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UTM UNIVERSITI TEKNOLOGI MALAYSIA

MINGGU SAINS NEGARA

ICBME 2024

in parallel with BioNanoSem BIONANOTECHNOLOGY RESEARCH

Program & Abstract BOOK

Emerging Technologies in Biosciences & Biomedical Research

6th International Conference on Biosciences and Medical Engineering (ICBME 2024)

in parallel with

5th Bionanotechnology Research Seminar and Conference (BIONANOSEM 2024)

SCAN ME

https://linktr.ee/icbme_bionanosem

Emerging Technologies in Biosciences & Biomedical Research

PROGRAM & ABSTRACT BOOK

6th International Conference on Biosciences and Medical Engineering (ICBME 2024)

in parallel with

5th Bionanotechnology Research Seminar and Conference (BIONANOSEM 2024)

28 - 29 August 2024
Concorde Hotel, Kuala Lumpur, Malaysia

SCAN ME

https://research.utm.my/csnano/icbme-2024/home/

First Edition 2024

Program & Abstract Book

6th International Conference on Biosciences and Medical Engineering (ICBME 2024)

in parallel with

5th Bionanotechnology Research Seminar and Conference (BIONANOSEM 2024)

Editors

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Centre for Sustainable Nanomaterials (CSNano)

Ibnu Sina Institute for Scientific and Industrial Research

Universiti Teknologi Malaysia

August 2024

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Emerging Technologies in Biosciences & Biomedical Research

6TH INTERNATIONAL CONFERENCE ON BIOSCIENCES AND MEDICAL ENGINEERING (ICBME 2024)

in parallel with

5TH BIONANOTECHNOLOGY RESEARCH SEMINAR AND CONFERENCE (BIONANOSEM 2024)

Organized by

Centre for Sustainable Nanomaterials (CSNano), Institute Ibnu Sina for Scientific and Industrial Research (ISI-SIR), Universiti Teknologi Malaysia (UTM)

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Faculty of Agricultural Technology, Udayana University, INDONESIA

Institute of Bioproduct Development, Universiti Teknologi Malaysia, MALAYSIA

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CONFERENCE SPEAKERS

KEYNOTE SPEAKER

Prof. Hiroshi Umakoshi
Osaka University, JAPAN

Prof. Dr. Hong Liu
Shandong University, CHINA

PLENARY SPEAKER

Assoc. Prof. Dr. Hendra Susanto
Universitas Negeri Malang, INDONESIA

Prof. Dr. Maria Nilda M. Munoz
Cagayan State University, PHILIPPINES

PRE-CONFERENCE WORKSHOP ON NANOCOSMECEUTICAL

Dr Chang Seo Park
LCS Biotech, KOREA

Ts. Mohd Helme Mohd Helan
National Nanotechnology Centre, Malaysia

Assoc. Prof. Ir. Ts. Dr. Rosnani Hasham
Institute of Bioproduct Development, UTM

Mr Johan Iskandar Hasan
NanoVerify Sdn Bhd

Ts. Dr. Mariani Abdul Hamid
Founder of Dermags Skincare

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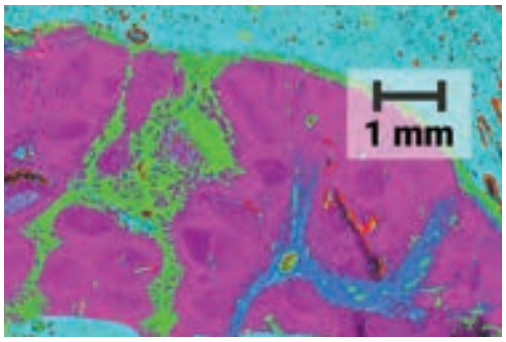

Fig. 1
Autonomous evaluation of chemical image by adaptive K-means clustering. Distribution of components was based on spectral differences of 3.6 million spectra.

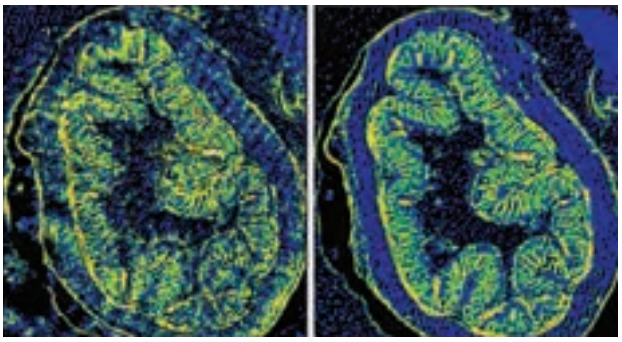

Fig. 2
Effect of Bruker's patented spatial coherence reduction on on the quality of IR images acquired with QCL imaging: Instead of unwanted artifacts, fringes and speckles (left) we get a pristine IR image (right) without applying post-processing.[3]

	Area	Pixel Size	Spectral Resolution	Spectral Range	Time Required
LUMOS II	14.7 x 5.9 mm	5 µm	4 cm^{-1}	4.000 - 750 cm^{-1}	113 min
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FOREWORD BY CHAIRMAN

ASSOC. PROF. IR. TS. DR. ROSNANI BINTI HASHAM @ HISAM

Chairman, 6th International Conference in Biosciences & Medical Engineering (ICBME) 2024

Dear Colleagues and Friends,

I am pleased to welcome you to the 6th International Conference on Biosciences & Medical Engineering (ICBME 2024), taking place on August 28-29, 2024, at the Concorde Hotel in Kuala Lumpur, Malaysia. This prestigious event is organized by the Centre for Sustainable Nanomaterials (CSNanO), Institute of Bioproduct Development (IBD), and Biosciences Dept., Faculty of Science, Universiti Teknologi Malaysia (UTM), along with the Kulliyyah of Science, International Islamic University Malaysia (IIUM), Ondokuz Mayis University, Turkiyë, and Udayana University (UNUD), Indonesia. In conjunction with National Science Week (Minggu Sains Negara) and the 5th Bionanotechnology Research Seminar (BioNanoSem 2024), the conference is proudly supported by the Ministry of Science, Technology, and Innovation (MOSTI). ICBME has established itself as a leading platform for sharing cutting-edge research in biosciences and medical engineering advancements. This year's conference theme is "Emerging Sustainable Technologies in Biosciences & Biomedical Research." With 75 oral and 36 poster presentations, the conference offers a valuable opportunity for academia and industry to exchange knowledge on innovations and achievements in related fields.

ICBME 2024 will feature keynote speeches from renowned experts, networking opportunities, conference proceedings publications, and various awards, including the Young Scientist Award, Distinguished Scientist Award, Distinguished Professor Award, Excellent Researcher Award, Best Oral Award, and Best Poster Award. Additionally, the 'Pre-conference Workshop on Nanocosmeceutical,' co-organized by the IBD and CSNano, will provide an in-depth exploration of nanotechnology in cosmetics. Concurrently, the industrial showcase will offer academics a unique opportunity to engage in meaningful discussions and network with potential industrial collaborators. We are honored to have the support of our organizers, esteemed co-organizers, and sponsors, especially our Platinum Sponsors. Your participation and contribution make this conference a success, and we look forward to your active engagement in the sessions and discussions. I would also like to sincerely thank the organizing committee members for their dedication and continuous support. On behalf of the committee, I invite you to explore the vibrant city of Kuala Lumpur, a hub of culture and innovation, as you join us for this enlightening and inspiring event. Together, let us advance the frontiers of biosciences and medical engineering for a healthier, better future.

Thank you, and see you at ICBME 2024!

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PROGRAMME TENTATIVE

PRE-CONFERENCE WORKSHOP ON NANOCOSMECEUTICAL

WEDNESDAY, 28TH AUGUST 2024

VENUE: CONCORDE V, LEVEL G, CONCORDE HOTEL

8:00 - 9:00	Registration
9:00 - 10:00	Skin delivery approaches and applications AP Ir Ts Dr Rosnani Hasham (UTM)
10:00 - 10:15	Coffee Break
10:15 - 11:45	Production, testing and demonstration Ts. Dr. Mariani Abdul Hamid (Dermags Skincare)
11:45 - 12:45	Nanosafety Ts. Mohd Helme Mohd Helan (NNC)
12:45 - 14:00	Lunch Break
14:00 - 14:45	NANOVerify Programme: An Essential Value for Malaysia's Nanocosmeceutical Industry Johan Iskandar Hassan (NanoVerify)
14:45 - 15:30	A novel 1-O-acylceramide: Synthesis, physicochemical characterization, and role in the lipid lamellar organization in skin barrier Dr. Chang Seo Park (CTO, LCS Biotech, Korea)
15:30 - 16:15	Nano-sized Bioactives for Topical Application Dr. Mazita binti Haji Mohd Diah (SIRIM)
16:15 - 16:45	The Role of Phytochemicals on Mitochondrial Health and Function Dr. Mohamad Roji Sarmidi (Phyto Biznet Sdn Bhd)
16:45 - 17:00	Q&A Session & Summary

CONFERENCE

THURSDAY, 29TH AUGUST 2024
VENUE: BALLROOM, LEVEL G, CONCORDE HOTEL KUALA LUMPUR

Time	Duration	Program/Activities	Place
7:30 - 8:30	1:00	Registration	Lobby
8:30 - 10:10	1:40	Opening Ceremony Speech by Prof Dr Rosli Md Illias, Deputy Vice-Chancellor (Research and Innovation), Universiti Teknologi Malaysia Main Speech (Official opening) by YBhg. Dato' Ts Dr Aminuddin Hassim, Secretary General, Ministry of Science, Technology and Innovation (MOSTI), Malaysia Ceremony - Launching of new product (Phyto Biznet Sdn Bhd) MoU document exchange between UTM and Universitas Brawijaya, Indonesia MoU document exchange between UTM and Asia Metropolitan University (AMU) UTM Industrial showcase visit	Ballroom
10:10 - 10:25	0:15	Presentation by platinum sponsor (Bruker (M) Sdn Bhd)	
10:25 - 10:40	0:15	Presentation by platinum sponsor (Skinlab Biochem Resources Sdn Bhd)	
10:40 - 10:45	0:05	Closing by MC	
10:45 - 11:00	0:15	Coffee Break/Poster Session	Lobby
11:00 - 11:05	0:05	Introduction of Speakers by Chairperson: Assoc Prof Ts ChM Dr Nik Ahmad Nizam Nik Malek (Deputy Dean (Research, Development and Innovation), Faculty of Science, UTM and Acting Director of CSNano, UTM)	Ballroom
11:05 - 11:40	0:35	Keynote Speaker 1 (Prof Dr Hiroshi Umakoshi, Osaka University, Japan)	
11:40 - 12:15	0:35	Keynote Speaker 2 (Prof Dr Hong Liu, Shandong University, China)	
12:15 - 12:20	0:05	Introduction of Speakers by Chairperson: Assoc Prof Ts Ir Dr Rosnani Hasham (Director of Institute of Bioproduct Development (IBD), UTM)	
12:20 - 12:40	0:20	Plenary Speaker 1 (Assoc Prof Dr Hendra Susanto, Universitas Negeri Malang,	
12:40 - 13:00	0:20	Plenary Speaker 2 (Prof Dr Maria Nilda M. Nunoz, Cagayan State University,	
13:00 - 14:00	1:00	Lunch	Café

PARALLEL SESSION
VENUE: CONCORDE HOTEL KUALA LUMPUR

Time (MY)	Ballroom, Level G
SLOT PARALLEL 1.1	
14:00 - 14:15	**Invited**
14:15 - 14:25	Oral
14:25 - 14:35	Oral
14:35 - 14:45	Oral
14:45 - 14:55	Oral
14:55 - 15:05	Oral
15:05 - 15:15	Oral
15:15 - 15:30	**Invited**
15:30 - 15:40	**BREAK**
Time (MY)	**Ballroom, Level G**
SLOT PARALLEL 1.2	
15:40 - 15:55	**Invited**
15:55 - 16:05	Oral
16:05 - 16:15	Oral
16:15 - 16:25	Oral
16:25 - 16:35	Oral
16:35 - 16:45	Oral
16:45 - 17:00	**Invited**

Time (MY)	Concorde V, Level G
SLOT PARALLEL 2.1	
14:00 - 14:15	**Invited**
14:15 - 14:25	Oral
14:25 - 14:35	Oral
14:35 - 14:45	Oral
14:45 - 14:55	Oral
14:55 - 15:05	Oral
15:05 - 15:15	Oral
15:15 - 15:30	**Invited**
15:30 - 15:40	**BREAK**
Time (MY)	**Concorde V, Level G**
SLOT PARALLEL 2.2	
15:40 - 15:55	**Invited**
15:55 - 16:05	Oral
16:05 - 16:15	Oral
16:15 - 16:25	Oral
16:25 - 16:35	Oral
16:35 - 16:45	Oral
16:45 - 17:00	**Invited**

Time (MY)	Patio 2, Level 2
SLOT PARALLEL 3.1	
14:00 - 14:15	**Invited**
14:15 - 14:25	Oral
14:25 - 14:35	Oral
14:35 - 14:45	Oral
14:45 - 14:55	Oral
14:55 - 15:05	Oral
15:05 - 15:15	Oral
15:15 - 15:30	**Invited**
15:30 - 15:40	**BREAK**
Time (MY)	**Patio 2, Level 2**
SLOT PARALLEL 3.2	
15:40 - 15:55	**Invited**
15:55 - 16:05	Oral
16:05 - 16:15	Oral
16:15 - 16:25	Oral
16:25 - 16:35	Oral
16:35 - 16:45	Oral
16:45 - 17:00	**Invited**

Time (MY)	Patio 3, Level 2
SLOT PARALLEL 4.1	
14:00 - 14:15	**Invited**
14:15 - 14:25	Oral
14:25 - 14:35	Oral
14:35 - 14:45	Oral
14:45 - 14:55	Oral
14:55 - 15:05	Oral
15:05 - 15:15	Oral
15:15 - 15:30	**Invited**
15:30 - 15:40	**BREAK**
Time (MY)	**Patio 3, Level 2**
SLOT PARALLEL 4.2	
15:40 - 15:55	**Invited**
15:55 - 16:05	Oral
16:05 - 16:15	Oral
16:15 - 16:25	Oral
16:25 - 16:35	Oral
16:35 - 16:45	Oral
16:45 - 17:00	**Invited**

Time (MY)	Studio 4, Level 2
SLOT PARALLEL 5.1	
14:00 - 14:15	**Invited**
14:15 - 14:25	Oral
14:25 - 14:35	Oral
14:35 - 14:45	Oral
14:45 - 14:55	Oral
14:55 - 15:05	Oral
15:05 - 15:15	Oral
15:15 - 15:30	**Invited**
15:30 - 15:40	**BREAK**
Time (MY)	**Studio 4, Level 2**
SLOT PARALLEL 5.2	
15:40 - 15:55	**Invited**
15:55 - 16:05	Oral
16:05 - 16:15	Oral
16:15 - 16:25	Oral
16:25 - 16:35	Oral
16:35 - 16:45	Oral
16:45 - 17:00	**Invited**

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SLOT PARALLEL 1.1 Chairperson: Prof Dr Fahrul Huyop, Universiti Teknologi Malaysia, MALAYSIA				
Time			**Duration**	**Venue: Ballroom, Level G**
14:00	-	14:15	0:15	**INVITED SPEAKER** **Green Synthesis of Metal and Metal Oxide Nanoparticles: Trends and Future Endeavours** Hanis Mohd Yusoff, *Universiti Malaysia Terengganu, MALAYSIA*
14:15	-	14:25	0:10	**Unveiling Bioactive Compounds Biosynthesis of Silver Nanoparticles from Palm Oil Mill Effluent** Abdulrahman Sani Aliero, *Kebbi State University of Science and Technology, NIGERIA*
14:25	-	14:35	0:10	**Isolation and Screening of Nanocellulose Producing Bacteria from Pineapple Wastes,** Yamunathevi Mathivanan, *Universiti Teknologi Malaysia, MALAYSIA*
14:35	-	14:45	0:10	**The Role of Purple Sweet Potato Nanoemulsion in Modulating Glutamate Pathway Protein Expression and Behavioral Changes in Schizophrenia-Model Zebrafish** Wike Astrid Cahayani, *Universitas Brawijaya, INDONESIA*
14:45	-	14:55	0:10	**Two-Stage Blocking Mechanism in Crossflow Filtration System using *Neolamarckia cadamba* Nanofibrillated Filter Paper** Siti Solehah Ahmad Norrahma, *Forest Research Institute Malaysia, MALAYSIA*
14:55	-	15:05	0:10	**Development of Nano-Chitosan Filtrate N-Butanol Antibiotic Products from Streptomyces sp.11 and Testing Its Inhibition against *Ralstonia solanacearum*** Retno Kawuri, *Udayana University, INDONESIA*
15:05	-	15:15	0:10	**Preparation and Characterization of *Andrographis paniculata* Extract Loaded onto Chitosan-based Nanoparticles** Mohamad Khairul Hafiz Idris, *Universiti Teknologi Malaysia, MALAYSIA*
15:15	-	15:30	0:15	**INVITED SPEAKER** **Green Synthesis of Silver, Silver Oxide and Zinc Oxide Nanoparticles for Antibacterial Applications** Mohd Hayrie Mohd Hatta, *Asia Metropolitan University, MALAYSIA*
15:30	-	15:40	0:10	**COFFEE BREAK**

SLOT PARALLEL 1.2 Chairperson: Ts. Dr. Latifah Jasmani, Forest Research Institute Malaysia, MALAYSIA				
Time			**Duration**	**Venue: Ballroom, Level G**
15:40	-	15:55	0:15	**INVITED SPEAKER** **The PI3K/AKT Activator has Anti-Apoptotic Potential of Nano-Cinnamaldehyde at Diabetes Mellitus in vitro** Agustina T. Endharti, *Universitas Brawijaya, INDONESIA*
15:55	-	16:05	0:10	**Phytochemical Analyses and Biosynthesis of Silver Nanoparticles Using *Bauhinia kockiana*** To Soon Wei, *Universiti Teknologi Malaysia, MALAYSIA*
16:05	-	16:15	0:10	**Combination of Nanoemulsion Curcumin and Purple Sweet Potato Modulates Locomotor Behaviors of Stressed Mice** Nia Kurnianingsih, *Universitas Brawijaya, INDONESIA*
16:15	-	16:25	0:10	**Virtual Selection of γ-Oryzanol and its Derivatives from Brown Rice (*Oryza sativa* L.) Blocking HMG CoA Reductase in Hypercholesterolemia Disease** Ja'far Umar, *Universitas Brawijaya, INDONESIA*
16:25	-	16:35	0:10	**Anti-Nociceptive and Anti-Inflammatory Effects of *Rosmarinus officinalis* L. Extract Nano-Emulsion on Dental Pulpitis Rat Model** Azkiya Asri Rahmaniar, *Universitas Brawijaya, INDONESIA*

16:35	-	16:45	0:10	**The Effect of Biotinylated NS1 Antibody Concentration on Photoluminescence Intensity of $CuInS_2$ QDs/ZnS Conjugated Streptavidin** Hanifah Isma Qurattu'ain, *Institut Teknologi Sepuluh Nopember, INDONESIA*
16:45	-	17:00	0:15	**INVITED SPEAKER** **Green Synthesis of Silver Nanoparticles using *Garcinia mangostana* Pericarp: A Promising Approach for Tetracycline Degradation in Water Systems** Sheela Chandren, *Universiti Teknologi Malaysia, MALAYSIA*
17:00	-	17:30	0:30	Closing Ceremony at Ballroom

SLOT PARALLEL 2.1 **Chairperson: Dr Happy Kurnia Permatasari, Universitas Brawijaya, INDONESIA**				
Time			**Duration**	**Venue: Concorde V, Level G**
14:00	-	14:15	0:15	**INVITED SPEAKER** **Nanoemulsion of *Rosmarinus officinalis*: A Promising Topical Antinociceptive Agent for Inflammation Management** Husnul Khotimah, *Universitas Brawijaya, INDONESIA*
14:15	-	14:25	0:10	**Greener Biomass-based Composites is the Future** Roswanira Ab. Wahab, *Universiti Teknologi Malaysia, MALAYSIA*
14:25	-	14:35	0:10	**Scabies Detection by Using Image Processing** Agwin Fahmi Fahanani, *Universitas Brawijaya, INDONESIA*
14:35	-	14:45	0:10	**Synergistic Anticancer Analysis of *Zingiber officinale* and *Azadirachta indica*** Sharel Raj *Universiti Teknologi Malaysia, MALAYSIA*
14:45	-	14:55	0:10	**The Correlation between PER3 rs2640908 Polymorphism and Colorectal Cancer in the Japanese Population** Holipah Holipah, *Universitas Brawijaya, INDONESIA*
14:55	-	15:05	0:10	**Identification and Ability of Indigenous Bacteria from Bestari Probolinggo Landfill in Degrading Various Types of Plastic in Broth Medium with and Without Glucose** Evi Susanti, *Universitas Negeri Malang, INDONESIA*
15:05	-	15:15	0:10	**Design and Optimization of Microencapsulation of Flamboyant Extract (*Delonix regia*) using Response Surface Methodology (RSM) Based on Biodegradable Polymers and Biological Activity** Anna Safitri, *Universitas Brawijaya, INDONESIA*
15:15	-	15:30	0:15	**INVITED SPEAKER** **Drying of *Moringa Oleifera* Leaves for Improved Physicochemical Properties** Dayang Norulfairuz Abang Zaidel, *Universiti Teknologi Malaysia, MALAYSIA*
15:30	-	15:40	0:10	**COFFEE BREAK**

SLOT PARALLEL 2.2 **Chairperson: Dr Ida Bagus Wayan Gunam, Udayana University, INDONESIA**				
Time			**Duration**	**Venue: Concorde V, Level G**
15:40	-	15:55	0:15	**INVITED SPEAKER** **Nanoencapsulation as a Burgeoning Nanotechnology-Based Approach for Modern Industry** Tumirah Khadiran, *Forest Research Institute Malaysia (FRIM), MALAYSIA*
15:55	-	16:05	0:10	**Phytochemical Analysis of *Moringa oleifera* and Its Application for Silver Nanoparticle Biosynthesis** Mustapha Isah, *Sokoto State University, NIGERIA*

16:05 - 16:15	0:10	**Formulating *Moringa oleifera* Based Ready-to-Use Therapeutic Food as a Cost-Effective and Sustainable Solution for Malnutrition** Teba Abdul Lateef, *University of Karachi, PAKISTAN*
16:15 - 16:25	0:10	**Effectiveness of *Moringa oleifera* Liquid Detergent Product as an Eco-Friendly Antibacterial Agent** Devi Mariya Sulfa, *Universitas Negeri Malang, INDONESIA*
16:25 - 16:35	0:10	**Green Synthesized AgNPs using Leaf Aqueous Extract of *Moringa oleifera* Promotes Apoptosis by Targeting Cleaved Caspase-3 in MCF-7 Cells** Sa'diyatul Rizqie Amaliyah Firdaus, *Universitas Brawijaya, INDONESIA*
16:35 - 16:45	0:10	**The Effect of Fluid Restriction Monitoring Guidelines Using the Heart Failure Self-Care Application (ATRIA) on Reducing Risk of Fluid Retention in Heart Failure Patients at Dr. Saiful Anwal Hospital Malang** Mohammad Saifur Rohman, *Universitas Brawijaya, INDONESIA*
16:45 - 17:00	0:15	**INVITED SPEAKER** **Green Synthesis of Silver Nanoparticles (AgNPs) via *Moringa oleifera* Target Potentials Oncological Pathways in HeLa Cervical Cancer Cell** Happy Kurnia Permatasari, Universitas Brawijaya, INDONESIA
17:00 - 17:30	0:30	Closing Ceremony at Ballroom

SLOT PARALLEL 3.1 **Chairperson: Assoc Prof Dr Mh Busra Fauzi, Universiti Kebangsaan Malaysia, MALAYSIA**		
Time	**Duration**	**Venue: Patio 2, Level 2**
14:00 - 14:15	0:15	**INVITED SPEAKER** **Antimicrobial Activity of Some Medicinal Plant Extracts and Encapsulate against Microbial Contaminant of Coconut Sap (*Cocos nucifera*)** Ida Bagus Wayan Gunam, *Udayana University, INDONESIA*
14:15 - 14:25	0:10	**Study of Periodontal Cell Growth on Human Amniotic Membrane Impregnated with Tualang Honey** Fatin Syamimi Sabri, *Universiti Sains Malaysia, MALAYSIA*
14:25 - 14:35	0:10	**Anti-Proliferation Effect and Induction of PPARG Expression in Human Cervical Cancer Cells by Combination of Grape Leaf Ethanol Extract and Cisplatin** Robiatul Munawaroh, *Universitas Brawijaya, INDONESIA*
14:35 - 14:45	0:10	**Molecular Weight of *Rhizomucor pusillus* Cellulase via Fermentation** Abdulkarim Ali Deba, *Abubakar Tafawa Balewa University, NIGERIA*
14:45 - 14:55	0:10	***Zanthoxylum acanthopodium* DC. Fruit Extract Modulates Blood Pressure in Salt-Induced Hypertension Rat through Angiotensin-Converting Enzyme Inhibition** Muhammad Shafala Safa, *Universitas Brawijaya, INDONESIA*
14:55 - 15:05	0:10	**Comparative Analysis of Immunodiagnostic Performance of Chemiluminescent Assay versus Immunochromatography for Toxoplasmosis** Aulia Rahmi Pawestri, *Universitas Brawijaya, INDONESIA*
15:05 - 15:15	0:10	**Effectiveness of Using Gum Arabic for Co-Microencapsulation of *Ruellia tuberosa* L. and Tithonia diversifolia Extracts as Encapsulating Agent and Release Studies** Nabila Almayda, *Universitas Brawijaya, INDONESIA*
15:15 - 15:30	0:15	**INVITED SPEAKER** **Synthesized of Metal Nanoparticles with Plant Extract Loaded with Niosomes for Potential Anti Skin Bacterial Psoriasis** Che Azurahanim Che Abdullah, *Universiti Putra Malaysia, MALAYSIA*
15:30 - 15:40	0:10	**COFFEE BREAK**

SLOT PARALLEL 3.2 Chairperson: Assoc Prof Dr Hanis Mohd Yusoff, Universiti Malaysia Terengganu, MALAYSIA			
Time		**Duration**	**Venue: Patio 2, Level 2**
15:40 - 15:55		0:15	**INVITED SPEAKER** **Microbiota Profile Found in The Respiratory Tract of Coronavirus Disease-2019 (COVID-19) Patients** Nuning Winaris, *Universitas Brawijaya, INDONESIA*
15:55 - 16:05		0:10	**Generation of SARS-CoV-2 Virus-Like Particles in HEK-293T Cells** Kavan Hafil Kusuma, *Universitas Brawijaya, INDONESIA*
16:05 - 16:15		0:10	**Prebiotic Potential of Pineapple and *Curcuma xanthorrhiza* Rhizomes Solventless Extracts towards *Lacticaseibacillus paracasei* Proliferation** Mirdawati Mashudin, *Universiti Teknologi Malaysia, MALAYSIA*
16:15 - 16:25		0:10	**Effect of Ethanol Extract *Elaeocarpus grandiflorus* Leaves on Lipid Profile of Hyperlipidemia Rats** Wahyu Harini Nugrahaningsih, *Universitas Negeri Semarang, INDONESIA*
16:25 - 16:35		0:10	**The Effect of Polyethylene Microplastics Inhalation Towards Hematological Disorder** Hikmawan Wahyu Sulistomo, *Universitas Brawijaya, INDONESIA*
16:35 - 16:45		0:10	**Development of Functional Gluten-Free Noodles from Modified Cocoyam (*Xanthosoma sagittifolium*) and corn Flour** I Nengah Kencana Putra, *Udayana University, INDONESIA*
16:45 - 17:00		0:15	**INVITED SPEAKER** **Synergistic Effect of Hyperthermia Treatment Combined with Anti-cd200 Blockade Therapy in Modulating Immunological Response** Wan Fatin Amira Wan Mohd Zawawi, *Universiti Teknologi Malaysia, MALAYSIA*
17:00 - 17:30		0:30	Closing Ceremony at Ballroom

SLOT PARALLEL 4.1 Chairperson: Dr Farah Hanis Juhari, Universiti Teknologi Malaysia, MALAYSIA			
Time		**Duration**	**Venue: Patio 3, Level 2**
14:00 - 14:15		0:15	**INVITED SPEAKER** **FRIM's Efforts in Research & Development of Herbal Products through Nanotechnology** Noor Rasyila Mohamed Noor, *Forest Research Institute Malaysia (FRIM), MALAYSIA*
14:15 - 14:25		0:10	**Metagenomics Approach for Honey eDNA Focusing Plant Species: Origin and Authentication** Saeed Ullah, *Universiti Teknologi Malaysia, MALAYSIA*
14:25 - 14:35		0:10	**Morpho-Agronomic Characters of Twenty-Two Indonesian Pigmented Rice (*Oryza sativa* L.) Varieties from East and Central Java, Indonesia** Yeni Avidhatul Husnah, *Universitas Brawijaya, INDONESIA*
14:35 - 14:45		0:10	**Deterioration of Protein and Carbohydrate During Processing of Animal Feed Pellet from Pineapple By-Product** Aidee Kamal Khamis, *Universiti Teknologi Malaysia, MALAYSIA*
14:45 - 14:55		0:10	**Amino Acid and Proximate Analysis of Tomatoes (*Solanum lycopersicum*) and its Potential Application as Anticomplication Diabetes Mellitus** Sekararum Narwasthu, *Universitas Brawijaya, INDONESIA*
14:55 - 15:05		0:10	**Exploring the Effect of Different Polymers on *Ruellia tuberosa* Linn Extract Microcapsules** Firza Rajasa Gunawan, *Universitas Brawijaya, INDONESIA*

15:05	-	15:15	0:10	**Analysis of the Potential of Arbuscular Mycorrhizal Fungi (AMF) as a Biofertilizer in Increasing Plant Productivity and Realizing Sustainable Agriculture** Avivi Nur Aina, *Universitas Airlangga, INDONESIA*
15:15	-	15:30	0:15	**INVITED SPEAKER** **Therapeutic Potential of Nutraceuticals** Tooba Lateef, *University of Karachi, PAKISTAN*
15:30	-	15:40	0:10	**COFFEE BREAK**

SLOT PARALLEL 4.2 **Chairperson: Dr Husnul Khotimah, Universitas Brawijaya, INDONESIA**				
Time			**Duration**	**Venue: Patio 3, Level 2**
15:40	-	15:55	0:15	**INVITED SPEAKER** **Goat Milk Skincare Nourishes, Moisturizes, and Exfoliates Skin to Improve Healthy Skin Cells** Fatchiyah Fatchiyah, *Universitas Brawijaya, INDONESIA*
15:55	-	16:05	0:10	**Exploring the Therapeutic Potential of *Salacca zalacca* in Hyperlipidemia: Insights from Network Pharmacology, Molecular Docking, and Dynamics Simulations** Sri Utami, *Universitas Brawijaya, INDONESIA*
16:05	-	16:15	0:10	**Computer-Aided and Experimental Studies of Conjugation Effect in Diimino Diphosphine-Based Compounds Towards Nonlinear Optic Application** Mamoona Jillani, *Universiti Teknologi Malaysia, MALAYSIA*
16:15	-	16:25	0:10	**Potential of Active Compounds from Green Tea and Green Coffee as Selective FGF23 and FGFR4 Inhibitors against Cardiac Fibrosis Signaling in Metabolic Syndrome Conditions: In Silico Study** Victor Alvianoes Guterez Hose, *Universitas Brawijaya, INDONESIA*
16:25	-	16:35	0:10	**In Silico Evaluation of *Curcuma longa* Phytochemicals Interactions on Hypothalamic-Pituitary-Adrenal Axis Pathway Protein (HPA Axis): Traditional Malay Medicine Mechanism Study** Nurul Nadhirah Rodzuan, *Universiti Teknologi Malaysia, MALAYSIA*
16:35	-	16:45	0:10	**Potential of Ligans from Binahong (*Anredera cordifolia*) Leaves Targeting to MMP2 Receptor of Breast Cancer** Silvi Zakiyatul Ilmiyah, *Universitas Brawijaya, INDONESIA*
16:45	-	17:00	0:15	**INVITED SPEAKER** **Functionalised-Natural Biomaterials for Cutaneous Tissue Engineering: Conventional vs Additive Manufacturing Technology** Mohd Fauzi Mh Busra, *Universiti Kebangsaan Malaysia, MALAYSIA*
17:00	-	17:30	0:30	Closing Ceremony at Ballroom

SLOT PARALLEL 5.1 **Chairperson: Dr Wan Fatin Amira, Universiti Teknologi Malaysia, MALAYSIA**				
Time			**Duration**	**Venue: Studio 4, Level 2**
14:00	-	14:15	0:15	**INVITED SPEAKER** **Diffusivity and Thermodynamic Analysis of Enzyme Entrapment within Calcium Alginate Beads for Starch Hydrolysis** Nor Hasmaliana Abdul Manas, *Universiti Malaysia Pahang Al-Sultan Abdullah, MALAYSIA*
14:15	-	14:25	0:10	**Isolation and Selection of Cellulose-Degrading Microbes from Empty Palm Oil Bunch Waste in Pasangkayu Regency, West Sulawesi** I Gede Arya Sujana, *Udayana University, INDONESIA*
14:25	-	14:35	0:10	**Therapeutic Potential of *Salacca zalacca* Skin (Snake Fruit) Ethanolic Extract as a Metabolic Syndrome Supplementation: A Comprehensive Study Using an In-Silico and In-Vitro Approach**

				Diana Yuswanti Putri, *Universitas Brawijaya, INDONESIA*
14:35	-	14:45	0:10	**Microplastic Pollution in Indonesian Rivers: A Mini Review of Water Contamination, Health Impacts, and Future Actions** Maya Safitri, *Universitas Airlangga, INDONESIA*
14:45	-	14:55	0:10	**Study on the Concentration of Polyvinyl Alcohol in Bioplastic Composites of Taro Starch and Other Polysaccharides** Amna Hartiati, *Udayana University, INDONESIA*
14:55	-	15:05	0:10	**IComPBag – An Innovative Positioning Device** Mohd Fahmi Lukman, *National Defence University of Malaysia, MALAYSIA*
15:05	-	15:15	0:10	**Lead-Resistant Bacteria in Heavy Metal Polluted Agricultural Soils Near Lapindo Mud Volcano** Mohammed Bosha, *Universitas Brawijaya, INDONESIA*
15:15	-	15:30	0:15	**INVITED SPEAKER** **ArgenTAC©: Innovative Adsorbent for Microfiber Removal from Laundry Wastewater** Alyza A. Azmi, *Universiti Malaysia Terengganu, MALAYSIA*
15:30	-	15:40	0:10	**COFFEE BREAK**

SLOT PARALLEL 5.2 **Chairperson: Assoc. Prof. Ir. Dr. Dayang Norulfairuz Abang Zaidel, Universiti Teknologi Malaysia, MALAYSIA**				
Time			**Duration**	**Venue: Studio 4, Level 2**
15:40	-	15:55	0:15	**INVITED SPEAKER** **Antifungal Activity of Fabric Grafted with *Persicaria odorata*-Biosynthesized-Silver Nanoparticles** Nik Ahmad Nizam Nik Malek, *Universiti Teknologi Malaysia, MALAYSIA*
15:55	-	16:05	0:10	**Study of the Bioactive Potential of Doro Putih (*Strychnos lucida*) Extract: Phytochemical Profile, Antioxidant Activity and Cytotoxicity against Breast Cancer Cells** Yuslinda Annisa, *Universitas Brawijaya, INDONESIA*
16:05	-	16:15	0:10	**Entomo-Toxicological Approach using Enzyme Responses in Insects (*Callosobruchus maculatus*) for Monitoring Insecticide Contamination in Stored Cowpea** Salihu Ibrahim Maikudi, *Ibrahim Badamasi Babangida University, NIGERIA*
16:15	-	16:25	0:10	**Comparative Analysis of Different Natural Polymers as Coating Agents for Freeze-Dried Microencapsulation of *Cosmos caudatus* Kunth Compounds** Izaz Aqeiluz Zahara, *Universitas Brawijaya, INDONESIA*
16:25	-	16:35	0:10	**Antiobesity Performance of Encapsulated *Caulerpa racemosa* Extract** Dewi Ratih Tirto Sari, *Universitas Ibrahimy, INDONESIA*
16:35	-	16:45	0:10	**The Antihypertensive Effects and Safety Profile of *Physalis angulata* L. Leaf Extract** Dian Nugrahenny, *Universitas Brawijaya, INDONESIA*
16:45	-	17:00	0:15	**INVITED SPEAKER** **Effects of Rat Tickling on Stereotypic Behaviour and Ghrelin** Farah Hanis Juhari, *Universiti Teknologi Malaysia, MALAYSIA*
17:00	-	17:30	0:30	Closing Ceremony at Ballroom

LIST OF ABSTRACTS AND PRESENTERS

CATEGORY: KEYNOTE SPEAKERS

CATEGORY: PLENARY SPEAKERS

CATEGORY: INVITED SPEAKERS

CATEGORY: ORAL SPEAKERS

CATEGORY: POSTER

Keynote Speaker

Design Lipid Nano Carriers for Drug Delivery

Hiroshi UMAKOSHI[a*], Nozomi Morishira WARANABE[a], Ni'matul IZZA[b], Natsuumi ITO[a], Kota YAMAGUCHI[a]
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Abstract
Nanostructured lipid carriers (NLCs) are a new generation of lipid vectors for drug delivery systems (DDSs), which are composed of solid and liquid lipids dispersed throughout the inner lipid matrix. In this presentation, a systematic method to characterize the “interface” of various NLCs will be introduced by selecting some case studies, such as (i) standard vesicles, (ii) model biomembranes, (iii) cubosomes, (iv) cataniosomes, and (v) covid19-carrier (DSPC/cholesterol/cationic lipid (SM102)). The method includes the (1) conventional physical characterization methods (i.e. DLS, SANS, etc.) and (2) (our original) physicochemical ones (i.e. multi-probes fluorescence spectroscopy, time-resolved / decay-associated fluorescence spectroscopy, (surface-enhanced) Raman spectroscopy etc.). These systematic results can be used to clarify the design space of the NLC composition to show the drug delivery.
Keywords: Nano Carriers; Drug Delivery; Vesicle; Cubosome; Analysis

Biography

Hiroshi Umakoshi is currently a Professor / Vice Dean at the Graduate School of Engineering Science at Osaka University in Japan. He obtained his PhD in Chemical Engineering at Osaka University, Japan in 1997. He worked as a post-doctoral fellow (JSPS) at the Department of Biochemistry, School of Science, Lund University, Sweden, from 1997 to 1998. Currently, he is conducting research on Bio-Inspired Chemical Engineering, focusing on the utilization of Self-Organizing System as core material. He is also working as a Director of the Society of Chemical Engineers, Japan (SCEJ), vice president of the Society of Separation Process and Engineering, Japan (SSPEJ), and a councillor of the Society of Membrane, Japan (SMJ). He is also a member of ACS and AIChE.

Keynote Speaker

Material Cues Regulating Stem Cell fate for Cell Therapy of Neurodegenerative Diseases

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Abstract
Stem cell therapy is a promising treatment approach for neurodegenerative diseases and other disease. However, direct regulation of stem cell differentiation, especially in vivo, is still one of the greatest obstacles for stem cell therapy. The conventional approach for inducing or accelerating direct differentiation is building a bio-microenvironment of the stem cells with some biomolecules as growth factors. However, the biomolecules, including proteins, enzymes, and RNAs, are expensive and easily degraded in vivo or out of control to diffused into other tissues, which brings great difficulties for practical stem cell therapy. Fortunately, some receptors related to physical signals on the surface of the extracellular matrix of stem cells provided a great opportunity to regulate stem cell fate by material cues or physical signals derived from materials. Compared with bio or chemical signals, material cues can be applied quantificationally and timely on the cells derived from the interaction of the external physical field and internal nanostructured materials. However, for the conventional material cue application methods, the macroscopic physical fields used for stimulating the functional materials cannot be localized on the surface receptors of the cells. In recent years, we proposed a new concept in bio-materials-physics interdisciplinary research, regulation of stem cell fate by nanostructure-mediated physical signals, and great progress in this area has been achieved. In this talk, we will introduce this topic's principles, progress, and perspective by introducing recent works in our group. The important part of this talk is the evidence that wireless electric signals generated on piezoelectric or conductive nanomaterials driven by ultrasound or alternating magnetic field can realize the promotion of neuronal differentiation of neural stem cells and mesenchymal stem cells in vitro and demonstrated stem cell therapy of the neurodegenerative disease based on the animal experiments.

Biography

He received his PhD degree in 2001 from Shandong University (China). His current research interest focuses mainly on photo-electrical functional materials, biosensors, tissue engineering and stem cells, especially the interaction between stem cells and nanostructure biomaterials. Until now, he has been awarded more than 40 patents and published more than 400 papers with a total citation of over 43000 and an H-index of 87. In 2009, the National Natural Science Foundation of China awarded him a Distinguished Young Scholar. He was included in the Clarivate Analytics Highly Cited Researchers 2018-2023 list. He was invited to publish review papers on Chem. Soc. Rev., Adv. Mater., Adv. Funct. Mater., etc. He was awarded the first prize of Shandong Natural Science in 2020. Recently, two sci-tech achievements worth 10 million RMB in his group have been transferred and industrialization. In 2022, as editor-in-chief, he launched a new journal, *BMEMat* (Biomedical Engineering Materials, Wiley Publisher).

Plenary Speaker

Kelor (*Moringa oleifera*): a Green Pearl of Asia for Future Medical and Nanoengineering Application

Hendra Susanto[a*], Ahmad Taufiq[b], Nik Ahmad Nizam Nik Malek[c], Agustina Tri Endharti[e], Happy Kurnia Permatasari[d], Moh. Sholeh[a,d], Sa'diyatul Rizqie Amaliyah Firdaus[a,d]

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[c]Centre for Sustainable Nanomaterials, Ibnu Sina Institute for Scientific and Industrial Research, Universiti Teknologi Malaysia, Malaysia

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Abstract

The use of herbal medicine, whether as standalone or combination therapy, offers a potential future treatment alternative recently. Exploring Kelor (*Moringa oleifera*), the local biodiversity from Madura Island and a green pearl of Southeast Asia provides the potential for cost-effective and sustainable medicinal raw materials. Preliminary *in vitro* and *in vivo* studies were conducted on *M. oleifera* Leaf Powder (MOLP) and Seed Oil (MOSEIL). The in vivo study was performed using the liver fibrosis-HCC animal model, which measured the RNA-Protein level of specific target genes and their histological analysis. Notably, the baseline data of this study showed that Moringa has superior potential as an alternative drug, with MOSEIL suppressing proinflammatory and fibrogenic gene expression in the liver of fibrosis mouse models. In-vitro studies were also performed using biosynthesized *M. oleifera*-silver nanoparticles (AgNPs) and Nanochitosan for drug-delivery purposes on HT-29, Hep-G2, and MCF-7 cancer cell lines. Findings revealed that Moringa-AgNPs reduced metastatic gene expression in HT-29 cell lines, while Moringa Nanochitosan inhibited cancer proliferation in Hep-G2 and MCF-7 cell lines through the Wnt/β-catenin pathway. These findings indeed highlighted the potential of *M. oleifera* plant as an anticancer agent. Future *in vivo* studies of MOLP-MOSEIL nanoparticles are emerging to improve the potential of these green materials as a nano-drug candidate against cancer and other diseases.

Keywords: *Moringa oleifera*; green materials, nanoengineering; cancer; medical application

Biography

Assoc. Prof. Hendra Susanto, Ph.D., is a Head of the Biology Department, Faculty of Mathematics and Natural Sciences, Universitas Negeri Malang, Indonesia. He is a professional physiologist and technologist. His expertise is in biological sciences and technology, and his research area involves molecular physiology and nanotechnology for metabolic syndrome and cancer. He is a program leader for the Green Nanomaterial and Metabolic Syndrome-Cancer Project in collaboration with Universiti Teknologi Malaysia (UTM). His current primary research is the development of *Moringa oleifera* nanoparticles for Cancer and Metabolic Disease drug development.

Plenary Speaker

Introduction to Biomedical Engineering and its Application

Maria Nilda M. Muñoz
Cagayan State University, Tuguegarao City, Cagayan Valley, Philippines
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Abstract
Biomedical engineering (BME) applies engineering principles to tackle biological and medical challenges in order to improve healthcare. BME has created several medical gadgets that are extensively utilized in the field of healthcare. Thus, BME has a vital role in several technological advancement phases, from performing laboratory research to designing and evaluating medical products. This presentation explores the utilization of smartphones in the field of BME. It is recognized that smartphones allow for the examination and graphical representation of biological information while enhancing medical equipment's effectiveness. This has several significant benefits, such as its capacity to accurately identify ailments, minimize ambient noise, and deliver tailored treatments to meet the specific requirements of each patient. Subsequently, the presentation explores the various associated terminology and the specific responsibilities of medical engineers, clinical engineers, and bioengineers. This delineates many subdivisions of biomedical engineering, such as biomechanics, biomaterials, medical devices, and clinical engineering. It is recognized that the integration of technology with biology and medicine is currently propelling the industry of the 21st century. Biomedical innovations improve the well-being of our population, contribute to economic growth, and offer valuable hands-on learning experiences for both undergraduate and graduate students.
Keywords: biomedical engineering; healthcare; medicine, medical gadgets

Biography

Professor Muñoz is a Balik-Scientist, appointed by the Department of Science and Technology, Philippines. Currently, a Senior Medical Scientist at Cagayan State University and hold various positions, such as Director of Animal Research Facility, Head of Natural Product Development Center, Head of Food Innovation & Product Development, and a Lecturer. The focus of her research lies on studying lung inflammation through the use of animal model of diseases, as well as exploring the potential of natural products in biological and medicinal applications. She is the inventor of the FDA-approved Sunberry (Bignay) dietary supplement and Bignay Liqueur. Scientific evidence has demonstrated that Bignay has the ability to decrease lung inflammation, especially in cases of asthma and acute lung damage.

Plenary Speaker

NANOVerify Programme: An Essential Value for Malaysia's Nanocosmeceutical Industry

Johan Iskandar Hasan[a]*, Dr. Nur Aimi Mohd Nasir[a], Hazmy Iman Abas[a]
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Abstract
The NANO*Verify* Programme stands as Malaysia's premier nanotechnology products certification scheme – playing a pivotal role in the regional certification landscape. Endorsed by the Ministry of Science, Technology and Innovation (MOSTI) and operated by NanoVerify Sdn. Bhd. (NVSB), this programme is the first of its kind in the world to be accredited under ISO/IEC 17065, underscoring its commitment to quality and reliability. The programme's primary mission is to verify products that genuinely incorporate nano-elements aiming to boost consumer confidence and trust in nanotechnology-based products, correspondingly resulting in enhanced commercialization and revenue. The NANO*Verify* Programme spans diverse industries including the rapidly growing field of nanocosmeceuticals – elevating industry standards and driving innovation. In a market flooded with numerous nano-products, certification is essential for establishing trust, promoting ethical practices and meeting the evolving demand of consumers. This presentation will explore how the NANO*Verify* Programme enhances the marketability of nano cosmeceutical products, fostering consumer trust and supporting industry stakeholders in the dynamic and advancing field of nanotechnology.
Keywords: nanotechnology, product certification, NANO*Verify* Programme, certification mark, nano cosmeceuticals, nanotechnology-based products

Biography

Johan Iskandar Hasan is the Managing Director of NanoVerify Sdn Bhd (NVSB), the first and only International Nanotechnology certification body accredited by ISO/IEC 17065 and endorsed by the Government of Malaysia. Johan has over 20 years of experience in the Service Industry covering Oil and Gas, defence, aviation and technology. He has been in top management for over 13 years and provides strategic advice and guidance to Chair and Board Members. His impactful career stems from constantly analysing business landscapes and formulating industry-centric solutions within the said industries. He has spearheaded the set-up and operations of various business ventures locally and abroad focusing on end-to-end service provision within the aviation and technology sectors, driving value creation and sustainable profitability.

Plenary Speaker

A Novel 1-O-Acylceramide: Synthesis, Physicochemical Characterization, and Role in The Lipid Lamellar Organization in Skin Barrier

Eun Ok Lee[a], Jin Wook Kim[a], Kwang-Hyeon Liu[b], Kyung-Min Lim[c], Yoon Sung, Nam[e], Jin Woong Kim[d], and Chang Seo Park[a]
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[b]Kyungpook National University, Daegu, Korea
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Abstract
1-O-stearoyl-ceramide NP (CerENP) was produced by optimizing the selective 1-O-acylation process. LC/MS and 1H NMR analyses confirmed its correct 1-O-acyl conformation. DSC analysis revealed that CerENP increased the transition temperature of the 2D multi-layered lamellar membranes while lowering the total heat capacity. An SC mimetic-nanovesicle (SCNV), a 3D multi-lamellar vesicle, showed significantly improved long-term stability in a dose-dependent manner. These findings indicate that CerENP is essential for stabilizing the structure of SCNVs containing SC lipids. MD simulation in conjunction with radial distribution function (RDF) analysis further supports that CerENP can enhance the permeability barrier function of SC lamellar organization via a bidirectional anchoring mode of action. A human study demonstrated that CerENP had a boosting effect to enhance skin barrier function in combination with ceramide NP. In conclusion, CerENP was proved to have a novel function in stabilizing the SC lamellar organization. A proposed bidirectional anchoring model for this new class of ceramide was further supported by a human study.
Keywords: ceramide ENP, lamellar stability, boosting effect, anchoring model, skin barrier

Biography

Dr. Chang Seo Park is the CTO of LCS Biotech. He got his Ph.D. in Microbiology at UC Davis, USA. He started his career at Doosan Biotech in 1981, where he developed ceramide production processes based on yeast-derived phytosphingosine. Then, he moved to Dongguk University, chemical and biochemical engineering department, Seoul, Korea, where he focused on skin barrier research. He joined LCS Biotech in 2007 as a co-founder and was involved in developing eco-friendly ceramide products, including EcoCeramide LCS and EcoCeramide ENP. The poster on this investigation was selected as one of the top 10 posters in IFSCC 2022 held in London.

INV-1

Green Synthesis of Metal and Metal Oxide Nanoparticles: Trends and Future Endeavours

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Abstract
Green synthesis of metal oxide nanoparticles (M-NPs) and metal oxide nanoparticles (MO-NPs) has gained more interest among researchers because of its simplicity, low cost and wide range of applications. There are various methods for the fabrication of these M-NPs and MO-NPs via green synthesis routes, such as plant extracts, microorganisms, algae or even industrial or agricultural wastes. Plant-driven is favourable due to the phytochemical constituents such as amines, amides, alkaloids, flavonoids, phenols, terpenoids, which serve as stabilizing, capping, and reducing agents. It is important to optimize synthesis in the green synthesis route to produce comparable NPs with chemical synthesis routes such as co-precipitation and combustion methods. The synthesis conditions include species of plants, reaction time, and several calcination temperatures. M-NPs and MO-NPs derived from the green synthesis route display excellent applications ranging from physical to biological applications with their eco-friendliness and sustainable nature.
Keywords: Green synthesis; metal nanoparticles; metal oxide nanoparticles

INV-2

Green Synthesis of Silver, Silver Oxide and Zinc Oxide Nanoparticles for Antibacterial Applications

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Abstract
For the past few years, nanomaterials have emerged as new strategies that can be utilized against bacterial infections to help overcome the problems with antibiotic resistance. Nanoparticles such as gold and silver have been widely used in modern medicine for centuries for infection control due to their antibacterial properties. However, the conventional methods in the preparation of nanoparticles have adverse effects on the environment and health.

Therefore, green synthesis has now evolved as a sustainable alternative to the conventional method. In this study, metallic and metal oxide nanoparticles (NPs) such as silver (Ag), silver oxide (AgO), and zinc oxide (ZnO) were successfully synthesized via green synthesis methods using various leaf extracts as the reducing agent. The leaf extract of *Mitragyna speciosa* (*M. speciosa*) was used to reduce silver nitrate ($AgNO_3$) to prepare AgNPs, while the leaf extract of *Moringa oleifera* (*M. oleifera*) was used to prepare both AgO NPs and ZnO NPs. The 1%, 2%, and 5% concentrations of *M. speciosa* extract, each with varying volumes (0.2, 0.4, 0.6, 0.8, and 1.0 mL), were utilized to synthesize AgNPs from a 100 ppm $AgNO_3$ precursor solution. Optimization studies revealed that the 5% concentration of *M. speciosa* extract, with a volume of 1.0 mL, is optimal for producing a high yield of AgNPs within 24 hours. Meanwhile, in the preparation of AgO NPs using *M. oleifera* leaf extract, the studies revealed that aqueous-based synthesis was the most effective solvent for synthesizing both AgO and AgNPs. On the other hand, 20% *M. oleifera* leaf extract was used to prepare the ZnO NPs. Fourier transform infrared (FTIR) and X-ray diffraction spectroscopy showed that all the nanoparticles were successfully synthesized. All the synthesized metal/metal oxide NPs were tested against both gram-positive and gram-negative bacteria, specifically *Escherichia coli* and *Staphylococcus aureus*. The antibacterial studies showed that both AgNPs and AgO NPs have high antibacterial properties towards both types of bacteria, as determined by the size of the zone of inhibition. In contrast, ZnO NPs showed a lower inhibition zone than the other samples. These studies showed the potential of the leaf extract in the preparation of other nanomaterials via green synthesis approaches.

Keywords: Nanomaterials; Green Synthesis; Zinc Oxide; Silver Oxide; Antibacterial Therapy

INV-3

Antifungal Activity of Fabric Grafted with *Persicaria odorata*-Biosynthesized-Silver Nanoparticles

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Abstract

A fabric grafted with silver nanoparticles (AgNP) can have various applications in consumer and biomedical industries, such as inhibiting bacterial growth or aiding in medical procedures like wound healing. However, the conventional synthesis of AgNP can be concerning due to using hazardous chemical-reducing agents in the process. Therefore, our research aimed to incorporate AgNP onto cotton fabric using nanoparticles synthesized using *Persicaria odorata* (Kesum) leaf extract. The addition of *P. odorata* extract to an $AgNO_3$ solution resulted in a color change and an absorbance peak at 440 nm, indicating successful AgNP synthesis. The optimal conditions for achieving the highest localized surface plasmon resonance (LSPR) of the AgNP were a 5% concentration and 0.3 mL plant extract. Subsequently, cotton fabrics grafted with different AgNP concentrations (100%, 50%, and 25%) were prepared. The physical and chemical properties of the AgNP and the fabric were analyzed using visible spectroscopy, Fourier-transform infrared spectroscopy (FTIR), and transmission electron microscopy (TEM). The AgNP was found to be spherical, with a size of less than 100 nm. The

antifungal activity of the samples was tested against *Candida albicans* ATCC 90028 and *Aspergillus niger* ATCC6275 using the Disc Diffusion Technique (DDT). The colloidal AgNP exhibited antifungal activity against these fungi. However, the fabric-grafted AgNP showed lower antifungal activity due to the low amount of AgNP present, resulting in less Ag diffusion into the agar. This study demonstrated that environmentally friendly synthesized AgNP can be grafted into fabric and exhibit antifungal activity. Further research is warranted to thoroughly examine the antimicrobial activity of fabric-grafted biosynthesized AgNP.
Keywords: Silver nanoparticles; Persicaria odorata; cotton fabric; antifungal agent

INV-4

Goat Milk Skincare Nourishes, Moisturizes, and Exfoliates Skin to Improve Healthy Skin Cells

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Abstract
Goat milk is rich in vitamins and minerals and contains alpha-hydroxy acids (AHAs) such as lactic acid, which help exfoliate and moisturize to soften, brighten, and smooth the skin. Goat milk has beneficial antioxidant and anti-inflammatory properties, so it has the potential to be developed as a topical formulation to promote the skin aging process. This study aimed to determine the physical stability and heavy metal content of goat milk, yogurt, and kefir-based skin lotion and to test antimicrobial testing of the lotions. All lotions were stored at different conditions, such as 4°C, 25°C without light exposure (LE), 25°C with light exposure, and 33°C for 3, 6, and 12 months. The characteristics of color, aroma, separation, viscosity, pH level, and heavy metals were determined periodically. Antimicrobial activity was measured by measuring the diameter of the clear zone of the bacteria, including *Escherichia coli*, and then determined with SEM. The viscosity of all samples was relatively stable, with a minor reduction at 33°C of temperature storage. The longer duration of storage reduced the pH level for all lotions. Even though heavy metals were slightly detected within safe range values, most milk, yogurt, and kefir lotions showed no Cd, Hg, or Pb found in all incubation conditions at each incubation time. The CSN1S2 protein of the lotion is indicated as an antimicrobial agent. Conclusions: The study concluded that all lotions were proposed as safe topical formulations for skin application that have health benefits for moisturizing and smoothing the skin.
Keywords: exfoliate; goat milk; health cosmetics; skin lotion; stability testing

INV-5

Antimicrobial Activity of Some Medicinal Plant Extracts and Encapsulate against Microbial Contaminant of Coconut Sap (*Cocos nucifera*)

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Abstract
Coconut sap (nira) is the sweet liquid that drips from the cut flower buds of coconut and palm trees. To maintain the quality of nira for further processing, it is necessary to add both chemical preservatives and natural preservatives. Natural preservatives can come from medicinal plants that contain tannins, flavonoids, and polyphenols, which are secondary metabolite compounds known to be used as antimicrobials and sourced from the stem bark, leaves, and fruits of plants. Material preparation begins with reducing the size, open drying, crushing, and sieving until the material is obtained in powder form. Extraction of the material with ethanol solvent by maceration at room temperature and evaporation to obtain a thick extract. To be stored longer and more practical to use as a natural preservative, the extract is mixed with fillers to form an encapsulation. Testing for its ability as an antimicrobial was carried out. Antimicrobial screening test of ethanolic plant extract (10 mg/mL) against some microbial contaminants of coconut sap, the minimum inhibitory concentration (MIC), minimum microbicidal concentrations (MMC), analysis of bioactive compounds, and their application to coconut sap. Of the 12 types of natural materials extracted, three materials, including coconut fiber (*Cocos nucifera*), bayur bark (*Pterospermum javanicum*), and mangosteen peel (*Garcinia mangostana*), have high antimicrobial activity against the test microbes, both some pathogenic microbes, and some sap contaminants. The highest extract that was able to inhibit microbial growth was coconut fiber extract, with the diameter of the inhibition zone in *Escherichia coli* bacteria obtained at 30,187 mm. For *Acetobacter aceti*, the ability of coconut fiber to inhibit growth was 19,373 ± 1,022 mm. In contrast to *Saccharomyces cerevisiae*, the highest inhibition diameter value on bayur tree bark is 11,400 ± 1,481 mm. Hence, it is expected that in the future, coconut sap preservatives should use a mixture of coconut fiber extract and bayur tree bark.
Keywords: medicinal plant; encapsulate; coconut sup; antimicrobial

INV-6

Green Synthesis of Silver Nanoparticles using *Garcinia mangostana* Pericarp: A Promising Approach for Tetracycline Degradation in Water Systems

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Abstract
Significant interest among researchers continues in developing eco-friendly methods for synthesizing metal nanoparticles. Green synthesis has emerged as a cost-effective alternative to conventional methods, attracting attention for its sustainability. This study investigated a single-step approach for producing silver nanoparticles (AgNPs) using *Garcinia mangostana* pericarp to degrade tetracycline. HPLC identified the presence of α-mangostin, suggesting its potential as a reducing and stabilizing agent. UV-Vis spectrophotometry was used to observe the formation of stable colloids, demonstrating a correlation with molar ratio and pH. The optimum conditions for this green synthesis included a molar ratio extract to silver nitrate of 1:31, an alkaline environment at pH 10, and an incubation time of 2 hours. The green-synthesized AgNPs were characterized using FTIR, XRD, FESEM-EDX, and HR-TEM. The characterization revealed the synthesis of spherical-shaped nanoparticles, with a size range of 8 – 22 nm and constituting 65.5% of the Ag mass. X-ray diffraction analysis validated the FCC crystalline structure of the synthesized nanoparticles with the (111) plane as the prevalent peak. The photocatalytic efficiency of AgNPs was evaluated for eliminating tetracycline at 30 ppm under UV light, resulting in a degradation rate of 79%. This study highlights the potential of green-synthesized AgNPs in revolutionizing production processes while addressing the remediation of environmental tetracycline contaminants.
Keywords: Green synthesis; silver nanoparticles; *Garcinia mangostana*; photocatalytic; tetracycline

INV-7

Diffusivity and Thermodynamic Analysis of Enzyme Entrapment within Calcium Alginate Beads for Starch Hydrolysis

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Abstract
Enzyme immobilization is crucial for enhancing enzyme stability and reusability in various industrial applications. However, traditional entrapment methods using materials like alginate can be limited by substrate mass transfer limitation and enzyme leakage, impacting overall efficiency and effectiveness. This study investigates the diffusivity, permeability, and thermodynamic attributes of alginate-encapsulated enzymes, specifically cyclodextrin glucosyltransferase (CGTase) and maltogenic amylase (MAG1), essential for producing malt oligosaccharides (MOS) from starch. The primary research goals involve assessing the permeability and diffusivity of the immobilized enzymes towards their respective substrates and products, alongside determining the thermodynamic parameters within the alginate encapsulation matrices. Encapsulated CGTase in sodium alginate and MAG1 in sodium alginate demonstrated high activity recovery trends, with CGTase showing substantial recovery and MAG1 displaying notable recovery. CGTase encapsulated in sodium alginate with starch exhibited the highest permeability coefficient at its optimum sodium alginate concentration, while MAG1 encapsulated in sodium alginate with β-CD showed the largest

permeability coefficient at its optimum sodium alginate concentration. The release kinetics for alginate CGTase followed the Higuchi model, whereas alginate MAG1 followed the Korsmeyer-Peppas kinetic model. Moreover, at elevated temperatures, both immobilized CGTase and MAG1 demonstrated longer half-lives compared to their free enzyme counterparts, indicating greater thermal stability of the immobilized enzymes. In conclusion, understanding the diffusivity, permeability, and release kinetics of enzymes encapsulated in materials like alginate is vital for optimizing enzyme-based processes, enabling better control over substrate conversion rates and overall efficiency in various biotechnological applications.
Keywords: alginate; entrapment; enzyme immobilization, permeability

INV-8

Therapeutic Potential of Nutraceuticals

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Abstract
Nutraceuticals are important food components possessing both nutritional and therapeutic potential. Their role in human healthcare and its endurance has been established recently due to their nutritional benefits, therapeutic effects, and safety profile. The healing role of nutraceuticals is protection against a cluster of conditions including metabolic syndrome, cardiovascular disease, liver diseases, cancer, and neurodegenerative diseases. This study focuses on the role of three nutraceuticals: *Avena fatua* (wild oat), *Prunus armeniaca* (apricots), and *Vitis vinifera* (raisins) as hepatoprotective, antihyperlipidemic, and antioxidant. For hepatoprotective and antioxidative activity, seeds of *A. fatua* were first extracted with ethanol, fractionated, and divided into hexane-soluble (HSF) and defatted seeds (DSF) fractions. They were subjected to a CCl_4-induced hepatotoxic animal model. Aqueous methanolic fruit extract (AqMFEt) of dried *P. armeniaca* and *V. vinifera* were investigated for antihyperlipidemic and antioxidative effects via a high-fat-induced hyperlipidaemic animal model. The results indicated that both the fractions of *A. fatua* significantly ($p<0.05$) decreased liver-specific enzymes and bilirubin. It also showed a marked decline in the percent inhibition of CAT and SOD and repaired the structure of liver cells and tissues with no fatty deposits. AqMFEt of apricots and raisins showed significant ($p<0.05$) improvement in lipid profile and a decrease in the percent inhibition of CAT and SOD. Thus, the findings envisage that wild oats might be useful in hepatoprotective, whereas apricots and raisins have antihyperlipidemic effects. All three plants have antioxidant potential. Thus, adding these nutraceuticals to the diet might be beneficial in terms of nutritional and therapeutic benefits.
Keywords: Nutraceuticals; hepatoprotective; antihyperlipidemic; wild oat; apricot; raisins

INV-9

The PI3K/AKT Activator has Anti-Apoptotic Potential of Nano-Cinnamaldehyde at Diabetes Mellitus in vitro

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Abstract
The dysregulation of the phosphoinositide 3-kinase protein kinase B (PI3K/AKT) signalling pathway has been associated with diabetes and its complications. Cinnamaldehyde (CA) can potentially inhibit diabetes complications through its pleiotropic effects, including anti-inflammatory, anti-oxidative, and anti-apoptosis. However, whether these effects are related to PI3K/Akt pathway modulation is unknown. **Objectives:** to investigate the effect of nano-cinnamaldehyde as anti-apoptosis in Diabetes Mellitus in vitro. **Methods:** The in vitro assay used high glucose-induced NIH3T3 rat cardiomyocyte cells. Cells were divided into treatment groups treated with CA nanoparticles and the standard intervention, dapagliflozin. Apoptosis detection was performed using Apoptosis Detection Kit Annexin V-FITC and analyzed by flow cytometer. **Results:** The results of this study indicated that administration of a single dose of cinnamaldehyde 10 µg/ml is less effective in reducing apoptosis in cells and increasing the percentage of cell death in cervical cancer NIH3T3 cells. Giving a combination dose of cinnamaldehyde and standard drugs was more effective than a single dose of cytarabine in reducing PI3K levels and increasing the percentage of cell apoptosis in NIH3T3 cells at a combination dose of 5 µg/ml cytarabine and 100 µg/ml cinnamaldehyde. The conclusion of this study is that there is a relationship between a decrease in hypertrophic activity in NIH3T3 cells given a combination of cinnamaldehyde at a dose of 5 µg/ml and 100 µg/ml cinnamaldehyde. **Conclusions:** CA has the potential to be a drug candidate to ameliorate diabetes complications by upregulating PI3K/AKT pathway. Further experimental study is required to ascertain its efficacy.
Keywords: Apoptosis; cinnamaldehyde; NIH3T3; PI3K

INV-10

Nanoemulsion of *Rosmarinus officinalis*: A Promising Topical Antinociceptive Agent for Inflammation Management

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Abstract
The utilization of nanoemulsion of *Rosmarinus officinalis* as a potential topical antinociceptive agent was investigated using a carrageenan-induced inflammation model. The study aimed to assess the impact of the nanoemulsion on key inflammatory markers, including IL-1B, TNFa, neurokinin 1 receptor (NK1-R), and Calcitonin Gene-Related Peptide (CGRP). Following the experimental procedure, it was observed that the nanoemulsion demonstrated significant

antinociceptive properties, indicative of its potential therapeutic application in managing pain. The results indicated a noteworthy reduction in IL-1B, TNFa, NK1-R, and CGRP levels, suggesting a modulatory effect on the inflammatory response. Overall, the findings support the notion that the nanoemulsion of *R. officinalis* holds promise as a topical antinociceptive agent. Further research focusing on elucidating the underlying mechanisms responsible for its analgesic effects would be beneficial in enhancing our understanding of its therapeutic potential. By harnessing this nanoemulsion's properties, novel pain management strategies may be developed, offering new avenues for treating inflammatory conditions. In conclusion, this study provides valuable insights into the pharmacological properties of *R. officinalis* nanoemulsion and highlights its potential for future pharmaceutical development in the field of pain management.
Keywords: *Rosmarinus officinalis*; nanoemulsion; inflammation; pain.

INV-11

Microbiota Profile Found in The Respiratory Tract of Coronavirus Disease-2019 (COVID-19) Patients

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Abstract
The global pandemic of Coronavirus Disease 2019 (COVID-19), caused by SARS-CoV-2, has broadly impacted studies of interactions between the host and SARS-CoV-2. However, existing studies to date have not yet been able to explain how SARS-CoV-2 infection affects the microflora of the respiratory tract and vice versa, which contributes to complications of COVID-19 and often causes death. This research aims to study how SARS-CoV-2 infection changes the microflora of the respiratory tract. Identification of bacteria culture from the sputum and nasopharyngeal swab samples was carried out using the Vitek® 2 automatic assay. The molecular identification of microbiota was analyzed using conventional PCR and Next Generation Sequencing (NGS). Identification of pathogen species using the culture method from swab and sputum samples had a lower success rate compared to molecular methods. Using the culture method, we found dominant bacteria consisting of *Serratia marcescens*, *Staphylococcus aureus*, and *Klebsiella pneumonia*. The PCR method failed to identify Extensively Drug-Resistant (XDR) *Escherichia coli* and *Acinetobacter baumannii*, which are known as dominant pathogens commonly found in COVID-19 patients. However, we found that pathogenic bacteria identified from positive COVID-19 patients using the NGS method had identical profiles to patients suffering from severe pneumonia, including *Haemophilus parainfluenzae* and several species from the Burkholderia genus.
Keywords: SARS-CoV-2; COVID-19; respiratory track, microbiota profile

INV-12

Green synthesis of Silver Nanoparticles (AgNPs) using *Moringa oleifera* Target Potentials Oncological Pathways in HeLa Cervical Cancer Cell

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Abstract
According to the World Health Organization (WHO), in 2020, the number of new cases of cervical cancer reached 604,000 with a mortality rate of 342,000 worldwide. In Indonesia, cervical cancer is the second-largest cause of death for women, accounting for 36,633 cases or 9.2% of all total cases. Most cases of cervical cancer are caused by high-risk HPV infections, specifically types 16 and 18. The treatment for cervical cancer has a failure rate of 20-50% in patients, failing to prevent the proliferation of cancer cells that have already spread. Advances in nanotechnology have introduced new therapeutic strategies for cancer treatment. Biogenic (green) metallic silver nanoparticles (AgNPs) derived from plant-mediated *Moringa oleifera* present an attractive approach for researchers investigating cancer treatment. This study explores the potential of *M. oleifera*-AgNP in inhibiting various oncological pathways induced by oncoproteins produced by HPV, such as the PI3K/Akt and NFκB pathways. *M. oleifera*-AgNP can inhibit these pathways and induce apoptosis. In late-stage cancer, *M. oleifera-AgNP* shows promise in preventing the Epithelial-Mesenchymal Transition (EMT) process, offering hope for impeding cancer metastasis, the primary cause of death in cervical cancer cases.
Keywords: silver nanoparticles; *Moringa oleifera*; cervical cancer; PI3K/Akt pathway; PI3K/Akt pathway

INV-13

Nanoencapsulation as a Burgeoning Nanotechnology-Based Approach for Modern Industry

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Abstract
The role of nanotechnology, specifically nanoencapsulation, as an emerging technology in enhancing modern industries in the fields of agri-food, drug security and safety and energy storage has attracted the interest of researchers and investors worldwide. Nanoencapsulation is the process of encapsulating unstable hydrophobic chemicals (core materials) in a protective coating at the nanoscale. The coating can be in the form of films, layers, or even simple microdispersions. The goal of nanoencapsulation is to improve their stability and controlled release characteristics. It also minimizes unwanted chemical reactions among the core materials with other components. The uniformity of nanocapsules is one of their key advantages, which leads to improved efficacy. However, the appropriate and effective nanoencapsulation process depends on the core material and the required final application. However, in terms of application, the fabrication of nanoencapsulated materials has several challenges, which range from figuring out the optimal technique for obtaining the best to determining the most suitable form of nanostructure for a core material of interest. This paper precisely addresses the concepts, recent advances in nanoencapsulation techniques, and current challenges of nanoencapsulation, with special reference to core materials for agro-food, drug, and energy storage applications. Since dealing with food, drug, and energy materials also raises the quest for safety and regulatory norms, thus a brief overview of the safety and regulatory aspects of nanoencapsulation is also presented.
Keywords: Nanoencapsulation; nanotechnology; agri-food industry; drug delivery; pesticide delivery; energy storage

INV-14

FRIM's Efforts in Research & Development of Herbal Products through Nanotechnology

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Abstract
The Forest Research Institute Malaysia (FRIM) is spearheading innovative research and development in herbal products by leveraging the power of nanotechnology. The Natural Products Division (BHS) focuses on unlocking the potential of Malaysia's rich botanical diversity by enhancing the quality, safety and efficacy of herbal remedies. Our goal is to create innovative, highly effective herbal preparations that address contemporary health challenges while preserving the traditional knowledge of herbal medicine through nanotechnology. FRIM is developing solutions by merging traditional herbal knowledge with modern scientific advancements. Their commitment to this research not only advances the field of herbal medicine but also brings new hope for improved health and well-being to people worldwide. This summary showcases BHS's efforts, including their key methods, significant discoveries, and the potential impact of these advanced herbal products on the market.
Keywords: nanotechnology, herbal products, traditional medicine, innovative solution

INV-15

Synergistic Effect of Hyperthermia Treatment Combined with Anti-cd200 Blockade Therapy in Modulating Immunological Response

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Abstract
Breast cancer is the leading cancer-causing death in women worldwide. Combinatorial therapies are typically used to improve treatment efficacy and attenuate the likelihood of cancer recurrence. Hyperthermia (HT) is a less invasive cancer treatment ideally suitable to treat superficial tumor and has shown promising outcomes in combination with the established immunotherapy. In EMT6 breast tumor, the elevated expression of CD200 has been associated with cancer progression. It was reported that blocking CD200/CD200R signalling resulted in an enhanced anti-tumor response. In light of this, the present study aims to investigate the therapeutic effects of local HT in combination with anti-CD200 blockade therapy. Breast tumors were induced by inoculating EMT6 cells subcutaneously at the right flank of Balb/c mice. On days 7, 8 and 9 post-tumor inoculations, tumors were subjected to local HT treatment by near-infrared radiation. Additionally, mice were injected with anti-CD200 mAb intraperitoneally on day 7, 9 and 11 post-tumor inoculation. It was observed that HT, in combination with anti-CD200 blockade therapy, significantly reduced tumor progression and increased mice survival. Besides, an increased number of activated CD8 T cells were observed in the draining lymph nodes of the mice, accompanied by the infiltration of T cells, NK cells and B cells into the tumor. In contrast, tumor-infiltrating regulatory T cells and myeloid-derived suppressor cells were largely diminished within the tumor microenvironment. The present findings reveal the potential of combining local HT and anti-CD200 blockade in improving immunological response against breast tumor.
Keywords: Hyperthermia, anti-CD200 blockade therapy, immune response, breast cancer

INV-16

ArgenTAC©: Innovative Adsorbent for Microfiber Removal from Laundry Wastewater

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Abstract
Microplastics, including microfibers originating from synthetic textiles, pose a significant environmental threat to aquatic ecosystems. These microscopic particles persist in the environment and pose challenges to conventional wastewater treatment processes due to their small size and resistance to removal. This study aimed to enhance the removal of microfibers from domestic laundry wastewater by synthesizing activated carbon (AC) from rice husk and integrating unique silver nanoparticles (AgNPs) to augment adsorption capacity and durability. Characterization of the resulting AC-AgNPs (known as ArgenTAC©), involved SEM, EDS, TEM, ATR-IR, XPS, and XRD analyses to confirm their structural and compositional attributes. SEM analysis revealed a larger pore size distribution in the AC compared to rice husk charcoal, with increased porosity following NaOH treatment. EDS analysis confirmed the presence of AgNPs, while TEM shows the presence of spherical AgNPs (4-6 nm) on the surface of AC. ATR-IR spectroscopy provided vibrational spectra of AgNPs, including characteristic peaks associated with O-H, C-H, and Ag-C. XPS wide scan confirmed the absence of impurities in the chemical elements, while XRD elucidated the amorphous nature of AC (57.1%) and the crystalline characteristics of AgNPs (42.9%). Fixed-bed column experiments evaluated microfiber removal efficiency, demonstrating the efficacy of the ArgenTAC© to eliminate over 94% of microfibers from domestic laundry wastewater for a microfiber feeding range of 40-1000 particles. Therefore, ArgenTAC© presents a sustainable solution for mitigating microfiber pollution from domestic laundry before it reaches the wastewater treatment systems.
Keywords: microfibers; activated carbon; silver nanoparticles; microplastic; wastewater

INV-17

Effects of Rat Tickling on Stereotypic Behaviour and Ghrelin

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Abstract
The rat tickling technique is well known for improving human-rat relationships. However, there is limited physiological evidence on the benefits of rat tickling and its influence on the development of stereotypic behaviour in laboratory rats. Ghrelin, also known as the 'hunger hormone', has been associated with anxiety-like behaviour in rats. Therefore, this study aims to investigate the effects of rat tickling on the development of stereotypic behaviour and plasma ghrelin concentrations in tickled (n= 6) and non-tickled Wistar rats (n =6). The tickled rats were tickled every three days from the age of 31 days until 80 days. Stereotypic behaviour, maintenance, locomotion and social behaviours in all rats were recorded for two consecutive

days at the ages of 31 (baseline), 55 (midpoint), and 80 (endpoint) days. Blood samples were also collected at these time points for plasma ghrelin analysis. Tickled rats spent significantly more time resting and feeding than non-tickled rats. Whereas non-tickled rats spent significantly more time self-grooming, walking, engaging rough-and-tumble play. Interestingly, stereotypic sniffing was lower in tickled rats compared to non-tickled rats. As the rats grew older, stereotypic sniffing increased significantly in non-tickled rats but not in tickled rats. Furthermore, non-tickled rats spent more time walking and self-grooming, and less time resting as they grew older compared to tickled rats. No significant changes were found in plasma ghrelin concentrations between groups and time points. In conclusion, the rat tickling method influenced rats' behaviour, particularly by reducing stereotypic sniffing, but had no effect on plasma ghrelin concentrations.
Keywords: Stereotypic Behaviour; Ghrelin; Rat tickling; Laboratory rats; Animal welfare

INV-18

Synthesized of Metal Nanoparticles with Plant Extract Loaded with Niosomes for Potential Anti Skin Bacterial Psoriasis

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Abstract
Skin infections pose a significant clinical challenge on a global scale. These infections in humans are brought on by bacterial agents. Our preliminary research indicates that a standardised extract of local extract, has the potential to inhibit skin bacterial infections, especially those caused by Staphylococcus aureus. However, there are obstacles to the therapeutic application of synthesised zinc oxide nanoparticles (ZnONPs) combined with local extract. Low extract stability, solubility, and bioavailability are the primary obstacles to its efficacy. To unlock the therapeutic potential of the plant extract, it is crucial to address these limitations promptly. Nanoencapsulation using niosome nanotechnology formulations represents a promising alternative to conventional delivery systems. Niosomes permit the sustained release of bioactive compounds at a specific site. As a result, the purpose of this research is to examine the efficacy of nanoencapsulation via niosome formulations in overcoming the therapeutic limitations of synthesised ZnONPs derived from local extract as an anti-psoriasis agent. The ZnONPs synthesised with the extract will be synergized via nanoencapsulation with niosomes. Using scanning electron microscopy (SEM), transmission electron microscopy (TEM), zetasizer, and Fourier transform infrared spectroscopy (FTIR), the formulation's physicochemical properties, including particle size, stability, and morphology, will be evaluated. The formulation of niosomal nanoencapsulation aims to improve the bioavailability of the synthesised ZnONPs from local extract and enable sustained release of bioactive compounds, making it an ideal vehicle for delivering existing anti-psoriasis and skin treatment therapies.
Keywords: skin infection; extract; zinc oxide; nanoparticles; noisome; encapsulation

INV-19

Functionalised-Natural Biomaterials for Cutaneous Tissue Engineering: Conventional vs Additive Manufacturing Technology

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Abstract
Current management of skin wound healing involves several external factors, such as the patient's lifestyle, health status, social support, wound types, treatment selection and others. Tissue engineering and regenerative medicine technologies are currently tremendously explored to achieve future personalized/precision medicine. The current standard gold treatment for full-thickness skin wounds using split skin graft (SSG) may lead to severe infection and a limited source of autologous skin even though it helps in the healing process. A major drawback for deep and large open wounds, especially in chronic wounds, is slow healing, severe infection, and scar formation, leading to treatment failure and mortality. Thus, rapid skin wound management is feasible to expedite the healing rate and reduce the risk of complications via multifunctional smart biomaterials. Therefore, our Functional Biomaterials Technology research group focuses on developing ready-to-use products from green resources and fulfilling the requirements of local medical device authority. It includes collagen, gelatin or cellulose, etc., incorporating various formulation forms, including natural products, growth factors, and secretome, which have been widely explored to accelerate cutaneous regeneration. Additionally, various fabrication technologies, from conventional to advanced technology, have been used for the abovementioned applications.
Keywords: Tissue Engineering; Functional Biomaterials; Precision Medicine; Cutaneous Regeneration; Collagen.

INV-20

Drying of *Moringa Oleifera* Leaves for Improved Physicochemical Properties

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Abstract
The fast-growing *Moringa Oleifera* Lam. tree is well-adapted to drought conditions and is prevalent across South, East, and West Africa, tropical Asia, and Latin America. Moringa leaves are highly valued by healthcare professionals and nutritionists for their substantial protein content, which is instrumental in combating malnutrition and various ailments. Drying

the leaves is essential for preserving their appearance and nutritional qualities and extending their shelf life. This study examines the impact of tray drying on the physical characteristics, nutrient content, and phytochemical properties of moringa leaves. The leaves were dried under various conditions and analyzed before and after. The findings reveal that while the total phenolic content in *M. oleifera* leaves increases post-drying, the flavonoid content and antioxidant activity tend to decrease due to degradation during the drying process. Despite these changes, dried moringa leaves remain a significant source of essential nutrients, underscoring their importance in diet and health management. To maximize their nutritional benefits, optimizing preservation methods that retain the leaves' nutrient content is crucial.
Keywords: Moringa oleifera; drying; tray dryer; nutrition

ORAL-1

Entomo-Toxicological Approach Using Enzyme Responses in Insects *(Callosobruchus maculatus)* for Monitoring Insecticide Contamination in Stored Cowpea

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Abstract

The study was conducted to extract information from enzyme activities in insects for bio-monitoring insecticide contamination in stored cowpeas. Developing affordable and sustainable alternative strategies for monitoring insecticide contamination is very important. Entomo-toxicological approach (i.e., the use of insects), is one of such strategies, as insects are ubiquitous and highly sensitive to environmental and food contaminants. A completely randomized design was used for the experimental setup, involving seven (7) treatments, with two (2) serving as Controls (positive and negative controls), with the following concentrations: 2, 4, 6, 8, 10 and 12 mg/kg (8mg/kg was used for positive control). Biochemical parameters, such as the activity of insecticide resistance enzymes, were assessed. The results revealed that the concentration of both Aspartate transaminase (AST) and Glutathione peroxidase (GPx) activity in colonized insect larvae increases with an increase in insecticide concentration. Concentrations of GPx were generally lower than AST in respect of the insecticide concentration applied. Likewise, in the imago life stage, a similar trend of increase was recorded as the former. The concentration of cumulative enzyme activity was higher in the imago (adult) than in the larval life stages. A positive significant correlation was found between AST and GPx activity in larva and adult life stages (r = 0.78 and r =0.98), respectively. The concentration of AST GPx ranged from 36.00±1.41 to 59.57±1.06 IU/L and 0.83±0.02 to 3.11±0.16 µml/minute/mg protein, respectively, for larvae, while 46.24±1.05 to 62.00±1.41 IU/L and 1.46±0.06 to 2.96±0.02 µml/minute/mg protein, respectively for imago (adult) life stage retrieved from untreated beans seed (NC). Those treated with the highest concentration of Dichlorvos insecticide, respectively. The study identified biochemical (enzyme) traits that were affected by insecticide treatments and, thus, can be used as early warning signals and biomarkers of insecticide contamination in stored cowpeas.

Keywords: Forensic entomotoxicology; Insecticide resistance; Larval instar; *Vigna unguiculata*

ORAL-2

Antibacterial Activity of Phyto-Synthesized Silver Nanoparticles using Different Organs of *Persicaria odorata*

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Abstract
This study explores the antibacterial activity of silver nanoparticles (AgNPs) synthesized using *Persicaria odorata* leaf and stem extract. The optimized parameters included the extract volume at 1 mL and 1 mM of $AgNO_3$ precursor concentration, having reaction times at 96 and 120 h, respectively. The AgNPs were characterized and tested against *Staphylococcus aureus* and *Escherichia coli*. Results revealed significant antibacterial efficacy, with notable inhibition zones for both AgNPs, with *S. aureus* showing higher susceptibility towards the AgNPs. These findings underscore the potential of *Persicaria odorata*-mediated AgNPs as effective antibacterial agents, holding promise for addressing antibiotic resistance.
Keywords: Silver nanoparticles; *Persicaria odorata*; antibacterial

ORAL-3

Unveiling Bioactive Compounds Biosynthesis of Silver Nanoparticles from Palm Oil Mill Effluent

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Abstract
This study aimed to harness novel bioactive compounds in Palm Oil Mill Effluent (POME) to synthesize silver nanoparticles (AgNP) and optimize the synthesis process. Liquid Chromatography-Mass Spectrometry (LC-MS) analysis was conducted using aqueous POME extract, and the influence of synthesis parameters was optimized using one factor-at-a-time (OFAT). POME-based AgNP were characterized using Fourier Transform Infrared (FTIR) spectroscopy, X-ray Diffraction (XRD), Dynamic Light Scattering (DLS), and Field Emission Scanning Electron Microscopy (FESEM). The LC-MS analysis identified numerous bioactive compounds belonging to fatty acids, aldehydes and amino acids theorized to be involved in the biosynthesis of AgNP. Spectrometry showed a distinct peak at 440 nm, indicating the formation of AgNP. FTIR detected POME functional groups, mainly carbonyl and hydroxyl, whereas XRD confirmed the crystallinity nature of AgNP. DLS showed the average diameter (21.18 nm) of POME-AgNP with a polydispersed index (PdI) of 0.295, showing monodispersion of AgNP. The zeta potential value of −19.3 mV suggests the stability of the POME-AgNP. The morphological analysis revealed the spherical shape of POME-AgNP with an average size of 21 nm. The POME-AgNP exhibited significant antioxidant inhibition assessed using a 2,2-Diphenyl-1-picrylhydrazyl assay.
Keywords: POME; bioactive compounds; biosynthesis; silver nanoparticles; antioxidants

ORAL-4

Phytochemical Analyses and Biosynthesis of Silver Nanoparticles Using *Bauhinia kockiana*

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Abstract
Silver nanoparticles (AgNPs) have attracted considerable attention due to their antimicrobial efficacy and versatility across various fields. However, conventional synthesis methods often rely on hazardous chemicals, necessitating exploring eco-friendly alternatives. This study investigates the potential of *Bauhinia kockiana* as a sustainable source for biosynthesizing AgNPs. The choice of *B. kockiana* stems from its traditional medicinal application and rich abundance of bioactive compounds. Phytochemical analyses revealed differential distributions of phenolic and flavonoid content across different organs of *B. kockiana*, with flowers exhibiting the highest levels of phenolics (191.83 ± 1.34 mgGAE/g) and flavonoids (462.59 ± 27.06 mgQE/g). These observations correlate with lower EC_{50} values (0.313 ± 0.006 mg/mL) and enhanced antioxidant activity (801.72 ± 62.95 mMFeSO4E/g), indicating its potential as a promising reducing agent for AgNPs synthesis. The green synthesis of AgNPs using *B. kockiana* extracts resulted in distinctive colour changes that indicate nanoparticle formation. Spectroscopic analysis confirmed the presence of AgNPs, with flowers yielding the most prominent peak at 430 nm. These findings underscore the potential of *B. kockiana* as a valuable source of natural antioxidants and bioreducing agents for the biosynthesis of AgNPs.
Keywords: *Bauhinia kockiana*; total phenolic content; total flavonoid content; silver nanoparticles; biosynthesis

ORAL-5

Phytochemical Analysis of *Moringa oleifera* and Its Application for Silver Nanoparticle Biosynthesis

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Abstract
This study analyzed the bioactive compounds in *Moringa oleifera* leaf extract to identify those responsible for silver nanoparticle (AgNP) synthesis. Liquid chromatography-mass spectrometry (LC-MS) analysis revealed the presence of polyphenolic compounds, including kaempferol 3-O-β-D-glucosylgalactoside, quercetin 3-O-(6-O-malonyl-β-D-glucoside), quercetin-3-galactoside, quinoline-3-carboxamide, chlorogenic acid, and kaempferol, which could be responsible for the reduction and capping processes during AgNP formation. The influence of the parameters: pH (7 and 8), extract volume (0.1, 0.2, and 0.3 mL) per 10 mL $AgNO_3$ (0.85 mM), and temperatures (30, 40, 50, 60, 70, and 80˚C) was optimized using "one factor at a time" (OFAT), and their significant influence on the synthesis of MO-AgNP was analyzed. The optimized parameters included a pH of 8, a temperature of 80˚C, and an extract volume of 0.3 mL. This study shows that the leaves of *M. oleifera* are rich in bioactive compounds, and the optimized parameters are crucial in the synthesis process.
Keywords: LC-MS analysis, *Moringa oleifera*, silver nanoparticles, biosynthesis, optimization

ORAL-6

Effectiveness of Using Gum Arabic for Co-Microencapsulation of *Ruellia tuberosa* L. and *Tithonia diversifolia* Extracts as Encapsulating Agent and Release Studies

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Abstract
This study used a combination of leaf extracts from *Ruellia tuberosa* L. and *Tithonia diversifolia* plants encapsulated using gum Arabic. The selection of leaves in medicinal plants because they are rich in bioactive compounds that provide health benefits. The encapsulation technique was microencapsulation through freeze-drying since the nanoencapsulation for the plant extracts is unlikely to be conducted due to their large particle sizes. The resulting microcapsules were then tested for their biological activities in vitro. Several conditions affecting microcapsules' production were assessed, including pH, gum Arabic concentration, and stirring time. The optimum conditions were chosen based on the highest encapsulation efficiency. The results showed that the optimum microcapsule preparation was achieved at pH 5, with a gum Arabic concentration of 4% (w/v) and a stirring time of 60 min, with an encapsulation efficiency of 84.29%. The in vitro assays include inhibition of alpha-amylase and antioxidant activities, resulting in the respective IC_{50} values of 54.74 µg/mL and 152.74 µg/mL. Releases of bioactive compounds from the microcapsules were investigated under pH 2.2 and pH 7.4 from 30 to 120 min. Results indicated a release of 43.10 % at pH 2.2 and 42.26% at pH 7.4 during 120 min, demonstrating the controlled release behaviour of the encapsulated bioactive compounds; nonetheless, their release behaviour was not pH-dependent. This study confirms that microencapsulation has an important role in the development of plant extracts with maintained biological functions and stability.
Keywords: freeze-drying; microencapsulation; gum Arabic; *R. tuberosa* L.; *T. diversifolia*

ORAL-7

Exploring the Effect of Different Polymers on *Ruellia tuberosa* Linn Extract Microcapsules

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Abstract
Ruellia tuberosa L. extracts have been previously studied for their biological activities and health benefits. This study evaluates the freeze-drying microencapsulation of *R. tuberosa* L. extracts using three different coating materials: gum Arabic, maltodextrin, and a combination of both. The produced microcapsules underwent testing for encapsulation efficiency, biological activity assessment, and controlled release. Techniques used for powder characterization were scanning electron microscopy (SEM), Fourier-transform infrared (FTIR) spectroscopy, and particle size analyzer (PSA). Results show the type of encapsulant strongly influenced encapsulation efficiency, morphological properties, and biological activities. Microcapsules prepared using gum Arabic, and maltodextrin had more spherical particle shapes and smaller average particle sizes than those using gum Arabic or maltodextrin alone. Evaluation of alpha-amylase enzyme inhibition activity reveals that microcapsules can effectively inhibit the activity of the alpha-amylase enzyme with a coating combination>gum Arabic>maltodextrin. All three microcapsules exhibit moderate antioxidant activity, again in the order of coating combination>gum Arabic>maltodextrin. All microcapsules released more active compounds at pH 7.4 compared to pH 2.2 over a 0 to 120 min time range. Therefore, freeze-drying microencapsulation using biodegradable polymers is feasible for delivering health benefits of *R. tuberosa* L. extracts. Freeze-drying yields a product in a convenient powder form, which also can be used for drug delivery system.
Keywords: freeze-drying; maltodextrin; microencapsulation; gum Arabic; *R. tuberosa* L.

ORAL-8

Comparative Analysis of Different Natural Polymers as Coating Agents for Freeze-Dried Microencapsulation of *Cosmos caudatus* Kunth Compounds

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Abstract
The research concentrated on encapsulating bioactive compounds in the *Cosmos caudatus* Kunth using different natural polymers. Coating materials, including gum Arabic (GA), maltodextrin (MD), and a combination of both (MDGA) were employed. The investigation

aimed to compare these polymers regarding encapsulation efficiency (%EE), inhibition of the alpha-amylase enzyme, antioxidant activity, and release kinetics from the microcapsules. Results revealed that MDGA exhibited the highest encapsulation efficiency, followed by GA, and then MD. The encapsulation efficiency was directly linked to alpha-amylase inhibition and antioxidant activities. Release assays were conducted at pH 2.2 and 7.4 for 30-120 min. The MD showed slower release than GA and MDGA, with MDGA and GA releasing 7.98% and 8.11% at pH 2.2 and 71.08% and 77.66%, respectively, at pH 7.4 over 120 min. SEM analysis of MD displayed a flat shape with a smooth surface, while GA and MDGA appeared round with uneven surfaces. Particle size analysis indicated that MD > MDGA > GA. Furthermore, FTIR analysis revealed changes in functional groups at specific wavelengths, indicating interaction with the coating materials. In summary, freeze-drying microencapsulation using biodegradable polymers is viable for delivering the health benefits of *C. caudatus* K. extracts. This technique produces a convenient powder form that can also be utilized in drug delivery systems.

Keywords: freeze-drying; maltodextrin; microencapsulation; gum Arabic; *C. caudatus* K.

ORAL-9

Design and Optimization of Microencapsulation of Flamboyant Extract (*Delonix regia*) using Response Surface Methodology (RSM) Based on Biodegradable Polymers and Biological Activity

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Abstract
The bioactive compounds naturally present in plants are important due to their biological characteristics. These substances could lose their active characteristics since they are highly unstable. Microencapsulation is one of the techniques to improve stability and protect these compounds. The optimization and design of pairs of independent variables for testing encapsulation efficiency can be determined using Response Surface Methodology (RSM). This method helps to design optimizations to save time and reduce the cost of analysis methods. The research design was carried out through the CCD (composite central design) model in RSM using Design Expert software version 13. The research variables are coating concentration (X1) and stirring time (X2), and the expected response was encapsulation efficiency (Y). The microcapsules produced from each of the highest encapsulation efficiencies of coating concentration and stirring time will be identified and further characterized. In this research, microencapsulation of *D. regia* extract was carried out using biodegradable polymers, namely chitosan and alginate, via a freeze-drying technique. The concentration of sodium alginate coating and the mixing time have an effect on the percent value of encapsulation efficiency (%EE) of microcapsules. The research results were obtained with optimum conditions for microcapsules at a sodium alginate coating concentration of 1.75% (w/v) and stirring time of 37.5 min with a %EE value of 82.70%. In addition, optimum conditions for microcapsules at a chitosan concentration of 0.12% (w/v) and a stirring time of 75 min with a percent encapsulation efficiency value of 84.13%. With its prediction and

optimization capability, response surface methodology has the potential to assist the development of microencapsulation optimization.
Keywords: alginate; chitosan; *Delonix regia*; freeze-drying; microencapsulation; RSM

ORAL-10

Identification and Ability of Indigenous Bacteria from Bestari Probolinggo Landfill in Degrading Various Types of Plastic in Broth Medium with and Without Glucose

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Abstract
Plastic, a complex polymer integral to various aspects of life, poses a global environmental problem due to its resistance to natural decomposition. Indonesia ranks as the fourth largest contributor of plastic waste, primarily from Polypropylene (PP), Polystyrene (PS), Polyethylene Terephthalate (PET), and High-Density Polyethylene (HDPE). This research aims to identify indigenous polypropylene-degrading bacteria from the Bestari Probolinggo landfill and assess their ability to degrade different types of plastics with and without glucose in a Broth medium. The 16s RNA sequences of the isolated bacteria B1UM1, B1UM2, B2UM1, showed 100% similarity to *Staphylococcus haemolyticus*, 99.86% to *Bacillus cereus*, and 99.79% to *Bacillus sp*., respectively. The biodegradation ability of *B. cereus* B1UM2 on PP, PS, PET, and HDPE (1.9%, 1.88%, 1.34%, 0.88%) was the highest compared to *S. haemolyticus* B1UM1 (1.33%, 1.77%, 1.31%, 0.88%) and *Bacillus sp*. B2UM1 (1.21%, 1.48%, 1.49%, 1.16%) in Broth medium containing glucose over 15 days. Similarly, without glucose, *B. cereus* B1UM2 demonstrated the highest degradation (0.7%, 0.92%, 0.5%, 0.31%) compared to S*. haemolyticus* B1UM1 (0.38%, 0.85%, 0.5%, 0.31%) and *Bacillus sp*. B2UM1 (0.48%, 0.73%, 0.35%, 0.18%). These results indicate that the presence of glucose enhances the biodegradation ability of all isolates. The variation in degradation ability among the isolates is attributed to differences in the type and activity of enzymes they possess. Further molecular identification of plastic structures before and after degradation and the enzymes involved in the degradation process is necessary to substantiate these findings.
Keywords: Plastics; Biodegradation; Indigenous Bacteria; Glucose

ORAL-11

Effectiveness of *Moringa oleifera* Liquid Detergent Product as an Eco-Friendly Antibacterial Agent

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Abstract
The increased use of synthetic chemicals in cleaning products has raised concerns about their impact on human health and the environment. Many conventional antibacterial ingredients are difficult to break down, causing water and soil pollution. In addition, these chemical residues can affect aquatic ecosystems and contribute to antibiotic resistance. This study assessed the antibacterial effectiveness of liquid detergents against *Escherichia coli* and *Staphylococcus aureus,* considering their environmental impact. The agar diffusion method was used to measure inhibition zones, with the liquid detergent showing significant inhibition against *E. coli* (25.39 ± 6.91 mm) and intermediate activity against *S. aureus* (15.70 ± 1.34 mm). These results were comparable to *chloramphenicol* and *ketoconazole* as positive controls, demonstrating the potential of liquid detergent as an environmentally friendly alternative to reduce bacterial contamination. The utilization of liquid soap as an antibacterial agent can reduce the use of harmful synthetic chemicals, support sustainable sanitation practices, and protect the ecosystem from the impact of pollutants. This research emphasizes the importance of developing effective and environmentally safe cleaning products.
Keywords: liquid detergent; antibacterial; eco-friendly; sustainable sanitation

ORAL-12

Virtual Selection of γ-Oryzanol and its Derivatives from Brown Rice (*Oryza sativa* L.) Blocking HMG CoA Reductase in Hypercholesterolemia Disease

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Abstract
Hypercholesterolemia is a dysregulated condition of increased cholesterol levels that triggers the development of various cardiovascular diseases. The bioactive compound γ-oryzanol from brown rice (*Oryza sativa* L.) potentially has anti-hypercholesterolemia activity by blocking cholesterol synthesis by HMG CoA Reductase. This study screened and determined the brown rice γ-oryzanol derivates with a strong potential to block HMG CoA Reductase in silico. Four γ-oryzanol derivates, HMG CoA and mevalonic acid as native ligand control and statin as drug ligand control, were downloaded from the PubChem Database. HMG CoA Reductase

target protein was downloaded from the RCSB PDB database. The 1st docking was performed between γ-oryzanol derivatives and the target protein; the 2nd docking was performed between native ligand control-target protein, and the 3rd docking was performed between statin ligand control-target protein. The docking assay was performed using Vina wizard in PyRx software. Ligand-protein interactions were interpreted using Discovery Studio 2024. Molecular dynamics stability was verified from the RMSD All and Ligand movement value under human physiology parameters virtually using YASARA. γ-Oryzanol derivatives generally interact with HMG CoA Reductase through hydrogen bonds in the ferulic component and hydrophobic bonds in the phytosterol component. γ-Oryzanol derivatives have a lower binding affinity score compared to the native ligand control and statin. In contrast, the γ-oryzanol derivatives on cycloartenyl ferulate have the lowest binding affinity score compared to other derivates. The RMSD values of All and ligand movement suggest cycloartenyl ferulate has similar molecular interaction stability to statins. γ-oryzanol derivatives from brown rice have potential as anti-hypercholesterolemia whereas cycloartenyl ferulate derivatives have the strongest potential to inhibit HMG CoA Reductase.

Keywords: Brown rice; cycloartenyl ferulate; HMG CoA Reductase; molecular docking

ORAL-13

Zanthoxylum acanthopodium DC. Fruit Extract Modulates Blood Pressure in Salt-Induced Hypertension Rat through Angiotensin-Converting Enzyme Inhibition

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Abstract
Hypertension contributes to about 20% of global deaths. Among the mechanisms involved in hypertension is the hyperactivation of the Renin-Angiotensin System (RAS), which can be triggered by factors such as an unhealthy diet, especially excessive sodium consumption. Given the known side effects of conventional antihypertensive drugs, there is a growing interest in exploring safer alternatives from natural sources. Therefore, this study aimed to assess the effectiveness of administering methanol extract of Andaliman Fruit (*Zanthoxylum acanthopodium* DC.) in modulating blood pressure in a salt-induced hypertensive rat model using in vivo and in silico methods. Rats were divided into four groups: negative control (no treatment), positive control (NaCl), P1 (NaCl + 100 mg extract), and P2 (NaCl + 200 mg extract). After a two-week treatment period, the NaCl-exposed rats showed significantly increased blood pressure compared to the untreated group, while the Andaliman extract treatment successfully normalized blood pressure levels. Five bioactive compounds identified through in silico analysis involving kaempferol, quercetin, abscisic acid, cis-3,5,3',4'-tetrahydroxystilbene, and benzophenone have the potential to interfere with RAS activity by inhibiting angiotensin-converting enzyme (ACE) and this inhibition by binding to the ACE active site.

Keywords: Andaliman; hypertension; renin-angiotensin system; ACE

ORAL-14

Amino Acid and Proximate Analysis of Tomatoes (*Solanum lycopersicum*) and its Potential Application as Anticomplication Diabetes Mellitus

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Abstract
Tomato (*Solanum lycopersicum*) is a food rich in essential nutrients and bioactive compounds. Tomato is a promising candidate for the prevention and management of diabetic complications. This study aimed to investigate the amino acid and proximate composition of tomatoes. Fresh local tomatoes, including Sirvo, Montana, and Marvel varieties, were air-dried for amino acid determination and proximate analysis. The results showed that Sirvo tomatoes had higher protein and fat composition than Montana and Marvel tomatoes. Sirvo tomato has the highest amino acid content of glutamic acid and aspartic acid, compared to other tomato varieties, while Marvel tomato has the highest glycine and arginine content compared to other tomato varieties. These four amino acids are crucial for maintaining glucose levels and improving insulin sensitivity. A recent study analyzed the amino acid composition and nutritional profile of tomatoes to evaluate their effectiveness as a functional food or nutraceutical in preventing and managing diabetic complications.
Keywords: anticomplication; diabetes; functional food; nutraceutical; tomatoes.

ORAL-15

Morpho-Agronomic Characters of Twenty-Two Indonesian Pigmented Rice (*Oryza sativa* L.) Varieties from East and Central Java, Indonesia

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Abstract
Pigmented rice has a high content of bioactive compounds for functional foods. To select superior pigmented rice plants, qualitative and quantitative morpho-agronomic characterization of rice plants is carried out for plant breeding. This study aims to analyze the morpho-agronomic characters of several pigmented rice varieties from Central and East Java and to provide information for local farmers in the breeding of pigmented rice. Morpho-agronomic characters observed include qualitative and quantitative characters, kinship relationships of varieties displayed in the form of Principal Component Analysis (PCA) and biplots, clustering using the PAST program, and phylogeny construction using the Unweighted Pair Group Method Using Arithmetic Averages (UPGMA) method. The results showed that the characteristics that affect the diversity of Indonesian pigmented rice from East Java and Central Java from 22 varieties include leaf colour, shoot colour, and a number of shoots. Based on the results of morpho-agronomic characters, four varieties have similar grain length and dehulled grain length characteristics, including Siam-siam, Kabir 07, Blambangan A2, and Blambangan A3.
Keywords: characterization, Indonesian pigmented rice, morpho-agronomy, phylogeny

ORAL-16

Development of Nano-Chitosan Filtrate N-Butanol Antibiotic Products from Streptomyces sp.11 and Testing Its Inhibition against *Ralstonia solanacearum*

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Abstract
Streptomyces bacteria are one of the bacteria that can produce antibiotics such as cephamycin, chloramphenicol, kanamycin, tetracycline and monensin. Research in 2023 succeeded in isolating 67 genera of Streptomyces where *Streptomyces* sp.11 was able to very strongly inhibit the pathogen *Ralstonia solanacearum* in potato plants. In this research proposal in 2024, the antibiotic filtrate from *Streptomyces* sp.11 will be developed to nanoparticle size. Nano-sized filtrates have a larger particle surface contact area which can increase the amount of active substance isolated, resulting in stronger antibacterial activity. Gas chromatography-mass spectrometry (GC-MS) analysis has been developed to analyze and characterize active compounds from microorganisms. This research aims to develop nanoparticle-chitosan filtrate n-butanol antibiotic products from *Streptomyces* sp.11, and determine its effectiveness against the pathogen *R. solanacearum* which causes bacterial wilt in potato plants. Antibiotic filtrate nanoparticles from Streptomyces were made using the ionic gelation method through encapsulation with chitosan and sodium tripolyphosphate (NaTPP). Nanoparticle size analysis was carried out using a Particle Size Analyzer (PSA). Isolation of antibiotic filtrate using liquid fractionation with n-butanol solvent followed by fractionation using TLC. Results showed that nanopartilce chitosan 1% is the highest inhibitory power (10.75 mm) against *R. solanacearum* compared with nanoparticle chitosan 0.5% and Filtrate antibiotic without chitosan. All control negative showed no inhibitory power (0 mm) against *R. solanacearum.* The nanoparticle chitosan1% of filtrate n- butanol antibiotic product from

Streptomyces sp11 is the best to use as a biocontrol against the *R. solanacearum* pathogen, which can cause bacterial wilt in potato plants
Keywords: chitosan; n butanol; nanoparticle; *Streptomyces* sp.

ORAL-17

The Effect of Biotinylated NS1 Antibody Concentration on Photoluminescence Intensity of $CuInS_2$ QDs/ZnS Conjugated Streptavidin

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Abstract
Dengue fever poses a serious health threat to the global community and is predicted to become more prevalent in the future. Failure to promptly detect the viral infection results in delayed diagnosis, leading to improper treatment and increased mortality rates among patients. The NS1 detection method effectively identifies the dengue virus during the early stages of infection; its low sensitivity necessitates further development for practical application. This research focuses on utilizing $CuInS_2$ QDs/ZnS as a substitute CdSe/ZnS material, providing environmentally friendly, highly sensitive, and non-toxic properties as biosensor probes for NS1 detection. Streptavidin attaches to these materials and is tightly coupled with the biotinylated NS1 antibodies. The synthesis of $CuInS_2$/ZnS involves wet chemical and hot injection methods, resulting in yellow-orange emissions. Different temperatures (200°C and 215°C) were employed in the synthesis process, and the sensitivity was characterized using biotinylated NS1 antibodies at various doses (30 nM, 90 nM, and 150 nM). Temperature significantly influences the synthesis of quantum dots with specific wavelengths, leading to yellow-orange emission. The emission spectra of bioconjugated fluorescence displayed photoluminescence quenching, indicating energy transfer to electron donors and acceptors in the form of streptavidin and biotinylated NS1 antibodies. Upon recognition of the target molecule, such as using streptavidin and NS1 biotin as binders for dengue virus antigens, a resonance transition occurs between the donor and the acceptor, resulting in decreased photoluminescence intensity. All reactions can occur if the donor and acceptor overlap.
Keywords: Biosensor, Optical Properties, Photoluminescence, Quantum Dots

ORAL-18

The Antihypertensive Effects and Safety Profile of *Physalis angulata* L. Leaf Extract

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Abstract
Leaf decoctions of ciplukan (*Physalis angulata* L.), also known as letup-letup in Malay, are traditionally used by the Nias tribe in Indonesia to reduce blood pressure. This study investigated the bioactive components in ciplukan leaf extract and their vascular health benefits, emphasizing their antioxidant, anti-inflammatory, and vasodilatory effects. In vitro experiments revealed that ciplukan leaf extract and its fractions increased cytosolic Ca^{2+} levels and nitric oxide (NO) production. The extract also promoted endothelial nitric oxide synthase (eNOS) expression and its translocation to the nucleus in endothelial cell cultures. In vivo studies demonstrated that ciplukan leaf extract reduced oxidative stress and pro-inflammatory mediators, improved endothelial dysfunction, promoted the regeneration of damaged endothelial cells, enhanced vasodilation, and lowered blood pressure in hypertensive rat models, including those representing hypertension during pregnancy (preeclampsia) and hypoestrogenism. Safety assessments confirmed the extract's non-toxicity, with sub-chronic toxicity tests showing that doses exceeding 2000 mg/kg body weight did not cause significant liver, kidney, or haematological impairments in rats. Ciplukan leaf extract contains trigonelline, stachydrine, chlorogenic acid, quercetin, kaempferol, and withanolide, which exhibit antioxidant activity. Quercetin enhances endothelial progenitor cell (EPC) function, which is important for the regeneration of damaged endothelial cells. Stachydrine, chlorogenic acid, quercetin, and kaempferol improve endothelial function by boosting eNOS/NO signalling. These findings suggest that ciplukan leaf extract is a potent and safe candidate for managing hypertension, warranting further exploration for potential therapeutic applications.
Keywords: Blood pressure; Endothelial function; Oxidative stress; Toxicity; Wild gooseberry.

ORAL-19

Isolation and Selection of Cellulose-Degrading Microbes from Empty Palm Oil Bunch Waste in Pasangkayu Regency, West Sulawesi

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Abstract
Oil palm empty fruit bunch (EFB) waste is one of the sources of organic waste from the palm oil industry. Utilization of EFB is a major challenge in efforts to manage palm oil industry waste in a sustainable manner. In this study, isolation and selection of cellulose-degrading microbes from EFB waste disposal sites in Pasangkayu Regency, West Sulawesi, were carried out. The

isolation method was carried out by taking 5 different soil samples from the waste disposal site and culturing them using media containing Carboxymethyl Cellulose (CMC). After that, the selection was carried out based on the ability of microbes to degrade cellulose through observation of the clear zone around the colony using 0.1% congored. The results showed that of the 42 microbial isolates that had been isolated, 9 isolates were able to produce clear zones. The highest Cellulolytic Index (CI) value was obtained in isolates B.32.12 and E.42.12 with a value of 2.35 followed by isolate D.12.12 (CI value 2.19) and B.42.12 (CI value 2.10). This study makes an important contribution to understanding the diversity of cellulose-degrading microbes and their potential for use in biotechnology applications, including bioenergy production. Thus, this effort can make an initial contribution to the development of sustainable palm oil industry waste management.
Keywords: Oil Palm Empty Bunch; Isolation; Selection; Cellulose; Microbes

ORAL-20

Study on the Concentration of Polyvinyl Alcohol in Bioplastic Composites of Taro Starch and Other Polysaccharides

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Abstract
Taro starch has been utilized to make liquid sugar. Taro starch can also be used to make bioplastics. Bioplastic or degradable plastic is packaging that can decompose in the soil and is made from renewable materials so that its use does not pollute the environment. This research aims to determine the effect of the concentration of polyvinyl alcohol (PVA) reinforcing material on the characteristics of the composite of taro starch and other polysaccharides produced and to determine the bioplastic composite of taro starch-other polysaccharides which produces the best characteristics as a packaging material. This research used an experimental design that used a randomized block design with 9 variations in the ratio of taro starch composite with 2 other polysaccharides (glucomannan and carrageenan) with a ratio of 25:75; 50:50 and 75:25 with 3 levels of PVA concentration, namely 0, 5 and 10% (calculated from the composite material). The treatment combination table can be seen in Table 1. All treatments were divided into 2 groups based on the processing time for making the composite so that 36 treatment units were obtained. The data was analyzed for diversity, and if it had a real effect, it was continued with the Duncan test. The variables observed were tensile strength, elongation of bioplastics, elasticity, biodegradation of bioplastics, swelling, and functional group testing for the best treatment. The results of the research show that variations in bioplastic and polyvinyl alcohol composite materials have a significant effect on tensile strength, elongation at break and elasticity on the characteristics of the taro starch-other polysaccharide composites produced. In the treatment variations of taro starch: carrageenan ratio of 25:75 with a PVA concentration of 10% produced the best bioplastic composite characteristics.
Keywords: glucomannan, carrageenan, bioplastic composite, taro starch and polyvinyl alcohol

ORAL-21

Antiobesity Performance of Encapsulated *Caulerpa racemosa* Extract

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Abstract
Seagrape (*Caulerpa racemosa*) is a green macroalgae with high phytochemical value and health benefits. In a recent study, a carotenoid from *C. racemosa* exhibited antiobesity by blocking cholesterol synthesis and absorption. However, the chemical compounds of *C. racemose* were unstable and easily reduced the activity. Therefore, the technology for drug delivery system should be developed. This study designed the encapsulated *C. racemosa* extract formula and investigated the antiobesity performance. C. racemosa was extracted using 70% ethanol and evaporated. Then, *C. racemosa* extract was encapsulated with gum Arabic – chitosan (1:3) and freeze-dried. The encapsulated *C. racemosa* was characterized by the functional group, microscopic, and macroscopic performance. The antiobesity test was analyzed using molecular docking against human pancreatic lipase. The functional group profile of encapsulated *C. racemosa* showed seven peaks indicating a functional group from the extract and polymer combination. Morphological observation showed that encapsulated *C. racemosa* has a brown pastel colour, rough texture, and microscopic size of 5.7 µm. Molecular docking showed that encapsulated *C. racemosa* effectively inhibited pancreatic lipase more than the *C. racemosa* compound. In summary, encapsulated *C. racemos*a is a more stable compound and has higher activity as an antiobesity agent than non-encapsulated *C. racemosa*.
Keywords: antiobesity, *Caulerpa racemosa,* encapsulation

ORAL-22

Deterioration of Protein and Carbohydrate During Processing of Animal Feed Pellet from Pineapple By-Product

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Abstract
This study used pineapple waste as a raw material in a low-cost animal feed formulation. Despite cheaper formulations, meeting high-quality requirements in the animal feed market is critical. Protein and carbohydrates are two major elements of animal feed pallet quality. These two major elements represent the nutrient value contributing to animal feed pallets' price. Increasing product protein and carbohydrate content will increase consumer demand. This

study aims to maintain 10-15% protein and 20-30% carbohydrate levels in pineapple-waste-based animal feed formulations before, during, and after. Converting pineapple by-products to animal feed pallets requires a crusher, compactor, dryer, grinder, mixer, and palletizing machine. The samples were collected at every step of the process, and the protein and carbohydrate amounts were analyzed using the Kjeldahl method. Other parameters on the samples, such as moisture, particle size, and crude fiber, were also monitored. It was determined that the amount of protein decreased by 50% in animal feed pallets from the palletizing machine. In contrast, the carbohydrate increased by 100% from the initial pineapple by-product. The findings of this study indicate that heat and friction contribute to protein loss and carbohydrate accumulation.
Keywords: animal feed pallet; protein; carbohydrate; pineapple by-product

ORAL-24

Greener Biomass-based Composites is the Future

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Abstract
The global resource shortage demands urgent scientific intervention, utilizing eco-friendly processes and greener chemical sources. This shift requires a paradigm change among manufacturers and consumers toward renewable and sustainably sourced products. By embracing biocomposites, material science, especially in nano-based technologies, can lead the way in achieving sustainable communities through "Waste to Wealth" and "Zero-Waste" initiatives. Using renewable carbon and silica feedstocks to create biomass-based polymers can produce a variety of eco-friendly materials for manufacturing and environmental applications. Repurposing agro-industrial biomass is a highly effective strategy for managing global biomass surplus and promoting a circular economy. This biomass serves as an excellent starting material for synthesizing platform chemicals and biofuels. The remarkable aspect of biomass lies in its easily tunable polyol-rich moieties, derived from carbon-based materials in the agronomic and food manufacturing sectors. These modifications have resulted in innovative biomaterials and hybrid composites used in wound healing, fuel cells, enzyme supports, biosensors, sorbents, and more. Consequently, the use of sophisticated greener solvents, advanced processing machinery, and engineered enzymes broadens the application of biomaterials and composites for greener purposes. The primary challenge remains the large-scale development and widespread utilization of such bio-based composites. The success of these efforts relies on integrating multidisciplinary knowledge from various scientific fields—engineering, material science, physics, enzymology, computational science, mathematics, and commerce—to develop a practical, sustainable, and cost-effective science capable of addressing global issues.
Keywords: greener bio-based composite; composite; material science; biomass; sustainable

ORAL-25

Formulating *Moringa oleifera* Based Ready-to-Use Therapeutic Food as a Cost-Effective and Sustainable Solution for Malnutrition

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Abstract
Malnutrition persists as a significant public health concern, particularly impacting children under five years old in developing nations. Ready-to-use therapeutic food (RUTF) serves as a crucial intervention for severe acute malnutrition (SAM), but its widespread use is hindered by expensive ingredients. In response, UNICEF seeks alternative, cost-effective formulations. This study aimed to develop a nutritious and economical RUTF using *Moringa oleifera* and compare it to standard RUTFs. Employing a D-mixture optimal design, six ingredients; full-fat milk, icing sugar, vegetable oil, peanut butter, Moringa leaves powder, and mineral-vitamin mix were utilized. Six Moringa-based RUTF samples, varying in Moringa leaves powder content from 1% to 6%, were prepared and compared against two control samples: one following the UNICEF formula (C1) and another commercially available (C2). It was found that incorporating Moringa leaves powder led to substantial cost savings, with all Moringa-based RUTFs proving more cost-effective than controls, with reductions ranging from 50% to 65% compared to C2 and up to 148% compared to C1. ARUTF 6 exhibited the highest energy content (1422.6 Kcal) and significant macronutrient and micronutrient levels surpassing control samples. Additionally, Moringa-based RUTFs displayed superior lipid oxidation control and reduced oil separation, which is attributed to Moringa's antioxidant properties. Sensory evaluations revealed differences in colour and spreadability, with children favouring higher Moringa content for taste, aroma, mouthfeel, and overall acceptability. These findings suggest Moringa-based RUTFs as promising solutions for addressing malnutrition, offering a balance of nutritional adequacy and economic feasibility in interventions.
Keywords: Malnutrition; RUTF; *Moringa oleifera*.

ORAL-26

The Effect of Polyethylene Microplastics Inhalation Towards Hematological Disorder

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Abstract
Microplastics originating from polyethylene (PE) have the potential to spread broadly via the respiratory and digestive systems. Its impact on blood cells is still being studied, though. This study aimed to examine the effects of polyethylene microplastics (PE-MPs) on the blood components of female rats, specifically the erythrocytes, leukocytes, and thrombocytes. This study split female Wistar rats into groups for PE-MPs and controls. Whole-body inhalation was used to deliver the PE-MPs, which had a concentration of 15 mg/m^3, four hours a day for 28 days. The rats were subjected to death after the exposure period in order to get a blood sample via the heart. An automated hematology analyzer was used to perform the complete blood count, and a thin blood smear was used to examine the blood morphology study. We found that PE-MP exposure increased thrombocyte and erythrocyte counts but did not increase leukocyte response. Furthermore, erythrocytes additionally display an aberrant morphology. Our studies showed that rats' hematological disorders can be driven by exposure to PE-MPs. These findings have significant implications for how the general public perceives the potential risks associated with microplastics.
Keywords: microplastic, pollution, hematological disorders, blood, toxicity

ORAL-27

Scabies Detection by Using Image Processing

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Abstract
Scabies is a disease caused by *Sarcoptes scabiei*, affecting the skin in humans. It commonly affects populations in developing countries, with outbreaks potentially affecting more than 10 people and incidence rates varying between 3-46%. According to the WHO, children, the elderly, and impoverished populations are particularly vulnerable to scabies. The highest prevalence occurs in countries with tropical climates, high population densities, and low socioeconomic status. Since 2017, the WHO has classified scabies as a neglected tropical disease. With advancements in technology, image processing has proven to be a useful tool in diagnosis. This paper proposes a scabies detection method using digital image processing. The method begins with pre-processing, where images are resized to a uniform size of 640x640 pixels. A low-pass filter is then applied to remove the "salt and pepper" noise before segmentation. Segmentation isolates the skin image using a combination of thresholds on the YCBCr color channel. The next step is feature extraction, where the Gray-Level Co-occurrence Matrix (GLCM) is used to derive parameters such as contrast, correlation, energy, and homogeneity. The final step is classification using a Support Vector Machine (SVM) to distinguish between scabies-infected and non-infected images. The results indicate a potential accuracy of over 85%.
Keywords: scabies; GLCM; SVM

ORAL-28

The Correlation between PER3 rs2640908 Polymorphism and Colorectal Cancer in the Japanese Population

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Abstract
Colorectal cancer (CRC) is one of the most common cancers in Japan. Many factors influence this cancer, one of which is circadian rhythm disruption. Our research investigated the correlation between single-nucleotide polymorphisms (SNPs) in Period 3 (PER3) (rs2640908), which is one of the circadian genes, and colorectal cancer in the Japanese population. The study participants consisted of 121 cases and 197 controls. DNA was extracted from participants' peripheral blood cells, and polymerase chain reaction-restriction fragment length polymorphism analysis (PCR-RFLP) was performed to detect genotypes of PER3. Participants with the T/T genotype were at lower risk of developing colorectal cancer than participants with the C/C genotype (adjusted ORs = 0.32 (95% CI: 0.15–0.63)). When stratified by gender and smoking status, T/T genotype was associated with a decreased susceptibility to cancer in males only (adjusted ORs: 0.23 (95% CI: 0.09–0.59)), T/T genotype was also associated with a decreased susceptibility to cancer among both smokers and non-smokers. A significant association was found between the T allele of PER3 polymorphism and a reduced risk of colorectal cancer, especially in males. Smoking status showed no association with the relationship between PER3 genotype and CRC carcinogenesis.
Keywords: Circadian gene, PER3, Colorectal cancer, Japanese

ORAL-29

Comparative Analysis of Immunodiagnostic Performance of Chemiluminescent Assay versus Immunochromatography for Toxoplasmosis

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Abstract
Toxoplasmosis remains a significant global health issue, especially among pregnant women and immunocompromised patients. Immunodiagnosis is preferred, with chemiluminescent assays being widely utilized. Various immunochromatographic tests (ICTs) have recently been developed with differing accuracies. This meta-analysis compares the diagnostic performance of chemiluminescent assays and ICTs in toxoplasmosis detection. Studies meeting the inclusion criteria were sourced from public databases, and the risk of bias was assessed using

JBI criteria for diagnostic accuracy. Analysis was conducted using RevMan 5.4. Out of 278 studies retrieved, 17 met the inclusion criteria, encompassing 7,523 samples from 9 countries. Chemiluminescent assays exhibited higher overall sensitivity and specificity than ICTs (96.86% vs. 92.10% and 98% vs. 96%, respectively), with similar positive and negative predictive values. In summary, chemiluminescent assays offer superior sensitivity and specificity over ICTs for toxoplasmosis diagnosis. These findings support the continued use of chemiluminescent assays as reliable diagnostic tools in clinical settings. The enhanced accuracy of immunodiagnostic assays facilitates better clinical outcomes through timely and precise diagnosis, particularly in vulnerable populations such as pregnant women and immunocompromised patients. This study underscores the importance of selecting high-accuracy diagnostic tools to improve patient care and disease management in toxoplasmosis.
Keywords: immunodiagnosis; immunochromatography; chemiluminescent; meta-analysis; tropical infection

ORAL-30

The Role of Purple Sweet Potato Nanoemulsion in Modulating Glutamate Pathway Protein Expression and Behavioral Changes in Schizophrenia-Model Zebrafish

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Abstract

Schizophrenia is a complex mental disorder requiring innovative therapeutic approaches beyond current dopaminergic treatments. This study investigates the potential of purple sweet potato (*Ipomoea batatas*) nanoemulsion, rich in anthocyanins, to modulate the glutamate pathway as a novel treatment for schizophrenia. Using zebrafish (*Danio rerio*) as a model, schizophrenia-like symptoms are induced with dizocilpine (MK-801). The study aims to evaluate the effects of anthocyanin nanoemulsion on locomotor behavior and protein expression of NMDA and DARPP-32. Locomotor behavior was assessed to measure improvements in movement patterns, hyperactivity, and social interactions. Immunohistochemical analysis focuses on NMDA and DARPP-32 expression to determine the modulation of the glutamatergic pathway. Preliminary findings suggested that anthocyanin nanoemulsion treatment may result in improved locomotion and social behavior, along with targeted modulation of glutamatergic proteins. These results highlight the therapeutic potential of anthocyanin nanoemulsion in addressing schizophrenia symptoms and provide insights into its underlying mechanisms. Further research will elucidate the long-term efficacy and safety of this treatment.
Keywords: Schizophrenia; Nanoemulsion; Anthocyanins; Glutamatergic; Zebrafish

ORAL-31

Combination of Nanoemulsion Curcumin and Purple Sweet Potato Modulates Locomotor Behaviors of Stressed Mice

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Abstract
Depression is an emotional disorder characterized by sadness, anhedonia, and a decrease in psychosocial function. Stress is associated with depression through brain neurotransmitter dysregulation. Plant bioactive compounds are well established as stress adaptogens to improve stress recovery. Previous studies showed the potential effect of curcumin and purple sweet potato (PSP) on the behaviour of stressed animals. However, improvement of blood-brain barrier penetration is necessary to enhance the significant effect of both plant extract compounds. Our studies focused on the role of nanoemulsion of curcumin (NC) and PSP (NP) on the behaviour of stressed mice. Adult mice were stressed by immobilization 2 hours/day for a duration of 14 days. The nanoemulsion was parallelly administered via oral route at a frequency once/day. Our study revealed stress reduced locomotor behaviour by reducing the distance travelled and movement velocity. In contrast to NP, the administration of NC enhanced the locomotor behaviour among mice. The combination of NP and NC in different concentrations stimulated higher locomotion than the administration of NP only. Our presentation will detail the effect of plant metabolite compounds of curcumin and PSP in molecular interaction with potential brain receptor proteins. Our finding has the potential to reveal the further health benefits of the nanoemulsion form of curcumin and PSP as an antidepressant.
Keywords: behavior; curcumin; depression; purple sweet potato; stress

ORAL-32

Anti-Nociceptive and Anti-Inflammatory Effects of *Rosmarinus officinalis* L. Extract Nano-Emulsion on Dental Pulpitis Rat Model

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Abstract
Dental pulpitis is a condition of dental pulp inflammation caused by bacterial byproducts such as lipopolysaccharide (LPS) or iatrogenic forces. Eugenol is usually used to relieve pulpitis, but its toxicity may induce unfavourable effects. *Rosmarinus officinalis* L. (RO) is known to have anti-inflammatory and anti-nociceptive properties, especially when given in the form of nano-emulsion. This study aims to determine the differences in the expression of IL-6, TNF-α, IL-1β, TRPV1, TRPV4, NK1R, and SP after pulpitis induction in rats with and without RO nano-emulsion treatment. RO ethanolic extract was prepared as a nano-emulsion using the self-nanoemulsifying drug delivery systems (SNEDDS) method. Characterization of RO nano-emulsion (RO-NE) was conducted using Particle Size Analysis (PSA) and Zeta-Potential analysis (ZA). Pulpitis induction was carried out using non-water spray cavity preparation and topical administration of 1µl of 10 mg/ml LPS E. coli on the left maxillary first molar of 30 healthy male Wistar rats weighing 200–250 g. The rats were randomized into 6 groups: K(-) without pulpitis induction (PI); K(+) received PI only; T1, T2, and T3 received PI + topical administration of 0.5, 1, and 2 mg/ml RO-NE respectively, while the TE group received PI + eugenol. RO-NE has an average droplet size of 193.87 nm and an average Zeta-Potential value of -13.07 mV. RO-NE (0.5 mg/ml) is able to significantly lower the expression of TNF-α and TRPV4. In contrast, the expression of IL-6, IL-1β, SP, NK1-R, and TRPV1 is significantly lower after administration of RO-NE (2 mg/ml) ($p < 0.05$), compared to K(+). There is no significant difference in the studied biomarkers for all the RO-NE treated groups compared to the TE group. This study shows the potential of topically administered RO-NE in reducing the expression of IL-6, TNF-α, IL-1β, TRPV1, TRPV4, NK1R, and SP in dental pulpitis-induced rats. RO-NE may exert the same biological activities as eugenol in reducing dental pulpitis.
Keywords: Dental Pulpitis, RO-NE, IL-6, TNF-α, IL-1β, TRPV1, TRPV4, NK1R, SP

ORAL-33

Therapeutic Potential of *Salacca zalacca* Skin (Snake Fruit) Ethanolic Extract as a Metabolic Syndrome Supplementation: A Comprehensive Study Using an In-Silico and In-Vitro Approach

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Abstract
The current trend of drug discovery for metabolic syndrome (MetS) involves the certification of herbal medicines, including Salak skin (*Salacca zalacca* skin/SZS). This study aims to understand the therapeutic potential of SZS as an herbal medicine, its role in MetS management, and its role in improving overall health outcomes. We conducted in vitro assays using DPPH and ABTS antioxidant assays and lipase and glucosidase inhibition assays, supported by in silico assays using molecular docking and molecular dynamics approaches. The results showed that SZS extract has the ability to scavenge free radicals through ABTS

and DPPH assays, with EC50 values of 776.4 ug/mL and 647.8 ug/mL, respectively. SZS extract also inhibited lipase and glucosidase enzyme activities, with EC50 values of 4330 ug/mL and 481.1 ug/mL, respectively. The discovery of 16 compounds by LC-MS/MS, including diphyllin, 19-norandosterone, and anastrozole, supports these data. Molecular docking predicted these compounds binding to TNF-α and PPARγ, MetS target proteins. The stability of anastrozole and diphyllin towards TNF-α, along with their moderate flexibility towards PPARγ, indicates that all three compounds exhibit binding stability. In addition, all three have a favourable pharmacokinetic profile, fulfilling the rule of five criteria. The good pharmacokinetic profile of the compounds and computational prediction by molecular docking and molecular dynamics support the conclusion that the ethanolic extract of SZS has a potential role in the regulation of body metabolism associated with the development of MetS in vitro.

Keywords: *Salacca zalacca* skin; Metabolic syndrome; In-Silico; In-Vitro

ORAL-34

Exploring the Therapeutic Potential of *Salacca Zalacca* in Hyperlipidemia: Insights from Network Pharmacology, Molecular Docking, and Dynamics Simulations

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Abstract

Hyperlipidemia is a metabolic disorder that increases the risk of cardiovascular disease. Quercetin, an active compound in *Salacca zalacca* (SZ), a tropical fruit in Indonesia, shows potential properties including antioxidant, anti-inflammatory, anticancer, and antidiabetic properties. This study aims to target SZ as a potential herbal medicine to inhibit the activity of PCSK9, a key regulator of cholesterol metabolism. Compounds of SZ identification using LCMS. Protein-protein interaction was identified from the NCBI, GeneCard, and DysGened databases. Pharmacokinetic analyses were performed using the pkCSM. In silico approach with molecular docking and molecular dynamics. A total of eight SZ compounds were subjected to analysis. The pharmacological network identified fourteen proteins that contribute to hyperlipidemia, such as LPL, LIPC, APOA1, APOB, APOC3, APOE, CETP, PPARA, PCSK9, LCAT, APOA5, MTTP, LDLR, and ADIPOQ. Of these, PCSK9 was selected for further investigation due to its potential to reduce lipid mechanisms in hyperlipidemia. Among these compounds, quercetin (-8.2 kcal/mol) shows strong binding affinity and occupies the same binding pocket as the control (-8.1 kcal/mol). Molecular dynamics simulations demonstrated quercetin was stable in the interaction with PCSK9, comparable to the control. Quercetin has the potential to inhibit PCSK9, which makes it a good option for further drug candidates for lowering cholesterol. It also has an excellent oral availability and safety profile. Additional research is necessary to determine the effectiveness of this new treatment for hyperlipidemia.

Keywords: Hyperlipidemia, *Salacca zalacca*, molecular docking, molecular dynamics, PCSK9.

ORAL-35

Green Synthesized AgNPs using Leaf Aqueous Extract of *Moringa oleifera* Promotes Apoptosis by Targeting Cleaved Caspase-3 in MCF-7 Cells

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Abstract
The high mortality and morbidity rates due to breast cancer make it a significant health problem among women. As one of the widely consumed plants, *M. oleifera* contains many phytochemical constituents which can play a role in inhibiting cancer cell activity. This study involves the use of *M. oleifera* in an effort to impede the development of cancer cells through green-based silver nanoparticle synthesis by targeting programmed cell death. Different analytical techniques were used to analyze the synthesized AgNPs. Its surface plasmon resonance (SPR) was detected in the range of 476 nm. TEM also showed that AgNPs synthesized from *M. oleifera* (MOLP-AgNPs) have a spheroid form. Based on the total viable cells through dye exclusion assay, it showed that MOLP-AgNPs significantly reduced breast cancer cell viability, and there was no cytotoxic activity of MOLP-AgNPs against non-cancerous cells after 24h investigation. Caspase-3, as an apoptosis-related protein and phosphorylated AKT, which plays a crucial role in cell growth, may interact with AgNPs indirectly. It was observed that MOLP-AgNPs promote apoptosis through Caspase-3-dependent signalling and inhibit AKT phosphorylation in a dose-dependent manner. These findings also showed that MOLP-AgNPs have the potential for further development as anticancer drugs, especially for breast cancer.
Keywords: *Moringa oleifera*; Silver nanoparticles; Apoptosis; Breast cancer

ORAL-36

Potential of Ligans from Binahong (*Anredera cordifolia*) Leaves Targeting to MMP2 Receptor of Breast Cancer

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Abstract
Breast cancer is a type of cancer that is dominant in women, with the highest percentage. Breast cancer is an abnormal growth of cells lining the ducts and lobules in the breast. Currently, many breast cancer therapy targets are being researched, one of which is MMP2. MMP2 is a heterodimeric protein that is MMP2 proteins are highly expressed in circulating tumor cells from patients with pancreatic carcinoma, making it a potential target for breast cancer therapy. Binahong (*Anredera cordifolia*) is a plant that has medicinal properties for various diseases including saponin, alkoloid and flavonoids for anticancer as especially in breast cancer. The purpose of this study was to determine the potential of compounds from binahong leaves as drug candidates in their binding affinity to inhibit the metastasis pathway of MMP2 protein from breast cancer. The methods used are compound screening and ligand preparation, ADMET analysis, protein pathway network interaction analysis, molecular docking and molecular dynamic. The result of this study is that 6 compounds in binahong (*Anredera cordifolia*) which were docked with the MMP-2 protein showed the highest results, namely the saponin compound with a binding affinity value of -10, Urcolid acid -9.1, Vitexin -8.8. The molecular dynamic in all compound average is on a stable graph, namely 1-3 Å. The conclusion of this study shows that the compounds in binahong (*Anredera cordifolia*) extract are able to bind well with the MMP2 protein.
Keywords: *Anredera cordifolia*; breast cancer; MMP2

ORAL-37

Potential of Active Compounds from Green Tea and Green Coffee as Selective FGF23 and FGFR4 Inhibitors against Cardiac Fibrosis Signalling in Metabolic Syndrome Conditions: In Silico Study

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Abstract
Cardiac fibrosis is one of the main causes of heart failure. Cardiac fibrosis can occur from various causes, for example, metabolic syndrome. One of the clinical conditions encountered in metabolic syndrome patients is a disturbance in mineral metabolism which causes a mineral imbalance in the blood serum. This situation causes increased expression of FGF23, a protein responsible for regulating minerals in the blood. Increased expression of FGF23 will form a complex with α-klotho, which will then bind to FGFR4 and activate the cardiac fibrosis pathway. Direct inhibition of FGF23 or FGFR4 could be a potential treatment that can prevent the activation of the cardiac fibrosis pathway. This study aims to determine the potential of

active compounds in green tea and green coffee as selective inhibitors of FGF23 and FGFR4. Of the six compounds selected, it is known that Cafestol (-6.2 kcal/mol) is the best compound that is able to bind to FGF23, while ECG (-8.8 kcal/mol) is the best compound that can bind to the active site of FGFR4. Based on these results, green tea and green coffee compounds are not good enough to be used as FGF23 inhibitors but have good potential to be used as selective FGFR4 inhibitors.
Keywords: Cardiac fibrosis, FGF23, FGFR4, green coffee, green tea.

ORAL-38

Effect of Ethanol Extract *Elaeocarpus grandiflorus* Leaves on Lipid Profile of Hyperlipidemia Rats

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Abstract
The purpose of the study was to examine the effect of *Eleaocarpus grandiflorus* leaves extract on the lipid profile of hyperlipidemic rats. A randomized post-test control group design was conducted on 4 groups of hyperlipidemic rats. The control group was given a high-fat diet only. The experiment groups were given a high-fat diet and extract in doses: P1 (200 mg/kg BW), P2 (400 mg/kg BW) and P3 (800 mg/kg BW. The high-fat diet was given on days 1- 14. The ethanol extract of *E. grandiflorus* was given orally on days 8-14. The HDL, LDL, and TG were examined on day 15. The means of LDL level were 22.98 mg/dL (control),16.76 mg/dL (P1), 13.87 mg/dL (P2), and 16.64 mg/dL (P3). The mean HDL levels were 51.60 mg/dL (control), 48.20 mg/dL(P1), 48.20 mg/dL(P2), and 57.00 mg/dL(P3). The mean triglyceride levels in the control group were 227.36 mg/dl, P1 173.86 mg/dl, P2 155.63 mg/dl, and P3 148.63 mg/dl. The statistical analysis showed the p values were 0.521 (LDL), 0.603 (HDL) and 0.330 (TG). There was no significant difference between the control and experiment groups, although the mean HDL was increased, and the means of LDL and TG were decreased.
Keywords: *E. grandiflorus*; HDL; hyper lipidemic; LDL; TG

ORAL-39

Development of Functional Gluten-Free Noodles from Modified Cocoyam (*Xanthosoma sagittifolium*) and corn Flour

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Abstract
Noodles are one type of food that is very popular in Indonesian society today. Generally, noodles are made from flour which is an imported commodity. On the other hand, each region

in Indonesia has great potential as a producer of local foods such as cocoyam and corn which have the potential to be processed into flour and further processed into noodles. The aim of this study was to determine the optimal formulation for producing gluten-free dry noodles using modified cocoyam flour and corn flour. The research employed a Complete Randomized Design, with the treatment involving a comparison of modified cocoyam flour and corn flour. Comprehensive evaluations of sensory, physical, and chemical properties were conducted, comparing cocoyam-corn noodles with traditional wheat noodles. Results indicated that the optimal ratio of modified cocoyam to corn flour for gluten-free noodles was 70:30, yielding noodles with 8.73% protein, 1.55% fat, 74.92% carbohydrates, 2.74% crude fiber, 144.25 mg/100g calcium, and 1.55 mg/100g iron content. Compared to wheat noodles, cocoyam-corn gluten-free noodles exhibited higher levels of carbohydrates, crude fiber, and iron, but lower levels of protein, fat, and calcium. Sensory analysis revealed no significant preference for aroma and flavour between cocoyam-corn gluten-free and wheat noodles. However, cocoyam-corn noodles scored lower in colour, texture, and overall preference.
Keywords: Gluten-free noodles; Modified cocoyam flour; Corn flour; Sensory evaluation; Chemical properties

ORAL-40

Synergistic Anticancer Effects of Silver Nanoparticles Synthesized using *Zingiber officinale* and *Azadirachta indica*

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Abstract
The study investigates the synergistic effects of silver nanoparticles (AgNPs) synthesized using *Zingiber officinale* (ginger) and *Azadirachta indica* (neem) on Michigan Cancer Foundation (MCF)-7 breast cancer cells using the MTT Checkerboard Assay. The primary aim was to explore potential combinatory therapies that could enhance anti-cancer efficacy. AgNPs were synthesized using biological synthesis. The cytotoxicity of the individual and combined treatments was evaluated using the MTT assay, followed by synergy analysis with CompuSyn software. Results identified seven promising combinations that exhibited significant synergistic effects, reducing the viability of MCF-7 cells more effectively than either agent alone. With a combination index (CI) value of 0.28524, Point 7, which included a dose concentration of 0.5 mM/mL *Z. officinale*-AgNPs (ZO-AgNPs) and 0.5 mM/mL *A. indica*-AgNPs (AI-AgNPs), exhibited a strong synergistic effect compared to the remaining

synergistic points. This synergy suggests an enhanced therapeutic potential, likely due to the complementary mechanisms of action of the bioactive compounds in ginger and neem. The findings support the potential of using these natural product-based nanoparticles in combination therapies for breast cancer, providing a foundation for further *in vivo* studies and clinical evaluations.
Keywords: Silver nanoparticles; *Zingiber officinale*; *Azadirachta indica*; Synergistic effects; MCF-7 cells

ORAL-41

Anti-Proliferation Effect and Induction of PPARG Expression in Human Cervical Cancer Cells by Combination of Grape Leaf Ethanol Extract and Cisplatin

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Abstract
Cervical cancer is the growth of abnormal cells in the tissues of the cervix. Cisplatin works as an anti-cancer by attaching to the DNA of cancer cells and preventing their growth. Grape leaf extract contains polyphenolic compounds that can affect the transcription factor nuclear factor κappa B (NF-κB) and activation of Peroxisome Proliferator Activator Receptor gamma (PPARγ). Phenol compounds present in grape leaf extract reduce proliferation, and target various aspects of cancer (angiogenesis and metastasis). Grape leaf extract also has the potential to reduce the side effects of chemotherapy drugs. Cisplatin is combined with polyphenolic compounds to suppress cisplatin side effects. This study aims to analyze the combination of grape leaf ethanol extract (Vitis vinifera) and cisplatin to increase peroxisome proliferator-activated receptor gamma (PPARγ) expression and inhibit HeLa cell proliferation in vitro. This research described a new combination therapy method. This research included the cytotoxicity test, proliferation test with 3-(4,5-dimethylthiazol-2-yl)-2,5- diphenyltetrazolium bromide (MTT) Assay, PPARγ expression using immunofluorescence method. The anticancer effects of grape leaf extract (2.5, 5, and 10 mg/mL) were studied through grape leaf phytochemical assays. In this study, the expression of PPARγ increased significantly in grape leaf extract 10 mg/mL + cisplatin. The combination therapy of grape leaf ethanol extract (Vitis vinifera) and cisplatin proved to be more effective than single therapy ($p < 0.05$). Cisplatin with polyphenolic active compounds (phenolics) can inhibit the proliferation of cervical cancer cells. Combination therapy of cisplatin and grape leaf extract inhibited the survival of HeLa cells.
Keywords: Grape Leaves, Cell Proliferation, Ethanol Extract, PPARγ, Phenolic Test

ORAL-42

Microplastic Pollution in Indonesian Rivers: A Mini Review of Water Contamination, Health Impacts, and Future Actions

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Abstract
Microplastics (MP) have become a significant global concern due to their impacts on freshwater environments, human health, and overall ecosystems. Indonesia's rivers are the primary source of plastic waste distribution to the ocean, and it is facing severe challenges related to MP pollution due to the large population and ineffective plastic waste management. This literature review aimed to assess the abundance, distribution, and physical characteristics (shape, size, and colour) of MP in Indonesian rivers. The method in this research is a literature review sourced from Google Scholar, and data analysis was carried out descriptively. The highest abundance of microplastics for sediment was found in Citanduy River, West Java, with an abundance of 18,190-70,405 particles/kg dry weight. Meanwhile, the highest abundance of water was found in Metro River, East Java, with a range of 0.8 - 1.61 particles/mL. Java Island has the highest MP abundance. MP pollution is dominant in small microplastics (SMP) size, transparent colour, and fragment shape. MP particles will damage organisms from low to high trophic levels through the bioaccumulation process. It will also potentially affect human health.
Keywords: Microplastics; Indonesia; Pollution, Rivers, Health.

ORAL-43

Lead-Resistant Bacteria in Heavy Metal Polluted Agricultural Soils Near Lapindo Mud Volcano

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Abstract
The 2006 Lapindo mud disaster released heavy metal-laden mud into the Porong and Aloo Rivers, essential for irrigation and fisheries. The presence of lead (Pb) in agricultural soil poses severe risks to food safety, ecosystems, and human health. This study aimed to identify soil

bacteria capable of bioremediating Pb-contaminated agricultural lands in the Tangulangin district of Sidoarjo City, East Java, Indonesia. Soil samples were collected from Polo-Gunting village (LP) and Glagah-Arum (LGA). Sixty bacterial isolates were screened, with four (LGA.1, LP.1, LP.8, and LP.19) demonstrating the highest Pb resistance. The isolates were tested for growth efficiency at varying Pb concentrations and optimal culture conditions. Notably, LGA.1 and LP.8 showed significant growth at 1,200 ppm Pb, while LP.8 and LP.19 thrived at 900 ppm. The most effective isolates reduced Pb concentrations substantially within seven days. Identification through 16S rDNA sequencing revealed specific bacterial strains with high resistance. These findings highlight the potential of these bacteria as bioremediation agents for Pb-contaminated soils, promoting sustainable agricultural practices in the affected region.
Keywords: Bioremediation, Lapindo Mud, Volcanic Area, Agricultural Soil Bacteria, Pb Contamination.

ORAL-44

Study of Periodontal Cell Growth on Human Amniotic Membrane Impregnated with Tualang Honey

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Abstract
Human amniotic membrane (HAM) has been highly studied as a scaffold in periodontal regeneration. Its low immunogenicity, anti-inflammatory properties, and ability to provide a surface for cell attachment and proliferation have made it a promising scaffold. On the other hand, honey helps in periodontal regeneration by reducing inflammation and preventing bacteria and biofilm formation. This study aimed to investigate the growth of human periodontal ligament fibroblast (HPDLF) cells on the human amniotic membrane (HAM) impregnated with Tualang honey. HAM was soaked in 0.02% and 0.3% concentration of Tualang honey and incubated at 37°C for 24 hours. HPDLF cell was seeded on HAM with Tualang honey, and its proliferation was analyzed for days 1, 3, 7, 14, 21 and 28 using Presto blue reagent. HAM samples for day 1 and 28 were prepared for scanning electron analysis. HAM without honey was used as a control. The result shows that the proliferation of HPDLF cells on HAM with Tualang honey and control increased from day 1 until day 28. However, cell proliferation on HAM with Tualang honey was higher than control. Meanwhile, the cell morphology of HPDLF showed an increase in size and overlapping on day 28 compared to day 1. It can be concluded that the combination of HAM and honey gives good results in cell growth and morphology. This combination can potentially be used as a periodontal biomaterial in treating periodontitis.
Keywords: Periodontitis, human amniotic membrane, Tualang honey, scaffold, periodontal regeneration

ORAL-45

In Silico Evaluation of Curcuma longa Phytochemicals Interactions on Hypothalamic-Pituitary-Adrenal Axis Pathway Protein (HPA Axis): Traditional Malay Medicine Mechanism Study

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Abstract
Curcuma longa (turmeric) has been extensively used in traditional Malay medicine for postnatal care and is believed to possess therapeutic properties that may be beneficial for postpartum depression (PPD). Current mechanisms of *C. longa* for PPD treatment have deficient scientific evidence, requiring exploring phytochemical and target protein interactions for therapeutic studies. This study investigates the role of *Curcuma longa* in regulating the hypothalamic-pituitary-adrenal (HPA) axis through molecular docking and molecular dynamic simulations, followed by network analysis. Bisdemethoxycurcumin (BDMC) phytochemical selected by screening through ADME analysis exhibited stable binding interactions with glucocorticoid receptor (GR) with docking score – 7.5 kcal/mol. This binding suggests that BDMC can effectively activate GR, suppressing CRH and ACTH synthesis. Consequently, BDMC may suppress cortisol production through a negative feedback mechanism, thereby regulating the HPA axis. The protein-pathway mapping revealed that BDMC's interaction with target proteins could significantly impact various biological mechanisms, including hormone balance, stress response, and mood regulation. These findings highlight BDMC as a promising candidate for regulating the HPA axis and treating PPD. These can facilitate the development of new treatments targeting the underlying physiological signalling pathways in PPD.
Keywords: TMM*; Curcuma longa*, Molecular Docking; Molecular Dynamic Simulation, PPD

ORAL-46

Analysis of the Potential of Arbuscular Mycorrhizal Fungi (AMF) as a Biofertilizer in Increasing Plant Productivity and Realizing Sustainable Agriculture

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Abstract
The agricultural sector is a sector that has a vital role in driving the economy and meeting food needs in a country. In practice, to increase crop yields and the export-import process, the state supports the massive use of inorganic fertilizers through pesticide subsidies, which result in long-term environmental damage. One of the efforts to realize sustainable agriculture, increase agricultural productivity, and reduce adverse environmental impacts in the long run is to use biological fertilizers in agriculture. One organism with the potential as a biofertilizer is the arbuscular mycorrhizal fungi (AMF). Arbuscular mycorrhizal fungi are important in soil fertility, plant physiology, and ecological roles. This article reviews the potential of AMF as a biological fertilizer in increasing agricultural productivity and sustainable agriculture. The method used is a literature review using secondary data from literature studies. The results showed that AMF is essential in agriculture, increasing crop productivity and sustainable agriculture by maintaining soil health, protecting against plant stress, and providing soil nutrients.
Keywords: Arbuscular mycorrhizal fungi; Agriculture Sustainability; Biofertilizer; Plant productivity.

ORAL-47

Generation of SARS-CoV-2 Virus-Like Particles in HEK-293T Cells

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Abstract
The purpose of this work was to generate and analyze SARS-CoV-2 Virus-like Particles (VLPs) in HEK-293T cells. Due to the restrictions of working directly with the virus, which necessitates BSL-3 facilities, VLPs provide an alternative technique for drug development. The work effectively created SARS-CoV-2 VLPs in HEK-293T cells by co-transfecting plasmids carrying the spike, membrane, and envelope structural proteins' genetic sequences. The electroporation method ensured effective transfection, as evidenced by Enhance Green Fluorescence Protein (EGFP) fluorescence. Plasmid isolation was confirmed by PCR, which revealed the production of DNA bands matching the targets on the Spike-EGFP, Membrane, and Envelope plasmids. The optimum antibiotic dose for HEK-293T cells was identified, yielding results with hygromycin B at 400 µg/mL and zeocin at 200 µg/mL. The VLPs were formed after plasmid transfection into HEK-293T cells, as demonstrated by EGFP fluorescence. Efficient electroporation allowed for VLP observation using fluorescence microscopy. The VLP shape was investigated in TEM with negative staining, which revealed optimum spike trimers on the SARS-CoV-2 envelope. The resulting VLPs had an average diameter of 52.94 ± 27.32 nm, which was less than the original viral size due to the employment of three structural proteins without the genomic packaging protein N. This approach can be used to generate VLPs, which are critical for drug screening against pandemics caused by viruses.
Keywords: enhanced green fluorescence protein, HEK-293T, transfection, virus-like particle

ORAL-48

Study of the Bioactive Potential of Doro Putih (*Strychnos lucida*) Extract: Phytochemical Profile, Antioxidant Activity and Cytotoxicity against Breast Cancer Cells

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Abstract
Breast cancer is a major public health concern, highlighting the need for novel therapeutic strategies using traditional plants with unexplored medicinal depths. The aim of this study was to investigate the bioactive potential of Doro Putih (*Strychnos lucida*) extract by analyzing its phytochemical profile, antioxidant activity, and cytotoxic effects against T47D breast cancer cells. Phytochemical analysis showed total phenolics and total flavonoids as 94.67 mg GAE/g extract and 48.51 mg QE/g extract, respectively. The antioxidant activity of the extract was assessed using a DPPH free radical scavenging assay, which showed antioxidant potential with an IC50 value of 226.67 µg/ml. Furthermore, the cytotoxicity of Doro Putih extract was evaluated against T47D breast cancer cells using the WST-1 assay, which showed a dose-dependent inhibitory effect on cell viability with an IC50 value of 734.78 µg/ml. These findings suggest that White Doro extract has anti-cancer potential with weak toxicity. However, further studies are needed to elucidate the mechanism and explore the potential of Doro Putih (*Strychnos lucida*) as a therapeutic agent for breast cancer.
Keywords: *Strychnos lucida*; Phytochemical; Cytotoxicity; Breast Cancer

ORAL-49

Computer-Aided and Experimental Studies of Conjugation Effect in Diimino Diphosphine-Based Compounds Towards Nonlinear Optic Application

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Abstract: Diimino diphosphine ligands containing {(-HC=N) imine group} demonstrating aliphatic and aromatic frameworks such as ethane and azobenzene exhibit different nonlinear optical (NLO) properties. In this study, two different ligands N,N'-Bis-(2-diphenylphosphinobenzyaldehyde)-ethane-1,2-diamine (A) and N,N'-Bis-(2-diphenylphosphinobenzyaldehyde)-4,4 azodianiline (B) have been synthesized with a percentage yield of 60-70% and further characterized by spectroscopic analysis. Comparative

study of computational analysis using Gaussian software with the DFT method and hybrid functional B3LYP together with basis set 6-31 ++ G (d, p) has shown good agreement. Derivatives of these compounds have all the factors required for the NLO response, such as conjugation, electron-withdrawing groups (EWG), electron-donating groups (EDG), metal mass, highest occupied molecular orbital-lowest unoccupied orbital (HOMO-LUMO) and band gap. The evaluation shows that both ligands have high NLO properties established on the value of β_{tot} at 1064 nm wavelength. Studies indicate that ligand B showed the highest NLO property with the βtot value of 11.1534 × 10^{-30} esu, followed by ligand A 10.3786 × 10^{-30} esu due to increased conjugation in the system. This is supported by the high dipole moment 5.501404 μ (D) of ligand B. These ligands can be further modified by the addition of the metals to form complexes to improve NLO properties with the β_{tot} value of complex A 24.0638 × 10^{-30} esu followed by complex B with the β_{tot} value 526.9826 × 10^{-30} esu.

ORAL-50

Metagenomics Approach for Honey eDNA Focusing Plant Species: Origin and Authentication

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Abstract
Honey, renowned for its therapeutic properties since ancient times, offers significant antibacterial advantages due to its high sugar concentration, low water content, and acidic nature. Beyond its nutritional benefits and diverse flavours, honey is a biomonitoring tool, detecting environmental toxins and pollutants by analyzing pollen and other bee-derived products. Traditional techniques like melissopalynology and biochemical studies have been used to verify honey's geographical and botanical origins but come with limitations. Emerging DNA barcoding and metagenomics techniques have revolutionized honey authentication, precisely identifying floral sources and enabling traceability of honey origins. The progress in honey eDNA metagenomics is explored, highlighting their roles in exploring biodiversity, verifying honey authenticity, and identifying plant species. The potential of DNA-based techniques to overcome conventional challenges and their implications for sustainable honey production and bee health are discussed. A significant gap in the literature is identified: the lack of metagenomics research focused on Southeast Asian honey. Addressing this gap is crucial for understanding the microbiome of regional honey and its health and industry implications. Future research should aim to enhance the reliability and accuracy of honey metagenomics by improving reference databases, developing universal primers, and implementing long-read sequencing technologies.
Keywords: eDNA Metabarcoding, Metagenomics

ORAL-51

Two-Stage Blocking Mechanism in Crossflow Filtration System Using *Neolamarckia cadamba* Nanofibrillated Filter Paper

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Abstract
This present study suggested Weisner and Aptel's pore-blocking models to investigate the blocking filtration mechanism at different dosage ratios for the treatment of synthetic dye. This study utilized empirical models describing the decline in permeate flux for a crossflow filtration system to fit the experimental results, aiming to identify the fouling phenomena at various cellulose dosage ratios of nanofibrillated (NFC) filter paper. NFC filter paper was fabricated from *Neolamarckia cadamba* or commonly known as "*kelempayan*". The combination method of papermaking was applied in between NFC and bleached pulp at different dosage ratios to produce filter paper. A detailed study on the investigation of the fouling behaviour involved in the removal of Methyl Orange (MO) dye using NFC filter paper was carried out. The result showed that NFC filter paper and MO dye interaction generated different blocking mechanisms and was interpreted in two stages of 3 hours of operational condition. The decrease in flux decline analysis could be further supported by the increment of the nanocellulose consisted in the filter paper, which led to cake layer formation. Therefore, it can be concluded that the cake formation mechanism dominated the removal process and proved the effectiveness of NFC filter paper in terms of colour removal and normalized flux analysis.
Keywords: Blocking filtration laws, NFC filter paper, Filtration, Methyl Orange, Kelempayan

ORAL-52

IComPBag – An Innovative Positioning Device

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Abstract
In the medical field, patient positioning systems are crucial for successful operations and injury prevention. Traditional systems like gel pads have limitations, including the need for multiple OR personnel, radiopacity on x-rays, and high costs. To address these issues, the authors, in

collaboration with Malaysian Armed Forces Healthcare Services, developed IComPBag, a locally made, portable, reusable/disposable inflatable positioning device. IComPBag is designed for surgeries in maxillofacial, otorhinolaryngology-head and neck, orthopaedics, endocrinology, and obstetrics. It features an inflatable bag, connecting tube, hand-held pump, puncture tube, safety clamp, and adjusting screw. Made from Renolit Solmed Medituub, it offers superior safety and ease of use, reducing infection risk and pressure points. In clinical trials at Tuanku Mizan Armed Forces Hospital, IComPBag significantly reduced positioning time (125.2 sec vs. 261.8 sec, $P < 0.001$) and required fewer staff compared to gel pads. Feedback highlighted its ease of use, portability, durability, and cost-effectiveness (RM150 per unit). No complications were reported. Since 2019, IComPBag has been widely distributed and utilized in numerous Ministry of Health hospitals in Malaysia. Its innovative design and effectiveness have earned multiple awards. In conclusion, IComPBag is a cost-effective, safe, and innovative solution for patient positioning that is suitable for various surgeries and medical procedures. Its unique features make it a viable alternative to conventional positioning devices.

Keywords: patient positioning, inflatable device, IComPBag

ORAL-53

Isolation and Screening of Nanocellulose Producing Bacteria from Pineapple Wastes

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Abstract

Bacterial nanocellulose (BNC) has many unique properties, such as high purity, porosity, and water capacity compared to plant cellulose. This study was conducted to isolate potential BNC-producing bacteria from pineapple wastes (1st pond, old pineapple wastes, fresh-pressed pineapple peel juice, and fresh pineapple peel waste). A total of 11 bacteria were successfully isolated from these pineapple wastes. All the isolates were screened for BNC production in Hestrin and Schramm (HS) media at 30°C. After ten days of static incubation, all 11 isolates produced BNC in the culture medium. The BNC produced by each isolate was purified using an alkaline treatment method and oven-dried at 60°C until it reached a constant weight. The dry weight of the BNC was recorded, and isolate F1 produced the highest BNC with a dry weight of 1.68 ± 0.19 g/L. Hence, it was chosen as the best BNC producer for further studies. The Gram-negative F1 isolate was analyzed by 16S rRNA sequencing. Based on the results, the F1 isolate was identified as *Comamonas terrae* YSZ sp. To the best of our knowledge, this is the first study to report the potential of *C. terrae* YSZ sp. as a BNC producer.

Keywords: Bionanocellulose, Pineapple wastes, *Comamonas terrae*

ORAL-54

Molecular Weight of *Rhizomucor pusillus* Cellulase via Fermentation

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Abstract
There is a renaissance in developing robust lignocellulose degrading enzymes in view of the high cost of lignocellulose degrading enzymes which affect subsequent enzymatic hydrolysis of biomass to biofuel. A decade to date, enzyme potentials related to the genus Rhizomucor have been confined to pectinase, and other enzymes like cellulase have been contemplated. *Rhizomucor pusillus* AK2 was screened for cellulase potential through Carboxymethyl cellulose (CMC) agar plate. The strain was further subjected to Solid State Fermentation (SSF) with Oil Palm Mesocarp Fiber (OPMF) as substrate. The fermentation broth was assayed quantitatively and characterised via Sodium Dodecyl Sulphate-Polyacrylamide Gel Electrophoresis (SDS Page) SDS. The enzymatic index on the CMC plate was observed to be ≥ 1.5 and the Mw 20 to 36 was revealed. This study reveals potential enzymes produced from *Rhizomucor* to include cellulase that can be used in enzymatic hydrolysis.
Keywords: Cellulase; SSF; Molecular weight; *Rhizomucor pusillus*; OPMF

ORAL-55

The Effect of Fluid Restriction Monitoring Guidelines Using the Heart Failure Self-Care Application (ATRIA) on Reducing Risk of Fluid Retention in Heart Failure Patients at Dr. Saiful Anwal Hospital Malang

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Abstract
Heart failure patients are often at risk of rehospitalization due to recurrent symptoms such as dyspnea, edema, pulmonary congestion, and rapid weight gain resulting from fluid retention. Therefore, this study aimed to analyze the impact of guided fluid restriction using the ATRIA application on the risk of fluid retention in heart failure patients. The quasi-experimental method was used with a post-test-only control group design. Simple random sampling was

conducted to select respondents, with the intervention group given the ATRIA application and the control group receiving a booklet intervention. The study duration was four weeks, with 16 respondents in the intervention group and 15 in the control, all from Dr. Saiful Anwar Hospital in Malang. Data analysis used an independent sample t-test to assess differences in body and weekly weight changes. The results showed no significant difference in body weight between the intervention and control groups each week, with a p-value > 0.05. Similarly, there was no significant difference change in body weight between the two groups, with a p-value > 0.05. In conclusion, no distinction was observed between the ATRIA application and the booklet concerning fluid restriction guidelines for reducing the risk of fluid retention in heart failure patients. The results suggested that nurses could provide educational services and monitor the condition of heart failure patients using either an application or a booklet. Future studies were recommended to analyze factors that might impact weight loss in heart failure patients at risk of fluid retention.
Keywords: heart failure, ATRIA, fluid retention.

ORAL-56

Prebiotic Potential of Pineapple and *Curcuma xanthorrhiza* Rhizomes Solventless Extracts towards *Lacticaseibacillus paracasei* Proliferation

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Abstract
For the past few decades, plant derivatives have been patronized in multiethnic Malaysia as traditional and complementary medicines. Plant extracts that are rich in bioactive compounds have shown remarkable positive impacts on probiotics in the gut. Therefore, this study aimed to examine the effects of selected plant extracts on the proliferation of the *Lacticaseibacillus paracasei* (*L. paracasei*) strain. Solventless extract of pineapple flesh, pineapple waste, *Curcuma xanthorrhiza* rhizome and a mixture of pineapple flesh and Curcuma xanthorrhiza rhizome was supplemented to liquid media and tested on L. paracasei in a shake flask as a bioreactor for cell density, pH, postbiotic metabolites and bioactivities. Among all extracts tested, *Curcuma xanthorrhiza* extract exhibited the highest cell density (1.4179), proteolytic (12.012 U/mL), and the lowest pH. Pineapple flesh extract also showed the lowest pH value (5.685) and indoles (3.774 ppm). The mixture extract demonstrated the highest postbiotic metabolite of lactic acid (538.812 ppm), phenolics (222.494 ppm) and indoles (16.942 ppm) with antioxidative capacity (IC50 2.3347). Saccharide utilization was observed for all tested extracts after 8 hours of fermentation, exceeding 85%. The findings demonstrated that all plant extracts stimulated *L. paracasei* growth and exhibited prebiotic properties, suggesting their potential commercialization as new functional foods and beverages.
Keywords: *Curcuma xanthorrhiza*, lactic acid, *Lacticaseibacillus paracasei*, pineapple, solventless extract

ORAL-57

Preparation and Characterization of *Andrographis paniculata* Extract Loaded onto Chitosan-based Nanoparticles

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Abstract
Andrographis paniculata (AP) is a multipurpose medicinal herb native to Malaysia with prominent anticancer properties. The main obstacles to its clinical value are ineffective drug loading and release. Thus, this study aimed to screen and characterize the important variables of AP extract loaded onto chitosan nanoparticles to synthesize nanoparticles of a specified size. Nine formulations were prepared and tested for their particle size, polydispersity index (PDI), and encapsulation efficiency by altering the mass ratio of chitosan to tripolyphosphate (2:1, 4:1, and 6:1) and reaction duration (30 min, 60 min, and 90 min). The most promising formulation was then examined for zeta potential, shape, and stability. The optimum formulation had a size of 79.68 ± 0.30 nm, a PDI of 0.200 ± 0.013, and an encapsulation efficiency of 81.71 ± 1.486 %. The selected formulation's zeta potential was measured at −4.60 ± 0.711 mV, and the micrographs revealed spherical and smooth-surfaced nanoparticles in dispersion. These findings indicate that the nanoparticles prepared were able to acquire relatively tiny sizes below 600 nm under specified conditions.
Keywords: *Andrographis paniculata*, anticancer, chitosan nanoparticle, polydispersity index, zeta potentia

POSTER-1

Extraction, Characterization, and Assessment of Biological Activities of Anthocyanin Pigment from *Solanum melongena* Fruit Peels

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Abstract
The scientific community has become interested in anthocyanins primarily because of their broad variety of potential applications. Multidrug resistance (MDR) has grown to be a significant problem in the treatment of pathogenic bacterial infections. The use of anthocyanin extracted from *Solanum melongena* peels is a promising strategy for combating medication resistance in a variety of pathogens that cause deadly diseases. Anthocyanin dye was extracted from *Solanum melongena* and characterized by using UV-vis spectroscopy (UV-vis), Fourier transform infrared spectroscopy (FTIR), and gas chromatography mass spectrometry (GC-MS). Various biological activities of the dye were examined in both *in vitro* and *in vivo* settings. The *in vitro* investigation involved testing the role of anthocyanin as an antibacterial agent. The results showed values of inhibition zones (19.33±0.42, 18.33±0.42, 15.30±0.50, 14.63±0.50, 8.4±0.42, and 17.80±0.42) mm for *Serratia marcescens*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Bacillus cereus, proteus mirabilis*, and *Candida albi*cans, respectively. The highest antioxidant value of 83.10±0.017 was achieved using the highest dye concentration.
Keywords: Anthocyanin; *Solanum melongena* peels; Antibacterial; Antioxidant.

POSTER-2

Curcuma zanthorrhiza Gel Extract as Novel Alternative Post-Intervention Therapy for Tooth Extraction in DM Patients

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Abstract
Introduction: Diabetes mellitus (DM) is a major health problem with more than half a billion sufferers. Indonesia ranks fifth in countries with the most cases. The predominance of AGEs in patients with DM can cause dysfunction and increase cell death, which inhibits post-extraction wound healing. *Curcuma zanthorrhiza* (*temulawak*) has active ingredients, namely curcumin and flavonoid, which may accelerate wound healing. This study aims to determine the effect of *Curcuma zanthorrhiza* gel extract as a novel alternative treatment for wound healing after tooth extraction. **Method:** We conducted a true experimental post-test with a control group using an in vivo study design to evaluate the effect of *temulawak* gel extract administration on alloxan-induced diabetic Wistar rats. Diabetic rats had their teeth extracted, and test materials were subsequently administered to them in groups. Each group received either CMC-Na placebo gel, gengigel, or *temulawak* extract. The histopathological specimens were then evaluated for their macrophages and neutrophils. **Result & Discussion:** The average number of macrophages and neutrophils in the *Curcuma zanthorrhiza* (P1, P3, P5)

group was higher than the positive control group (K+1, K+3, K+5). According to the Post Hoc LSD test, there was a significant difference between the two groups on day 3 and day 5 ($p<0.001$). In addition, a decreasing number of macrophages and neutrophils was found in the treatment group, indicating no persistent inflammation. This might occur due to the immunostimulating and anti-inflammatory role of *temulawak*. **Conclusion:** *Curcuma zanthorrhiza* gel extract may be considered a potential therapy for wound healing after tooth extraction in DM patients.
Keywords: *Curcuma zanthorrhiza*; wound healing; tooth extraction; diabetes mellitus

POSTER-3

In Silico Investigation of Phytochemicals from *Nigella sativa* and Its Interaction on Kynurenine Pathway in Traditional Malay Medicine: A Mechanism Study

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Abstract
Postpartum depression (PPD) poses significant challenges to maternal mental health globally. Practitioners have been using *Nigella sativa* seeds traditionally to treat PPD symptoms among mothers. The study aimed to identify potential bioactive compounds from *Nigella sativa* and its molecular mechanisms underlying the efficacy of modulating proteins associated with PPD in the kynurenine pathway using an *in silico* approach. The utilization in silico techniques based on the IMPPT database managed to classify phytochemical constituents present in *Nigella sativa* seeds known for their pharmacological properties. Subsequently, thymoquinone, thymol and carvacrol were docked to a potential target identified in PPD pathophysiology, including interleukin-1β (IL-1β), indoleamine-2,3-dioxygenase 1 (IDO1), and kynurenine aminotransferase (KAT) prior to molecular dynamic. IDO1 resulted in the highest interaction and binding affinity with carvacrol at -6.6 kcal/mol, showing significant inhibition ability of the compound towards the target protein. Furthermore, network interaction analysis using Cytoscape identified the closest pathway, i.e., the serotonin pathway, which is related to the kynurenine pathway via tryptophan, which is a precursor for serotonin, a hormone that regulates mood and emotion. This integrative approach provided insights into the complex molecular networks underlying PPD. The findings highlighted the ability of specific phytochemicals from *Nigella sativa* to modulate neuroinflammation, oxidative stress, and neurotransmitter imbalances implicated in PPD, which could contribute to the development of novel therapeutic strategies for its management.
Keywords: Postpartum depression; *Nigella sativa*; kynurenine pathway; molecular docking and dynamic simulation

POSTER-4

Larvicidal Efficacy of Pulutan (*Urena lobata* L.) Leaves Extract Granules for *Aedes aegypti*

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Abstract
Plant extracts contain bioactive compounds that can eradicate mosquito larvae. This study aims to determine the effective concentration of granules made from the ethanol extract of Pulutan (*Urena lobata L*) leaves to cause death and changes in the morphology of *Aedes aegypti* larvae. The samples were *Ae. aegypti* third larval instar, which was selected using simple random sampling and divided into 5 groups (i.e two control groups (Placebo (K-) and temephos 1% (K+)) and three treatment groups (T1, T2, and T3, which contains Pulutan leaves extract granules with a concentration of 14%, 19% and 24%, respectively). Each group consisted of 25 larvae with 6 replications. After 24 hours of exposure, 52-90% of larvae were found dead at a concentration of 19-24%. Meanwhile, after 48 hours, 100% of larvae died at all concentrations. Larval mortality rate was higher with longer exposure time. At a concentration of 19-24%, granule ethanol extract of Pulutan leaves was effective in eradicating larvae with the following morphological changes: darkened colour in the entire larvae, shortened antennae, digestive tract disruption, darkened siphon, ruptured cuticle, damage to the anal papilla and loss of setae hair.
Keywords: *Aedes aegypti*; granules; larvicide; *Urena lobata* L

POSTER-5

Potential of Fermented Juwet Fruit on Testosterone Hormones and Testicular Histopathology of Alloxan-Induced Diabetic Rats

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Abstract
This study aims to determine the potential of fermented juuwet fruit on the testosterone hormone and spermatogenesis of alloxan-induced diabetic rats. The design used in this research was a Completely Randomized Design (CRD) with 4 treatments, each consisting of 5 replications. The treatment lasted for one month; each feed treatment tested was as follows: K- as negative control (given food and drink only), K+ (positive control) (given alloxan at a dose of 150 mg/kg BW), P1 (given alloxan dose of 150 mg/kg BW and fermented juwet fruit equivalent to 1800 mg/kg BW), and P2 (given alloxan dose of 150 mg/kg BW and glibenkelamide 0.8 mg/kg BW). The parameters observed were blood sugar levels,

testosterone hormone levels and testicular histopathology. The data obtained were analyzed using the One Way Anova test at a confidence level of 95% (α = 0.05). The results of the study showed that fermented juet fruit drink had the potential to improve testosterone hormone levels and histopathology of the testes of alloxan-induced diabetic male white rats.
Keywords: antioxidant; germinal epithelium; testosterone; seminiferous tubules

POSTER-6

Toxicity of Secondhand Smoke Exposure and Protection of Coffee Leaf Extract Against Histophysiology of the Lungs of Male Mice

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Abstract
The bad effects of cigarette smoke for active and passive smokers, among others, can cause disturbances in the respiratory tract and lungs. Secondhand smoke exposure is a source of free radicals which can trigger oxidative stress. Excess free radicals can be minimized by administering exogenous antioxidants by utilizing coffee leaves. A study has been carried out which aims to determine the toxicity of cigarette smoke exposure and the protection of coffee leaf extract against the histophysiology of the lungs of male mice. The experimental design used was a completely randomized design (CRD) with five treatment groups (n = 6). Mice not secondhand smoke exposure (K), mice secondhand smoke exposure and given 0.5% Na-CMC (T0), mice secondhand smoke exposure and given coffee leaf extract 60 mg/kg/day (T1), 120 mg/kg/day (T2) and 180 mg/kg/day (T3). Treatment of exposure to secondhand smoke (one stick/day) and administration of coffee leaf extract orally was carried out for 35 days. At the end of the study, the mice were sacrificed, and histological preparations for the lungs were made using the paraffin method. The parameters observed were the number of alveolar macrophages and the interalveolar diameter of the mice's lungs. The results showed that the control and coffee leaf extract treatment in mice exposed to secondhand smoke had a significant ($P<0.05$) effect on the number of alveolar macrophages and the interalveolar diameter of the mice's lungs. It can be concluded that the administration of coffee leaf extract can reduce the number of alveolar macrophages and lung interalveolar diameter of male mice exposed to secondhand smoke.
Keywords: coffee leaves, cigarettes, oxidative stress, lungs

POSTER-7

Test of Fatty Acid Content in Traditional Oil and Virgin Coconut Oil with Various Volume Ratio by Spectrometry

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Abstract
Fatty acids in traditional oils and Virgin Coconut Oil are different due to treatment with and without heating in its manufacture, and in its consumption, high fatty acids will cause oxidative damage that can interfere with health. The purpose of this study was to analyse the fatty acid content in various comparisons between traditional oil and Virgin Coconut Oil to obtain the highest fat content of several oil ratios compared. The analytical methods used were spectrophotometric, namely UV-Vis, FTIR, and mass spectrometry, with samples made by volume ratio between traditional oil and Virgin Coconut Oil 1:1, 1:2, and 2:1. The results of the analyses showed that in UV-Vis, there was maximum absorption in oil with a volume ratio of 1:2 which was supported by the results of FTIR analysis through the functional groups detected in favour of fatty acids. In addition, mass spectrometry data showed the presence of specific fragments as markers of fatty acid content.
Keywords: fatty acids, traditional oils, VCO, spectrophotometry

POSTER-8

Effect of Differences in Light Spectrum on Cell Number *Chlorella vulgaris* cultured with IAA-producing bacteria and Nitrogen Fixation bacteria

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Abstract
The Industrial Revolution led to an increase in economic growth, which was in line with the increase in the need for fossil fuels. Microalgae are capable of producing biofuels, one of which is *Chlorella vulgaris*. To obtain high biomass, it is necessary to optimize the growth of *C. vulgaris*. Light quality is an important factor in the growth of *C. vulgaris*, especially in the process of photosynthesis. This research was conducted with two treatment factors, they are light spectrum and culture techniques with three replications. The light used is red (625 nm), yellow (590 nm), blue (460 nm), and white. While the culture techniques were carried out in mono-culture and co-culture (addition of IAA producing bacteria and nitrogen fixers). The data obtained were analyzed with factorial Anova 5% and further tested with DMRT 5%. The results of this research are light spectrum, and the culture technique significantly affected the number of *C. vulgaris* cells, but there was no interaction between each other. The best treatment for obtaining the highest number of *C. vulgaris* cells was 38,27x106 cells/mL by the red-light irradiation (625 nm) treatment with co-culture.
Keywords: *Chlorella vulgaris*; light spectrum; co-culture

POSTER-9

Analysis of Esters in Biodiesel Using CaO Modified Moringa Stem Powder of Various Sizes by FTIR and GC-MS

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Abstract
Biodiesel with ester content is one of the renewable energies that can be used as a substitute for diesel fuel. Making biodiesel requires a catalyst that can be modified by adding natural materials such as moringa stem powder, which varies with various particle sizes. The purpose of this study was to analyse the esters in biodiesel from waste oil using a combination of CaO catalyst and Moringa stem powder of various particle sizes. The method of analysis of esters in biodiesel synthesized from waste oil and modified catalysts using FTIR and GC-MS. The FTIR analysis results showed a suspicion of ester functional group content and GC-MS separation of several ester compounds and identification as ester fragments in biodiesel.
Keywords: biodiesel, CaO, moringa stem, FTIR, GC-MS

POSTER-10

Modification of the Kato-Katz Diagnostic Technique Using "*Canang"* as Flower Waste Extract for Staining *Ascaris lumbricoides* Eggs

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Abstract
Neglected Tropical Diseases (NTDs) are caused by various pathogens, including viruses, bacteria, protozoa, and parasitic worms. *Ascaris lumbricoides* is one of the parasites that causes NTDs, with a global prevalence rate of 11.01% and reaching 32.02% in Indonesia. One method for preventing and controlling *Ascaris lumbricoides* infection is through identification by the Kato-Katz diagnostic technique. Using synthetic dyes, such as methylene blue, in the Kato-Katz method raises concerns for human health and the environment. In humans, methylene blue causes skin irritation, gastrointestinal issues upon ingestion, and systemic effects. Furthermore, its environmental impact includes reducing light penetration and acting as a toxic component in food chains. An alternative approach involves utilizing post-use offerings from Hindu rituals in Bali, known as *Canang*, which consist of flower components such as *Impatiens balsamina L.* and *Tagetes erecta*. Natural dyes found in these flowers serve as an alternative staining method. This research is conducted using an experimental approach, which consists of several processes, such as the extraction of dyes from *Canang* flower waste, preparation and absorption tests of cellophane using organoleptic

testing techniques, detection and morphological identification of *Ascaris lumbricoides* eggs using the Kato-Katz technique, and analysis of heavy metal contamination levels. Modification of the Kato-Katz diagnostic technique using *Canang* flower extract as a stain showed improved visibility of *Ascaris lumbricoides* eggs. *Canang* flower extract acts as a natural stain, providing an environmentally friendly and cost-effective alternative for parasite diagnosis. These results indicate broad potential applications in parasitology.
Keywords: Kato-Katz, *Ascaris lumbricoides*, *Impatiens balsamina L.*, and *Tagetes erecta.*

POSTER-11

Clear Cell Sarcoma Transformation in Post Immunotherapy Patient with Malignant Melanoma

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Abstract
Melanoma is a malignant tumour from skin melanocytes that commonly affects the elderly. It causes the most mortality incidence among all skin tumours. At the same time, Clear cell sarcoma (CCS) is a rare malignant tumour of soft tissue and mostly occurs in the distal extremities of young adults. We reported a case of a 72-year-old female with a darkly pigmented intraoral tumour. Biopsy results showed highly pleomorphic tumour cells with prominent eosinophilic nucleoli and focal areas with melanin pigment. Tumour cells expressed Melan-A diffusely on immunohistochemistry. The tumour was first successfully treated using immunotherapy but recurred a few years later. A biopsy of the recurrent specimen showed a gray-white mass with different histopathological features, consisting of spindle cells with pleomorphic nuclei and giant cells within myxoid stroma. S100, EMA, and HMB45 immunostaining were also performed. Malignant melanoma (MM) is known as the great mimicker in pathological perspectives due to its microscopic features' resemblance with many other malignancies, including Clear cell sarcoma if pigment and epidermal involvement is difficult to find. Moreover, both entities show the same immunohistochemical characteristics because CCS also has a melanocytic phenotype, making it more difficult to differentiate. Therefore, clinicopathological correlation is needed to elaborate the final diagnosis, and molecular examination of EWSR1-ATF1/CREB1 rearrangement is also suggested to distinguish both entities if available.
Keywords: melanoma; clear cell sarcoma; immunohistochemistry

POSTER-12

Nanotechnology in Forestry: Overview of FRIM's R&D

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Abstract
Forest, being the source of various lignocellulosic materials and phytochemicals, has a wealth of untapped potential that could be exploited to produce sustainable, biodegradable nanosized materials as well as active ingredients with intriguing features for use in forest-based industry itself or across many different application fields such as healthcare, biomedical, cosmeceutical, pharmaceutical and many others. The forest-based products sector could also utilize a variety of readily available nanomaterials and phytochemicals to enhance the performance of existing products or develop new and high-value products from the forest. This paper highlights recent advancements in the field of nanotechnology with some aspects of biotechnology carried out by FRIM towards application in forest and non-forest sectors.
Keywords: forestry, nanotechnology, biotechnology, wood, phytochemical

POSTER-13

Leveraging Nanocellulose from Biomass Waste for Advanced Smart Packaging

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Abstract
In Malaysia, a staggering 103 million tons of biomass are produced annually, with 91% originating from agricultural waste, notably palm oil mill residues. This abundant biomass represents a prominent resource for producing nanocellulose (NC), a versatile material derived from both crystalline and amorphous regions of cellulose. Nanocellulose exhibits several remarkable properties, such as a high surface area, abundance, and biodegradability, making it an attractive candidate for various innovative applications. One significant application of nanocellulose is in developing smart paper, a value-added product designed to enhance the quality and functionality of packaging materials. Smart paper incorporates active components to extend shelf life and improve product quality and interactive components to provide real-time information. Previous studies have demonstrated the potential of smart bamboo packaging, utilizing nanocellulose as a pulp-strengthening agent and incorporating electrospun nanofibers with thermochromic ink to detect temperature changes in food storage. Building on these advancements, our research explores the combination of nanocellulose with pH and thermal sensor dyes to produce a biodegradable sensor. Additionally, we investigate the incorporation of guanidine polymer and essential oils for their antimicrobial properties, aiming to prevent food spoilage. This innovative approach leverages the unique properties of nanocellulose to create multifunctional packaging materials that enhance food safety and extend shelf life, ultimately contributing to sustainability and waste reduction in the agricultural sector.
Keywords: Nanocellulose, Smart Packaging, Biomass Waste, Antimicrobial Properties

POSTER-14

Enhancing Wood Durability: The Role of Nanocoatings

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Abstract
Wood, widely used for its aesthetic and structural qualities, faces durability challenges due to exposure to moisture, UV radiation, and biological decay. Traditional treatments often fall short of providing long-term protection while maintaining wood's natural properties. Due to their unique properties, nanocoatings offer superior protection by forming an invisible barrier that safeguards against environmental and biological threats without compromising the wood's appearance and strength. By applying advanced nanotechnology-based coatings, we can develop a series of coatings that significantly improve wood's resistance to these degrading elements while preserving its natural appearance. Therefore, this study explores the synthesis, application methods, and performance evaluation of nanocoatings, highlighting their potential, especially in improving wood durability. This innovative approach perhaps can offer a promising solution for extending the lifespan of wood products in various applications, from construction to furniture making.
Keywords: Nanocoatings; wood; durability; green coatings; sustainability

POSTER-15

Optimization of Nanofibrillated Cellulose Production from Oil Palm Trunk: A Pathway to Sustainable Product Development

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Abstract
Nanofibrillated cellulose (NFC) has emerged as a promising material for various industrial applications due to its exceptional properties and eco-friendliness. This study focuses on the optimization of NFC production from lignocellulosic biomass, viz. oil palm trunk (OPT), to foster sustainable product development. The optimization process involved the extraction of cellulose fibres from OPT followed by enzymatic and mechanical fibrillation to obtain NFC via Response Surface Methodology (RSM). Various parameters such as temperature, incubation time, agitation rate, enzyme concentration and solid loading were optimized to enhance the yield and quality of NFC in terms of its solid content, diameter size and zeta potential. The optimized solid content of 95.71±0.26%, diameter size of 57.62±4.90 nm and zeta potential of 21.79±0.07 mV were obtained at optimized conditions of 39 hours (incubation time), 45°C (temperature), 0.15 w/v (solid loading), 0.14 w/v (enzyme concentration) and 214 rpm (agitation rate). Furthermore, the influence of these parameters on the mechanical, thermal, and morphological properties of NFC was investigated to ensure its suitability for intended

applications. The sustainability aspect is emphasized by utilizing lignocellulosic biomass as a renewable and abundant source for NFC production, thereby reducing environmental impact and promoting circular economy principles. The optimized NFC production process offers a pathway towards the development of sustainable products with enhanced performance and eco-credentials, contributing to the advancement of green technologies and circular economy initiatives.

Keywords: Oil palm trunk (OPT), enzymatic hydrolysis, mechanical fibrillation, nanofibrillated cellulose (NFC), response surface methodology (RSM).

POSTER-16

The Potential of Charcoal and Wood Vinegar as Sustainable Natural Medicine

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Abstract
Forest biomass, such as *Dyera costulata* (Jelutong), mangroves and bamboo, can be converted through pyrolysis to produce charcoal. Due to its large surface area, this fuel-based product functions as an efficient adsorbent. Besides being a food additive, charcoal is also used to cure diarrhea, lower cholesterol, and prevent gas and bloating. Wood vinegar is a by-product of the manufacturing of charcoal and contains organic acids, phenols, and other compounds. These substances support the antioxidant properties of wood vinegar. Wood vinegar can be used as a viable substitute for synthetic antioxidants that may have adverse consequences due to its possible antioxidant function. Food and medicine have both included natural antioxidants. The phenolic compounds can also be used as food additives and as intermediates in the production of pharmaceuticals due to their anti-diarrheal and germicidal effects, among other benefits. However, because wood vinegar includes certain carcinogens, like phenol and 2-methylphenol, the phenolic chemicals that were extracted from it cannot be used directly. Therefore, in order to assess the antioxidant activity and refine wood vinegar, it is imperative to determine the primary antioxidant present in the chemical.

Keywords: charcoal, wood vinegar, natural, medicine

POSTER-17

Innovation of Moringa Leaf Extract Bar Soap as an Environmentally Friendly Antibacterial Skin Care Product

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Abstract
Public awareness of natural and eco-friendly products increases the demand for natural soaps. Moringa leaves are rich in vitamins, minerals, and bioactive compounds such as flavonoids, tannins, and saponins, having antioxidant, antibacterial, and anti-inflammatory properties. This study developed solid soap from Moringa (*Moringa oleifera*) leaf extract using

the diffusion method, with water extraction at 90°C for 15 minutes. Soap with 10% and 15% concentrations of Moringa leaf extract increased skin moisture significantly compared to soap without extract. Antibacterial tests showed effectiveness against *Staphylococcus aureus* and *Escherichia coli*, with 15% extract producing a zone of inhibition of 19 mm. Irritation tests on 30 respondents showed the soap was safe and did not cause significant irritation. The pH value of the soap is 9.5, which means it is safe for the skin. Organoleptic tests showed a favourable natural aroma, soft texture, and abundant foam. Moringa leaf soap with 10% and 15% concentration is considered effective, safe, and optimal. Further research is needed for other formulations and additional benefits.
Keywords: Bar Soap, Moringa Leaf Extract, Antibacterial, Environmentally

POSTER-18

Application of Bamboo Derived Products as Medicinal Remedy and Related Environmental Study

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Abstract
Bamboo-derived products exhibit a wide range of applications in the fields of biomedicine and environmental research. The distinctive characteristics of bamboo render it suitable for the production of char (charcoal/biochar) via pyrolysis, resulting in high yields and offering potential uses across various industries, including its efficacy in detoxifying air, water, and soil. Bamboo charcoal is widely regarded as superior to conventional charcoal, boasting yields ranging from 24.60% to 74.27%, along with an absorption rate four times greater and a surface area ten times larger. Studies in the biomedical field have demonstrated the health-enhancing properties of bamboo species, showcasing their effectiveness as drug-delivery vehicles while providing protection against oxidative stress, inflammation, and cardiovascular ailments, underscoring their promising applications in medicine. Moreover, the mechanical attributes of bamboo and its abundance as a resource underscore its potential across diverse industrial sectors such as construction and energy, thereby positively influencing the environment. To summarize, the rapid growth rate, cost-effectiveness, and capacity to bear loads exhibited by bamboo biomass render it a compelling substitute for conventional materials, with potential uses in energy generation as well as eco-friendly adsorbents for detoxification of the environment and medicinal applications.
Keywords: Bamboo, Charcoal, Biochar, Medicinal Remedy, Environmental

POSTER-19

Enhancing Polylactic Acid (PLA) with Green Nanofillers for Medical Applications: An Overview

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Abstract
Recent research has increasingly focused on green nanocomposites made from biodegradable materials due to the rising demand for sustainable products. Polylactic acid (PLA) stands out as a leading candidate among polymers because of its biocompatibility and biodegradability. However, PLA has limitations such as low flexibility, impact strength, and thermal stability compared to conventional polymers, which restrict its applications. To overcome these drawbacks while maintaining biodegradability, PLA is being enhanced with eco-friendly nanofillers (NFs). This review explores various green NFs blended with PLA through different methods, comparing their impact on PLA's physical, chemical, mechanical, and other properties. By evaluating existing research, the review aims to assess the effectiveness of these enhancements and explore the potential medical applications of PLA-NF composites.
Keywords: green filler; nanofillers; polylactic acid

POSTER-20

Surface Modification of Nanocellulose Towards Its Early Potential as Drug Carrier

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Abstract
Nanofibrillated cellulose (NFC) shows significant potential and current use in diverse industries due to its renewability, abundance and intrinsic properties. However, a notable limitation of NFC is its hydrophilicity, which restricts its suitability for applications in non-aqueous environments. This study aims to synthesize hydrophobic NFC from *Macaranga gigantea* through a two-step surface modification process involving the reaction of NFC with tannic acid and an amine group. The research also examined how different alkylamines affect the properties of modified NFC. The hydrophobic NFC was analyzed using several analytical methods, including Fourier Transform Infrared Spectroscopy (FTIR), Thermogravimetric Analysis (TGA), X-Ray Diffraction analysis (XRD), Atomic Force Microscopy (AFM), elemental analysis, and contact angle measurements. The current research also explored the potential application of modified NFC as a pharmaceutical excipient to deliver water-insoluble curcumin. UV-Visible spectrophotometry was employed to analyze the binding of curcumin to modified NFC. The study revealed that the modified NFC efficiently bound a significant amount of curcumin from 80 to 87%, with varying binding capacities observed among samples with different degrees of substitution.
Keywords: cellulose; nanofibrillated; hydrophobic; curcumin

POSTER-21

Anti-Aging Bioactive Nano-Ingredient from *Aquilaria* sp.

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Abstract
Consumer awareness of skincare products derived from plants has been increasing. The application of nanotechnology in developing bioactive ingredients is an approach to ensure the final product is effective. FRIM explored the potential of *Aquilaria* sp as an anti-aging bioactive nano-ingredient by formulating Nano K. Determination of particle size and polydispersity value (PDI) of Nano K was performed using Zetasizer ZS. The particle size diameter of Nano K is 15.11±0.99nm, and the PDI value is 0.27±0.05. The low PDI value indicates that the particles in Nano K have low polydispersity of size populations. The biological activities of Nano K towards anti-aging properties were evaluated based on elastase and hyaluronidase inhibition activities; 97.12± 0.99 and 23.46% ± 2.42, respectively. Both activities reflect the Nano K's potential as an anti-aging product.
Keywords: anti-aging bioactive, nano ingredient, natural skincare

POSTER-22

Characterisation of Polymerised Agarwood Resin

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Abstract
Agarwood is an aromatic resin formed as a result of injury to the *Aquilaria* sp. tree. Known as fragrant wood, it holds significant value in the agarwood industry. Agarwood chips and essential oils are the two main products with high market demand. Another notable product from this species is agarwood resin. However, the process of extracting this resin involves solvents and is difficult to store, leading to it being often overlooked. This study aims to convert the resin into a polymer state, making it easier to handle and reshape, thereby adding value to the product. Three percent of agarwood resin yield was extracted using a solvent from low-grade agarwood chips. The resin was transformed into a polymer through aldol condensation, a reaction process in which two or more ketone carbonyl moieties of sesquiterpene and tirucallane triterpene react, followed by a dehydration step to form terpenoid polymers crosslinked by beta-hydroxyketone groups. These terpenoid groups are abundantly present in the resin. The quality of the agarwood resin was assessed before and after polymerization using Fourier-transform infrared spectroscopy (FTIR) and Head Space-Solid Phase Micro Extraction (HS-SPME) coupled with Gas Chromatograph Mass Spectrometry (GCMS). The FTIR results indicated the conversion of ketone carbonyl groups to beta hydroxyketone groups. At the same time, the major chemical compounds of the agarwood remained present in the new agarwood bio-composite resin.
Keywords: Aquilaria, Agarwood, Resin, Aldol Condensation, Polymer

POSTER-23

Isolation of Galactomannan from *Leucaena leucocephala* Seeds as a Potential Nanomaterial Candidate in Drug Delivery Applications

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Abstract
Galactomannans are naturally occurring biocompatible and biodegradable non-ionic polysaccharides formed by a linear backbone chain of mannose units with galactose units as branched side groups. Besides the higher plants, galactomannan is also found in bacteria and algae. Seeds from *Leucaena lecocephala* known as ipil-ipil are reported rich in galactomannan. Due to its biocompatibility and biodegradability properties, these biopolymers have drawn the attention of many researchers to develop them as potential nano-drug delivery systems. From previous study, we managed to isolate a pure galactomannan from an aqueous extract of *L. leucocephala* mature seeds using a method which included a deproteinisation process using Sevag's reagent (chloroform: n-butanol; 4: 1)) followed by purification process using an open-column chromatographic method with DEAE-cellulose as a matrix and de-ionized water/sodium chloride solution with increasing concentrations manner as mobile-phase solvent system. Then, the isolated galactomannan was successfully converted to a nano-hydrogel drug carrier, galactomannan-TMPTA complex, with a particle size of 80 nm. In this study, we succeeded in improving the isolation galactomannan method from *L. leucocephala* to a new method that is compatible with upscaling purposes. The new method required an environment-friendly solvent (a low-concentration sodium chloride solution) instead of Sevag's reagent for protein removal and a purification process that involved the filtration of a suspension mixture of extract and matrix instead of a chromatographic method. In conclusion, the improved method is faster, cheaper, safer, and has a high percent recovery of galactomannan compared to the previous method. The characteristics of galactomannan obtained using the improved method, such as mannose to galactose ratio (1.00: 1.01), average molecular weight (64 kDa), particle size (376 nm with polydispersity index of 0.351), and HPLC, FT-IR, NMR profiles were found similar to the galactomannan obtained from the previous method.
Keywords: Galactomannan, *Leucaena leucocephala*, purification, nanomaterial, drug delivery

POSTER-24

Optimisation of Extraction Method of Isolated Compounds from *Azadirachta excelsa* by Using Laboratory Scale Extractor and Shaker Incubator

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Abstract
The previous extraction, which uses conventional maceration, was carried out on *Azadirachta excelsa* leaves; however, it requires a longer extraction time and a higher volume of solvent. Therefore, in this study, dynamic maceration was carried out using a shaker incubator and a laboratory-scale extractor specifically designed to enhance extraction efficiency. The influence of independent variables such as ethanol-to-chloroform ratio, extraction temperature, extraction time and sample-to-solvent ratio on the yield of the compounds in the extract was studied. The isolation of the compounds was carried out and their structural elucidation was elucidated by using spectroscopic methods such as Nuclear Magnetic Resonance (NMR) and Mass spectrometry. By comparison of the spectroscopy value with the literature, the isolated compounds were identified as spathulenol, α-tocopherol and quercetin 3-*O*-rhamnoside (quercitrin). Parameters such as accuracy, robustness and precision were utilized to validate the developed RP-HPLC method and resulted in RSD values less than 2.0% indicating the validity of the method. The HPLC analysis showed that the optimized extract prepared by using a laboratory scale extractor under optimal conditions had the highest concentration of marker compounds quercitrin 0.857 µg/g and α-tocopherol 1.661 µg/g compared to the shaker incubator, which only gave 0.538 µg/g quercitrin and 0.893 µg/g α-tocopherol.
Keywords: Optimisation, *Azadirachta excelsa*, HPLC, shaker incubator, laboratory scale extractor, quercitrin

POSTER-25

Essential Oil Microparticles as Powdered Fragrance Materials for Product Formulation: A Preliminary Study

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Abstract
Essential oils are the main natural sources of fragrance. Fragrances are used in product development to create a pleasant odour, mask the natural smell of some ingredients, and achieve a better version of the fragrance. Due to their liquid form, essential oils can be easily formulated into cosmetic or personal care products in liquid form, especially oil-based products. However, there are difficulties in mixing essential oils into dry powder-based product formulations. Therefore, in this study, fragrance powder containing single essential oils and/or blends of essential oils was produced by encapsulation technology. The fragrance powder was produced by mixing the supporting material (wall) with the essential oil suspension through an intensive homogenisation process. The mixture was then spray-dried, resulting in a powder with a particle size of 200μm-400μm and a 5-6% moisture content. The quality of the fragrance powder was monitored by chromatographic analysis (HS/SPME-GCMS) during one year of storage at room temperature, 4°C and 40°C. It is suggested to use the produced fragrance powder in products such as talcum powder, dry shampoo, loose powder, detergent powder as well as powdered gloves.
Keywords: Fragrance powder, essential oils, encapsulation

POSTER-26

Harnessing Microbial Dehalogenases for Environmental Remediation: A Biotechnological Perspective on Combatting Chemical Pollution in Ecosystems

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Abstract
The widespread application of chemical pesticides, coupled with the rapid expansion of large-scale industries worldwide, poses a significant threat to agricultural land, natural ecology, and human well-being. Besides that, with the agricultural and industrial activities of controlling agricultural pests, various insecticides, fungicides, and herbicides have entered environments such as meadows, pastures, rivers, and forests. The uncontrolled distribution of these chemical pesticides into the environment endangers living lives. Likewise, humans and animals can ingest pesticide residues through food. Bacterial enzymes called dehalogenases, which can break down carbon-halogen bonds in halogenated non-inorganic composition, have a lot of potential uses in agricultural biotechnology, especially in organic fertilizers and environmental biotechnology. Bioremediation and phytoremediation are innovative biotechnology ways that offer practical solutions for environmental contaminants. Halogenated organic compounds, prevalent in the environment due to their widespread use in agriculture and industry (e.g., insecticides and herbicides), pose significant challenges to human health and natural ecosystems. Microbial solutions emerge as a promising approach to address this environmental health concern. Bacterial genes that degrade toxic compounds have been used widely as biotechnological agents in environmental biotechnology research. This review endeavors to offer a succinct yet comprehensive exploration of microbial dehalogenases and their significance within their respective environmental contexts.
Keywords: Herbicide; Bioremediation; Bacterial genes

POSTER-27

Feeding Cysteine to Enhance the Production of Organosulfur Bioactive Compounds in Cell Suspension Cultures of Single Garlic (*Allium sativum* L.)

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Abstract
Precursor feeding in cell suspension culture is one of the effective strategies to induce and increase the production of bioactive compounds in plants. This study aimed to investigate the effects of different feeding cysteine on cell suspension growth and organosulfur bioactive compound production in cell suspension of single garlic (*Allium sativum* L.). The initiation of

suspension culture was carried out by transferring a single garlic friable callus to liquid MS media supplemented with 0.5 mg/L kinetin and 0.3 mg/L 2,4 D. The addition of 5 mM to 15 mM cysteine precursor to the culture media increased the biomass of cell suspension and the accumulation of organosulfur bioactive compounds. The highest fresh weight (3.053±0.005g), dry weight (2.097±0.003g), Settled Cell Volume (17%) and growth index (2.053±0.005) by 2-fold, 3.5-fold, 2-fold and 4-fold respectively compared to the control, were obtained from a media with 10 mM cysteine addition. HPLC analysis revealed 30 types of organosulfur compounds in the cell suspension culture of a single garlic. The highest major and essential organosulfur bioactive compounds were 12 detected from media supplemented with 12.5 mM cysteine (2 fold more than control). Molecular docking visualization results of ligands as a substrate with targeted proteins in the alliin biosynthesis through the cysteine pathway showed interactions in the ligand-protein complex. Feeding cysteine is an effective way to increase the production of organosulfur bioactive compounds in single garlic cell suspensions.
Keywords: single garlic cell suspensions, organosulfur bioactive compounds, cysteine, precursor feeding

POSTER-28

Optimization of Purple Sweet Potato Concentration and Storage Time on the Quality of Synbiotic Yogurt

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Abstract
Purple sweet potato (*Ipomoea batatas* L.) is a commercially valuable cultivar with several health benefits but limited utilization. This variety has higher anthocyanin pigments than other varieties, and the dietary fiber contains inulin as an oligosaccharide, which is used as a source of prebiotics, so it can increase the viability and shelf life of yogurt longer than regular yogurt. This research aimed to determine the effect of using various concentrations of purple sweet potato, storage time, and the interaction between the two on the quality of synbiotic yogurt. The research treatments were purple sweet potato concentration with levels of 0%, 2%, 4%, 6%, 8%, and 10%, and storage time with levels of 0, 7, 14 and 21 days. Parameters observed: water holding capacity (WHC), syneresis, DPPH, total phenol content (TPC) and total flavonoids content (TFC). The research results showed that increasing the concentration of purple sweet potato and the length of storage time significantly affected the quality of synbiotic yogurts, such as WHC, syneresis, and antioxidant activity of DPPH, TPC, and TFC. The interaction between the two independent variables significantly affected the quality of synbiotic yogurt only on the antioxidant activity, TPC, and TFC. The analysis results were found that the concentration of purple sweet potato 10% and the length of storage time of 21 days.
Keywords: Purple sweet potato; synbiotic yogurt; antioxidant; total phenolic content; total flavonoid content

POSTER-29

Draft Genome of an Extended-Spectrum β-Lactamase (ESBL)-Producing and Carbapenem Resistant *Klebsiella pneumoniae* Isolated from Philippine General Hospital Wastewater

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Abstract
Extended-spectrum β-lactamase (ESBL)-producing *Enterobacteriaceae* strains- are commonly associated with multidrug-resistant infections worldwide. ESBL-encoding genes are mostly located in plasmids that can easily be transferred through horizontal gene transfer, accelerating mutations, thus widening the scope of resistance. This study isolated, genotyped, and determined the draft genome of an ESBL-producing and carbapenem-resistant *K. pneumoniae* from wastewater of the Philippine General Hospital. From 100 randomly selected bacterial isolates, 32% were resistant to four or more of the β-lactam antibiotics tested. Twenty of these isolates were then selected and genotyped for the presence of β-lactamase genes. Results showed that 85% (17/20) possessed the *bla*TEM, followed by 55% (11/20) that harbored the *bla*SHV, 35% (7/20) with *bla*CTX-M and 5% (1/20) with *bla*OXA-1. The identity of one isolate that possessed multiple *bla* genes and exhibited co-resistance to carpapenem was determined to be *Klebsiella pneumoniae*. The whole genome sequence of this strain was then analyzed through Nanopore/Illumina hybrid sequencing. The mean genome size was 5.6 Mb, with an average GC content of 57.02% and coding sequences for 4,843 genes. A total of seven plasmid sequences were extracted from the assembled genome and four of them harbored antimicrobial resistance genes (ARGs). The pKPGH424-1 contained *bla*CTX-M-15 and other ARGs, pKPG424-2 with colistin-resistance *mcr8*, pKPGHWW424-3 with *erm*(42) for macrolide resistance, and pKPGHWW424-5 with *bla*OXA-48 carbapenemase gene. This study showed an ESBL- producing strains that harbored several plasmids with co-existence of ARGs that might become a threat for the spread of antimicrobial resistance to various environments. Therefore, further research regarding the ecology and epidemiology of these plasmids is necessary to understand their transmission in various environments.
Keywords: antimicrobial resistance, ESBL-producing bacteria, hospital wastewater, whole genome sequencing

POSTER-30

The Optimization of Red Bean Sprouts Protein (*Phaseolus vulgaris* L.) Extraction Process with Acid-Base Method and the Characterization of Its Functional Properties

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Abstract
The protein content of red bean sprouts is higher than red bean. Red bean sprouts' protein content was 26.41%. It can be isolated into concentrate powder or isolated protein by an acid-base method. The use of acid-base methods in the isolation of protein beans begins with the extraction process with alkaline solutions. The process of extraction in alkaline conditions produces more protein because the dissolved protein is easily separated from the residue. Variations in heating temperatures, pH, and extraction time in the isolation of nuts protein isolation also determine the yield of isolates or protein concentrates produced. The purposes of this study were to optimize the extraction process of red bean sprout protein and to obtain

a yield with the highest protein content and to determine the functional properties of red bean sprout protein extract. The research stage begins with germination and then continues with flouring. Furthermore, the optimization stage of the protein extraction process is carried out with extraction temperature, extraction pH, and extraction time variables using the Central Composite Design of Response Surface Methodology method. The chosen treatment was capable of producing yields with the highest protein content. The characterization of functional properties of red bean sprout protein extracts included water absorption, oil absorption, protein solubility, emulsion capacity, and foam capacity. The results showed that the temperature of 39.83^{o} C, pH 8.73, and extraction time of 42.28 minutes was the optimum condition for carrying out red bean sprout protein extraction with a yield of 25.23%, protein content of 79.13% with functional properties of water absorption 209,03%, oil absorption 164.84%, protein solubility 53.74%, emulsion capacity 61.35% and foam capacity 45.05%
Keywords: optimization, protein, red bean sprouts, acid-base

POSTER-31

Regulatory Mechanisms and Hormonal Biomarkers in Stereotypic Behaviour of Captive Animals

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Abstract
Stereotypic behaviour, characterised by functionless repetitive behaviour patterns, is often used as an indicator of poor welfare for a wide range of species living in captivity, from zoo animals to laboratory rodents. This review examines the regulatory mechanisms underlying stereotypic behaviour with particular emphasis on the role of improper dietary and feeding practices, alongside monotonous captive environments, incorrect feeding practices, hormonal influences, genetic predisposition, personality traits, and sex-specific differences. It also explores potential links to central nervous system dysfunctions akin to human psychological disorders such as obsessive-compulsive disorder (OCD) and autism. Additionally, the review discusses existing biomarkers and preventive strategies aimed at mitigating stereotypic behaviour. Understanding these mechanisms and identifying potential biomarkers is crucial for improving the welfare and management of animals in captivity.
Keywords: Stereotypic Behaviour; Biomarker; Dietary intake; Captive animals; Animal welfare

POSTER-32

Histology of Rats Testis after Drinking Soju

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Abstract
Soju is a traditional Korean alcoholic beverage; it can have negative effects on the body if consumed in excess. This study aimed to determine the effect of prolonged drinking soju on the histopathologic testicles of rats. The study design used was a complete randomized design with P0 = observed 0 days after the last soju consumption, P1 = observed 3 days after the last soju consumption, P2 = observed 7 days after the last soju consumption, and P3 observed 10 days after the last soju consumption. The treatment is administered orally for 30 days. Testicular histological preparations are made by the paraffin method. Histological observations were carried out with microsnos and optilabs connected to laptops. The parameters observed were the diameter and thickness of the seminiferous tubules and the presence of cell abnormalities of cells in the seminiferous tubules. The quantitative data obtained tested statistically with the SPPS for Windows program, while the qualitative data were presented in a figure and descriptions. The results showed that the length of time stopped drinking soju affected the thickness of the seminiferous tubules, the number of necrotic cells and the number of spermatogenic cells. The length of time stopping soju decreases the number of necrotic cells and increases the number of spermatids. The thickness of the seminiferous tubules gets better after the treatment of drinking, soju is stopped for longer.
Keywords: rats; histology; soju

POSTER-33

Characterized *Moringa oleifera* Lamk Leaves as Free Radical Scavenger

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Abstract
Moringa oleifera leaf was an important plant due to its rich medicinal and non-medicinal benefits. This plant contains rich amino acids, antioxidants, and metals. This study aimed to identify the complex compound as a free radical scavenger. The Liquid Chromatography-Mass Spectrometry (LCMS) analysis showed the presence of kaempferol, carotene, quercetin, alpha-tocopherol, and beta-carotene. in the *M. oleifera* leaf, transition metals of Fe, Cu, Ni, and Zn were also detected by X-Ray Fluorescence (XRF). The IC_{50} values for DPPH radicals with ethanol extract of the *M. oleifera* were found to be 19,131 ppm. The docking illustrated the complex binding of *M. oleifera* leaf, its formula with Fe and its role as a metal donor and metal acceptor. It confirmed the pharmacokinetics properties prediction of which molecular compounds of *M. oleifera* have aqueous solubility. It meant the *M. oleifera* leaf, bark complexed to Fe could be enhancement free radical scavenger capacity.
Keywords: Antioxidant**;** DPPH; In silico; *Moringa oleifera*; transition metal

POSTER-34

Plastic Waste Derivative Products Based on Local Wisdom in Maintaining the Ecosystem

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Abstract
Handling plastic waste that has been widely implemented is the 3R concept (Reuse, Reduce, and Recycle), and other alternatives that have been researched are used as fuel oil. Apart from fuel, the remaining hydrocarbons are processed into beautiful art products. This research processed the hydrocarbons into craft products based on local Balinese wisdom. The process of making the product is that hydrocarbons in solid form are reduced in size to become flour. Before processing to make a typical Balinese craft, several molds are first prepared, such as mask molds, panels with carvings, bokoran and others. The dough is made from plastic waste flour mixed with glue and put into a mold; after drying, it becomes a craft product that is still colored like the color of flour. To become a commercial product, it is colored according to the product's characteristics. The aim of the research is to make plastic waste into an art product based on local Balinese wisdom as an effort to minimize plastic waste and protect the ecosystem. Product quality data from respondents' decisions using a questionnaire distributed online. The results of the research are that art products based on local Balinese wisdom from plastic waste in protecting the ecosystem are very popular with respondents.
Keywords: Plastic waste, art products, protecting the ecosystem

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