet 2B.

F011

Synthesis and characterization of TiO_2@Carbon dots nanocomposites using electrolysis potential variation

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In this study, the synthesis and characterization of TiO_2@Carbon dots (TiO_2@CQDs) nanocomposites was carried out. The synthesis of nanocomposites begins with the preparation of CQDs through the oxidation process of Carbon rod electrodes in NaOH/Ethanol electrolyte solution. The synthesis process is carried out by varying the oxidation potential. The obtained CQDs were incorporated on the surface of TiO_2 nanoparticles (TiO_2NPs) through continuous stirring at room temperature followed by heating at a constant temperature of 140°C for 4 hours. To determine the effect of potential variations of CQDs on the characteristics of nanocomposites, we used Scanning Electron Microscopy (SEM), X-ray diffraction (XRD), and Fourier Transform InfraRed (FTIR). Based on SEM characterization, potential variations of CQDs did not affect or change the surface morphology of TiO_2NPs. TiO_2NPs have a characteristic surface morphology which is composed of spherical particles of uniform size. However, XRD and FTIR characterization showed that the potential variation of CQDs caused a 2 theta angle shift and TiO_2NPs wavenumber in the fingerprint region. Potential variations of CQDs caused the average particle diameter of TiO_2NPs to increase from 37.32 nm to 42.89 nm, 45.12 nm, and 49.01 nm for oxidation potentials of 10 V, 15, and 20 V, respectively. These results can be a new reference to various applications of TiO_2@CQDs in the field of technology, including its application as a voltammetric sensor electrode modifier.

Keywords: TiO_2@CQDs; TiO_2NPs; CQDs; variasi potensial oksidasi.

F012

Preparation of graphene/MnO_2-modified nickel foam for supercapacitors

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The preparation of nickel foam composites modified with manganese oxide-graphene has been successfully carried out. Characterization using SEM-EDX showed morphology in the form of white spots and the formation of a layer in the form of a sheet covering the nickel foam framework indicating the presence of manganese oxide and graphene. Meanwhile, the characterization using Raman spectroscopy showed that there was a peak indicating the D band and G band with the ID/IG ratio of 0.91, which determine the structure of graphene. The composites were then used to develop supercapacitors with different electrolyte system with the high capacitance performance. The electrochemical test using the cyclic voltammetry technique showed the highest specific capacitance value for MnO_2/graphene/Ni foam, which was 1117.32 $F.g^{-1}$. A similar result was conducted using the galvanostatic charge-discharge technique shows that the best capacitance performance is on MnO_2/graphene/Ni foam at a given current of 2 mA, with an energy density of 27.5 $Wh.kg^{-1}$ and a power density of 4500 W/kg. Impedance value of MnO_2/graphene/Ni foam is 1460 Ω higher than another variation electrode, where the impedance value was calculated from the charge transfer resistance of the material that linear with the capability of composite to stored the electron on the their electrode system. So, we can conclude that the MnO_2/graphene/Ni foam provide good stability and highest capacitance compared to the other electrode.

Keywords: supercapacitor, nickel foam, graphene, manganese dioxide.

F013

Electrocatalytical Performance of Graphene Modified Sulphur-TiO_2 Nanocomposite for Determination Formaldehyde Compound

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The unique study of TiO_2-sulphur modified graphene nanocomposite (Gr/TiO_2-S) has been developed for electrochemical sensors that detect formaldehyde compound. We developed TiO_2-sulphur which was easily synthesized by hydrothermal method and modified in graphene nanocomposite applying electrochemical system as cyclic voltammetry (CV). The TiO_2-S nanocomposite was characterized by X-ray Diffraction (XRD), while the Gr/TiO_2-S was characterised by Field Emission Scanning Electron Microscopy (FESEM), X-Ray Fluorosense (XRF). TiO_2-S has a smaller crystal size of 19.32 nm. The surface morphology of the TiO_2-S nanocomposite shows a good, intact and tightly porous structure that covers the graphene surface. The content of Gr/TiO_2-S electrodes was 41.5% of graphene, 37.8% of TiO_2, and 12.4% of sulphur. We found that the optimal mass of TiO_2-S used was 1 g compared to 0.5 g graphene and 0.3 mL paraffin. It has a high anodic current (I_{pa}) of 800 A and a high cathodic current (I_{pc}) of -600 A in a scan rate of 0.1 V/s. Gr/TiO_2-Sulphur electrode is expected to detect formaldehyde in future field applications.

Keywords: electroanalytical, graphene, TiO_2, sulphur, formaldehyde.

F014

Potential of nanosuspension based on TiO_2/carbon as the antifungal agent of *Phytophthora palmivora* of cocoa fruit rot

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Titanium Dioxide (TiO_2) is known as an antimicrobial compound that is environmentally friendly. TiO_2 is able to work more effectively when given the addition of dopants, one of which is nanocarbon. This compound can be used as an active ingredient of alternative antifungal compounds against *Phytophthora palmivora* fungi that attack cocoa pods. This study aim was to determine the effectiveness of the performance of TiO_2-C as an antifungal *P. palmivora* and the characteristics of the TiO_2-C nanospray product. This research method combines sol-gel, hydrothermal, and sonication techniques to obtain TiO_2-C nanosprays, then continued the antifungal activity test by solid dilution method. Product characteristics was obtained by FTIR analysis. The FTIR characteristic was indicated the presence of an O-H functional group and a C-O group for TiO_2-C. The success of the product was observed from the antifungal test results by measuring the activity under UV and without UV light. The effectiveness of TiO_2-C nanospray successfully inhibited the growth of *P. palmivora* fungus at a concentration of 0.3% with inhibitory activity of UV light and without UV light were obtined 99% and 72%, respectively.

Keywords: *Phytophthora palmivora*, TiO_2-C, sol-gel, FTIR, UV light.

F015

Mechanical and antibacterial property improvement of mineral trioxide aggregate by adding CuO nanoparticles

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Mineral trioxide aggregate (MTA) is a common biomaterial used for endodontic treatment. However, this material does not have antibacterial activity, and the addition of an antibacterial agent is necessary. In this research, CuO nanoparticles (CuONP) have been added to MTA to improve the compressive strength and antibacterial activity. CuO nanoparticles were synthesized by mixing 25 mL $CuSO_4.5H_2O$ 0.5 M and Na_2CO_3 0.5 M at volume variations (15, 25, and 42 mL), sonicating the mixture at a temperature of 60 °C for 2 hours, and calcining at a temperature of 600 °C for 4 hours. MTA/CuO material was made by mixing MTA and CuO nanoparticles at variations in weight percentage (1, 2, and 3%). CuO nanoparticles, MTA, and MTA/CuO were characterized with Fourier Transform Infrared (FT-IR), X-Ray Diffractometer (XRD), and Scanning Electron Microscopy-Energy Dispersive X-ray (SEM-EDX). The compressive strength and antibacterial properties against Staphylococcus *aureus* and Pseudomonas *aeruginosa* were also tested. The results showed that CuONP was successfully synthesized with an average particle size of 21.94 nm. Adding CuONP 2% to MTA improved its compressive strength of 12.03±0.44 MPa. In addition, the presence of CuONP in the MTA gave the antibacterial property of *S. aureus* with an inhibition zone value of 6.69±0.67 mm for MTA/CuO-2 and 6.77±0.31 mm for MTA added with 3% of CuONP. However, adding CuONP did not increase significant antibacterial activity against *P. Aeruginosa*. Adding CuONP 3% increased the inhibition zone from 5.50±00 to 7.04±0.39 mm. The findings indicated that MTA modified with CuONP can potentially be applied for endodontic treatment even though further investigation is still necessary to test the biocompatibility and cytotoxicity.

Keywords: antibacterial, CuO nanoparticles, compressive strength, mineral trioxide aggregate.

F016

Syntesis and Characteristic of TiO_2/Ti Electrode Doped Sulfur (S) Calchogenic Material

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TiO_2/Ti and sulphur doped TiO_2/Ti (S-TiO_2/Ti) electrodes with the anodizing method were successfully synthesized. The main objective of this study was to synthesize the TiO_2/Ti and S-TiO_2/Ti composites and to compare the performance of the two electrodes against methyl orange degradation. The sulfur (S) doping process on TiO_2/Ti was carried out by the dip-coating method and H_2SO_4 as a source of sulfur. XRD analysis of TiO_2/Ti electrodes showed the anatase TiO_2 peak, EDX data gives information that the amount of doped sulfur on the surface of TiO_2/Ti is S = 5.11% which was marked an energy peak of 0.2 keV; 2.35 keV and 2.49 keV. The results of FTIR characterization showed S-O functional groups at wavenumbers 1153 cm^{-1} and 1116 cm^{-1} and Ti-O at 1039 cm^{-1}. SEM shows the surface of the TiO_2/Ti electrodes in the form of nanotubes while the S-TiO_2/Ti electrodes show a smooth but broken Sulfur surface. The light current response test using LSV showed that the TiO_2/Ti electrodes have better activity in UV light than in visible light, while for S-TiO_2/Ti electrode has a better activity in visible light than in UV light.

F017

Photocatalytic Inactivation of Pathogenic Microorganisms using Nanospray TiO_2 Incorporation Silver Dioxide

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Phytophthora palmivora fungi that cause rot disease in fruit, stem cancer and leaf blight in cocoa plants can be prevented using TiO_2 nanoparticles with Ag dopants which are synthesized using the sol-gel method. The purpose of this study was to determine the characteristics of the results synthesis of TiO_2-Ag nanoparticles by the sol-gel method and the performance TiO_2-Ag nanoparticles as antifungal *P. palmivora* on cocoa plants. The stages of the research include synthesis of TiO_2-Ag sol-gel, characterization of TiO_2-Ag using UV-Vis DRS and SEM-EDX, and antifungal activity test. The results showed that TiO_2 with Ag doping can reduce band gap energy (Eg) from 3.2 eV to 2.8 eV. Eg reduction can help activate the performance of TiO_2 in visible light, so it can be used as an antifungal *P. palmivora*. TiO_2-Ag nanoparticles have been able to inhibit *P. palmivora* fungus at a concentration of 1% to 4%, while at a concentration of 5% *P. palmivora* fungus has not grown anymore or it can be said that TiO_2-Ag has 100% inhibitory power.

Keywords: antifungal, *P. palmivora*, sol-gel method, TiO_2-Ag.

F018

Gallic acid-assisted synthesis of novel ZrO_2 nanoparticle and its properties

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Zirconium oxide (zirconia, ZrO_2) is one of the most widely used ceramic materials because of its remarkable electrical, thermal, optical and mechanical stability. Due to the effectiveness and application of zirconia nanoparticles in various industries, demand for this nanoparticle continues to increase over time. Nanoparticle synthesis methods generally required large costs and showed negative impact on the environment. In addition, energy consumption during the production of nanomaterials must be controlled to maintain production cost efficiency, so that the nanomaterials produced are feasible to be commercialized. This has led to the development of simpler nanoparticle synthesis methods. Biomass of bacteria, fungi and algae, as well as plant extracts are the main precursors in the green synthesis of nanoparticles. The use of plant extracts is the simplest and most effective method, because it is easy to obtain in abundance, requires lower costs, and is safer to handle and to the environment. The purpose of this study was to determine the characteristics of ZrO2 synthesized using gallic acid as bio-reductor. Gallic acid is a phenolic compound and has been proven to be used in green synthesis of nanoparticles. The synthesized nanoparticles were subjected to various characterization techniques using UV–Visible spectrophotometer, FTIR Spectroscopy, SEM with EDAX and X-ray diffraction analysis.

Keywords: gallic acid, green synthesis, nanoparticle, ZrO2, zirconia.

F019

Effectiveness of ZnO-PILC as a heterogen catalyst for alpha-toceferol synthesis

Ida Ayu Gede Widihati

The catalytic activity of clays is generally not very high. Therefore, the clay must be modified before use. One way to modify clays is by pilarization. Synthesis and characterization of ZnO pillared clay (ZnO-PILC) and its use in the manufacture of vitamin E have been successfully carried out. This study aims to determine the physical and chemical properties of ZnO-PILC, the effect of ZnO scavenging on the catalytic activity of clay, and the total tocopherol content of vitamin E produced. The catalyst is prepared first and then intercalated with ZnO which is expected to form a pillar. The synthesized ZnO-PILC was characterized using X-Ray Diffraction, SEM-EDS, FTIR, surface area using the Methylene Blue adsorption method and surface acid sites using the acid-base titration method. The characterization results showed that the screening did not increase the distance between layers, the catalyst surface became more homogeneous and there was an increase in the number of Zn elements, the appearance of absorption bands that identified the functional group characteristics of ZnO-PILC, the surface area and the acid site respectively 46,357 m^2/g and 5,887 x 10^{22} sites/g. The catalyst application showed that the catalytic activity of ZnO-PILC resulted in a total tocopherol content of 36%.

F020

Synthesis and characterization of sulfonated poly ether sulfone/ chitosan membranes as creatinine transport

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The most important part in hemodialysis equipment is a membrane that must be able to remove metabolic wastes such as urea and creatinine out of the blood. In carrying out its functions, the membrane must be strong, hydrophilic, have an active site that recognizes target species, is permeable, and has a high flux against urea and creatinine species. To meet these requirements, a capable membrane constituent material is needed. In this study, a series of membranes made from poly ether sulfone (PES) were made modified with sulfuric acid and chitosan. PES is a strong synthetic polymer, resistant to various pH conditions, but is not hydrophilic and does not have an active site. On the other hand, chitosan has an active site that is very capable of functioning as an active site for identifying target species. With the ability to form medium strength hydrogen bonds, chitosan is able to bind urea and creatinine to be separated from other species in the dialysis process. The reaction barrier between PES and chitosan is bridged by the PES sulfonation process and the formation of LiCl-chitosan intermediate compounds. Five types of membranes have been made, namely: PES, sulfonated polyethersulfone (SPES), sulfonated polyethersulfone/chitosan-LiCl (SPES/CS-LiCl, variation 5:1.5; 5:2 (v/v)). The success of the reaction between PES-chitosan can be seen from the FTIR spectra, with the appearance of absorption at 1650 cm^{-1} which indicates the primary amine group in chitosan changes to secondary as a result of reaction with PES and the appearance of -OH absorption in the 3384 cm^{-1} region, which is a spectra specifically chitosan. Specific PES spectra were seen in the 1148 cm^{-1} region which showed symmetrical stretching of the –C-SO2-C- group, the –C-O-C ether group stretching in the 1237 cm^{-1} region, and absorption in the 1580 cm^{-1} region which indicated the aromatic C=C group. benzene. Based on physicochemical characterization, modification of PES either through sulfonation reaction or reaction with chitosan can increase porosity, expandability, water absorption, hydrophilicity up to 2x from the initial value. The ability to transport creatinine increases by 15-35% from the initial value.

Keywords: poly ether sulfone; sulfonation; chitosan; transport; creatinine.

INTERNATIONAL CONFERENCE OF

10th THE INDONESIAN CHEMICAL SOCIETY 2022

Kendari, 12th October 2022

Abstracts

Parallel Session F

J005

Transformative learning approach using think pair share (TPS) learning model to empower students' collaboration and communication skills in buffer solution

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The younger generation needs to be equipped with 21st century skills that are used to meet qualifications that are in accordance with the changing times and today's society. Collaboration and communication are two of the four 21st century skills that are very important in life long learning, so these skills need to be empowered in students. Therefore, this research aims to empower the collaboration and communication skills of students on the Buffer Solution material through the Social Emotional Learning (SEL) approach with the Think Pair Share (TPS) learning model. This study is a qualitative research with sampling technique using purposive sampling technique. The research was conducted in class XI MIPA 4 of MAN 1 Surakarta with 34 students. Data collection techniques used include observation, student reflective journals, Constructivist Chemistry Values Learning Environment Survey (CCVLES) questionnaires, and student interviews. It was found that the Social Emotional Learning (SEL) approach with the Think Pair Share (TPS) learning model on the buffer solution material could be used to empower students' collaboration and communication skills. In the learning process with the Pairing stage students are given the opportunity to collaborate with the team in finding solutions to the problems that have been given. Then the learning process continues with the Share stage where students are carried out by debating in conveying and defending opinions. Collaboration skills can be seen from students being able to work together in groups effectively, adapting to group members, deliberation in making decisions, taking responsibility for joint work, and negotiating differences of opinion in solving problems. Meanwhile, students' communication skills can be seen from students being able to express opinions according to the problems discussed, being active in answering questions, asking if there is something that has not been understood, and always listening well when other people express opinions.

Keywords: social emotional learning, think pair share, collaboration skills, communication skills, buffer solution.

J002

Analysis of learning objectives flow in chemistry class X Kurikulum Merdeka to achieve scientific literacy on green chemistry in sustainable development

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Every curriculum change is ideally welcomed by teachers in implementing it, because it gives more autonomy to teachers in formulating the flow and direction of learning objectives. To arrange the learning objectives flow and teaching materials, the teacher must be guided by several basic documents such as learning outcomes in Kurikulum Merdeka, and content standards of SNP, while also considering the stages of student cognitive development and the level of difficulty of teaching materials, so the teacher can choose the appropriate materials contained in textbooks. However, the reality is the teacher only guides existing textbooks without first analyzing the documents that are the basis for consideration in the preparation of the learning objectives flow. As a result, there are teaching materials that are ideally learned after understanding some of the previous concepts, given at the beginning of learning. Thus cognitive abilities that can be achieved only at the first level, remembering. This is because in the material there are terms that are not well understood by students because they have not been studied before. This qualitative study was conducted using a content analysis design. Data were collected by reviewing document content (1) learning outcomes of the Kurikulum Merdeka, (2) content standards of SNP, (3) publication articles on cognitive development theory, (4) publication articles on the difficulty level of teaching materials and (5) chemistry tektbooks. The data obtained were then processed following the steps introduced by Miles & Huberman, including: data condensation, data display, and conclusion drawing/verification. Based on a study of learning outcomes in Kurikulum Merdeka documents, content standards of SNP, cognitive development theory, and the level of difficulty of teaching materials and chemistry textbooks, to achieve scientific literacy on green chemistry in sustainable development in class X chemistry of the Kurikulum Merdeka resulted in a learning objectives flows as follows: semester 1 consists of three learning objectives, namely (1) explaining the rules of scientific work, (2) understanding atomic structure and its application in nanotechnology, (3) writing chemical reactions and applying the basic laws of chemistry, and semester 2 consists of two learning objectives namely (4) explaining chemistry in daily life, and (5) applying chemical concepts in environmental management. Based on the five learning objectives, the green chemistry in sustainable development can be integrated into the 5th learning goal, in semester 2. So, it can be concluded that the preparation of the

learning objective flow in the chemistry subject of class X Kurikulum Merdeka should be guided by learning outcomes in Kurikulum Merdeka, content standards of SBP, theory of student cognitive development, and level of difficulty of teaching materials, not only in existing textbooks.

Keywords: learning objectives flow, Kurikulum Merdeka, science literacy, green chemistry, sustainable development.

J004

Improving self-regulated learning and student learning outcomes with the flipped classroom-Edmodo model

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This study aims to determine (1) differences in self-regulated learning and (2) differences in student learning outcomes after participating in learning using the Edmodo-assisted flipped classroom model with students using conventional models on acid-base solution material. The method in this study is a quasi-experimental research design*nonequivalent control group design*. The samples of this study were students of class XI MIPA 1 as the experimental class and class XI MIPA 2 as the control class at SMAN 1 Alalak. The independent variable is the Edmodo-assisted flipped classroom learning model, while the dependent variable is self-regulated learning and learning outcomes. Data collection uses to test and non-test techniques. The data analysis technique used descriptive and inferential analysis using a t-test. The results showed that (1) there were differences in students' self-regulated learning between the experimental class and the control class, and (2) there were differences between students' learning outcomes between the experimental class and the control class.

Keywords: flipped classroom, Edmodo, self-regulated learning, learning outcomes.

H001

Nitric oxide (NO) and malondialdehyde (MDA) levels in DM model rats after administration of teak leave ethanol extract (*Tectona grandis* L.)

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This study was conducted with the aim of knowing the activity of the ethanol extract of teak (Tectona grandis L.) leaves on nitric oxide levels and malondialdehyde levels in male Wistar strain rats with diabetes mellitus. Modeling of diabetes mellitus in test animals was carried out by inducing streptozotocin 40 mg/kgBW intraperitoneally. After modeling, twenty-four male rats were grouped into 6 treatment groups, namely the normal control group was only given food and drink, the positive control group was given glibenclamide, the negative control group was given 0.5% Na-CMC, the group was given ethanol leaf extract. teak at a dose of 100 mg/kgBW, the group given teak leaf ethanol extract at a dose of 200 mg/kgBW and the group given teak leaf ethanol extract at a dose of 300 mg/kgBW. Mice were treated for 7 days, after which the nitric oxide and malondialdehyde levels in plasma were measured using a UV-Vis spectrophotometer. The level data obtained were analyzed using one-way ANOVA, then followed by a post hoc LSD test. The result of this research is that the ethanol extract of teak (Tectona grandis L.) leaves has antihyperglycemic activity as seen from the decrease in nitric oxide and malondialdehyde levels.

Keywords: *Tectona grandis* L., streptozotocin, nitric oxide, malondialdehyde, hyperglycemic.

H002

Analysis of river water quality and sustainability status of Konaweha river management for raw water supply in Kendari city

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This study aims to analyze and determine the water quality status of the Konaweha River and analyze the level of sustainability of konaweha river management for the provision of raw water in Kendari City. This research was conducted in Konawe Regency and Kendari City from July to September 2022, using two methods, namely the Pollution Index method and the Multi Dimensional Scaling (MDS) analysis method. The Pollution Index method is used to determine the level of pollution from the Konaweha River, while the MDS analysis method is used to determine the sustainability status of konaweha river management for the provision of raw water in Kendari City. The results showed that the Konaweha River at Station I, Station II, Station III and Station IV obtained Pollution Index values of 3.23, 7.37, 7.56 and 7.79, of the four stations whose parameters were analyzed, all of them met the quality standards except Detergent at station III so that the water quality status of the Konaweha River belonged to the classification of mild contaminants for stations I and moderate contaminants for stations II, III and IV. As for the sustainability status of the Konaweha River. Based on the results of the assessment of 41 attributes from the five ecological, economic, social, technological and institutional dimensions in the management of the Konaweha River for the supply of raw water in Kendari City, the current condition of the Sustainability Index value is 45.42, meaning that the nature of the Konaweha River management for raw water supply in Kendari City is currently in a Less Sustainable status.

I002

Sago: The future of Indonesia's national sugar self-sufficiency

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The gap between demand and supply of sugar production is still a major obstacle in Indonesia. National sugar production is still very dependent on sugar cane, which is currently has several problems, such as low efficiency of sugar factories, uncompetitive sugarcane plantation business, and high production costs. Therefore, other sources of sugar production need to be pursued, including looking for alternative raw materials for sugar, namely sago; where Indonesia is the largest sago producer in the world. This study was aimed to analyze the production of liquid sugar, which was based on sago. Using the enzymatic method, sago was converted into liquid sugar. The enzymes used were alpha-amylase and amyloglucosidase, each as much as 1.2 ml per kg of sago. The resulting liquid sugar had the characteristics of 60o Brix, sweet taste, no odor, yellowish red color, no contamination of harmful elements such as Pb, Cu, Zn, As and no microbial contamination. This result was in accordance with the national liquid sugar standard (SNI 01-2978992). The resulting liquid sugar production was 0.6 to 0.8 liters per kg of sago. If the sago obtained from around 50,000 hectares of sago plantations, and converted into liquid sugar, then around 600,000 kiloliters of sugar will be produced, or equivalent to 27% of the total national sugar production. The results of the feasibility analysis showed that the sago liquid sugar business was profitable, which might be seen from the BCR value of 1.16, NPV Rp 58,754,955.64, Pay Back Period 2 years 11 months, and iRR 34.73%. Although it had great potential, in its development it was still facing various problems including: sago plantations that had not been cultivated properly; access to land that was difficult; limited mastery of farmer technology; and farmer institutions that were not yet established. Therefore, efforts to develop sago liquid sugar may be initiated starting from the household scale, and continued to small and medium industries.

Keywords: liquid sugar; enzymatic method; sago.

E025

Development of cinnarizine analysis method in human blood plasma using UPLC MS/MS

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Cinnarizine is a generic drug with properties as an antihistamine and a sedative that produces significant effects for preventing or treating motion sickness. Generic drugs have the same quality and pharmacological response as patent drugs, so it is necessary to do a BA/BE test to control the quality of generic drugs. This research has optimum conditions with the composition of the mobile phase ammonium acetate 5mM pH 4.5: acetonitrile (35:65) with a flow rate of 0.2 mL/min. and an injection volume of 10 L, extraction using tert-butyl methyl ether (TBME) with a volume of 3 mL. The standard molecular mass of cinnarizine is 369.17 m/z with 167.02 m/z fragmentation. The standard molecular mass of loratadine is 383.07 m/z with 337.07 m/z fragmentation. Validation of the analytical method showed that human blood plasma blanks gave a response but were still included in the selectivity tests acceptance criteria. The carry-over test indicates that there is no carry-over in the injection. LLOQ test shows analyte signal >5x blank signal. The linearity of the calibration curve is higher than 0.99. The accuracy test (% different) and precision (% RSD) are samples with low, medium, high and highest concentrations of 15%, while the lowest concentration of 20%. The dilution measurement met the requirements for percent different 15% for and dilutions. Standard solutions are stable at storage temperatures for up to 18 days. Blood plasma samples containing cinnarizine were stable at room temperature for up to 6 hours, at storage temperature for 17 days and frozen for four cycles. The validation of the analytical method in this study refers to the EMA guidelines.

E026

Characterization of cocoa pod husk bio-oil and its application as antifungal in improving the cocoa seed's quality

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Production of quality cocoa seeds is produced from seeds free from fungi and diseases. Seed treatment is the earliest, safe, and environmentally friendly strategy for controlling fungi and pathogens with the help of bio-oil from cocoa pod huks (CPH). Cocoa seeds were treated with chemical methods, namely soaking in bio-oil with concentrations of 10, 20 and 30% for 15, 30 and 45 minutes, respectively. CPH bio-oil contains the dominant components of phenol derivatives, namely 2-methoxy-phenol (23.63%), 2,6-dimethoxy-phenol (7.18%), 3-methyl-phenol (3.85%), 2-methoxy-5-methylphenol (3.20%), 4-(ethoxymethyl)-2-methoxy-phenol (1.20%). The results of chemical analysis on cocoa seeds during the storage period obtained that the pH ranged from 5-6 with a normal moisture content of 30-50% for 10 days of storage. The water content's stability was from the third to the sixth day. The prepared seeds have a germination rate of 85% of the number of seeds grown. The best composition is the concentration of 20% bio-oil and soaking for 30 minutes. The percentage of seed growth is 90% for a storage period of 6 days. Therefore, CPH bio-oil of 20% was effective in inhibiting the growth of fungi on cocoa seeds compared to synthetic fungicides.

Keywords: antifungal, bio-oil, cocoa pod husk, cocoa seed's.

B026

Growth response of hot pepper (***Capsicum annuum*** L.) on the application of liquid organic fertilizer plus biological agents and AB-Mix in a Hydroponic System

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This study aims to test the effectiveness of liquid organic fertilizer plus biological agents integrated with inorganic fertilizer AB-Mix in increasing the growth of hot pepper plants in a hydroponic system. The study was conducted in Jati Bali Village, Ranomeeto Barat District, Konawe Selatan Regency from April to August 2022. The study was arranged using a separate plot design in a randomized block design. The main plot is the treatment of liquid organic fertilizer plus biological agents (POC-Plus) consisting of 2 treatments, namely POC-Plus which has been stored for 6 months and POC-Plus without storage. The sub-plots with AB-Mix concentration consisted of 4 treatments, namely without AB-Mix (control), AB-Mix 100%, AB-Mix 50% and AB-Mix 25%. Thus there were 8 treatment combinations and 24 experimental units (3 replications). Observational data were tabulated and analyzed by analysis of variance. The results of the analysis that showed a significant effect were continued with the Duncan Multiple Range Test (DMRT) =0.05. The results showed that the integration of liquid organic fertilizer treatment plus biological agents and AB-Mix was able to increase the growth of hot pepper plants in a hydroponic system. Although there was no interaction between the treatments tested, the application of POC-Plus both without storage and those that had been stored for 6 months was able to reduce the use of AB-Mix even to a concentration of 25%. In order to increase the efficiency and effectiveness of fertilization on the growth of hot pepper plants in a hydroponic system, it is better to use POC-Plus which is integrated with AB-Mix at a concentration of 25%-50%..

Keywords: AB-Mix, biological agents, hydroponics, liquid organic fertilizer.

B027

Diversity of vesicular arbuscular mycorrhizas (VAM) on agricultural land in karst area, Central Buton, Province Southeast Sulawesi, Indonesia

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Abstract. Mycorrhizas are a group of fungi associated with the roots of more than 90% of all plant species, Mycorrhizas can be found on land plants in almost every ecosystem, even in extreme conditions, such as karst soils. Karst is a plateau that has a geological structure of limestone and tertiary carbonate rocks. In this study, soil samples were taken from the karst area of the Gu district, Central Buton. The purpose of this study was to determine the type and diversity of Vesicular Arbuscular Mycorrhizas (VAM) on agricultural land in the karst area of Gu District, Central Buton. Soil samples were taken from agricultural land at three different stations. Isolation of VAM spores using a combination of the wet pour technique (Pacioni, 1992) and centrifugation technique (Brundrett et al, 1996). VAM identification was carried out based on the similarity of spore morphological characteristics including shape, color, size, ornamentation, and spore wall layer with the INVAM (International Culture Collection (Vesicular) Arbuscular Mycorrhizal Fungi) site guide. Then counted its diversity index. There are 17 species of VAM found on agricultural land in the karst area of Gu District, Central Buton, namely *Acaulospora colombiana, Acaulospora foveata, Acaulospora mellea, Acaulospora morrowiae, Acaulospora denticulata, Acaulospora delicata, Acaulospora spinosa, Gigaspora margarita, Gigaspora decipiens, Racocetra fulgida, Glomus macrocarpum, Glomus microcarpum, Glomus microcarpum, Glomus microcarpum, Rhizophagus manihotis* and *Rhizophagus intraradices*. The diversity of vesicular arbuscular (VAM) species found on agricultural land in the karst area of Gu District, Central Buton at stations 1 and 2 is in the medium category and station 3 is in the low category.

Keywords: karst region, vesikular arbuscular mycorrhizas (VAM), arbuscular vesicular mycorrhiza (VAM) diversity.

B028

The Effect of Various Sterilization Method and Volume Containers Towards Phytochemical Contens of *Phyllantus urinaria*

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Substrate sterilization is an important process in fermentation. This process is to guarantee that the microorganisms we inoculate are completely single. Autoclave sterilization is the most popular method in science world. In autoclaving, the heat is delivered by pressurized steam so it can reduces the substrate bioactive compounds. Comparative studies of sterilization methods have been reported. This study aims to investigate the effects of two substrate containers in sterilization methods of herbal plant on phytochemical compounds. The substrate container comprised the small container and big container. We applied three sterilization methods – pasteurization, steam and autoclave sterilization for 15 min. Meniran herbal plant (Phyllantus urinaria) as substrate. After sterilization, we measured the phytochemical contents (phenol and flavonoid) and analyzed the LCMS profile of *Phyllantus urinaria* extract. Among the sterilization technique, pasteurization by big container resulted in less in decrease phenolic contens (30,326%) and flavonoid contents (14,589%). LCMS profile showed that autoclave-sterilized *Phyllantus urinaria* extract resulted in loss many active phenolics and flavonoids. This study establishes that pasteurization by big container is the best sterilization method that exerts minimal adverse effects on the phytochemical compounds.

Keywords: herbal extract, phytochemical compounds, sterilization method, *Phyllantus urinaria*, LCMS.

J006

Practicum-based learning video: How is the product development and thee quality of the product?

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Trends in education and teaching perspective have changed to distance learning due to the covid-19 pandemic and the fourth industrial revolution. Moreover, technology plays an important role in distance learning. However, technology is not always the best solution for teaching strategies. We need an appropriate learning media and learning strategy in performing the learning process in accordance with the characteristic of learning content. Therefore, we aimed to develop practicum-based learning videos in the chemical separation method course as a virtual laboratory and to explore the product quality based on expert judgment. This research was a research and development product adopted ADDIE models. This research involved 2 content experts, 2 media experts, and 48 students of chemistry department. The research data was collected through online questionnaire consisting of product quality questionnaire for product validation. Product validation data was data category, thus it converted to data score using the Likert scale and were analyzed using ideal assessment criteria. The result revealed that practicum-based learning video for the chemical separation method course has been successfully developed based on the steps of the ADDIE model and consisted of 8 practicum-based videos including solvent extraction, metal extraction, electrogravimetry, column chromatography, paper chromatography, ion exchange chromatography, steam distillation, and vacuum distillation. The product has good quality according to expert judgments. From the findings, these media can be utilized as an alternative media for virtual practicum and can assist students in deepening theories about chemical separation methods.

Keywords: chemical separation method, distance learning, online-based learning, practicum-based video.

B029

Imunomodulator Test of Purified Extract of Pokea Shellfish (*Batissa violacea celebensis* Martens 1897) on phagocytic activity of macrophages in mice BALB/c

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Immunomodulators are agents that modulate the body's immune response. In Indonesia the mortality rate of children <5 years due to infection is in the percentage of 1-20%. This study aims to determine the immunomodulatory effect of purified extract of Pokea shellfish Batissa violacea celebensis Marten 1897 on phagocytosis of macrophages in mice and compare the increase in phagocytic activity. The type of research carried out was analytical research with the research design in the form of looking at the effect of giving ethanol extract, ethyl acetate fraction, and N-Hexane fraction of pokea shellfish to increase macrophage phagocytosis activity in mice induced with Staphylococcus aureus bacteria. The results showed that the percentage of macrophage phagocytic activity was ethanol extract (39.5%), ethyl acetate fraction (24%), N-hexane fraction (53.25%), stimuno® (72.83%), Na CMC (35.33%). Based on the average percent of macrophage phagocytic activity, it was shown that the fraction that had the best immunomodulatory effect on increasing macrophage phagocytic activity in male mice was the non-polar fraction. It is necessary to study the specific active substance components contained in the pokea shellfish fraction (Batissa violacea celebensis Martens 1897).

Keywords: Immunomodulator, ethanol extract, ethyl acetate fraction, N-hexane fraction, Batissa violacea celebensis Martens 1897, phagocytosis

B030

Growth and accumulation of metallic mercury (Hg) in cashew (*Anacardium occidentale* L.) seedlings planted in post gold mining bombana soil with concentration treatment of cow manure

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Open pit mining systems decreased plant growth around the gold mining, because macro and micro nutrients were degraded, leached, and accumulated heavy metals in the soil, such as the mercury (Hg). This study was aimed to determine the growth, biomass and accumulation of metallic mercury (Hg) in the organs of cashew (*Anacardium occidentale* L.). The soil texture was sieved, pH was measure using pH Meter, spectrophotometric and titrimetric were performed for BO and CEC, Metal was measured by AAS. S3 treatment had an effect on the growth of cashew (*Anacardium occidentale* L.) planted on post-mining soil in increasing plant height growth, relative growth rate of plant height, number of leaves, leaf area, compared treatment S1, S2 and S0. And S3 treatment of metal uptake of mercury (Hg) in cashew (*Anacardium occidentale* L.) plant organs can inhibit metal absorption compared to S1, S2 treatment with the same fertilizer treatment.

Keywords: soil, cashew (*Anacardium occidentale* L.), biomass, metal, cow manure.

B031

Electric potential of tofu production liquid waste using microbial fuel cell methode with pottery membrane

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Tofu production liquid waste causes a pungent and rotten odour that badly impacts the surroundings. This waste is used as a substrate source in the MFC system. A microbial fuel cell (MFC) is a renewable and environmentally friendly electrical energy generator. The electrons generated from the anode chamber are transferred to the cathode chamber via an external circuit, and protons are transmitted through the membrane. Electrons and protons combine to reduce oxygen and produce H_2O in the cathode space. The study's objectives are 1) to determine the maximum electrical energy value produced by the MFC system from tofu production liquid waste. 2) to determine the effect of the $KMnO_4$ electrolyte on the electrical energy produced. And 3) to determine the effect of using the MFC system in improving environmental quality standards for tofu production liquid waste and measuring the voltage and electric current generated in the bioreactor, using an earthenware membrane, graphite sheet electrode, $KMnO_4$ as an oxidizing agent with a substrate using tofu production liquid waste. The results of this study indicate the effect of $KMnO_4$ concentration on the resulting voltage and current. The maximum electrical energy occurred on the 16 days with 0.1 M $KMnO_4$ cathode chamber producing an electric voltage and current of 965 mV and 14.97 mA while in $KMnO_4$ 0.2 M cathode chamber it produced 1,013 mV and 18.14 mA. Thus, the higher the $KMnO_4$ concentration, the greater the electric voltage and current compared to the lower $KMnO_4$. The characterization of the sample resulted in a decrease in the value of COD (Chemical Oxygen Demand), BOD (Biochemical Oxygen Demand), and TSS (Total Suspended Solid). This MFC system improved environmental quality standards for tofu production liquid waste. So the tofu liquid waste can be used as a substrate in the microbial fuel cell system.

Keywords: microbial fuel cell, electric potential, electric current, tofu liquid waste, pottery membrane, graphite sheet.

B032

Effect of activated sludge in degradation of wastewater contained detergent

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Detergent wastewater must be treated first not to pollute the water bodies where the waste is disposed. Detergent wastewater treatment must require serious handling. In this research activity, detergent wastewater degradation using activated sludge is an effective process for managing wastewater. Activated sludge can contain microorganisms, where these microorganisms can utilize dissolved or suspended materials in the water as an energy source. The purpose of this study (1) is to determine the ability of activated sludge to degrade linear alkyl benzene sulfonate (LAS) in detergent waste (2) to determine the decrease in the concentration of BOD (Biochemical Oxygen Demand) and COD (Chemical Oxygen Demand) in wastewater containing detergent. After being. Sample observations were conducted for ten days to analyze the levels of Linear alkyl benzene sulfonate (LAS) in detergent. The results of this study indicate that using activated sludge for waste degradation containing detergents can degrade waste with a decrease in the concentration of LAS levels for the first waste from 16.764 mg/L to 1.827 mg/L with an efficiency of 89.1% reduction in LAS levels of detergent. The levels of LAS for the second laundry waste decreased from 19.563 mg/L to 2.977 mg/L, with an efficiency of 84.7% reduction in LAS levels. The characterization of detergent waste resulted in a decrease in the value of Biochemical oxygen demand (BOD), Chemical oxygen demand (COD) so that activated sludge was proven to be able to improve the environmental quality standards of detergent waste

Keywords: activated sludge, degradation, linear alkyl benzene sulfonate, biochemical oxygen demand, chemical oxygen demand, laundry detergent waste.

B035

In vitro kinetics of pancreatic lipase inhibition by *asam gelugur* and *kunci pepet* water extracts

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Asam gelugur (*Garcinia atroviridis*) and *Kunci pepet* (*Kaempferia angustifolia* Rosc.) are the plants that have been studied for its ability to reduce the body weight. The fruit water extract of *asam gelugur* and rhizome water extract of *kunci pepet* showed the inhibition of pancreatic lipase activity and a potentcy as an anti-obesity agent. This study aimed to determine the inhibition mechanism of water extracts of the *asam gelugur* and *kunci pepet* rhizome (single extract and combination extract) on pancreatic lipase activity *in vitro*. *Asam gelugur* and *kunci pepet* rhizomes were extracted using water as solvents by maceration method. The water extracts of *asam gelugur* and *kunci pepet* and its combination extract showed inhibition of pancreatic lipase activity *in vitro*. Kinetic analysis to determine the type of inhibition of the extracts showed that *kunci pepet* extract was competitive inhibitor while *asam gelugur* extract and combination of *asam gelugur* and *kunci pepet* extracts were uncompetitive inhibitor. K_I values showed that single extract of *kunci pepet* exhibited higher affinity to the enzyme.

Keywords: antiobesity, *asam gelugur*, inhibitor, *kunci pepet*, pancreatic lipase.

B036

Identification of chemical compounds from moringa seeds (*Moringa oleifera*) as an antibacterial agents

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Moringa seeds are a class of edible oil that have activities as antioxidants, antiaging, emollients, hair care and skin lightening. This study aims to identification potential of chemical compounds from moringa seed oil as an antibacterial against *Streptococcus pyogenes* bacteria. Analysis by GC-MS showed that Moringa seed oil contains 40% oleic acid which is the compound with the highest peak. The antibacterial activity of Moringa seed oil was categorized as strong with clear zones of 11 mm and 15 mm respectively by Moringa seed oil which was extracted using soxhletation and MAE methods. Moreover, the characterization using GC-MS identified the presence of high oleic acid in Moringa seed oil with an area of 40%.

Keywords: moringa, antibacterial, *Streptococcus*, chemical, GC-MS

B037

The Inhibition to enzyme α-Glukosidase of β-Sitosterol from Spons (*Haliclona* sp.)

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The recommended alternative drugs for type 2 diabetes mellitus is to use α-Glucosidase Inhibitors (AGI). AGI can control pospandrial blood glucose spikes, reduce glucose levels in organs, and delay tolerance to diabetes mellitus, but the availability of AGI is limited so it is necessary to look for new sources of AGI. from natural resources, one of which is a steroid compound, namely -sitosterol isolated from sponge (Haliclona sp.). The purpose of this study was to determine the inhibitory activity of the α-glucosidase enzyme from extracts and -sitosterol compounds isolated from the sponge *Haliclona* sp. from Lombok waters with positive control of acarbose. The activity test was carried out by measuring the amount of *p*-nitrophenol produced at 400 nm, temperature (37Ḡ, pH 6.8, substrate concentration (10 mM), and time incubation (8 minutes). The results showed that the inhibitory activity of -sitosterol was higher (IC_{50} = 21,7783 mM) than acarbose ((IC_{50} = 80,2125 mM), -sitosterol was potential as α-glucosidase inhibitor.

Keywords: Diabetes mellitus, Inhibition, α-glukosidase, -sitosterol, *p*-nitrophenol

B0138

The coastal ecosystems vulnerability status in Southeast Sulawesi, Coral Triangle areas, Indonesia

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The Coral Triangle areas are households of rich coastal ecosystems with mangroves, seagrasses, corals, etc., regarded as a world center of biodiversity. However, the recent condition of these ecosystems is at risk due to climate change and anthropogenic pressures. The present study elucidates the coastal ecosystems' vulnerability status in the coral triangle, Southeast Sulawesi. The vulnerability of the mangrove ecosystem was elucidated by the scoring and rank values of exposure, sensitivity, and adaptive capacity of the mangrove ecosystem in the comparison of protected and unprotected sites. However, the coral vulnerability status was investigated by field sampling and experiments in the laboratory. The result showed that the average exposure values of the mangrove ecosystem in RAWN park (protected area), Tinanggea, and Kendari bay (both unprotected areas) were found to rank values less than 3, which indicates the moderate condition. However, average sensitivity values were found to rank values < 2 in RAWN park, but it was > 3 in Tinanggea and Kendari bay mangroves' indicating less sensitive mangroves in the RAWN park, but it was more sensitive mangrove conditions in unprotected areas. Similarly, the adaptive capacity value in RAWN park was < 2, while it was > 4 in Tinanggea and > 3 in Kendari bay mangroves indicating good management and availability of above land behind mangroves in the protected area, but it was poor management and unavailable land behind mangroves. However, overall rank values showed that less vulnerability status of mangroves is found in the protected areas, but high vulnerability status of mangroves is found in unprotected areas of Southeast Sulawesi. Although high coral diversity was found on the beach of the small Islands, Buton Street, Muna Regency, the coral performance is shown almost bleached in most of the areas of the small Islands. This is might be an indication of the climate change pressures of acidification and anthropogenic pressures by human activities. Laboratory experiments showed that the corals are found very sensitive to low pH of 5 as compared to a pH of 6 and normal. Most of the branching corals of *Acropora* spp on treatment with pH 5.0 were bleached just 10 days after, but the other corals of *Porietes* sp and *Fungia* sp seemed to bleach about 50%. However, the condition of corals in control showed good performance, while the corals in the treatment of pH 6.0 showed little bleached (<25% bleached) for branching corals of *Acropora* spp, but the corals of *Porietes* sp and *Fungia* sp seemed to show good performances, though they were fully bleached after 12 days of the experiment. Furthermore, all the corals of *Acropora* spp, *Porietes* sp as well as *Fungia* sp in the treatment of pH 6.0 were fully

bleached at 14 days experiment. These results highlight that the vulnerability status of the mangrove ecosystem is at risk in unprotected areas, while corals are shown high sensitivity to climate change and anthropogenic pressures. Therefore, efforts must be done to sustain the health of the coastal ecosystem and people in the coral triangle areas.

INTERNATIONAL CONFERENCE OF

10th THE INDONESIAN CHEMICAL SOCIETY 2022

Kendari, 12th October 2022

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