

اونيۇرسىيتى مليسيا ڤھڠ UNIVERSITI MALAYSIA PAHANG

# ICIABC2

#### INTERNATIONAL CONFERENCE ON INDUSTRY-ACADEMIA INITIATIVES IN BIOTECHNOLOGY AND CHEMISTRY

20<sup>th</sup> – 21<sup>st</sup> December 2021

**Virtual Conference** 

## PROGRAMME

Organized by: Green Technology & Drug Discovery and Diagnostic Research Clusters, Faculty of Industrial Sciences and Technology, Universiti Malaysia Pahang

#90

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Towards a Paradigm Shift in Technology for the Advancement of Industry and Society







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#### **OPENING REMARKS**

Prof. Dr. Jayarama Reddy Venugopal Chairman of iCIABC21 Faculty of Industrial Sciences and Technology Universiti Malaysia Pahang



Welcome to the International Conference on Industry-Academia Initiatives in Biotechnology and Chemistry (iCIABC21), organised by the Faculty of Industrial Sciences and Technology, Universiti Malaysia Pahang from 20<sup>th</sup> – 21<sup>st</sup> December 2021. iCIABC21 proposes to provide a platform for scientists, researchers and students to exchange knowledge, challenges, collaborations to learn about future perspectives in the multidisciplinary areas of Biotechnology, Drug Discovery, Nanotechnology and Materials chemistry to develop novel economic and environmentally friendly industrial and bioprocess engineering. All abstracts and manuscripts submissions were rigorously reviewed through a blind-review process by at least two experts comprising of nonmembers and members of the scientific committee. I would like to express my sincere gratitude to the members of the organizing committee for their hard work and continuous support; plus, my sincere appreciation to all participants, members of the advisory committee, keynote speakers and sponsors that have contributed to making this conference a successful one. On the behalf of the organizing committee, it is our pleasure to welcome you to participate in the International Conference on Industry-Academia Initiatives in Biotechnology and Chemistry, virtual conference.

#### WELCOME MESSAGE

Ts. Dr. Saifful Kamaluddin Bin Muzakir @ Lokman Dean Faculty of Industrial Sciences and Technology Universiti Malaysia Pahang



I take great pride in welcoming all the attendees of International Conference on Industry-Academia Initiatives in Biotechnology and Chemistry (iCIABC21), 20th – 21st December 2021. I am sure that each one of you will identify subjects of interest and will benefit from many fruitful and enriching discussions. I am very much concerned about the latest findings and development in the field of sciences and technology between industry and academia. Therefore, it is timely that this conference will enable you exchange views and share experiences with other professors, colleagues and friends, representing many wellknown Universities and Research Institutes together with members of relevant international organizations. I congratulate you for your commitment and active participation and wish you a successful conference.

#### **ORGANIZING COMMITTEE**

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PUBLICITY	MR. MOHD HAIRUL BIN AB. RAHIM DR. HAJAR FAUZAN BIN AHMAD

#### PROGRAM

TECHNICAL, EXHIBITION AND LOGISTIC

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#### ABOUT iCIABC21

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#### **Conference Goals and Objectives**

International Conference on Industry-Academia Initiatives in Biotechnology and Chemistry (iCIABC2020) aims to be a medium of communication on the latest findings and development in the field of sciences and technology between industry and academia. We realize that the readiness of knowledge and technology is crucial to ensure the sustainability of the Fourth Industrial Revolution (Industry 4.0). Through this conference, researchers could share their works and findings, and its impact or benefit to the industry and society could be validated. With the theme of "Towards Technological Paradigm Shift for the Advancement of Industry and Society", we ultimately aim that this conference could initiate some collaboration works between academia and industry.

iCIABC21 will bring together researchers, academicians and industry in Malaysia to exchange ideas, advance knowledge and discuss key issues for biotechnology- and chemistry-related fields.

The conference is dedicated entirely as a medium of communication on the latest findings and development in the field of sciences and technology. The conference will highlight particular areas of promising technological development, and support the unifying themes of the advancement of industry and society.

#### **Conference Research Area**

Industrial biotechnology:

- Microbiology
- · Green technology and renewable energy
- Environmental sciences
- Gene technology
- Molecular biology and bioinformatics
- Food technology
- Agricultural technology
- Enzyme technology
- Biomaterials
- Biosensor and molecular diagnostics
- Nanotechnology



Industrial chemistry:

- Fine and specialty chemicals for application in food, feed and pharmaceutical industries
- Natural products
- Reaction and catalysis
- Flavour and fragrance

#### **Journal Publications**

Accepted papers will be published in one of the following journals:

- i. Material Science Forum
- ii. ASM Science Journal
- iii. Indonesian Journal of Biotechnology
- iv. Malaysian Applied Biology
- v. Malaysian Journal of Biochemistry and Molecular Biology



## PROGRAM AND TENTATIVE



#### **CONFERENCE SCHEDULE**

#### Day 1 – 20<sup>th</sup> December 2021

Time	Event				
08:15 – 09:00			Registration		
09:00 – 09:15		Openin Chairman of iCIAE	g Speech: Prof. Dr. Jayarama Reddy Venug 3C21, Faculty of Industrial Sciences and Te	opal chnology, UMP	
09:15 – 09:30		Welcome Deputy	Speech: Professor Ts. Dr. Kamal Zuhairi bin Vice-Chancellor (Research & Innovation), I	n Zamli UMP	
09:30 – 10:15		Plenary	y Speech: En. Mohd Khairul Fidzal Abdul Ra CEO, Bioeconomy Corp.	azak	
10:15 – 11:00	Keynote 1: Prof. Dr. Nor Hadiani Ismail Director, Atta-Ur Rahman Institute for Natural Product Discovery, UiTM Title: The Role, Challenges and Future Prospects of Natural Products: Academia, Industry and Societal Relevance				
Theme	Food Science & Technology	Genomics & Transcriptomics	Natural Product & Medicinal Chemistry	Medical & Healthcare Biotechnology	Industrial Biotechnology & Applied Microbiology
11:00 – 11:05			Session Login and Preparation		
11:05 – 11:35	Invited Speaker: Mdm. Nur Azwani Ab Karim (Sime Darby Research Sdn. Bhd.) Title: Versatility of Palm Oil in Food Application	Invited Speaker: Dr. Gan Han Ming (GeneSEQ Sdn. Bhd.) Title: Current NGS Landscape in Malaysia	Invited Speaker: Dr. Teh Chin Hoe (Bruker (M) Sdn. Bhd.) Title: NMR as Structure Characterization and Elucidation Tool for Analytical Chemistry of Natural Products	Invited Speaker: Assoc. Prof. Dr. Nina Suhaity Azmi (Glycobio Int. Sdn. Bhd.) Title: Moving Technology from Lab to Market	Invited Speaker: Asst. Prof. Dr. Vijitra Luang-In (Mahasarakham University, Thailand) Title: Beneficial Microbes in Food and Feed

	Session 1A	Session 1B	Session 1C	Session 1D	Session 1E	Session 1F	
11:35 – 11:55	Paper ID M009	Paper ID G071	Paper ID D034	Paper ID D081	Paper ID E059	Paper ID A048	
11:55 – 12:15	Paper ID M024	Paper ID A162	Paper ID D038	Paper ID D108	Paper ID E070	Paper ID A049	
12:15 – 12:35	Paper ID M060	Paper ID M178	Paper ID D044	Paper ID D119	Paper ID E106	Paper ID A018	
12:35 – 12:55	Paper ID M077			Paper ID M176		Paper ID A040	
12:55 – 13:15						Paper ID A047	
13:15 – 14:00			Bre	ak			
14:00 – 14:45	Title: Pioneering I	Keynote 2: Dr. Mohd Zulkifli Mustafa USM, Health Campus Title: Pioneering Innovations, Transforming Communities: Stingless Bee Project to Improve Socio-economy and Ecology					
Theme	Food Science & Technology	Genomics & Transcriptomics	Natural I Medicinal	Product & Chemistry	Medical & Healthcare Biotechnology	Industrial Biotechnology & Applied Microbiology	
44.45 44.50			Session Login and Preparation				
14:45 - 14:50			Session Login a	nd Preparation			
14:45 - 14:50	Session 2A	Session 2B	Session Login a Session 2C	nd Preparation Session 2D	Session 2E	Session 2F	
14:45 - 14:50	Session 2A Paper ID M126	Session 2B Paper ID M189	Session Login a Session 2C Paper ID D148	nd Preparation Session 2D Paper ID D185	Session 2E Paper ID C179	Session 2F Paper ID A052	
14:45 - 14:50 14:50 - 15:10 15:10 - 15:30	Session 2A Paper ID M126 Paper ID B193	Session 2B Paper ID M189 Paper ID C032	Session Login a Session 2C Paper ID D148 Paper ID D164	nd Preparation Session 2D Paper ID D185 Paper ID D135	Session 2E Paper ID C179 Paper ID A092	Session 2F Paper ID A052 Paper ID A086	
14:45 - 14:50 14:50 - 15:10 15:10 - 15:30 15:30 - 15:50	Session 2A Paper ID M126 Paper ID B193 Paper ID C146	Session 2B Paper ID M189 Paper ID C032 Paper ID C120	Session Login a Session 2C Paper ID D148 Paper ID D164 Paper ID D180	nd Preparation Session 2D Paper ID D185 Paper ID D135 Paper ID D137	Session 2E Paper ID C179 Paper ID A092 Paper ID A094	Session 2F Paper ID A052 Paper ID A086 Paper ID C084	
14:45 - 14:50 14:50 - 15:10 15:10 - 15:30 15:30 - 15:50 15:50 - 16:10	Session 2A Paper ID M126 Paper ID B193 Paper ID C146	Session 2B Paper ID M189 Paper ID C032 Paper ID C120 Paper ID C130	Session Login a Session 2C Paper ID D148 Paper ID D164 Paper ID D180 Paper ID D183	nd Preparation Session 2D Paper ID D185 Paper ID D135 Paper ID D137 Paper ID E151	Session 2E Paper ID C179 Paper ID A092 Paper ID A094	Session 2F Paper ID A052 Paper ID A086 Paper ID C084	
14:45 - 14:50 14:50 - 15:10 15:10 - 15:30 15:30 - 15:50 15:50 - 16:10 16:10 - 16:30	Session 2A Paper ID M126 Paper ID B193 Paper ID C146	Session 2B Paper ID M189 Paper ID C032 Paper ID C120 Paper ID C130 Paper ID C131	Session Login a Session 2C Paper ID D148 Paper ID D164 Paper ID D180 Paper ID D183 Paper ID C147	nd Preparation          Session 2D         Paper ID D185         Paper ID D135         Paper ID D137         Paper ID E151         Paper ID M165	Session 2E Paper ID C179 Paper ID A092 Paper ID A094	Session 2F Paper ID A052 Paper ID A086 Paper ID C084	
14:45 - 14:50 $14:50 - 15:10$ $15:10 - 15:30$ $15:30 - 15:50$ $15:50 - 16:10$ $16:10 - 16:30$ $16:30$	Session 2A Paper ID M126 Paper ID B193 Paper ID C146	Session 2B Paper ID M189 Paper ID C032 Paper ID C120 Paper ID C130 Paper ID C131	Session Login a Session 2C Paper ID D148 Paper ID D164 Paper ID D180 Paper ID D183 Paper ID C147 END D	nd Preparation Session 2D Paper ID D185 Paper ID D135 Paper ID D137 Paper ID E151 Paper ID M165 AY 1	Session 2E Paper ID C179 Paper ID A092 Paper ID A094	Session 2F Paper ID A052 Paper ID A086 Paper ID C084	



#### Day 2 – 21<sup>st</sup> December 2021

Time			Eve	ent		
9:00 - 09:45	Title: New I	Keynote 3: Prof. Ts. Dr. Rashidi Bin Othman IIUM Title: New Insights into Carotenoid Extracts Production: From Chemical Extraction, HPP to SFE Technology				
9:45 – 10:30	т	Keynote 4: Dr. Cheng Ming-Hsun University of Illinois at Urbana-Champaign, USA Title: The Perspective on Cellulosic Biorefinery for Producing Value-Added Bioproducts				
Theme	Industrial Chemistry & Biochemistry	Computational Biology & Chemistry	Green Technology, Renewable Energy & Environmental Sciences Nanotechnology and Biomaterials			
10:30 – 10:35			Session Login a	nd Preparation		
10:35 – 11:05	Invited Speaker: Mdm. Siti Normaimunah Ariffin (Winwa Medical Sdn. Bhd.) Title: HPLC Spectroscopy and its Application in Pharmaceutical Analysis	Invited Speaker: Assoc. Prof. Dr. Azzmer Azzar Abdul Hamid (IIUM) Title: Biomolecular Dynamics of Microbial Proteins	Invited Speaker: Mr. William Rodney Yeo (Airestec Sdn. Bhd.) Title: Multi-Enzyme Technology: From Pyramid to Diamond			Invited Speaker: Prof. Dr. Jayarama Reddy Venugopal (UMP) Title: Current Trends in Nanotechnology for Healthcare Applications
	Session 3A	Session 3B	Session 3C	Session 3D	Session 3E	Session 3F
11:05 – 11:25	Paper ID B057	Paper ID K061	Paper ID H008	Paper ID H090	Paper ID 1058	Paper ID L085
11:25 – 11:45	Paper ID B027	Paper ID K062	Paper ID H042	Paper ID H144	Paper ID 1076	Paper ID L111
11:45 – 12:05	Paper ID B068	Paper ID K063	Paper ID H046	Paper ID 1005	Paper ID 1097	Paper ID L155
12:05 – 12:25	Paper ID B075	Paper ID K064	Paper ID H033			



13:05 – 14:00		Break					
14:00 – 14:45		Keynote 5: Assoc. Prof. Dr. Ma Nyuk Ling UMT Title: Fungal Science for sustainable economic development					
Theme	Industrial Chemistry & Biochemistry	strial stry & Biology & Green Technology, Renewable Energy & Environmental mistry Chemistry Nanotechnology & Biomaterials				Nanotechnology & Biomaterials	
14:45 – 14:50		Session Login and Preparation					
	Session 4A	Session 4B	Session 4C	Session 4D	Session 4E	Session 4F	
14:50 – 15:10	Paper ID J171	Paper ID K134	Paper ID 1110	Paper ID I138	Paper ID I121	Paper ID H073	
15:10 – 15:30	Paper ID J173	Paper ID K125	Paper ID 1113	Paper ID I184	Paper ID I122	Paper ID H069	
15:30 – 15:50	Paper ID J169	Paper ID K167	Paper ID 1117	Paper ID I161	Paper ID I190	Paper ID I010	
15:50 – 16:10		Paper ID K166		Paper ID 1026	Paper ID 1083	Paper ID 1080	
16:10 – 16:30							
16:30 – 17:00			Closing c	eremony			
17:00			EN	D			

\* This tentative is subjected to change and update depending on the number of participants and final title confirmation by speakers.





## WHATSAPP GROUP LINKS

Day	Time	Session	WhatsApp group link (Please click on your respective session)
		1A	Click here
		1B	<u>Click here</u>
	11.25 12.15	1C	Click here
	11.35 - 13.15	1D	Click here
		1E	Click here
1		1F	Click here
(20 Dec 2021)		2A	Click here
		2B	Click here
	12:50 – 17:30	2C	Click here
		2D	Click here
		2E	<u>Click here</u>
		2F	<u>Click here</u>
	11:05 – 13:25	ЗA	Click here
		3B	Click here
		3C	Click here
		3D	Click here
		3E	Click here
2		3F	Click here
(21 Dec 2021)		4A	Click here
		4B	Click here
	14.50 17.10	4C	Click here
	14.50 - 17.10	4D	Click here
		4E	Click here
		4F	Click here

## PRESENTATION LIST

MONDAY, 20 DECEMBER 2021				
Time	SESSION 1A Food Science & Technology		oc. Prof. Dr. Alina Abdul Rahim azikussabah Binti Zaharudin	
	Presentation Title	Paper ID	Presenter	
11:35 - 11:55	Development of low glycemic index cookies made from functional cassava pulp flour	M009	Beni Hidayat, Politeknik Negeri Lampung	
11:55 - 12:15	Flavonoid content of <i>Phaleria macrocarpa</i> (mahkota dewa) fruit and its proximate compositions	M024	Siti Salwa Abd Gani, Universiti Putra Malaysia	
12:15 - 12:35	Agronomic and proteomic assessment of salt stress responses in <i>Pennisetum glaucum</i> (pearl millet) genotypes	M060	Rajeswari Somasundaram, Birla Institute of Technology and Sciences, Dubai Campus	
12:35 - 12:55	Techno-functionality and taste-enhancing properties of some selected fruits: A review	M077	Hong Pui Khoon, Universiti Malaysia Pahang	
	End of session			

MONDAY, 20 DECEMBER 2021					
Time	SESSION 1B Genomics & Transcriptomics		<b>Chair:</b> Assoc. Prof. Dr. Normi Mohd Yahaya <b>Host:</b> Dr. Yuen Mei Lian		
	Presentation Title	Paper ID	Presenter		
11:35 - 11:55	Diversity of Malaysian-traditional fermented food and its potential for probiotic sources	G071	Shariza Jamek, Universiti Malaysia Pahang		
11:55 - 12:15	Extraction of oil from fat waste of silver catfish ( <i>Pangasius hypopthalmus</i> ) by centrifugation	A162	Rohana Binti Abu, Universiti Malaysia Pahang		
12:15 - 12:35	Optimization of pretreatment and frying conditions on the quality of deep fat frying arunyik mushroom	M178	Pataraporn Prayotngam, King Mongkut's University of Technology North Bangkok		
	End of session				

MONDAY, 20 DECEMBER 2021					
Time	SESSION 1C Natural Product & Medicinal Chemistry	Chair: Asso Host: Ms. N	c. Prof. Dr. Noor Baity Saidi urul Nadiah Binti Hamidon		
	Presentation Title	Paper ID	Presenter		
11:35 - 11:55	Pharmacophore-based molecular docking of novel usnic acid derivatives as avian influenza A (H7N9) inhibitor	D034	Mohd Fadhlizil Fasihi Mohd Aluwi, Universiti Malaysia Pahang		
11:55 - 12:15	Pharmacophore-based molecular docking of usnic acid derivatives to develop anti- viral drugs against influenza a virus	D038	Mohd Fadhlizil Fasihi Mohd Aluwi, Universiti Malaysia Pahang		
12:15 - 12:35	Effects of selected plants against rice weevil (Sitophilus oryzae)	D044	Nazikussabah Zaharudin, Universiti Malaysia Pahang		
	End of session				

MONDAY, 20 DECEMBER 2021				
Time	SESSION 1D Natural Product & Medicinal Chemistry	Chair: Asso Host: Dr. Ai	c. Prof. Dr. Siti Aqlima Ahmad ni Norhidayah Binti Mohamed	
	Presentation Title	Paper ID	Presenter	
11:35 - 11:55	Antifungal activity of essential oil extracted from melaleuca alternifolia against pathogenic fungi on mangoes ( <i>Mangifera indica L.</i> ) For mango postharvest application	D081	Ahmad Anas Bin Nagoor Gunny, Universiti Malaysia Perlis	
11:55 - 12:15	Crude water extract of plant molluscicides for controlling golden apple snails ( <i>Pomacea canaliculata</i> )	D108	Rachadaporn Benchawattananon, Khonkaen University	
12:15 - 12:35	Evaluation of in-vitro anthelmintic activity of <i>Leucas zeylanica</i> extracts on earthworms	D119	Abdul Fatah Bin A.Samad, Universiti Teknologi Malaysia	
12:35 - 12:55	Quality improvement of gluten-free green Saba banana flour steamed cake using ovalette and soy protein isolate	M176	Lee Jau Shya, Universiti Malaysia Sabah	
	End of session			

MONDAY, 20 DECEMBER 2021					
Time	SESSION 1E       (         Medical & Healthcare Biotechnology       H		<b>Chair:</b> Assoc. Prof. Dr. Uswatun Hasanah Zaidan <b>Host:</b> Dr. Normaiza Binti Zamri		
	Presentation Title	Paper ID	Presenter		
11:35 - 11:55	IoT based mobile heart attack alert system using GSM technology	E059	Muhammad Fakhrul Yusuf, Universiti Malaysia Pahang		
11:55 - 12:15	Relating organizational environmental management practices and employees' organizational citizenship behaviour towards the environment – eco helping: The influence of affective commitment towards a sustainable environment	E070	Diyana Kamarudin, Universiti Malaysia Pahang		
12:15 - 12:35	Overview of COVID-19 outbreak in Libya	E106	Hana Moftah Ebrahem Kamoka, Lincoln University College Malaysia		
	End of session				

MONDAY, 20 DECEMBER 2021				
Time	SESSION 1F Industrial Biotechnology & Applied Microbiology		c. Prof. Dr. Marina Binti Mohd. Top @ ohd Farid Bin Jaafar	
	Presentation Title	Paper ID	Presenter	
11:35 - 11:55	Isolation and identification of Acetobacter spp. from selected Malaysian local fruits	A048	Junaidi Bin Zakaria, Universiti Malaysia Pahang	
11:55 - 12:15	Isolation and identification of <i>Gluconobacter spp</i> . from selected Malaysian local fruits	A049	Junaidi Bin Zakaria, Universiti Malaysia Pahang	
12:15 - 12:35	The mutational changes detection of superior rodent tuber pekalongan accession through RAPD and sequencing analysis	A018	Nesti Fronika Sianipar, Bina Nusantara University	
12:35 - 12:55	Xylanase and cellulase enzymes from pineapple waste for poultry supplement	A040	Shalyda Md Shaarani, Universiti Malaysia Pahang	
12:55 - 13:15	Effect of gibberellic acid and eggshells on the growth of Hylocereus polyrhizus	A047	Tan Suat Hian, Universiti Malaysia Pahang	
	End of session			

MONDAY, 20 DECEMBER 2021				
Time	SESSION 2A Food Science & Technology	<b>Chair:</b> Assoc. Prof. Dr. Zaima Azira Zainal Abidin <b>Host:</b> Dr. Nazikussabah Binti Zaharudin		
	Presentation Title	Paper ID	Presenter	
14:50 - 15:10	Optimization of citric acid extraction of pectin from unripe 'Saba' banana ( <i>Musa acuminata</i> x <i>Musa balbisiana bbb</i> ) peels	M126	Grace Anne P. Alcantara, University of The Philippines Los Baños	
15:10 - 15:30	Macronutrients comparison of commercial cat foods in Malaysia	B193	Mohd Najib Bin Razali, Universiti Malaysia Pahang	
15:30 - 15:50	Species identification of potential probiotic lactic acid bacteria isolated from Malaysian fermented seafoods based on 16S ribosomal RNA (16S rRNA) and internal transcribed spacer (ITS) sequences	C146	Ilyanie Hj Yaacob, Universiti Sains Islam Malaysia	
15:50 - 16:10				
16:10 - 16:30				
16:30 - 16:50				
	End of session			

MONDAY, 20 DECEMBER 2021				
Time	SESSION 2B Genomics & Transcriptomics	<b>Chair:</b> Assoc. Prof. Dr. Mohd Rafein Zakaria <b>Host:</b> Dr. Yuen Mei Lian		
	Presentation Title	Paper ID	Presenter	
14:50 - 15:10	Perception of Malaysian consumers towards probiotic in fermented foods and its benefits to human health	M189	lda Muryany Md Yasin, Universiti Teknologi MARA	
15:10 - 15:30	Isolation and characterization of cellulolytic fungi from rice straws	C032	Lee Chin Mei, Universiti Malaysia Pahang	
15:30 - 15:50	Efficacy of eugenol and thymol derivatives as potential bio-pesticides against the red palm weevil, <i>Rhynchophorus ferrugineus olivier</i> adults	C120	Wahizatul Afzan Azmi, Universiti Malaysia Terengganu	
15:50 - 16:10	Effects of sucrose and methyl jasmonate on production of allixin in callus of garlic ( <i>Allium sativum L.</i> )	C130	Jeeraporn Chitphan, Chiang Mai University	
16:10 - 16:30	Derivatization and quantitative analysis of s-allyl-cysteine in callus of garlic ( <i>Allium sativum L</i> .) via High Performance Liquid Chromatography	C131	Rachaporn Manmanasaree, Chiang Mai University	
	End of session			

MONDAY, 20 DECEMBER 2021				
Time	SESSION 2C Natural Product & Medicinal Chemistry	Chair: Assoc. Prof. Dr. Suhaila Mohd Omar Host: Ms. Nurul Nadiah Binti Hamidon		
	Presentation Title	Paper ID	Presenter	
14:50 - 15:10	Identification and characterization of endophytic fungi from <i>Garcinia atroviridis</i> for potential antagonistic against phytopathogenic, <i>Colletotrichum gloeosporioides</i>	D148	Nor'aishah Hasan, Universiti Teknologi MARA	
15:10 - 15:30	Elicitor-induced phytochemical properties and transcriptional changes of genes associated with 20-hydroxyecdysone biosynthesis in <i>Asparagus officinalis</i>	D164	Waraphon Wichit, Kasetsart University, Kamphaeng Saen Campus	
15:30 - 15:50	A study on active functional group from <i>Rhizophora apiculata</i> extract used by a Malay as medicine and tanning	D180	Razanah Binti Ramya @ Abd Rahim, Universiti Kebangsaan Malaysia	
15:50 - 16:10	Effect of ph on chromaticity and colour stability of curcumin and pla-curcumin coating	D183	Ainaa Eliah Binti Abu Bakar, International Islamic University Malaysia	
16:10 - 16:30	A recent review on phytochemical constituents and medicinal properties of sambau paya ( <i>Chloranthus erectus</i> )	C147	Nor'aishah Hasan, Universiti Teknologi MARA	
16:30 - 16:50				
	End of session			

MONDAY, 20 DECEMBER 2021				
Time	SESSION 2D Natural Product & Medicinal Chemistry	<b>Chair:</b> Assoc. Prof. Dr. Murni Halim <b>Host:</b> Assoc. Prof. Dr. Tan Suat Hian		
	Presentation Title	Paper ID	Presenter	
14:50 - 15:10	Carotenoid pigments from selected green and blue-green algae species cell culture as potential halal food colorants	D185	Haslin Hanani Binti Md Zaini, International Islamic University Malaysia	
15:10 - 15:30	A comprehensive review of the ethnobotanical, phytochemical and pharmacological properties of the <i>genus Bambusa</i>	D135	Mohammad Amil Zulhilmi Bin Benjamin, Universiti Malaysia Sabah	
15:30 - 15:50	Grain biochemical composition in carriers of a combination of maize mutant genes o2su2	D137	Tymchuk Dmytro S., Kharkiv Institute of Medicine And Biomedical Sciences	
15:50 - 16:10	Anti-apoptotic actions of safinamide in 6-hydroxydopamine-induced cell model of parkinson's disease	E151	Koh Rhun Yian, International Medical University	
16:10 - 16:30	Sensory, proximate, and physicochemical properties of <i>Moringa oleifera</i> leaf juice after clarification by pectinase treatment	M165	Fan Hui Yin, Universiti Malaysia Sabah	
16:30 - 16:50				
	End of session			

MONDAY, 20 DECEMBER 2021				
Time	SESSION 2E Medical & Healthcare Biotechnology	Chair: Assoc. Prof. Dr. Nurulfiza binti Mat Isa Host: Dr. Aini Norhidayah Binti Mohamed		
	Presentation Title	Paper ID	Presenter	
14:50 - 15:10	In vitro $\alpha$ -glucosidase inhibition activity of endopolysaccharide isolated from Ganoderma lucidum	C179	Nur Raihan Binti Abdullah, International Islamic University Malaysia	
15:10 - 15:30	Electrospinning of essential oil plant extracts for antibacterial activity and wound healing applications	A092	Nor Naimah Hussin, Universiti Malaysia Pahang	
15:30 - 15:50	Polycaprolactone/cellulose acetate loaded <i>Psidium guajava</i> essential oil electrospun nanofibrous mat dressing for healing wounds	A094	Nor Naimah Hussin, Universiti Malaysia Pahang	
	End of session			

MONDAY, 20 DECEMBER 2021				
Time	SESSION 2F Industrial Biotechnology & Applied Microbiology	<b>Chair:</b> Assoc. Prof. Dr. Asilah Binti Ahmad Tajudin <b>Host:</b> Ms. Nurul Salma Munirah Binti Ruslan		
	Presentation Title	Paper ID	Presenter	
14:50 - 15:10	Comparative assessment on pretreatment methods for landfill waste utilization in biohydrogen production	A052	Nazira Mahmud, Universiti Malaysia Pahang	
15:10 - 15:30	Isolation and characterization of chondroitin sulphate from fish and fish wastes	A086	Nina Suhaity Azmi, Universiti Malaysia Pahang	
15:30 - 15:50	Preliminary results of antifungal activity of lactic acid bacteria isolated from Malaysian traditional fermented food	C084	Nina Suhaity Azmi, Universiti Malaysia Pahang	
15:50 - 16:10				
16:10 - 16:30				
	End of session			

TUESDAY, 21 DECEMBER 2021				
Time	SESSION 3A Industrial Chemistry & Biochemistry	Chair: Assoc. Prof. Dr. Amir Syahir Bin Amir Hamzah Host: Dr. Normaiza Binti Zamri		
	Presentation Title	Paper ID	Presenter	
11:05 - 11:25	Toxicity and efficacy of cocoa liquor facial mask	B057	Alyaa Nurathirah Binti Abd Halim, Universiti Putra Malaysia	
11:25 - 11:45	Effect of extraction condition on the recovery of phenolic compounds and antioxidant capacity of defatted <i>Hylocereus polyrhizus</i> seed	B027	Siti Atikah Binti Zulkifli, Universiti Putra Malaysia	
11:45 - 12:05	Synthesis and characterization of molecularly imprinted polymer with oleic acid as the template	B068	Nurlin Abu Samah, Universiti Malaysia Pahang	
12:05 - 12:25	Food grade grease formulation using paraffin oil, fumed silica and chitosan	B075	Mohd Najib Bin Razali, Universiti Malaysia Pahang	
12:25 - 12:45	Palm-based mid olein blended polyol	B149	Mohd Fadlly Jumadi Sime Darby Plantation Research Sdn Bhd	
	End of session			

TUESDAY, 21 DECEMBER 2021			
Time	SESSION 3B Computational Biology & Chemistry	Chair: Assoc. Prof. Dr. Zetty Norhana Binti Bal Yusof Host: Dr. Nazikussabah Binti Zaharudin	
	Presentation Title	Paper ID	Presenter
11:05 - 11:25	Discovery of potent benzimidazole as α-glucosidase inhibitors through 3D-QSAR, molecular docking simulation and ADMET screening	K061	Ayoub Khaldan, Moulay Ismail University of Meknes, Morocco
11:25 - 11:45	New $\alpha\mbox{-}glucosidase$ inhibitors based on quinoline and derivatives: Molecular modeling studies	K062	Ayoub Khaldan, Moulay Ismail University of Meknes, Morocco
11:45 - 12:05	Antifungal activity of triazole derivatives using 3D-QSAR, molecular docking, and ADMET prediction	K063	Soukaina Bouamrane, Moulay Ismail University of Meknes, Morocco
12:05 - 12:25	Combined 3D-QSAR, molecular docking and ADMET properties to identify effective triazole compounds against <i>candida albicans</i>	K064	Soukaina Bouamrane, Moulay Ismail University of Meknes, Morocco
12:25 - 12:45	Copper oxide coupled titanium dioxide (CuO/TiO2) nanocomposite photocatalyst for degradation of methyl orange dye	J118	Alina Irwana Binti Muhamad A'srai, Universiti Malaysia Terengganu

End of session

TUESDAY, 21 DECEMBER 2021				
Time	SESSION 3C Green Technology, Renewable Energy & Environmental Sciences	<b>Chair:</b> Dr. Nurul Iman Aminudin <b>Host:</b> Assoc. Prof. Dr. Tan Suat Hian		
	Presentation Title	Paper ID	Presenter	
11:05 - 11:25	Alkali impregnation and steam explosion of cogon grass for improved enzymatic saccharification	H008	Joel P. Rivadeneira, University of The Philippines Los Banos	
11:25 - 11:45	Synthesis gas characteristics from biomass feedstocks with gasification process	H042	Norazila Othman, Universiti Teknologi Malaysia	
11:45 - 12:05	Use of <i>Pleurotus ostreatus</i> spent mushroom compost as bio-waste on the growth of fig tissue culture	H046	Tan Suat Hian, Universiti Malaysia Pahang	
12:05 - 12:25	A Review: PLA degradation and PLA-degrading microorganisms	H033	Zatul Iffah Mohd Arshad, Universiti Malaysia Pahang	
12:25 - 12:45				
	End of session			

TUESDAY, 21 DECEMBER 2021				
Time	SESSION 3D Green Technology, Renewable Energy & Environmental Sciences	<b>Chair:</b> Dr. Anil Azura Jalaludin <b>Host:</b> Ms. Nurul Nadiah Binti Hamidon		
	Presentation Title	Paper ID	Presenter	
11:05 - 11:25	The effect of the imidazolium-based cation alky chain branching on the ferulic acid recovery: COSMO-RS approach	H090	Nurul Aliaa Binti Abdul Rahman, Universiti Malaysia Pahang	
11:25 - 11:45	Dynamics of yield and chlorophyll content of four kangkong ( <i>Ipomea reptans poir</i> ) sequences with soilless cultivation system due to direct and residual effects of vermicompost application	H144	Nurhidayati, University of Islam Malang	
11:45 - 12:05	Estimating zero waste index and resident waste participation in Indonesian middle city	1005	Muhammad Nizar, Universitas Serambi Mekkah	
End of session				

TUESDAY, 21 DECEMBER 2021				
Time	SESSION 3E Green Technology, Renewable Energy & Environmental Sciences	<b>Chair:</b> Dr. Azaima Razali <b>Host:</b> Mr. Muhamad Husaini Bin Sulaiman		
	Presentation Title	Paper ID	Presenter	
11:05 - 11:25	Longan and mango as an alternative source to enhance the yeast community in microbial inoculant	1058	Nurul 'Azyyati Sabri, Universiti Malaysia Pahang	
11:25 - 11:45	Photodegradation of reactive blue 4 using suspension of anatase-titanium dioxide and corn cob	1076	Shariena Bt Shamsul Bahari, Universiti Malaysia Pahang	
11:45 - 12:05	Selected heavy metals concentration from road surface and road shoulder soils associated with run-off	1097	Aweng a/I Eh Rak, Universiti Malaysia Kelantan	
12:05 - 12:25				
12:25 - 12:45				
	End of session			

TUESDAY, 21 DECEMBER 2021				
Time	SESSION 3F Nanotechnology and Biomaterials	<b>Chair:</b> Dr. Nur Adeela Yasid <b>Host:</b> Dr. Aini Norhidayah Binti Mohamed		
	Presentation Title	Paper ID	Presenter	
11:05 - 11:25	Amperometric enzyme-free glucose sensor based on gold nanoparticle decorated titanium dioxide nanotube	L085	Nina Suhaity Azmi, Universiti Malaysia Pahang	
11:25 - 11:45	Preparation, spectroscopic and pharmacological evaluations of 2-{(E)-[(2-{(Z)-[(3,4-dimethoxyphenyl)methylidene]amino}ethyl)imino]methyl}phenol ligand and its metal(III) complexes	L111	Ikechukwu P. Ejidike, University of South Africa	
11:45 - 12:05	Chitin and chitosan preparation from Malaysian black soldier fly biomass: A preliminary study	L155	Suhaila Mohd Omar, International Islamic University Malaysia	
	End of sossion			

End of session

TUESDAY, 21 DECEMBER 2021			
Time	SESSION 4A Industrial Chemistry & Biochemistry	Chair: Dr. Norizah Abdul Rahman Host: Dr. Yuen Mei Lian	
	Presentation Title	Paper ID	Presenter
14:50 - 15:10	Effect of temperature and fermentation time on protease production from fish waste hydrolysate	J171	Siti Hatijah Mortan, Universiti Malaysia Pahang
15:10 - 15:30	Production of cellulase and protease enzymes from empty fruit bunch and palm oil mill sludge via solid-state fermentation	J173	Noraziah Abu Yazid, Universiti Malaysia Pahang
15:30 - 15:50	Effect of different supported heteropoly acid on the catalytic hydrothermal conversion of cellulose into formic acid	J169	Nor Liyana Zakira Binti Zabidi Adil @ Zaibidai Adil, Universiti Sains Islam Malaysia
End of esseries			

End of session
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TUESDAY, 21 DECEMBER 2021			
Time	SESSION 4B Computational Biology & Chemistry	Chair: Dr. Ernee Noryana Muhamad Host: Ms. Nurul Nadiah Binti Hamidon	
	Presentation Title	Paper ID	Presenter
14:50 - 15:10	Computational drug discovery targeting SARS-CoV-2 main protease towards a treatment for COVID-19	K134	Panida Boontawee, Chiang Mai University
15:10 - 15:30	Substituent effects on the reactivity, absorption spectroscopy and electronic properties of a series of ruthenium-schiff base complexes-a DFT study	K125	Chhandasi Guharoy Sarkar, Hooghly Mohsin College, Chinsurah, Hoogly, West Bengal, India
15:30 - 15:50	In silico molecular modeling studies of novel 5,6,7-trimethoxy-naryl-2-styrylquinolin- 4-amines derivatives as tubulin polymerization inhibitors against human breast cancer cells	K167	Reda El-Mernissi, Moulay Ismail University, Chemistry, Meknes, Morocco
15:50 - 16:10	In silico molecular modeling studies of novel 5,6,7-trimethoxy-naryl-2-styrylquinolin- 4-amines derivatives as tubulin polymerization inhibitors against human ovarian carcinoma	K166	Reda El-Mernissi, Moulay Ismail University, Chemistry, Meknes, Morocco
End of session			

TUESDAY, 21 DECEMBER 2021			
Time	SESSION 4C Green Technology, Renewable Energy & Environmental Sciences	<b>Chair:</b> Dr. Zufarzaana Zulkeflee <b>Host:</b> Dr. Aini Norhidayah Binti Mohamed	
	Presentation Title	Paper ID	Presenter
14:50 - 15:10	Screening of catechol dioxygenase gene among bacterial communities isolated from anthropogenic contaminated area in Pahang, Malaysia	l110	Asmadamia Binti Abdul Aziz, International Islamic University Malaysia
15:10 - 15:30	An adsorbent based on humic acid-like and carboxymethyl cellulose for efficient pollutant removal from synthetic wastewater	l113	Rahmat Basuki, Universitas Gadjah Mada
15:30 - 15:50	Effectiveness of EM Mudball treatment for pollution remediation of Balok river	1117	Nurafifa Akmal Misman, International Islamic University Malaysia
End of session			

TUESDAY, 21 DECEMBER 2021			
Time	SESSION 4D Green Technology, Renewable Energy & Environmental Sciences	<b>Chair:</b> Dr. Rohasliney Hashim <b>Host:</b> Dr. Nazikussabah Binti Zaharudin	
	Presentation Title	Paper ID	Presenter
14:50 - 15:10	Reuse of agricultural waste to adsorp Fe metal content in acid mine water	I138	Lailan Ni`Mah, Lambung Mangkurat University
15:10 - 15:30	Malay poison: A study on <i>Melaluca cajuputi</i> extract as potential natural herbicide to suppress aquatic weed growth	l184	Wan Syibrah Hanisah Binti Wan Sulaiman, International Islamic University Malaysia
15:30 - 15:50	Using management system standards for improving organisational and national perception. A case of ISO 37001:2016	1161	Dewi Tamara, Bina Nusantara University
15:50 - 16:10	Assessment of drinking water quality using the NSFWQI model: A case study of Alzuhur water supply station and quarters included in the distribution network	1026	Abdulaziz Younis Talea Al-Saffawi, Mosul University
End of session			

TUESDAY, 21 DECEMBER 2021			
Time	SESSION 4E Green Technology, Renewable Energy & Environmental Sciences	Chair: Dr. Looi Ley Juen Host: Dr. Normaiza Binti Zamri	
	Presentation Title	Paper ID	Presenter
14:50 - 15:10	Characterizing groundwater turbidity reduction by using a magnetic biocarbon adsorbent composite (MBAC): Process optimization	l121	Palsan Sannasi Abdullah, Universiti Malaysia Kelantan
15:10 - 15:30	Synthesis and application of positively charged and magnetically separable magnetite/silica-ammonium as an effective platinum (iv) adsorbent	1122	Ngatijo Ngatijo, Universitas Jambi
15:30 - 15:50	The molluscicidal plant extracts to control golden apple snails ( <i>Pomacea canaliculata</i> )	1190	Trai Wongsiri, Khon Kaen University
15:50 - 16:10	5.8 GHz circularly polarized rectangular microstrip antenna arrays simulation for point-to-point application	1083	Mohd Aminudin Bin Jamlos, Universiti Malaysia Perlis
End of session			

TUESDAY, 21 DECEMBER 2021			
Time	SESSION 4F Nanotechnology and Biomaterials	Chair: Dr. Lailatun Nazirah Ozair Host: Mr. Khairul Affendi Bin Yusof	
	Presentation Title	Paper ID	Presenter
14:50 - 15:10	Direct energy conversion from metroxylon sagu via multienzyme catalysis in enzymatic biofuel cell	H073	Aliyah Jamaludin, Universiti Malaysia Pahang
15:10 - 15:30	Dangerous health and beauty purchase through supplement and food-drug interphase products: Attaining impossible healthy and beauty body from medical staff and practitioners' perspective.	H069	Diyana Kamarudin, Universiti Malaysia Pahang
15:30 - 15:50	Contamination level, source identification and health risk assessment of heavy metals from the surface water of Riruwai Mining Area, Northwestern Nigeria	1010	Hamza Badamasi, Federal University Dutse, Jigawa State, Nigeria
15:50 - 16:10	Adsorption of methylene blue using tea waste treated with alkaline-potassium hydroxide	1080	Yuen Mei Lian, Universiti Malaysia Pahang
End of session			



# KEYNOTE ABSTRACTS





**PROF. DR. NOR HADIANI ISMAIL,** Universiti Teknologi MARA

#### The Role, Challenges and Future Prospects of Natural Products: Academia, Industry and Societal Relevance

Abstract. Natural products can be broadly defined as the set of small molecules derived from nature. Natural products matter, for they are essential contributors to societal well-being and health. Many of today's small molecule therapeutics trace their origins to natural products. Because natural products occupy chemical space that is unique and diverse, they remain of high value for biomedical applications. Drug discovery from plants requires multidisciplinary approach combining botanical, ethnobotanical, phytochemical and biological techniques. Significant academic research infrastructure supporting vibrant natural products research programs has ensured continued productivity in natural product discovery. Even though the rediscovery of known natural product structures is an increasing challenge, development of innovative discovery methods will continue to yield compounds with unique structural and biological properties. Whilst nature is a rich source of unique chemical diversity, these vast resources of Earth are disappearing, adversely affected by climate change and market expansion thus putting strain on plant sourcing in the decades ahead. At the same time, there are opportunities for Malaysia as we are rich in genetic resources and traditional knowledge. Academia-industry collaboration is undoubtedly the way forward in the development of safe and quality natural products to meet the needs of our society. Evolution of artificial intelligence, automation and robotic technology in the Fourth Industrial Revolution (IR4.0) era is having a huge impact on natural product research, offering rapid solutions to problems and bottlenecks.

Keywords: natural products, challenges, academia, industry, societal relevance



DR. MOHD ZULKIFLI MUSTAFA,

Universiti Sains Malaysia

**Keynote Speaker 2** 

#### Pioneering Innovations, Transforming Communities: Stingless Bee Project to Improve Socio-economy and Ecology

Abstract. Empowering stingless bee (kelulut) industry will enhance pollination and provide multiplier effects which benefits national food security and sustainability of the biodiversity. Studies indicate that pollination by stingless bee increases up to 40 % of crops yield. Nowadays, wild bee colonies have been steadily declining, threatened by habitat loss brought about by logging activities, the expansion of residential developments into virgin forests, and use of pesticides on farms. Efforts to create stakeholders that received direct benefits from the bee are one of the best ways to conserve the bees and honey is sweetest reward offer. However the facts that Malaysian honey is stuck in traditional market due to quality and volume issues hinder the potential of the industry. In response to this, a KELULUNOMIC project was designed at USM with simple enough goals: to improve the guality and marketability of local stingless bee honey. Being stingless, the bee possesses no threat to people. It requires low maintenance and less continuous supervision, making it a suitable backyard project at home. Honey commercialization has helped generate income to the target communities, which is rewarding and, thus, directly drives actions towards bee conservation that can ensure the sustainability of the bees. Various acts have been implemented under KELULUNOMIC initiative that came up with significant awards winning innovations such as MUSTAFA Hive, SOP Books, HILDA System, KEIFh Device and 17 Episode MOOC videos. Over 3000 farmers have been trained to become major producers of stingless bee honey in Malaysia. Natural stingless bee honey had proven itself with a track record of century's years old in serving its purposes as a remedy, supplement and beauty products. The discoveries of unique trehalulose sugar and the content of polyphenol compounds in the honey were outstanding, with a boost of nearly tenfold as compared to the other types of honey. As conclusion, the industry has seen to catalyse the spill-over impacts in community in relation to novel products, social innovations, entrepreneurship, agricultural interest and general well-being as a whole. Bearing significant importance in socio-economy and ecology, the implication of the project is expected to be capable of transforming the industry to create more employment opportunities, targeting those from rural areas with low incomes (B40), ultimately increase the production and support the honey into becoming a new national commodity.





**PROF. TS. DR. RASHIDI BIN OTHMAN,** International Islamic University Malaysia

#### New Insights into carotenoid Extracts: From Chemical Extraction, HPP TP SFE Technology

**Abstract.** Natural pigments are one of the most widely used in the food industry. Carotenoids, anthocyanins and betacyanins are among naturally occurring pigments that have always incorporated into dietary requirements to make it colourful and attractive. The interest in these bioactive constituent pigments lies in the health enhancement effects of the diet. Carotenoids are an excellent source of colouring agent that is acknowledged for its bioactive compounds ability and pro vitamin A and antioxidant properties. Carotenoids can be produced through various extraction methods, such as chemical extraction, alkaline method, soxhlet, ultrasound, oil extraction, or to a more advanced technology such as supercritical fluid extraction. However, the applicability of the extraction methods used is a monumental factor in ensuring product quality. In this study, attention is given to carotenoids, with emphasis on the chemical extraction, High Pressure Processing Unit (HPP) and Supercritical Fluid Extraction (SFE) technologies. Thus, in this review, the advantages and limitations of these natural pigment extraction technology were presented in relation to their physico-chemical properties, reactivity and bioactivity.

Keywords: carotenoid, natural pigment, extraction technology, food safety, green technology



**DR. CHENG MING-HSUN,** University of Illinois at Urbana-Champaign

#### The Perspective on Cellulosic Biorefinery for Producing Value-Added Bioproducts

Abstract. Through biorefinery, the renewable carbon in lignocellulosic biomass is converted to platform chemicals. The cellulosic biorefinery in the USA utilizes corn stover, sugarcane bagasse, energy sorghum, miscanthus, and switchgrass as the major feedstocks to produce ethanol and lipids. Efficient sugar recovery is critical for improving titers of ethanol and single-cell lipid through fermentation. In cellulosic sugar recovery, an efficient pretreatment is required to open the recalcitrance of biomass structure followed by hydrolysis. However, high energy consumption and costly operations in pretreatment are the main hurdles to commercialize the cellulosic biorefinery. To this end, we have successfully developed a pilot-scale process combining chemical-free hydrothermal pretreatment with mechanical milling in a continuous system. The biomass solids loading was increased to 50% w/w for the hydrothermal pretreatment to reduce the operating costs. For securing the economic feasibility of cellulosic sugars production, fed-batch enzymatic hydrolysis has also been optimized using 50% w/v solids. The total sugar concentration obtained from the sequential hydrothermal pretreatment, mechanical milling, and fed-batch enzymatic hydrolysis reached 230 g/L, corresponding to the sugar yield of 73%. This continuous system with high solids processing reduced the operating costs by 30% compared to the conventional process using dilute acid pretreatment and enzymatic hydrolysis. For having a viable cellulosic biorefinery, the concept of cellular agriculture was employed in our study. The value-added bioproducts were produced from cellulosic sugars through fermentations. In cellulosic lipid production, we developed a two-stage fermentation using oleaginous yeast Rhodosporidium toruloides. The lipid productivity of 1.92 g/L/d was obtained from the fermentation using concentrated cellulosic hydrolysates. In a different study, an engineered S. cerevisiae SR8ΔADH6 was used to produce ethanol by co-fermenting C5 and C6 sugars. The best ethanol concentration obtained from fermenting concentrated hydrolysates reached 50.1 g/L, surpassing the critical concentration for the commercial production of 40 g/L. In addition to lipid and ethanol, we optimized  $\beta$ -carotene production from cellulosic xylose fermentation with the best titer of 114.5 mg/L using engineered S. cerevisiae SR8B. There are more applications of cellulosic biorefinery being explored and broadened. Introducing cellular agriculture into the cellulosic biorefinery has been seen as another focus for future development. The ultimate goal is to produce multiple bioproducts from a single bioprocessing pipeline to secure the economic and environmental sustainability of cellulosic biorefinery.

**Keywords**: Cellulosic biorefinery; Cellulosic sugars; High-solids processing; Ethanol; Lipid; βcarotene





ASSOC. PROF. DR. MA NYUK LING, Universiti Malaysia Terengganu

#### Fungal Science for Sustainable Economic Development

**Abstract.** Global solid waste is anticipated to increase by at least 70% annually until the year 2050. The combination of solid waste from industry and residential sources, such as food waste, diaper waste, and biomass, pollutes the environment and threatens human health. In fact, lignocellulolytic enzymes, which are largely produced in mushroom cultivation, may readily digest 30% of this waste having high lignocellulose, converting lignocellulose materials into energy for mushroom development and growth. Therefore, our research looks into the possibility of employing the medical fungus Lingzhi to reduce landfill trash while also producing high-value fungus. Lingzhi *Ganoderma lucidum* is a well-known medical fungus that has a global market turnover of around USD 2.16 billion each year. Many studies have been done on the phytochemicals in its fruit body, which have been shown to have medical health advantages. There are many reports on the phytochemicals of its fruit body that confer medical health benefits. Furthermore, the discarded mushroom block from this study could be recycled into high-quality bioboard that is formaldehyde-free and has an internal bonding strength of 2.51 mPa, significantly exceeding the requirements for plywood. Finally, our research identified feasible resource management strategies that would lead to zero-waste and circular economic.

Keywords: bioboard, zero-waste, circular economic



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**MDM. NUR AZWANI AB KARIM,** Sime Darby Research Sdn. Bhd.

#### Versatility of Palm Oil in Food Application

**Abstract.** Palm oil is used in about 50 per cent of all the products sold in a typical supermarket, and with good reason. It is extremely versatile, has lifted millions of people out of poverty and, properly managed, can be beneficial for the environment. Palm oil is found in everything from ice cream to shampoo, with 80% of the consumption is for food application. Palm oil has a long shelf life and is solid at room temperature, making it an ideal ingredient in a wide variety of foods. It gained significant popularity since the 1990s as manufacturers looked for alternatives to unhealthy hydrogenated and partially-hydrogenated fats. Like most natural seed oils, palm oil contains less than one per cent trans fats so can play an important role in a healthier diet. It is stable at high temperatures so is ideal for use in cooking and frying, while its high melting point makes it a cost-effective replacement for animal fats in products such as spreads and baked goods. Palm oil is used to manufacture sodium lauryl sulfate, which is used as a foaming agent in many body care products such as soap and toothpaste, and is also often added to household cleaning products. Its fat content also makes it an ideal emulsifier for moisturisers, makeup and even candles.

Keywords: palm oil, frying, bakery





**DR. GAN HAN MING**, GeneSEQ Sdn. Bhd.

#### **Current NGS Landscape in Malaysia**

**Abstract.** To date, several local universities have acquired at least one or more Illumina sequencing machines. However, the usage of the systems remain surprisinly low even if the demand for its application is high. Most if not all of the time, having the required hardware could even be a liablity or a curse when the correct combination of expertise or user in NGS is absent in a given institute. Dr Gan will be sharing his experience of doing genome sequencing within and outside of Malaysia to date focusing on two major sequencing platforms e.g. Illumina and Nanopore. In addition, the main bottlenecks preventing Malaysia from becoming an NGS-savvy country will also be shared and discussed.

Keywords: NGS, Genomics, Bioinformatics, DNA, Metagenome, Amplicon sequencing



SiCIABC2

**DR. TEH CHIN HOE**, Bruker (M) Sdn. Bhd.

#### NMR as Structure Characterization and Elucidation Tool for Analytical Chemistry of Natural Products

**Abstract.** Natural Products, being pure or in mixture forms, are important sources of new therapeutic agents. Over the decades, NPs drug discovery has become significantly technolgydriven with nuclear magnetic resonance (NMR) spectroscopy playing a crucial role typically in characterisation and structure elucidation. Hardware improvements in NMR instrumentation, mainly related to higher fields of superconducting, new generation of spectrometer console and cryogenic probes, have result to the increase of resolution and sensitivity. Software advancements on the other hands, for instance new pulse sequences and computational software, have led to tremendous improvement on efficiency in routine measurements and become indispensible tool in data mining process.

**Keywords:** NMR, molecular spectroscopy, characterization, structure elucidation, biochemical fingerprint, metabolomics





ASSOC. PROF. DR. NINA SUHAITY AZMI, Glycobio Int. Sdn. Bhd.

#### Moving Technology from Lab to Market

Abstract. The process of transitioning technologies from the research lab to the marketplace is known as technology commercialization. These technologies typically commercialized through a license agreement in which the university grants rights in a specified technology to a third party for a period of time. The essential to delivery technology invention to the market is to make the results of its research are available through education and publication, as to ensure that the inventions are potentially useful and beneficial. However, to enable the technology successfully delivered, the identification of market demand is indispensable parts to bring the product to the market as there are frequent changes in competitors' status, technology, customer interests/demand and global issues. The invention should be able to be distinguished from current technology as the uniqueness will brings continued profitability and product identity. The process from lab to the market need to be equipped with commercialization team which includes the inventor, investor, entrepreneur and technology expert to ensures the feasibility of commercialization with the suggested technology commercialization model. In order to economically and socially utilize potentials of research sector, the management and authorities must greatly value ideas and research results through rational decision-making or implementing proper strategies related to the country. This requires organizing the findings of research organizations and universities as well as comprehensive participation of all stakeholders.



SiCIABC2

ASST. PROF. DR. VIJITRA LUANG-IN,

Mahasarakham University

#### **Beneficial Microbes in Food and Feed**

**Abstract.** Thailand, which excels in farmed agriculture and seafood, is one of the world's major exporters of food goods. Thailand's fermented food business is worth over USD 600 million and expanding at a rate of 10% per year. Fish sauce, fermented soybeans, fermented pork sausages, and pickled cabbage are among the industry's main products.

The usage of starting culture of beneficial microbes is critical since it assures constant product quality, food functionality and safety. Furthermore, feed is a key component of animal production which contributes to another main export product of Thailand. Beneficial microbes have been employed as probiotics and means to improve nutrition sources for a variety of animals (e.g. shrimps and fish). The feeds have helped animals to grow quicker, get sick less frequently, and have reduced fatality rates. This talk will highlight the utilization of beneficial microbes isolated from diverse sources in the creation of functional food and feed with the link to industry via the Bio-Circular-Green (BCG) economy concept, which hold a high potential to open up new vistas for Thailand's food and feed sectors.

Keywords: microbes, probiotics, aquaculture, functional food, feed industry





**MDM. SITI NORMAIMUNAH ARIFFIN,** Winwa Medical Sdn. Bhd.

#### HPLC Spectroscopy and its Application in Pharmaceutical Analysis

**Abstract.** High performance liquid chromatography is one of the most useful analytical methods in the development and manufacture of pharmaceuticals. Its applications are not confined to just one area and it is instrumental in a number of critical steps necessary for robust pharmaceutical analysis. Winwa Medical, a wholly Malaysian owned pharmaceutical and complementary products manufacturer, use advanced equipment to improve future growth and enable us to strengthen our position in the pharmaceutical and healthcare industry. HPLC is considered a crucial tool in a variety of pharmaceutical applications, including evaluating formulations, checking purity, and monitoring changes due to process adjustments or during scaleup. There's no doubt that HPLC plays an important role in pharmaceutical analysis. Its accuracy and versatility make it a suitable tool for many stages of the development and production of pharmaceutical products.

Keywords: HPLC, pharmaceutical





ASSOC. PROF DR. AZZMER AZZAR ABDUL HAMID, International Islamic University Malaysia

#### **Biomolecular Dynamics of Microbial Proteins**

Abstract. Bioinformatics & Computational Biology provides comprehensive research coverage under the area of Biotechnology, especially during the pandemic. In-silico study is preferable nowadays to obtain fast and reliable data, and the technique is also cost-effective. Structural Bioinformatics deals with molecular structure interactions and dynamics, indicating biomolecules stability and affinity, thus paving a way to advance Biotechnology research. Environmental proteins such as microbial hydrolytic enzymes prefer only specific substrates for carbon and energy sources. Our RUBIC has investigated the affinity of these enzymes to their particular substrates or stereoisomers, and explained the dynamics interactions at the molecular level. We have established the mechanistic roles of the key amino acid involved in microbial substrate degradation and essential for the protein engineering of effective environmental enzymes. In Medical Biotechnology, high demands on drug discovery for disease treatment and important sensory receptors for biodiagnostic have made bio-computing the best yet reliable application. We have virtually screened some potential compounds for viral inhibition using molecular docking simulation and verified them using enzymatic assays. For molecular recognition, we have designed new aptamers for Hepatitis B virus detection, and a new study is ongoing for SARS-CoV-2 detection. We also helped the fisheries department develop a new viral vaccine using an immunoinformatics approach to combat nervous necrosis disease occurring in the aquaculture industry. We strongly believe that by using Bioinformatics & Computational Biology, we could explore more research opportunities and contribute meaningfully to the industry for solving real issues.

Keywords: Computational Biology, Virtual Screening, Molecular Dynamics, Bioinformatic





MR. WILLIAM RODNEY YEO, Airestec Sdn. Bhd.

#### Multi-Enzyme Technology: From Pyramid to Diamond

**Abstract.** Enzymes are naturally present in the environment. Fret not, they are also in our digestive system. In industrial settings, enzyme has been regarded as a safe, greener and sustainable solution compared to conventional chemicals. Multi-enzyme technology can be utilised in our daily life for cleaning and decontamination purpose. In fact, enzymes have been proven to remove biological contaminants such as biofilm, bacteria, fungi, and mould effectively, in a safe and eco-friendly manner. This is important because the biological contaminants are present everywhere; for example, in HVAC Systems, on hard surfaces, building facades, in vehicle radiators and many more. Their existence can cause deterioration to human health, indoor air/environment quality (IAQ/IEQ), energy and system efficiency, aesthetic appearance, hygiene issues, discomfort and structural damage. All of these problems can be resolved in a safe and ecological manner using multi-enzyme solution.

**Keywords:** Enzymes, Biofilm, Indoor Air Quality, Decontamination, HVAC Systems, Sustainable solution





PROF. DR. JAYARAMA REDDY VENUGOPAL, Universiti Malaysia Pahang

#### **Current Trends in Nanobiotechnology for Healthcare Applications**

Abstract. Nanobiotechnology delivering medical devices to diagnose disease and monitoring, implants and regenerative medicine, drug delivery, research tools for drug discovery in healthcare. Applications of nanobiotechnology in regenerative medicine, particularly at the cellular level sets the stage for an exciting role to develop biological substitutes to restore, maintain, or improve tissue function. The availability of more durable and better prosthetics and new drug delivery systems are of great scientific interest and give hope for cancer treatment and minimally invasive treatments for heart disease, diabetes and other diseases. Electrospinning is a wellestablished process capable of producing ultra-fine fibers diameter ranges micrometers (10-100 um) to nanometers (10-100 nm). Particularly, large specific surface area, high porosity and spatial interconnectivity of nanofibers well suited for nutrient transport, cell migration, cell communication and efficient cellular responses for developing artificial organs. Stem cells are considered for cellbased tissue engineering approaches, of which bone-marrow-derived mesenchymal stem cells (BM-MSCs), adipose-derived stem cells (ADSCs) and embryonic stem cells (ESCs) are frequently utilized for the advancement of new tissue engineering strategies. The cells are combined with nanotechnology and applied for the regeneration of various tissue systems such as skin, cardiac, nerves, cartilage and bone. In order to advance the biotechnological and especially medical nanobiotechnology applications of polymer nanofibers from the perspective to commercialized stages, collaborative interdisciplinary research involving biologist, material scientists, engineers, physiologists, clinicians and surgeons are required to develop functionalized artificial organs promise to improve the quality of health and average lifespan of human beings in the near future.

Keywords: Nanobiotechnology, nanofibers, drug delivery, stem cells, tissue engineering



# ABSTRACTS



# DAY 1: SESSION 1A



### Development of Low Glycemic Index Cookies Made From Functional Cassava Pulp Flour

Beni Hidayat<sup>1,a\*</sup>, Udin Hasanudin<sup>2,b</sup>, Siti Nurdjanah<sup>2,c</sup>, Neti Yuliana<sup>2,d</sup> and Zukryandry<sup>1,e</sup>

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Keywords: cookies, functional cassava pulp flour, glycemic index

**Abstract.** One of the food ingredients that has the potential to be used as raw material for low glycemic index food is functional cassava pulp flour (FCPF) which has a dietary fiber content of 23.84% and resistant starch of 7.31%. The aim of the research was to obtain the optimal substitution concentration of F FCPF to produce cookies with the best chemical, organoleptic, and physical characteristics; and a low glycemic index. The research was arranged in a Completely Randomized Design (CRD) with six levels of substitution concentration of FCPF, namely 0% (control), 10%, 20%, 30%, 40%, and 50%. The results showed that the higher the concentration of FCPF substitution, the higher the fiber content, resistant starch content, and texture of cookies. Cookies with a 50% FCPF substitution concentration will produce cookies with the lowest glycemic index (40.49%) but with an organoleptic score that is not different from cookies made from wheat flour (6.6 versus 6.9). Cookies products with a 50% FCPF formulation are categorized as foods with a low glycemic index.

# Flavonoid Content of Phaleria macrocarpa (Mahkota Dewa) fruit and its Proximate Compositions

Siti Salwa Abd Gani<sup>1, 2\*</sup>, Najat Nabilah Noor Ezzuddin<sup>2</sup>, Uswatun Hasanah Zaidan<sup>3</sup>, Mohd Izuan Effendi Halmi<sup>4</sup> and Alyaa Nurathirah Abd Halim<sup>2</sup>

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Keywords: Flavonoid content, antioxidant, proximate analysis, phaleria macrocarpa, FTIR

**Abstract.** Flavonoids is one of the compounds in phenolic compounds in fruits. P.macrocarpa fruit were extracted by Soxhlet extraction using water. TFC content in P.macrocarpa fruit extract was  $89.89\pm3.71 \text{ mg QE}/100 \text{ mL}$  with p value of 0.215. Proximate analysis were carried out to determine the fruit's moisture content, ash content, dry matter, crude protein, crude fiber and crude essential oil. Results obtained for proximate composition were  $9.45\pm2.67\%$  (crude protein),  $21.633\pm1.177$  (fiber), and  $5.605\pm0.882$  (essential oil). Moisture content in this fruit was  $88.401\pm0.749\%$  and dry matter was 10.968% and its ash content was  $6.33\pm3.72\%$ . FTIR analysis shows that functional spectra of phenol, alkane, alkene and alkyne groups exists in the extract.



## Agronomic and Proteomic Assessment of Salt Stress Responses in *Pennisetum glaucum* (pearl millet) Genotypes

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**Keywords:** salinity tolerance; pearl millet; agronomy; proteomics; Na<sup>+</sup>/K<sup>+</sup> ratio; 2-DEe electrophoresis

**Abstract.** Salinity is one of the environmental stresses that alter protein expression. To evaluate protein expression on salt stress, two ICRISAT Pennisetum glaucum (pearl millet) genotypes (IP 19586 and IP 22269) were subjected to 0.3 dSm<sup>-1</sup> and 10 dSm<sup>-1</sup> salinity. The agronomic parameters and ion content were assessed to find the tolerance level of the genotype to salinity. Differential expression of proteins on salt stress in both genotypes were analyzed by 2-dimensional gel electrophoresis. MALDI-MS/MS-TOF-TOF analysis helped in ascertain the amino acid sequences and the MASCOT search suggested the biological process of the predicted proteins. IP 22269 exclude the accumulation of toxic level of sodium in leaf. Based on physiological responses, IP 22269 was proposed to be salt-sensitive, and IP 19586 salt-tolerant genotypes, respectively. 67 proteins were responsive to salinity in that they were either less or more abundant. As per our finding the protein responsive to salt stress are granule-bound starch synthase 1, alpha-amylase, Meiotic recombination protein SPO11, flavonoid 3'- monooxygenase, ethylene receptor 4, protein transcription initiation factor Y 11g, and auxin-responsive protein IAA16. Further, based on the STRING analysis these proteins form a highly complex protein-protein interaction network with 171 proteins. This research elucidates few salt stress tolerance traits and network between the salt stress-responsive mechanisms in pearl millet.



## Techno-functionality and Taste-Enhancing Properties of Some Selected Fruits: A Review

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Keywords: fruits, techno-functionality, taste-enhancing properties

Abstract. The utilization of animal-based protein, soy and legumes to improve the functional properties of food products is among the top trends in the food industry. However, increasing demand, overdependence and several risk factors associated with the practice have promoted the food industry in exploring fruits as alternatives, due to their nutritional advantages, strong techno-functional properties, affordability, and availability. This review is divided into two parts, whereby the techno-functionality in the selected fruits' edible and non-edible portion was discussed. Whilst later, the taste-enhancing capacity of the fruits was discussed. Techno-functionality – closely related to protein and starch – was discussed using metrics such as solubility, water and oil-holding capacity, gelation, foaming ability and stability, as well as viscosity. In addition to their techno-functionality, the fruits' were also reviewed as an alternative to the conventional taste additives due to the taste-active amino acids, peptides, sugars, nucleotides, and glycoprotein. Some of these fruits may need modifications to achieve optimal results. This review provides a comprehensive overview and research progress on the techno-functional properties and taste enhancing potentials of some selected fruits. It can also provide additional insights into the development of potential functional food as alternatives to soy and legumes.



# DAY 1 SESSION 1B

## Diversity of Malaysian-Traditional Fermented Foods and Its Potential as Probiotic Source

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Keywords: Traditional foods; Fermentation; Microbial diversity; Probiotic; Lactic acid bacteria

**Abstract.** Fermentation is one of the earliest food preservation processes. It has evolved and been improved and diversified over the centuries. The microbial population is a significant component of fermented foods, since it aids in the preservation of nutrients and extends the shelf life of food. These microbes have attracted further interest due to their genetic similarity to probiotic strains. Probiotics are defined as live microorganisms. Although lactic acid bacteria (LAB) from various genera, including *Lactobacillus*, *Streptococcus*, and *Leuconostoc*, are the most prevalent in fermented foods, other bacteria, yeast, and fungi contribute to food fermentations. Local diets have traditionally featured a range of indigenous fermented foods containing probiotic microorganisms. Besides, there is a growing interest in commercialising Malaysian-traditional fermented foods as a natural prebiotic food containing health-promoting bacteria. Consumption of probiotic products, such as fermented foods, is gaining popularity due to its health benefits and consumer accessibility. The purpose of this article is to present an overview of recent research on the potential source of probiotics formed during fermentation of Malaysian traditional fermented food matrices, in order to contribute to our understanding of their critical role in healthy diets.

# Extraction of Oil from Fat Waste of Silver Catfish (*Pangasius hypopthalmus*) by Centrifugation

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Keywords: silver catfish, fish waste, oil yield, fatty acids

**Abstract.** Oil extracted from fish waste could be a source of valuable fatty acids such as saturated (SFAs), monounsaturated (MUFAs) and polyunsaturated fatty acids (PUFAs). In this study, the fat waste from silver catfish (*Pangasius hypopthalmus*) was used to extract oil by centrifugation (Eppendorf 5810 R) using different extraction solvent (distilled water, 70% ethanol, 70% acetone and 70% cyclohexane), rotation time (15, 25, 35 and 45 min), rotational speed (2000, 4000, 6000, 8000 and 10000 rpm) and rotational temperature (5, 10, 15, 20 and 25 °C). The compositions of fatty acids in the extracted oil was determined by gas chromatography-mass spectrometry (GC-MS) analysis. The best centrifugation conditions to extract oil was at 10000 rpm, 25 °C for 15 min with 70% acetone, yielding 156.7  $\pm$  0.017 mg/g oil. The high yield of oil contains 0.0223  $\pm$  0.022 mg/g palmitic acid, 0.0216  $\pm$  0.009 mg/g steric acid and 0.0262  $\pm$  0.003 mg/g oleic acid. However, essential PUFAs such as, eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) could not be detected by GC-MS. This study found that oil extracted from the fat waste of silver catfish can be used as a potential source of valuable fatty acids.

## Optimization of Pretreatment and Frying Conditions on the Quality of Deep Fat Frying Arunyik Mushroom

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Keywords: Gigantopanus giganteus, pretreatment, deep fat frying, sensory evaluation

**Abstract.** Arunyik mushroom (*Gigantopanus giganteus*) contains high protein and exhibits a large stalk appropriate for various food products. There are very few studies on the value-added of this mushroom. The purpose of this research was to study the pretreatment and frying conditions for the deep fat frying Arunyik mushroom. The mushrooms were cultivated in a mushroom farm and harvested at 14-21 days after casing in soil. The samples were analyzed for their chemical compositions. Their stalks were cut into two sizes,  $4 \times 4 \times 50$  mm<sup>3</sup>, and  $7 \times 7 \times 50$  mm<sup>3</sup>. The effects of frying temperature at 160, 170, and 180°C for 120, 150, 180, 210 and 240 sec on the color and texture of the fried samples were determined. Pretreatments including blanching, pre-freezing, and immersion in three solutions (maltodextrin, carboxymethyl cellulose, and calcium chloride) were carried out to evaluate the physical, chemical, and sensory properties of the fried products. The results demonstrated that the optimal frying temperature and time for small- and large-sized was 170°C for 120, and 180 sec, respectively. The pretreatment with maltodextrin solution (50% w/v) presented the most acceptable deep fat fried mushroom in terms of color (5Y 8/16, yellow tone), crispy texture, odor and oil absorption.



# DAY 1 SESSION 1C

#### Pharmacophore-based Molecular Docking of Novel Usnic Acid Derivatives as Avian Influenza A (H7N9) Inhibitor

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Keywords: Usnic acid, Pharmacophore, Molecular docking, Avian Influenza A

**Abstract.** The avian influenza virus is not only harmful to birds, but also to humans and other animals. It is a significant threat to poultry around the world, with the ability to spread to animals, including humans; thus, more effective drugs are needed to combat this virus. The binding efficacy of twenty-one usnic acid derivatives out of 340 obtained from pharmacophore filtering with avian influenza A (H7N9) using an in-silico approach was investigated in this study. From the molecular docking results, the compound **87** showed the best binding affinity (-52.0339 kcal/mol) with Arg119, Asp152, Arg153, Ser181, Glu229, Lys294, Arg372, Arg226, Trp180, Glu279, Trp180, Ile224 and Arg226 amino acid residues where the co-crystal interacted with Arg119, Glu120, Glu278, Arg372, Glu279, Ile224 and Arg226 residues. As a result, compound **87** could be used as a lead inhibitor in the formulation of anti-avian influenza drug.

SiCIABC2

## Pharmacophore-based Molecular Docking of Usnic Acid Derivatives to Develop Anti-viral drugs Against Influenza A Virus

Miah Roney<sup>1,2</sup><sup>a</sup>, Kelvin Wong Khai Voon<sup>1,2</sup><sup>b</sup>, AKM Moyeenul Huq<sup>3</sup><sup>c</sup>, Hazrulrizawati Abd Hamid<sup>1</sup><sup>d</sup>, Mohd Fadhlizil Fasihi Mohd Aluwi<sup>1,2</sup><sup>e</sup>

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Keywords: Influenza, Usnic acid, Pharmacophore, Molecular docking

**Abstract.** Influenza virus infection has been a major health problem through seasonal epidemics and pandemics, which keeps on rising until today but still now, there is no proper gold standard treatment available for curing Influenza viral infection. So, it is necessary to develop a better drug to combat Influenza infection. The aim of this study was to explore the potency of usnic acid derivatives as an antiviral drug to Influenza virus in the in-silico pathway. We used pharmacophore-based molecular docking and drug likeness properties to identify the potential drug as anti-influenza. Molecular docking study showed that the binding energy between compound **4** and Influenza H1N1 polymerase was -54.6676 kcal/mol with the amino acid residues Leu91, Tyr29, Glu104, Ile43, His46 and Ala42. From the Drug Likeness results analysis, the compound **4** as a good candidate for an antiviral drug to Influenza infection in the future.



## Effects of Selected Plants against Rice Weevil (Sitophilus oryzae)

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Keywords: plants, rice weevil, repellency, anti-feedant, anti-progeny

**Abstract.** In Malaysia, the main factor that caused the damage and losses in rice was due to the infestation of rice weevil in storage grain as they acted as the primary pest to feed on the rice. The existing chemical pesticides had slowly showed their negative effect and limitation toward environment and rice weevils. Therefore, it was necessary to develop natural insect-control alternatives with natural plants. The purpose of this research was to determine the effects of selected plants against rice weevils, *Sitophilus oryzae*. The selected plants being used in this research were pandan leaves (*Pandanus amaryllifolius*), kaffir lime leaves (*Citrus hystrix*) and asam keping (*Garcinia atroviridis*). Soxhlet extraction method was used to extract compound from plant samples whereas rotary evaporator used to concentrate the crude extracts. Plant extract solution were then used to test for their repellency, anti-feedant, anti-progeny effect on rice weevils. From the results obtained, the most effective plant was pandan leaves as it showed highest percentage of repellency (46.67%) and had better anti-progeny effect (2.175%). Kaffir lime leaves had no effect on rice weevils while asam keping only showed anti-progeny effect (6.525%) on rice weevils.



# DAY 1 SESSION 1D

## Antifungal Activity of Essential Oil Extracted from *Melaleuca Alternifolia* Against Pathogenic Fungi on Mangoes (*Mangifera Indica L.*) for Mango postharvest application

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Keywords: antifungal activity, Melaleuca alternifolia, essential oil, In-vivo, In-vitro

**Abstract.** An infection from pathogenic fungi is one of the main reasons causing the losses of mangoes during postharvest. An essential oil from *Melaleuca alternifolia* is being introduced as natural fungicide in controlling postharvest disease of mangoes. The extraction of essential oil from *Melaleuca alternifolia* was performed using Solvent Free Microwave Assisted Extraction with yield of 0.5%. The inhibitory effect of essential oil extracted from *Melaleuca alternifolia* against isolated fungi from mango was investigated through *in-vitro* and *in-vivo* analysis. Distilled water was used as negative control while chemical fungicide (Globus 5.5) as positive control in the analysis. The mycelial growth inhibition of extracted essential oil for poisoned food test and disc diffusion test showed 62.50 %  $\pm$  0.49 and 59.70 %  $\pm$  0.30 respectively for in-vivo experiment which had artificially wounded and unwounded mangoes. The result also demonstrated that the essential oil applied on the wounded mangoes could decrease the disease incidence from 100% to 61.33% for up to 10 days kept at room temperature compared to that of the control. Hence, the essential oil of *Melaleuca alternifolia* can act as green fungicide and is also a promising alternative to the synthetic chemical fungicide for controlling postharvest disease on mangoes.


#### Crude Water Extract of Plant Molluscicides for Controlling Golden Apple Snails (*Pomacea canaliculata*)

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Keywords: Niclosamide, Molluscicidal plant, Golden apple snail, Photo degradation

Abstract. Golden apple snail (*Pomacea canaliculata*) had been introduced to Thailand in 1980s. Recently reported as one of the most severe rice's pest in Thailand. The Department of Agriculture of Thailand suggests in using chemical molluscicide to control the snails. However using natural product such as plant molluscicide is much better alternative in managing the snails. It's safer, cheaper, lower impact to the natural and ecological system. This study has 7 representatives of molluscicidal plants prepared to control the Golden apple snail. The static aquatic toxicology method was exposure of 48 hours. The mortality rate will be recorded for median concentration  $(LC_{50})$  after the snails had been intoxicated. Plant that shows the lowest  $LC_{50}$  value would be considered the highest molluscicidal effect. The molluscicidal plants showing LC<sub>50</sub> as follows: Nerium oleander(205.80ppm), Duranta erecta(197.86ppm), Plumeria rubra(595.93ppm), Catharanthus roseus(859.78ppm), Euphorbia tirucalli(604.87ppm), Chromolaena odorata (526.17ppm) and Schefflera actinophylla(52.46ppm). The positive control (Niclosamide) revealed the LC<sub>50</sub> as 0.42 ppm. In comparison, S. actinophylla shows the highest molluscicidal effect. The molluscicidal efficiency of S. actinophylla and Niclosamide were reduced by 50% when 5.2 days and 4.2 days have passed and both compounds will completely decomposition after 15 days and 20 days respectively.

SiCIABC2I

#### Evaluation of *in-vitro* Anthelmintic Activity of *Leucas Zeylanica* Extracts on Earthworms

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Keywords: anthelmintic, Leucas zeylanica, earthworm

Abstract. Leucas zeylanica or locally known as Ketumbit has a wide variety of medical applications. This includes the traditional and Ayurvedic practice of L. zeylanica for the treatment of worm infections successfully, however to date the anthelmintic effect has still not been scientifically proven. Therefore, the present study aimed to evaluate the anthelmintic activity of L. zeylanica. Leucas zeylanica or locally known as Ketumbit has a wide variety of medical applications. This includes the traditional and Ayurvedic practice of L. zeylanica for the treatment of worm infections successfully, however to date the anthelmintic effect has still not been scientifically proven. Therefore, the present study aimed to evaluate the anthelmintic activity of L. zeylanica. The study began with the extraction of L. zeylanica extracts using methanol, ethanol and aqueous, respectively. Next, experiments were conducted to evaluate the possible invitro anthelmintic activity of various extracts of L. zeylanica against earthworms. Various concentrations (25, 50 and 100 mg/ml) of all extracts were tested and results were expressed in terms of the time of paralysis and time of death of worms. All extracts of the plant exhibited considerable anthelmintic activities in a dose-dependent manner. The order of the sensitivity of the extracts to the worms was that methanolic extract showed the best anthelmintic activity when compared to ethanol and aqueous extracts. Of them all, methanolic extract at 100 mg/ml showed the most effective anthelmintic activity that was comparable to the reference drug (albendazole, 25 mg/ml). Therefore, we conclude that methanolic extract at the concentration of 100 mg/ml could be considered as a candidate for worm treatment other than the standard medication. This work may provide a framework for further study of L. zeylanica as an alternative treatment for worm infection.

### Quality improvement of gluten-free green Saba banana flour steamed cake using ovalette and soy protein isolate

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**Keywords:** green banana flour, gluten-free, resistant starch, soy protein isolate, texture profile analysis

**Abstract.** Green banana flour has attraced increasing research interest in recent years because of its low digestibility and health benefits that is associated with its high resistant starch content. This study was attemted to produce a steamed cake using green Saba banana flour. Owing to the absence of gluten in banana flour, functional additives are required to improve the volume and hence the eating quality of the cake produced. In this study, 3 x 3 factorial design involving ovalette and soy protein isolate was used to produce nine formulations of steam cake for investigation. The characteristics of the batter and cake along with resistant starch content were analysed and compared to standard (wheat flour steamed cake). Ovalette and soy protein isolate brought about significant improvement on the eating quality of the gluten-free steamed cake. The best formulation also contained higher resistant starch and dietary fibre than standard.



# DAY 1 SESSION 1E

#### **IoT Based Mobile Heart Attack Alert System Using GSM Technology** Rashidah Ramle<sup>1, a</sup>, Muhammad Nadzrien Mohamed-Nazaruddin<sup>1, b</sup> and Muhammad Fakhrul Yusuf <sup>2, c, \*</sup>

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Keywords: GSM, temperature, heart failure, SMS

Abstract. The prototype of Mobile Heart Attack Alert System with Arduino and GSM application is a system that helps the caregiver to monitor the patient's condition by alerting them when the patient's body temperature exceeds the normal temperature and the patient's heart rate is too high. The purpose of this project is to enable the caregivers to monitor the patient remotely in a safe condition. The system is based on Arduino UNO, GSM, and sensors. The system consists of two sensors, namely a temperature sensor and a pulse sensor. When the temperature sensor detects a temperature higher than 37.2°C and the pulse sensor detects a heart rate higher than 100 beats per minute, the system issues a warning message to the caregiver. In addition, the project found that the distance factor between the sensor and the mobile phone is not a significant factor. This is based on the analysis of different distances between the sensor and the mobile phone. From each scenario, the average response time for sending alert messages is obtained. It can be seen that alert messages can be sent immediately to the caregivers even if the caregivers are far away from the patient. This system provides benefits to the caregivers as 100% of the respondents agreed that they are satisfied with the system. For future recommendations, this system needs to focus on other vital signs that need to be added to increase the value of the project to the patient. These include blood pressure, respiratory rate, and other parameters.



#### Relating Organizational Environmental Management Practices and Employees' Organizational Citizenship Behaviour Towards the Environment – Eco Helping: The Influence of Affective Commitment Towards a Sustainable Environment

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**Keywords:** Organizational citizenship behavior, environment, eco helping, environment management practices, affective commitment, local government

**Abstract.** An emergent body of knowledge has acknowledged that organizational environmental management practice is associated with employees' organizational citizenship behaviour toward the environment. Nonetheless, not much is known about the mediating mechanisms that triggers this relationship. Based on the social exchange theory, this study explored whether affective commitment towards environment function as an indirect effect of the relationship between environmental management practices and employees' organizational citizenship behaviour toward the environment – eco helping. This research model was examined using information gathered from 244 local authorities employees of Penisular Malaysia. Respondents accomplished questionnaires measuring their perceptions of environmental management practices, affective commitment towards environment, and organizational citizenship behaviour toward the environment — eco helping. Indirect effect analysis revealed that affective commitment towards environment, mediate the relationship between environmental management practices and employees' organizational citizenship behaviour toward the environment mediate the relationship between environmental management practices and employees' organizational citizenship behaviour toward the environment mediate the relationship between environmental management practices and employees' organizational citizenship behaviour toward the environment mediate the relationship between environmental management practices and employees' organizational citizenship behaviour towards environment mediate the relationship between environmental management practices and employees' organizational citizenship behaviour towards the environment — eco helping.



#### **Overview of COVID-19 Outbreak in Libya** Hana Moftah Ebrahem Kamoka<sup>a</sup> and Asita Elengoe<sup>b\*</sup>

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Keywords: COVID-19, Outbreak, Libya, Vaccination

**Abstract.** A major health threat emerged in early of 2020. In December 2019, a novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) epidemic outbreak occurred in Wuhan, China. It spreads rapidly across the world. World Health Organization (WHO) named the disease as COVID-19 on 11<sup>th</sup> February 2020. This COVID-19 pandemic has affected about one-fifth of Libyans. As of 9<sup>th</sup> July 2021, there were 199,526 infected, 3,227 death and 180,204 recovered cases have been confirmed in Libya. In this review, the overview of the COVID-19 outbreak; and vaccination in Libya were explored. There is no specific anti-viral treatment against SARS-CoV-2 until now. However, vaccines were discovered to slow down the rapid spread of the virus throughout the world. Preventive measures such as wash hands frequently with soap and water or sanitizer; wear a mask; and maintain social distancing about 1 meter should be always followed although a person gets vaccinated. The best preventive measure should be the 'stay at home' to break the COVID-19 infection chain. In a conclusion, each country should focus on preparedness to combat future epidemic or pandemic outbreaks.



### DAY 1 SESSION 1F

#### Isolation and identification of *Acetobacter* spp. from selected Malaysian local fruits

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Keywords: Acetobacter spp., isolation, local fruits, 16S rRNA gene, BLASTn analysis

**Abstract.** Acetobacter spp. that are commonly found on fruits can perform oxidation processes, resulting in acetic acid production in vinegar. Besides that, Acetobacter spp. can produce bacterial cellulose (BC), which is an essential by-product. This present study was carried out to isolate Acetobacter spp. from selected local fruits. Species verification of the bacterial isolates was performed using molecular and bioinformatic approaches. A total of six local fruits (starfruit, jackfruit, watermelon, pineapple, honeydew and banana) were subjected to seven days of fermentation in a brown sugar solution. Acetobacter spp. were isolated from the fermented medium using bromocresol green ethanol agar as the selective medium. A total of 13 bacterial isolates were obtained and subjected to a series of molecular works, including DNA extraction and PCR amplification using universal primers, targeting 16S rRNA gene. PCR-amplified products were selected for single-pass sequencing. BLASTn analysis of the sequencing results showed three isolates belong to Acetobacter spp. and one isolate representing Gluconobacter sp. that might have potential in BC production. However, the remaining nine isolates hit Lactobacillus plantarum, a species of lactic acid bacteria. In the future, the isolated Acetobacter spp. could be further utilized for large-scale BC production in a suitable fermentation medium.

#### Isolation and identification of *Gluconobacter* spp. from selected Malaysian local fruits

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Keywords: Gluconobacter spp., isolation, local fruits, 16S rRNA gene, BLASTn analysis

**Abstract.** *Gluconobacter* spp. have potential as an acetic acid producer besides bacterial cellulose (BC) as their byproduct. The work focused on *Gluconobacter* spp. isolation from local fruits and followed by identification and characterization by using molecular and bioinformatics approaches. A total of six local fruits (watermelon, banana, pineapple, honeydew, jackfruit, and star fruit) were fermented in brown sugar solution for seven days. *Gluconobacter* spp. were isolated from the fermented medium using bromocresol green ethanol agar as the selective medium. A total of eleven positive bacterial colonies were subjected to genomic DNA extraction and followed by 16S rRNA gene amplification using PCR. PCR amplified products were further purified and sent for single-pass sequencing. BLASTn analysis showed a total of seven isolates representing *Gluconobacter* spp. and identified as *Gluconobacter oxydans*, *Gluconobacter albidus*, *Gluconobacter roseus* and *Gluconobacter europaeus*, respectively. Future work should be focused on growth optimization of the isolated *Gluconobacter* spp. besides their cellulose production as a potential bioproduct in related biotechnology industries.

#### The Mutational Changes Detection of Superior Rodent Tuber Pekalongan Accession Through RAPD and Sequencing Analysis

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Keywords: Cancer, Typhonium flagelliforme, Pekalongan accession, molecular markers

**Abstract**. Cancer is a large group of diseases that affect almost all organs or tissues of the body when abnormal cells get out of control and attack adjacent parts. Breast cancer is a type of cancer that infects humans, especially women. These cancer cells will form tumors that can be seen on x-rays. Efforts to treat breast cancer have been carried out, one of which is traditional medicine by utilizing the wisdom of local plants, rodent tuber plant (*Typhonium flagelliforme*). Rodent tuber contains stigmasterol which exerts a high anticancer effect and is found in several mutant clones. The purpose of this study was to analyze the differences in DNA between mutant and control rat taro plants based on specific RAPD markers and differences in the sequence sequences of each sample. RAPD markers were used for polymorphic primer optimization on 18 plant clones, and the OPB18 markers were the markers selected for sequencing with a size of about 500-700 bp. Sequence analysis between mutant and control plants showed differences in nine segments, namely 2-7 bp, 17-23 bp, 40-45 bp, 65-70 bp, 118-150 bp, 164-171 bp, 199-207 bp, 221 -238 bp, and 271-284 bp. Matching the test sequence with the database, the similarity of the control sample was 81.8% with the cotton plant species (*Gossypium raimondii*). In comparison, the mutant (BLAC) was 87.7% similar to the potato plant species (*Solanum tuberosum*).

SiCIABC2



#### Xylanase and Cellulase Enzymes from Pineapple Waste for Poultry Supplement

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#### **Author Contribution**

SMS, ZIMA, JHHS designed the study. PS carried out the laboratory work. SMS, ZIMA, NM, NZ analyzed the data. PS, SMS, ZIMA wrote the manuscript. All authors read and approved the final version of the manuscript.

Keywords: pineapple waste; xylanase; cellulase; poultry supplement; fermentation.

**Abstract.** Pineapple wastes (skin, core and crown) are mainly composed of carbohydrates (cellulose, hemicellulose, and lignin). Non-starch polysaccharides in feed are indigestible by the endogenous enzymes in poultry. Thus, exogenous enzymes (xylanase and cellulase) are required to overcome this problem. Due to high fiber content, pineapple wastes are unsuitable for animal feed. However, the fermented waste juice could be used to produce enzymes. The objective of this study is to produce xylanase and cellulase from the fermentation of pineapple waste using *Lactobacillus casei* bacteria inoculated from probiotic drink for poultry supplement. The fermentation was performed using different screening parameters (incubation time, temperature, pH value and substrate concentration) according to Two-Level Full Factorial Design by Design Expert. From this study, the substrate concentration had the highest influence on the xylanase activity while the temperature mostly affected the cellulase activity. Meanwhile, the pH had the least influence on both enzyme activities. The pineapple waste at its best fermentation parameters not only offers an economical way of high enzyme production but also alleviates the agricultural waste disposal issue. Further optimization of the pineapple waste fermentation parameters is required though to maximize enzyme production.

SiCIABC2I

#### Effect of Gibberellic Acid and Eggshells on the Growth of Hylocereus Polyrhizus

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Keywords: Hylocereus polyrhizus, micropropagation, gibberellic acid, eggshells

**Abstract.** Dragon fruit (*Hylocereus polyrhizus*) is a tropical fruit and gained popularity due to its potential health benefits. The acclimatization of micropropagated dragon fruit trees depends on the application of gibberellic acid (GA3) to increase the plant growth. Eggshells are food waste materials and their compositions are vital for the development of plant shoot and root. The objective of this research is to investigate the effect of different concentrations of GA3 and eggshells either added individually or in combination on the growth of shoot length and shoot diameter of dragon fruit trees. The result showed the shoot length of the dragon fruit tree increased approximately 154 %, from  $0.64 \pm 0.13$  cm to  $0.99 \pm 0.26$  cm, as the concentration of GA3 showed an adverse effect on the development of shoot length. The growth of shoot diameter with eggshells, showed an opposite growth pattern compared to shoot length without eggshells, due to the GA3 affected the shoot length but not the shoot diameter. The growth of shoot length and shoot diameter with eggshells was higher in comparison with those without eggshells, with an increment of 149% and 144 % in shoot length and shoot diameter respectively. Therefore, it could be inferred that eggshells are a good additive to promote the growth of dragon fruit trees.



## DAY 1 SESSION 2A

Optimization of citric acid extraction of pectin from unripe 'Saba' banana (*Musa acuminata x Musa balbisiana* BBB) peels

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Keywords: 'Saba' banana peels, pectin, citric acid extraction, Box-Behnken design

**Abstract.** The utilization of 'saba' banana processing wastes has shown potential as sources of pectin, which is widely used in the food and pharmaceutical industry. An optimized citric acid extraction of pectin from mature unripe 'saba' banana peel wastes was developed using a three-factor Box-Behnken design considering the effects of extraction temperature (75-90°C), extraction time (1-5 hours), and agitated precipitation time (30-180 minutes) on the crude pectin yield. Results showed that the generated model is significant and that the extraction temperature and time significantly affected pectin yield and its equivalent weight. An increase in extraction temperature (up to 90°C) accompanied by prolonged extraction time can increase extraction yield. Optimum extraction conditions of 85°C for 5 h, with precipitation for 30 min resulted in the highest crude pectin yield (32.89% dry basis). The extracted pectin showed higher ash content (3.63%) and lower equivalent weight (513.05), methoxyl content (4.88%), moisture content (10.15%), and anhydrouronic acid (44.43%), than that of commercially available citrus pectin while degree of esterification did not vary.



#### Macronutrients Comparison of Commercial Cat Foods In Malaysia

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Keywords: Pet food, nutritional content, Halal food, product development, dry food.

**Abstract.** There are many cat food products are sold in current retail market. The cat food product industry is rapidly expanding due to enlargement of middle class citizen and increase in spending on pet per capita. However, there is no validation of the actual nutritional value in these products. The present study aimed to determine the dietary nutrient profile of six commercial cat food available in Malaysia with comparison to the actual requirement of cats. The results showed that Grade A cat food product has a significantly higher protein, fat, moisture, and ash content in comparison to Grade B cat food. Meanwhile Grade B has a significantly higher carbohydrate content as compared to Grade A cat food. The new cat food formulation developed from this work has the highest protein, fibre and ash contents but lower in fat, moisture and carbohydrate content. This work suggests the best price range for new cat food product to penetrate the market is between RM 8.00 to RM 9.00. All of cat food products in Malaysia that was analysed in this work met the Association of American Feed Control Officials (AAFCO) standard. However, not all cat food products are considered as a perfect cat food formulation. This information provides insights of nutrient profile in commercial cat food available in the Malaysia market.

#### Species Identification of Potential Probiotic Lactic Acid Bacteria Isolated from Malaysian Fermented Seafoods based on 16S Ribosomal RNA (16S rRNA) and Internal Transcribed Spacer (ITS) Sequences

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Keywords: 16S rRNA gene, ITS gene, fermented seafood, lactic acid bacteria, PCR

**Abstract.** The taxonomical identification of potential probiotic lactic acid bacteria (LAB) in fermented food is essential as the microorganisms' benefits are various and often strain-specific. Utilising the biochemical and physiological methods is inadequate to precisely distinguishing each strain. In this study, molecular techniques were employed in the identification of 17 LAB isolated from three Malaysian fermented seafoods: belacan (BE), bosou (BO) and budu (BUM). When the isolates were PCR amplified with the 16S ribosomal RNA (16S rRNA) and internal transcribed spacer (ITS) gene primers, the sizes of PCR products were approximately 1500 bp and 750 bp, respectively. The phylogenetic analysis using both gene sequences revealed that all BE and BO isolates were identified as *Lactiplantibacillus plantarum* while all BUM isolates were identified as *Lacticaseibacillus paracasei*. Both 16S rRNA and ITS genes could disclosed the strains' identity up to species level. In summary, the use of the ITS gene in conjunction with the 16s rRNA gene can help more effective identification of potential probiotic LAB strains isolated from fermented food.



## DAY 1 SESSION 2B



#### Perception of Malaysian Consumers Towards Probiotic in Fermented Foods and Its Benefits to Human Health

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**Keywords:** Probiotics, Perceptions, Fermented food, Socio-demographic, Awareness Running title: Perception of consumers towards probiotic

**Abstract**. Currently, consumers demonstrated increased in awareness and interest in food that closely engaged to health benefits, thus they become interested to consume probiotic products and foods. Probiotics are bacteria that offered various benefits to human health when being consumed in sufficient amounts. Numerous probiotic products were listed and being listed are fermented foods that contained probiotics that beneficial to human health, hence consumers should be aware about these products. Aim of this study is to analyse the knowledge and awareness of consumers about probiotics in fermented foods based on the socio-demographic profiles. Questionnaire developed using Google Form and distributed using social media. Then, the data was analyse using SPSS software. 150 of respondents were involved, but only 133 of data selected. Descriptive analysis conducted to obtain the frequency of the socio-demographic profiles data. Meanwhile, statistical analysis conducted using chi-square analysis to identify significance difference at *p*-value < 0.05 between the socio-demographic profiles with awareness, knowledge and perceptions towards probiotics and probiotics in fermented food. Overall, the survey indicates that consumers aware, have knowledge and good perceptions towards probiotic and probiotics in fermented foods.



#### Isolation and Characterization of Cellulolytic Fungi from Rice Straws

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Keywords: cellulase; cellulolytic fungi; rice straws

**Abstract.** Rice straw is an agricultural waste that is normally produced after the paddy is harvested. Rice straw is high in cellulose content which makes it difficult to degrade. It is burnt away by most farmers as this method saves time and labour. However, burning of rice straw could leave a serious impact towards the environment and the human health in general. To overcome this, biodegradation of the rice using fungi should be applied in managing the cellulosic waste. In this study, rice straws were collected from Bagan Serai, Perak. Fermentations of rice straws were prepared by adding cow dung and phosphate fertilizer. A total of 18 isolates were isolated and characterised. Most isolates were found to belong to the genus *Aspergillus* based on their morphological characteristics. Next, cellulase screening was done using carboxymethylcellulose (CMC) agar with Gram iodine staining. Of all the 18 isolates, 17 isolates showed positive results on CMC agar. Isolate C7 showed the largest diameter of halo zone at 48 hours of incubation whereas isolate 4D has the most significant increase of halo zone in 24-hour duration. These isolates are potentially useful for the degradation of rice straw and return them to soil as biofertilizer.

#### Efficacy of Eugenol and Thymol Derivatives as Potential Biopesticides Against the Red Palm Weevil, *Rhynchophorus ferrugineus* Olivier Adults

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Keywords: red palm weevil, pest, essential oil, eugenol, thymol

**Abstract.** The red palm weevil (RPW), *Rhynchophorus ferrugineus* is a severe and damaging pest of plants under the family of Arecaceae around the globe. RPW was first reported found in Terengganu in 2007 but its population is increasing drastically. Understanding about natural enemies and defensive mechanisms of the RPW against predators and microorganisms is a significant key to discover effective methods for an integrated pest control. The bio-pesticide that is derived from natural plants is suitable to carry out their function in the field which will not degrade the ecosystem and have no negative effect on human health. Eugenol and thymol are the compounds of plant essential oils and they have been used to control some pests with their repellence and toxicity effect. This study found that the LC<sub>50</sub> value of eugenol and thymol derivatives were 470 ppm and 590 ppm respectively. The results conclude that both essential oils were infective towards adult *R. ferrugineus* and should be considered as potential bio-insecticide against adult *R. ferrugineus*.

### Effects of Sucrose and Methyl Jasmonate on Production of Allixin in Callus of Garlic (*Allium sativum* L.)

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Keywords: allixin, callus, garlic, methyl jasmonate, sucrose

Abstract. Allixin is a nonsulfur-containing compound with red-brown color found to accumulate on the surface of garlic (Allium sativum L.) bulbs that have been stored long term, approximately 9 months to 2 years. This phytoalexin showed several unique biological properties such as antioxidative, antimicrobial, radical scavenging, and neurotrophic effects with ability to inhibit binding of aflatoxin B2 to DNA. Allixin is absent in fresh garlic and may possibly be produced via plant tissue culture technique. Effects of sucrose and methyl jasmonate (MeJA) on allixin production in callus of garlic were therefore investigated in this study. Germ-free garlic explants were prepared and cultured in Murashige and Skoog (MS) media which normally contains 3% (w/v) of sucrose in the presence of 5.0 mg/L of kinetin and 1.5 mg/L of 2,4-dichloropheoxyacetic acid for 4 weeks. Garlic callus was subsequently subcultured into the same media supplemented with different sucrose concentrations, varying from 3 to 6% (w/v) and in other sets by varying sucrose concentrations from 3 to 6% (w/v) in combination with either 25 or 50 M of MeJA. After incubation for another 4 weeks, fresh calli were subjected to extraction with methanol and analyzed by High-Performance Liquid Chromatography (HPLC) to observe allixin production in comparison with commercial standard. Sucrose at 4% (w/v) in MS medium provided the highest allixin content at 0.24780.01 mg/g among the concentrations tested. The combination of 25 or 50 M MeJA with 4% (w/v) of sucrose further enhanced allixin content to 0.34320.02 mg/g and 0.94930.03 mg/g, allixin was not detected in the control group of callus. Hence, induced garlic callus is a newfound source of allixin with a much more feasible production time.

Derivatization and Quantitative Analysis of S-allyl-cysteine in Callus of Garlic (*Allium sativum* L.) via High Performance Liquid Chromatography

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Keywords: S-allyl-cysteine, callus, dansyl chloride, garlic, HPLC

Abstract. S-allyl-cysteine is a non-volatile organosulfur compound commonly present in garlic (Allium sativum L.) with promising medicinal properties such as cholesterol-lowering, hepatoprotective and neuroprotective effects as well as antidiabetic, anticancer, antioxidant and antiinflammatory activities. In an attempt to monitor production of this compound in garlic callus a protocol was developed for its quantitative analysis. Standard S-allyl-cysteine was derivatized with dansyl chloride to increase sensitivity and stability of its amino group prior to detection via High Performance Liquid Chromatography (HPLC). Molar ratios of S-allyl-cysteine to dansyl chloride used at 1:1, 1:5, 1:10, 1:20, 1:30, and 1:40 resulted in 0.1796±0.00142 µg,  $0.3173 \pm 0.00057$  µg,  $0.5872 \pm 0.00112$  µg,  $0.8110 \pm 0.00050$  µg,  $0.8172 \pm 0.00047$  µg and 0.8190±0.00032 µg of S-allyl-cysteine, respectively. Based on the previous report that fresh garlic contained approximately 20  $\mu$ g/g of S-allyl-cysteine, subsequently molar ratios of 1:20, 1:40, 1:60, 1:80, and 1:100 were employed to optimize the derivatization step. S-allyl-cysteine contents in fresh garlic determined were at 0.1286±0.00029 µg/g, 0.1289±0.00045 µg/g, 0.1299±0.00031  $\mu g/g$ , 0.1299±0.00025  $\mu g/g$  and 0.1299±0.00050  $\mu g/g$ , respectively. S-allyl cysteine production was also investigated in garlic callus cultured on Murashige & Skoog solid medium with 2,4dichloropheoxyacetic acid (2,4-D) at concentration of 0.05 mg/L for 8 weeks. S-allyl-cysteine was extracted from the tissue with methanol and derivatized with dansyl chloride following those molar ratios performed on fresh garlic revealing 0.2331±0.00085 µg/g, 0.2238±0.00055 µg/g,  $0.1990 \pm 0.00044 \ \mu g/g$ ,  $0.1941 \pm 0.00051 \ \mu g/g$  and  $0.1823 \pm 0.00025 \ \mu g/g$ , respectively. In the case of biological samples like those from fresh garlic and garlic callus the molar ratio of at least 1:20 of S-allyl-cysteine to dansyl chloride is proposed for feasible detection and quantitative analysis of S-allyl-cysteine. Moreover, with the conditions preliminarily used in this study garlic callus has shown S-allyl-cysteine content of nearly double of that found in the fresh garlic counterpart suggesting that tissue culture is an alternative approach for its manufacture.

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## DAY 1 SESSION 2C

#### Identification and Characterization of Endophytic Fungi from Garcinia atroviridis for Potential Antagonistic Against Phytopathogenic, Colletotrichum gloeosporioides

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**Keywords:** antagonistic activity, biocontrol agent, *Colletotrichum gloeosporioides*, endophytic fungi, *Garcinia atroviridis* 

Abstract. Biological control is referred as the "use of natural or modified organisms, genes or gene products" to minimize the effects of undesirable pest, pathogenic microorganism and disease on plant crops. This measure has become a suitable and safe alternative for chemical fungicides in plant disease management. Endophytic fungi have received much attention as biological control agents against many plant pathogens through antibiosis, parasitism, invading spores, mycelium and cells of pathogen and secreting bioactive metabolites. While therapeutic properties of Garcinia atroviridis has been studied, the existence of microbial endophytes and their properties is still less documented. In this research, G. atroviridis endophytic fungi were isolated and identified by fungal colony morphology observation combined with the PCR-amplified fungal internal transcribed spacer (ITS) sequence analyses. Fungal endophytes were assessed for their biocontrol potential against Colletotrichum gloeosporioides. In total, 111 endophytic fungal isolates harboring inside the leaf, branch and fruit of G. atroviridis and belonged to 6 different species with two unidentified genera. All the endophytic fungal species isolated were evaluated using in vitro dual culture assay against C. gloeosporioides, common pathogen that causing anthracnose disease. The results of the present study clearly showed that seven species of isolated fungal endophytes were capable of inhibiting the mycelial colony growth of C. gloeosporioides with inhibition percentage between 54.67% to 87.94 %. Among these species, Nigrospora sphaerica recorded the highest PIRG with 87.94%. Our work indicates that endophytic fungi isolated from G. atroviridis have biocontrol effect on C. gloeosporioides and are expected to be a potential source for bioactive metabolites.

#### Elicitor-Induced Phytochemical Properties and Transcriptional Changes of Genes Associated with 20-Hydroxyecdysone Biosynthesis in *Asparagus officinalis*

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Keywords: Asparagus, elicitor, 20-hydroxyecdysone, metabolite farming

Abstract. Asparagus (Asparagus officinalis L.) is chiefly known as a vegetable and medicinal herb, capable of producing various bioactive and phenolic compounds known for their strong antioxidant and pharmaceutical properties in mammals. Here, we described the potential elicitors to enhance the quantity and quality of phytochemical and phenolic compounds as well as antioxidant properties produced in A. officinalis. This is achieved by combining in vitro shoot cultures of A. officinalis with different concentrations of oxalic acid, salicylic acid (1, 2.5, and 5 μM), chitosan (50, 100, and 200 ppm), and calcium chloride (0.5, 1, and 2%) spraying. Total phenolic content and antioxidant capacity were significantly incremented by oxalic acid (2.5, and 5 µM) and chitosan (50 and 200 ppm). Phytochemical screening showed the presence of saponin, terpenoid, and cardiac glycoside in all treatments. Compared with control plants, A. officinalis strongly modified their terpenoid and cardiac glycoside profile after elicitation with oxalic acid at the concentration of 5 µM. Moreover, this study was also estimated 20-hydroxyecdysone (20E), the main bioactive compound posse's antimicrobial activity and several medicinal benefits, in A. officinalis after treated by 5 µM oxalic acid. Oxalic acid treatment increased the expression of the genes encoding key catalytic enzymes in an early precursor in the 20E biosynthetic pathway. Especially, AsSQE, AsCAS, AsDHCR24, AsEBP, AsEGR, and AsDHCR7 exhibited the expression at 5.5, 19.8, 2.4, 2.2, 2.4, and 12.7-fold higher than that of the control. These results suggest that elicitor-mediated metabolite farming using oxalic acid could be a valuable method for 20hydroxyecdysone production in A. officinalis culture.

#### A Study on Active Functional Group from *Rhizophora apiculata* Extract Used by a Malay as Medicine and Tanning

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Keywords: Rhizophora apiculata, ethnoscience, phenolic compound, HPLC, GCTOF-MS

Abstract. Rhizophora apiculata is a mangrove plant used by the Malay community to treat diarrhea, skin diseases, nausea, vomiting, antiseptic, fodder, tanning, and fuelwood. The plant has been exploited for its availability, high-quality timber and contains a chemical tannin used to reinforce fishing lines, ropes, and nets as well as acts as a leather tanning and antidote to dysentery (intestinal inflammation). The tannin content of R. apiculata's bark, roots, and leaves naturally inhibits fungal infections. This study aims to identify types of functional groups and individual phenolic compounds from R. apiculata. These natural bioactive compounds are in high demand, especially in the pharmaceutical and health markets. An analytical method for R. apiculata was developed using alkaline fractional extracts. The FT-IR analysis found three types of functional groups, mostly aliphatic hydrocarbons and alcohols. The HPLC results revealed three phenolic acids; Hydroxybenzoic acid, Caffeic acid, and Vanillic acid, while the GCTOF-MS results revealed ten compounds. For antibacterial activity, R. apiculata leaf extract inhibited Staphylococcus aureus, Staphylococcus epidermidis and Escherichia coli while antifungal activity inhibited Candida albicans and Fusarium sp. Further research needed to scientifically validate a traditional use by identifying pure authentic material of R. apiculata bioactive compounds.

### Effect of pH on Chromaticity and Colour Stability of Curcumin and PLA-curcumin Coating

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Keywords: Curcumin, PLA-curcumin, pH, Chromaticity, Colour stability

**Abstract.** Understanding the limitations and unfavorable conditions of curcumin would be an advantage to increase the stability of the pigment. Therefore, the ultimate objective of this research is to evaluate the effects of pH on chromaticity and stability of curcumin and PLA-curcumin extracted from Curcuma longa (turmeric), as a potential natural source for coating. Curcumin is the major component in Curcuma longa that is responsible for its biological actions. The bright yellow extract from the turmeric comes from fat-soluble, polyphenolic pigments which is known as curcuminoids. Overall, the dark condition was preferable and stable for the curcumin brightness and slower the degradation percentage. Dark condition exhibited a better and stable colour degradation (approximately 40%) in all curcumin concentrations (1 mg/ml, 2 mg/ml and 3 mg/ml) as compared to light condition with 89.92%, 85.79% and 60.90%, respectively. PLA alone showed the highest chroma (C\*) value at 3.08% in dark condition, which was slightly higher than in light condition (2.87%). The highest C\* values were achieved in curcumin set with lower pH (pH 3, 5 and 7) and the lowest at higher pH (pH 9 and 11) in both light and dark conditions. However, all PLA-curcumin showed colour stability in both acidic (pH 3 and 5) and basic (pH 9 and 11) in dark condition only.

A recent review on phytochemical constituents and medicinal properties of Sambau Paya (*Chloranthus erectus*)

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**Keywords:** Chloranthaceae, Malay herbs, Pharmacological properties, Phytochemical constituents, Sambau Paya

**Abstract.** Medicinal plants and herbal medicines are garnering widespread attention in scientific communities nowadays due to their consistent pharmacological activities and accessibility to the general public, hence making them beneficial in the treatment of a variety of disorders. *Chloranthus erectus* (Chloranthaceae) locally known as Sambau Paya is a popular folklore medicine used by the many indigenous communities or 'Orang Asli' in Malaysia to treat localised swelling, joint pain, skin inflammation, fever, and body ache. The plant has potential applications due to its valuable properties for anti-inflammatory and antibacterial activity. A few researches has carried out scientific study by using different *in vitro* and *in vivo* models for biological evaluations to support these claims. Even though there are many valuable properties of this plant mentioned by old folks, only few scientific data have been reported concerning their pharmacological and phytochemical properties. Therefore, this review paper may help upcoming research activities on *Chloranthus erectus* by providing up to date information on the phytochemical constituents and medicinal properties of Sambau Paya to a possible extent with relevant data.



# DAY 1 SESSION 2D

#### Carotenoid Pigments from Selected Green and Blue-Green Algae Species Cell Culture as Potential Halal Food Colorants

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Keywords: carotenoid, green algae, cyanobacteria, natural pigment, halal market

Abstract. Halal products are becoming widely recognised as a new standard for quality assurance and safety and also there is a strong need to investigate the potential of natural pigments, particularly carotenoids in microalgae to be fully commercialised especially in halal market, health advantages, food products and dye technology. Therefore, this research aimed is to explore new sources of pigments as halal food colourant. A total of 13 species were evaluated for carotenoid profile quantitative and qualitatively, namely, *Chlorella fusca*, *Chlorella vulgaris*, Selenastrum capricornutum, Pandorina morum, Botryococcus sudeticus, Botryococcus braunii, Chlorococcum sp., Ankistodesmus sp., Scenedesmus sp., Pseudanabaena sp., Synechococcus sp., Alkalinema sp., and Phormidium sp. The first 9 species are green algae while the remaining 4 are cvanobacteria. The main carotenoids identified through HPLC analysis were  $\beta$ -cryptoxanthin,  $\beta$ carotene, zeaxanthin, neoxanthin, lutein and violaxanthin which varies in ratio between species.  $\beta$ -cryptoxanthin was detected substantially higher in *Phormidium* sp. (30.58 µg/g DW);  $\beta$ carotene in C. vulgaris (356.15 ug/g DW); zeaxanthin in Synechococcus sp. (7731.30 µg/g DW); neoxanthin in Chlorococcum sp. (129.27 µg/g DW); whereas lutein and violaxanthin in C. fusca (220.14 µg/g DW) and (307.94 µg/g DW) respectively. The research's significant outcome will be discoveries of new natural carotenoid pigment sources as potential food colorants for halal industry.

#### A Comprehensive Review of The Ethnobotanical, Phytochemical and Pharmacological Properties of The Genus Bambusa

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Keywords: Bambusa, ethnobotanical, phytochemistry, pharmacological

**Abstract.** The genus *Bambusa* (Poaceae) has been used in folk medicine for centuries across Africa, China, India, and elsewhere. In recent years, numerous research studies have been conducted to highlight the ethnobotany, phytochemistry, and pharmacology of *Bambusa* spp. The crude extracts and pure bioactive components of *Bambusa* spp. have shown a wide range of pharmacological activities, such as antioxidant, anti-inflammatory, antibacterial, antifungal, antimalarial, anticancer, antidiabetic, abortifacient, and cytotoxicity activities. Several compounds from *Bambusa* spp. have been isolated and identified, including alkaloids, flavonoids, phenolics, terpenoids, and other compounds. Due to their excellent medical value and low toxicity, *Bambusa* spp. have a massive global market and trigger a growing enthusiasm among researchers. However, systematic reviews are still lacking. Hence, in this work, we reviewed the *Bambusa*-based articles published in Scopus, Web of Science, PubMed, and ScienceDirect from 2003 until recent years. The ethnobotanical uses, phytochemistry, and pharmacological properties of the genus *Bambusa* were discussed in this review which aims to provide a reference for further development and utilisation of *Bambusa* spp.

SiCIABC2

#### Grain Biochemical Composition in Carriers of a Combination of Maize Mutant gGnes o2su2

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Keywords: maize, endospermic mutants, biochemical effect

**Abstract.** The grain biochemical composition of carriers of the combination of mutant maize genes o2su2 was studied. It was established that the carriers of this combination are superior to monogenic mutants o2 and su2 in terms of a complex of biochemical characteristics. The o2su2 mutants are characterized by a higher content of protein, essential amino acids, oil, amylose in starch, increased digestibility of starch, and in some cases, an increased content of oleate. The effect of interaction between the o2 and su2 genes for these traits was found to be more significant than the effects of polygenic complexes. Corn hybrids-carriers of the o2su2 combination can be used as the sources of food products with increased nutritional value.

#### Anti-Apoptotic Actions of Safinamide in 6-Hydroxydopamine-Induced Cell Model of Parkinson's Disease

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Keywords: Apoptosis, Safinamide, 6-Hydroxydopamine, Parkinson's disease

**Abstract.** Parkinson's disease (PD) is a progressive neurodegenerative disorder. Safinamide has been identified as a new therapeutic approach in the treatment of PD. In the present study, the effect of safinamide is studied on 6-hydroxydopamine (6-OHDA)-induced SHSY5Y cell model of PD. 6-OHDA-challenged SH-SY5Y neuronal cells were treated with safinamide. Cell viability, reactive oxygen species (ROS) levels and apoptosis were determined using dimethylthiazol-diphenyltetrazolium bromide (MTT) assay, dichloro-dihydro-fluorescein diacetate (DCFH-DA) assay and cell cycle analysis, respectively. Treatment with safinamide slightly increased the cell viability, lowered the ROS levels and reduced apoptosis. However, all the results obtained are not statistically significant. In conclusion, safinamide possesses slight neuroprotective properties, achieved through anti-oxidative stress and anti-apoptotic properties.



#### Sensory, Proximate, and Physicochemical Properties of Moringa oleifera Leaf Juice after Clarification by Pectinase Treatment Fan Hui Yin<sup>a</sup> and Jasmin Nagiyah Mohd Sharuddin

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**Keywords:** clarification, pectinase, *Moringa oleifera* leaf juice, sensory acceptance, physicochemical properties

Abstract. The effect of pectinase treatment on clarification of *Moringa oleifera* leaf juice was studied through sensory acceptance, proximate and physicochemical properties, as well as filterability and clarity. Six juice samples (F1 to F6) were obtained from Moringa oleifera leaf pretreated with pectinase at 0.05%, 0.10% and 0.15% (w/w) for 60 and 120 min, respectively. Sensory evaluation using hedonic scale revealed that sample F6 (treatment: 0.15% pectinase, 120 min) scored the highest preference (p < 0.05) among the panellists for its colour, mouthfeel, aftertaste and overall acceptance. Proximate analysis of sample F6 showed a composition of 90.98  $\pm 0.12\%$  moisture,  $0.33 \pm 0.02\%$  ash,  $1.03 \pm 0.003\%$  protein,  $0.02 \pm 0.00\%$  fat,  $4.50 \pm 0.06\%$  fiber, and  $3.03 \pm 0.13\%$  carbohydrate, as well as pH value of  $5.49 \pm 0.07$ , which were not significantly different (p>0.05) as compared to juice without enzymatic treatment (control sample). Remarkably, sample F6 was significantly higher (p < 0.05) in lightness (L\*= 37.96 ± 0.31) and redness ( $a^*= 1.38 \pm 0.10$ ) as compared to the control sample, indicating the depectinization effect of pectinase in possible liberation of lycopene. Consequently, sample F6 exhibited a higher filterability  $(0.04 \pm 0.01 \text{ s}^{-1})$  and clarity  $(0.26 \pm 0.00 \text{ Abs})$  than the control sample (p<0.05). Taken together, clarification by pectinase treatment produced Moringa oleifera leaf juice with higher sensory acceptability while retaining its nutritional quality.



### DAY 1 SESSION 2E
### *In vitro* α-glucosidase inhibition activity of endopolysaccharide isolated from *Ganoderma lucidum*

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Keywords: T2DM; alpha-glucosidase; endopolysaccharide; Ganoderma lucidum

**Abstract.** Type 2 Diabetes (T2D) is a chronic metabolic disorder that causes by insulin resistance in body cells, disrupting glucose homeostasis. Inhibitory activity of  $\alpha$ -glucosidase enzyme becomes the primary target for T2D treatment which the inhibitor can decrease postprandial concentrations of glucose in the bloodstream. This project aimed to study the inhibitory effect of alpha-glucosidase enzyme activity and to determine the structural characteristic of crude and purified endopolysaccharide (ENS) from mycelial of Ganoderma lucidum as well as their chemical composition. The results were analysed using three methods of analysis which were in vitro alphaglucosidase inhibition assay, structural characterization using Fourier Transform Infrared (FTIR) spectrometer, and monosaccharides composition analysis using Gas Chromatography-Mass Spectrometer (GC-MS). The results showed that purified ENS from Ganoderma lucidum is the most potent compound with the highest inhibitory effect towards α-glucosidase enzyme with an IC<sub>50</sub> value of 1.460 mg/mL compared to the crude ENS extracts (IC<sub>50</sub> = 2.272 mg/mL). Both crude and purified ENS demonstrated a strong inhibition effect towards alpha-glucosidase activity similar to the clinically approved alpha-glucosidase inhibitor, acarbose ( $IC_{50} = 2.034 \text{ mg/mL}$ ). Hence, the crude ENS and purified ENS extracted from Ganoderma lucidum showed promising results in inhibiting the  $\alpha$ -glucosidase enzyme.

SiCIABC2

#### Electrospinning of Essential Oil Plant Extracts for Antibacterial activity and Wound Healing Applications

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Keywords: Electrospinning, Nanofibers, essential oils, antimicrobial activity, wound healing

**Abstract.** The essential oils are plant-based volatile oil from secondary metabolite with strong aromatic and composed of highly concentrated chemical compounds are useful in biomedical applications. Nanotechnology is one of the most promising and growing technology today shows an extremely huge potential in the field of tissue engineering. Electrospinning techniques generally provides the encapsulation of essential oils with aqueous polymer solutions for fabricating the nanofibrous scaffolds. Nanofibers possess several advantages in treating infected wounds and accelerate wound healing for their morphological design and high absorption of exudates in the wound sites, efficient gasses exchange, provide physical protection of the injured tissue, and the efficiency to release functional molecule with controlled release of antibiotics and growth factors for normal wound healing. This review aimed to briefly overview some recent research work in which plant essential oil extracts have been loaded with natural or synthetic polymers for antibacterial and wound healing applications.



#### Polycaprolactone/Cellulose Acetate loaded Psidium guajava essential oil Electrospun Nanofibrous Mat dressing for healing wounds

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**Keywords:** Polycaprolactone (PCL), Cellulose Acetate (CA), *Psidium guajava* essential oil (PGEO), biocomposite nanofibers, wound healing.

**Abstract.** Medicinal plants' essential oils and natural products are widely used in wound healing, especially in the pharmaceutical industry. The emergence of drug-resistant strains was controlled by essential oil extracted from the medicinal plant *Psidium guajava* was selected as an antibacterial agent against *Staphylococcus aureus*, *Bacillus subtilis*, and *Enterococcus faecalis*. Biocomposite nanofibers of Polycaprolactone (PCL)/Cellulose Acetate (CA) and *Psidium guajava* essential oil (PGEO) were developed through electrospinning for applications in drug delivery systems and antimicrobial activity. FESEM images showed that the average fiber diameters were 120 nm and 223 nm for the PCL/CA and PCL/CA/PGEO biocomposite nanofibers, respectively. The addition of PGEO into PCL/CA nanofibers increased the average diameter size of nanofibers. Moreover, FTIR studies observed the -OH peak in pure electrospun PCL/CA and PCL/CA/PGEO essential oil, and the peak is absent in pure PGEO nanofibers are an interesting platform for delivering bioactive compounds as wound dressing or other strategies for combating bacterial infections for wound healing applications.



## DAY 1 SESSION 2F

SiCIABC2I

#### Comparative Assessment on Pretreatment Methods for Landfill Waste Utilization in Biohydrogen Production

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Keywords: Young landfill waste, biohydrogen, value-added product, pretreatment

**Abstract.** Landfill waste consisted of a mixture of components that is highly potential as a substrate for hosting various microorganisms' growth. Utilizing this waste as fermentation substrate is seen as an economical solution for the management of the waste. Treating this waste is crucial to remove unnecessary components for the growth of specific organisms to ensure high reaction yield. Fermentative hydrogen production from this waste specifically requires the hydrogen consuming bacteria to be reduced. In this work, heat, UV radiation, acid and base pretreatment were conducted on the young landfill waste. The changes in the reducing sugar content and appearance of bacterial colonies were observed and compared. Heat pretreatment at 65°C was found to give among the best result with 75% (15 minutes), 80% (30 minutes), and 84% (60 minutes) increase in reducing sugar content and reduction in the number of aerobic bacterial colonies detected. The potential of the selected pretreatment in economic and environmental impact potential was also evaluated.



#### Isolation and Characterization of Chondroitin Sulphate from Fish and Fish Wastes

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**Keywords:** Fish, Chondroitin sulphate, Extraction, Glycosaminoglycans, Identification, Purification

Abstract. Chondroitin sulphate (CS) is one of the major components of the extracellular matrix of tissues. Significant uses of CS in medicinal and pharmaceutical industries, tissue engineering and skin care industry have increased its demand for years. Even though different sources are available for CS isolation, fish and fish wastes are more suitable sources due to its low cost, easy handling and availability. Additionally, the waste parts (i.e., fins, scales, skeleton, bone, and cartilage) of fish are also excellent sources of CS that would make it more economic production. However, a suitable isolation and characterization technique of CS from fish samples is still challenging considering the production yield of individual glycosaminoglycans (GAGs). Some factors play important roles in the isolation for the GAGs yield, including enzyme types for proteolysis and concentration, pH and temperature of the chemicals. Many studies suggest that enzyme-based extraction procedure give more successful results than chemical ones. Having an efficient protocol for CS productions from fish sample is an urgent need. Therefore, this study aimed to critically evaluate the existing methods and propose a suitable technique of isolation and characterization of CS from fish or fish wastes. In general, the existing methods were based on tissue hydrolysis, removal of proteins and purification. Therefore, the yield and quality of CS differ significantly due to the extraction conditions, enzymes and/or solvents used in isolation process, and the purification techniques. This alteration leads to the specific purity, molecular weight, and sulfation pattern of the isolated CS linked to its biological functions.

### Preliminary results of antifungal activity of lactic acid bacteria isolated from Malaysian traditional fermented food

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Keyword: Candida; antifungal agents; fermented food; lactic acid bacteria; antifungal activity

Abstract. Candida albicans, naturally a part of healthy gut and oral microflora, is an opportunistic pathogen that commonly infects humans. However, current antifungal agents are made of synthetic drugs that cause varied adverse effects in patients. This drives efforts into looking for natural and safer alternatives of antifungal agents. Fermented food has been studied for their ability to produce lactic acid bacteria with antimicrobial properties. This study examined the antifungal activity of lactic acid bacteria isolated from selected Malaysian traditional fermented food sources. Four fermented food (i.e. pickled chilies, pickled garlic, pickled maman, and tapai) were prepared by using homemade recipes and fermented at 4°C. Lactic acid bacteria were isolated from the fermented food during a two-week fermentation period on four types of selective growth agars. During fermentation, bacterial cell counts were taken at intervals. The growth trend for pickled garlic and pickled chilies presented an exponential phase between days 0 - 4, followed by stationery and death phases between days 8 - 14. Meanwhile, pickled maman and tapai showed a continuous growth throughout the 14 days. Antifungal potential of the lactic acid bacteria was tested via dual agar diffusion assay by spotting pickled water of each fermented food on De Man, Rogosa, Sharpe (MRS) agar placed above a layer of Sabouraud Dextrose agar (SDA) with preinoculated C. albicans, followed by measurement of zone of inhibition. Pickled maman produced  $1.2 \pm 0.05$  mm of inhibition, and pickled chilies showed  $0.5 \pm 0.05$  mm of inhibition. In conclusion, pickled maman and tapai produced lactic acid bacteria throughout the two-week fermentation. Based on the dual agar diffusion, pickled maman showed the highest antifungal potential.



# DAY 2 SESSION 3A



#### **Toxicity and Efficacy of Cocoa Liquor Facial Mask**

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Keywords: cosmetics, heavy metal, cocoa liquor

**Abstract.** Cocoa liquor is a natural source of antioxidants with potential health benefits. The present study was conducted to determine the stability, level of toxicity and efficacy of cocoa liquor facial mask (CLFM) in protecting the skin by warding off free radicals from the environment. The centrifugal study of CLFM depicted minimum separation when compared to pure cocoa liquor. Microbiological test on colony form unit showed microorganism and yeast and molds were <1 g and <10 g., respectively. The data of heavy metal in CLFM such as arsenic (As), lead (Pb), cadmium (Cd) and mercury (Hg) were <0.05 mg/kg, 6.0 mg/kg, 0.2 mg/kg, <0.01 mg/kg., respectively. The efficacy test of CLFM on the skin had decreased in skin roughness (SEr), skin scaliness (SEsc), increased in skin smoothness (SEsm) and decreased the skin wrinkles (Sew). The skin thickness increased with slowing down the degradation of collagen and elastin in the skin. The study presents scientific validation on its phytochemical contents showing presence of bioactive compounds with nutritional and therapeutic values which may have positive impact on skin health and suggesting its prospective use in value-added products such as skin care cosmetics.



#### Effect of Extraction Condition on the Recovery of Phenolic Compounds and antioxidant capacity of Defatted *Hylocereus Polyrhizus* Seed

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Keywords: antioxidant activity, phenolic content, solvent, time, temperature, defatted seed

**Abstract.** The purpose of the present study is to evaluate the effect of different extraction conditions (ethanol concentrations (20-95% v/v), extraction time (30-240 min) and extraction temperature (20-80°C)) on the recovery of phenolic content and antioxidant capacity of defatted *Hylocereus Polyrhizus* seed extract (DHPSE) using one variable at a time (OVAT) method. Total phenolic content (TPC), total flavonoid content (TFC) were used to determine the phenolic content while 2,2-diphenyl -1- picrylhydrazyl (DPPH) radical scavenging activity was used for evaluating the primary antioxidant capacity of DHPSE. All various extracting conditions studied showed a significant effect at p < 0.05 on the phenolic content and antioxidant activity of DHPSE. The optimise conditions determined for extracting phenolic compound were 80% ethanol for 60 min at 80 °C, which correspond to the value of 120.33 mg GAE/g sample for TPC, 10.76 mg QE/g sample for TFC with 92.22% inhibition of DPPH radical. Thus, these conditions are recommended to enhance the recovery yield of phenolic compounds from defatted *Hylocereus Polyrhizus* seeds.

#### Synthesis and Characterization of Molecularly Imprinted Polymer with Oleic Acid as The Template

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Keywords: molecularly imprinted polymer, oleic acid, palmitic acid, polymerization

**Abstract.** Molecularly Imprinted Polymer-Oleic Acid (MIPOA) and Molecularly Imprinted Polymer-Palmitic Acid (MIPPA) were synthesized using oleic acid and palmitic acid as the templates; acetonitrile as the porogen solvent; and allylthiourea as the monomer; and EDGMA as a cross-linker via bulk polymerization. The non-imprinted polymers (NIP) were prepared with the same procedure, but with the absence of template molecule. The synthesized MIPs and NIP were characterized using Fourier Transform Infrared Spectroscopy (FTIR) and the results showed the narrowing of –OH peak which shows that crosslinking has occurred. Field Emission Scanning Electron Microscope-Energy Dispersive X-Ray (SEM-EDX) was used to analyse the composition of in both MIPS and NIP. The results yielded a composition of C, O, and S. This analysis corresponds to the composition of oleic acid and sulphuric acid as both templates contain -COOH group. These results suggested that the molecularly imprinted polymers can be employed as a potential adsorbent for the selective adsorption and removal of oleic acid and palmitic acid from Palm Fatty Acid Distillate waste.

#### Food Grade Grease Formulation Using Paraffin Oil, Fumed Silica and Chitosan

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Keywords: fumed silica, NSF H1 food grade grease, chitosan, paraffin oil,

**Abstract.** This study aimed to formulate NSF H1 food-grade grease using paraffin oil and fumed silica as base oil and thickener respectively while chitosan are used as an additive. The formulated greases and a commercial food-grade grease were characterized for thermal stability via thermogravimetry (TG) and derivative thermogravimetry (DTG) analysis, and were characterized for dropping point, oil separation and consistency test to evaluate the properties of the greases. FTIR spectra were obtained for the fresh and aged grease to further understand the grease characterization. The result shows that the grease made with chitosan as additive show higher oil separation (%), better consistency and less effected by aging as indicated by the greases colour changes after oil separation test.



#### Palm-Based Mid Olein Blended Polyol

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Keywords: mid olein, RBD Palm Kernel Olein, transesterification, polyol, polyurethane

**Abstract.** Mid Olein (MOo) and RBD Palm Kernel Olein (RBD PKOo) with ratio 50:50 (w/w) was synthesized *via* transesterification reaction for polyol production. The properties of MOo-PKOo polyol was reported as follows; iodine value (IV), 32.43 g I<sub>2</sub>/100 g; acid value (AV), 0.84 mgKOH/g; hydroxyl value (OHV), 334 mgKOH/g; moisture content 0.52% and kinematic viscosity, 1.136 Pa s<sup>-1</sup>. MOo-PKOo polyol was then formulated with incorporation of 30%, 50% and 100% (w/w) replacement to polyol-based petroleum in polyurethane formulation. It was reported that 30% of MOo-PKOo polyol could be used and produced foam that having similar properties to the reference foam, except for the thermal conductivity value.



# DAY 2 SESSION 3B

#### Discovery of potent benzimidazole as α-glucosidase inhibitors through 3D-QSAR, molecular docking simulation and ADMET screening

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Keywords: α-glucosidase, 3D-QSAR, Molecular docking, benzimidazole, ADMET

Abstract. Miglitol and acarbose are distinguished  $\alpha$ -glucosidase inhibitors widely adopted for regulatory of diabetes mellitus. Unfortunately, these drugs clinically used have several unwanted effects. Consequently, development of safer and potent therapy became more indispensable. To that end, 3D-QSAR and molecular docking were effectuated on set of 20 benzimidazole molecule. CoMFA and CoMSIA models were molded using sixteen molecules in the training set afford Q<sup>2</sup> values of 0.597 and 0.537 respectively, and R<sup>2</sup> values of 0.958 and 0.948 respectively. The generated models were tested for their proficiency using four benzimidazole molecules affords R<sup>2</sup>test values of 0.85 and 0.627 respectively. Additionally, the outcomes of CoMFA and CoMSIA contour maps directed us to find out the regions responsible on increasing or decreasing the activity; bearing this in mind, we suggested 4 novel  $\alpha$ -glucosidase inhibitors with excellent predicted activities. Molecular docking was put into effect to figure out the binding modes between  $\alpha$ -glucosidase receptor and benzimidazole molecules. Moreover, to determine the safety of the proposed molecules and their accessibility to be viable drugs, we calculated the ADMET properties. The outcomes obtained pointed out promising ADMET results of novel candidate compounds; especially, the compounds M2 and M4.

SiCIABC2I

#### New α-Glucosidase Inhibitors based on Quinoline and Derivatives: Molecular Modelling Studies

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Keywords: α-glucosidase; CoMSIA; Molecular docking; Quinoline; In silico ADME.

Abstract. In search of the qualified drug as an  $\alpha$ -glucosidase inhibitor, we have studied a set of quinoline-based Schiff base derivatives by using 3D-QSAR and molecular docking studies. The optimal CoMSIA model was generated using thirteen molecules in the training set; gives good value of Q<sup>2</sup> (0.607), high value of R<sup>2</sup> (0.912) and significant value of R<sup>2</sup>test (0.75). In a similar vein, the contour maps produced by CoMSIA model afforded helpful information to determine the sites influencing the activity. These valuable findings guided us to propose two new  $\alpha$ -glucosidase inhibitors with best activities. Molecular docking was put into effect to guess the possible interactions existing between quinoline-based Schiff base compounds and  $\alpha$ -glucosidase receptor (PDB: 3AJ7). Moreover, the new  $\alpha$ -glucosidase inhibitors were tested for their ADME properties and drug likeness. The outcomes obtained pointed out good pharmacokinetics properties of the new molecules E1 and E2.

### Antifungal activity of triazole derivatives using 3D-QSAR, Molecular Docking, and ADMET prediction

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Keywords: antifungal, CoMFA, CoMSIA, Molecular docking, ADMET

**Abstract.** Candida albicans is deemed as the main fungal classes found in humans, and usually colonizes host mucosal surfaces as a commensal organism. In this study, we effectuated a 3D-QSAR study using CoMFA and CoMSIA approaches on a series of 25 triazole compounds present candida albicans activity. CoMFA and CoMSIA models were developed and they afford significant value of Q<sup>2</sup> (0.708 and 0.755) respectively, and important values of R<sup>2</sup> (0.908 and 0.931) respectively. The findings produced from CoMFA and CoMSIA contour maps were a good support to figure out the main regions affecting the candida albicans activity. Bearing this in mind, we succeed to design four new antifungal compounds with excellent activities. Molecular docking was executed to affirm the stability of the predicted compounds in the receptor with PDB code: 5TZ1. Moreover, the four new triazole molecules have been evaluated for their oral bioavailability and toxicity employing ADMET properties and drug likeness.

Combined 3D-QSAR, Molecular Docking and ADMET Properties to Identify Effective Triazole Compounds against Candida Albicans

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Keywords: candida albicans; triazole; CoMFA; Molecular docking; In silico ADMET.

**Abstract.** Candida albicans infection remains a challenge to clinicians due to the insufficient available antifungals drugs. Consequently, searching for new drugs, active constituents of natural or traditional medicines, and methods to beat antifungal resistance is necessary. For this urgent end, we conducted our search using one of the famous computational technique namely 3D-QSAR on set of 21 triazole molecules present an activity against candida albicans. The best established CoMFA model affords a Q<sup>2</sup> value of 0.601 and R<sup>2</sup> value of 0.985. The generated model was validated and checked for it capacity; the R<sup>2</sup>test obtained was 0.967, indicating the good predicted ability of CoMFA model. CoMFA contour maps bring a set of information to discover the sites impacting the candida albicans activity. These valuable findings lead us to designed five new triazole compounds with good predicted activities. Moreover, molecular docking was applied to identify the types of interactions between ligand and receptor. The findings obtained clearly showed that the new compound **S1** exhibited different and numerous interactions at the active site of the receptor. Finally, the new suggested triazole molecules were undergone to in silico ADMET study to determine their pharmacokinetics and drug likeness. These results suggest that the compound **S1** will be of great value in treating candida albicans infections.

#### Copper Oxide Coupled Titanium Dioxide (CuO/TiO<sub>2</sub>) Nanocomposite Photocatalyst for Degradation of Methyl Orange Dye

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Keywords: copper oxide, titanium dioxide, photocatalyst, nanocomposite, degradation

Abstract. Titanium dioxide (TiO<sub>2</sub>) was utilized in photocatalysis applications due to their nontoxic, cheap and high photocatalytic activity. However, its photocatalytic reaction is limited by low surface area as well as the rapid recombination of photogenerated electron-hole pairs and only has ability to absorb a small fraction (<5%) of indoor light. In this study, copper oxide coupled titanium dioxide (CuO/TiO<sub>2</sub>) nanocomposite photocatalyst and pure TiO<sub>2</sub> was synthesized using hydrothermal method. The synthesised photocatalyst was characterized by using Fouriertransform infrared spectroscopy (FTIR), X-ray diffraction analysis (XRD), Scanning electron microscopy (SEM), Thermogravimetric analysis (TGA), Brunauer, Emmett, teller (BET) and UV-Visible Spectroscopy. Spectra obtained from FTIR have proved that there are existence of O-H stretching, O-H vibration and metal-O bond that correlates to the functional groups of the samples. As affirmed by XRD analysis, highly crystalline anatase TiO<sub>2</sub> phase was obtained for pure TiO<sub>2</sub> samples. Anatase TiO<sub>2</sub> phase is remained and additional peaks belong to copper oxide was observed for CuO/TiO<sub>2</sub> nanocomposite photocatalyst sample. This finding suggesting that copper oxide was successfully loaded onto TiO<sub>2</sub>. Morphological study from SEM shows the presence of short rod-like particles of copper oxide and agglomerated TiO<sub>2</sub> bulk particles. TGA results show that pure TiO<sub>2</sub> and CuO were thermally stable as only 6.5 and 6.8% weight loss, respectively due to the water removal. BET surface area for CuO, TiO<sub>2</sub> and CuO/TiO<sub>2</sub> nanocomposite photocatalysts were 20.50 m<sup>2</sup>/g, 15.26 m<sup>2</sup>/g and 17.13 m<sup>2</sup>/g, respectively. The photocatalytic degradation of methyl orange (MO) was found to be 60.00% using CuO/TiO<sub>2</sub> nanocomposite photocatalyst with ratio 1:5, which is better than pure TiO<sub>2</sub>, pure CuO and other CuO/TiO<sub>2</sub> nanocomposites after 3 hours reaction. This is attributed to the presence of CuO at optimum amount which can enhance the surface area, promotes electron-hole separation and decelerates the charge carrier recombination.



# DAY 2 SESSION 3C

#### Alkali Impregnation and Steam Explosion of Cogon Grass for Improved Enzymatic Saccharification

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Keywords: saccharification, cogon, alkali-impregnation, steam explosion, lignocellulose

Abstract. Process parameters for the alkali-impregnation of cogon and its combination with steam explosion were evaluated and optimized using Response Surface Modeling (RSM). Dried cogon (10% w/v) was impregnated in diluted base (1, 2, 3% (w/w) NaOH) at different ranges of temperature (50, 85,120°C) and time (15, 32.5, 50 min), and then subjected to enzymatic saccharification using 60 FPU/g Accelerase 1500<sup>TM</sup>. The concentration of reducing sugar released was measured using Nelson-Somogyi Colorimetric Method. The RSM showed that the optimum condition, predicting 10% Reducing Sugar Yield (RSY), was treatment of 10 % (w/v) cogon with 1.5% NaOH (w/v) at 73°C for 15 min. Upon validation, done in triplicates, 13±1.0% RSY was obtained. The optimally-impregnated cogon was subjected to a steam explosion treatment to improve its saccharifiability. The factors varied were temperature (170 to 225°C) and exposure time (250 to 800 s). Upon saccharification of the steam-exploded samples, the RSM indicated that the best steam explosion condition, predicting 14% RSY, was 225°C and 800 s. Upon validation, 15±0.5% RSY was obtained. Steam explosion improved the saccharifiability of NaOH-impregnated cogon by 15%.



#### Synthesis Gas Characteristics from Biomass Feedstocks with Gasification Process

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Keywords: Biomass, Feedstock, Gasification, Material Characteristics, Synthesis Gas

Abstract. The continuous depletion of fossil fuel and the adverse effects of their usage has driven researchers to other resources of energy. There are many ways to utilize biomass as an energy source, including through gasification to produce Synthesis gas. Synthesis gas can be used in many applications such as methanol production and direct usage to generate electricity and so on give a strong reason researchers try to produce this valuable energy to generate electricity. Fundamentally this research aims to determine the thermochemical composition and energy content of materials and assess its effect towards syngas composition and quality before it can be produced in large amount. The feedstocks such as palm kernel shell, empty fruit bunch, coconut shell and Meranti wood chips were chosen in this research. The ultimate, proximate and thermogravimetry analyses were used to determine the thermochecmical composition. The ultimate and proximate analyses determine the material contents such as carbon, hydrogen, nitrogen, sulphur, oxygen, moisture content, volatile matter, fixed carbon, and ash. The derivative Thermogravimetry analysis can determine the hemicellulose, cellulose and lignin. The results show the quality of this gas is assessed through its hydrogen or carbon monoxide (H2/CO) amount as indicator for good quality level to synthesis gas. Experimental results suggests that palm kernel shell has the highest energy content with 21781 J/g amongst the four samples whilst Meranti wood chip was found to have the lowest value. After gasification, palm kernel shell was found to have the highest H<sub>2</sub> amongst the other samples tested, which affected its  $H_2/CO$  ratio. This elucidates the synthesis gas quality of palm kernel shell as a good feedstock for producing the synthesis gas feedstock for gasification. Based on canonical correlation analysis (CCA), it was found that several characteristics play a major role in synthesis gas production such as carbon, oxygen, lignin and hemicellulose. To enhance the production of H<sub>2</sub> in the steam reforming reaction, a sample may need to have high lignin content and low hemicellulose content. Decomposition for celulose and hemicelluose would increase the concentration of the synthesis gas. Further utilisation of biomass waste allows generation of additional energy through renewable sources, whilst potentially reducing reliance on coal and its associated pollutants in air which may indirectly increase the economy of Malaysia.



#### Use of *Pleurotus ostreatus* Spent Mushroom Compost as Bio-waste on the Growth of Fig Tissue Culture

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Keywords: spent mushroom compost; plant tissue culture; Ficus carica; shoot induction

Abstract. Spent mushroom compost is identified as waste substrate. The conservation of spent mushroom compost as waste to wealth is a great concept that can give value to agricultural industry and solid waste management of mushroom cultivation. This study established the use of *Pleurotus ostreatus* spent mushroom compost (SMC) as a component of the media in plant tissue culture of fig plant. Nodal segment of fig's stem were cultured in media supplemented with different concentration of SMC. The study revealed that in presence of suitable concentrations of SMC could produce new shoots at a frequency comparable to the control. In the presence of 10% SMC, the highest shoot produced were 2.167  $\pm$  1.169 and length of shoots 0.154  $\pm$  0.060 cm. Adding of 40% SMC produced highest number of leaves which was 1.000  $\pm$  0.894. In conclusion, the SMC added in media for plant tissue culture had significant effect on induction of shoot thus highlighted the innovation of waste substrate to nutrient supply of SMC for fig culture.

#### A Review: PLA Degradation and PLA-Degrading Microorganisms

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Abstract. Polylactic acid (PLA) is not new to the world of science since the application of PLA can be found in various industries such as biomedical, agricultural, and packaging. Despite the fantastic properties shown by PLA, it still has a setback in terms of waste disposal of PLA. Since PLA is more resistant to bacterial attack, it prolonged PLA decomposition indisposed in the environment. Therefore, PLA microbial degradation and enzymatic degradation need to be highlighted since most PLA waste will be in landfills. Most PLA degraders can be found in the genus family Amycolatopsis, and a few can be found in genus Lentzea, Kibdelosporangium, Paecilomyces, Thermomonospora, and Thermopolyspora and more. Researchers have found that most PLA degraders consist of either bacteria or fungi. This review paper aims to discuss the biodegradation and biodegradability of PLA and past studies regarding microorganisms that degrade this bioplastic.



# DAY 2 SESSION 3D

### The Effect of the Imidazolium-based Cation Alky Chain Branching on the Ferulic Acid Recovery: COSMO-RS Approach

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Keywords: COSMO-RS, Ferulic acid, Ionic liquids, alkyl chain length effect, selectivity

**Abstract.** Recent years have seen renewed interest in ionic liquid extraction especially on biomass extraction. However the key issues in biomass extraction is the nature of alkyl subtituent in the ionic liquid that leads to the selectivity of extraction. Biomass extraction including ferulic acid (FA) extraction is very impretive for multiple applications in health industries. Therefor, in this study, the effect of alkyl chain length subtituent on FA extraction was computationally investigated. A conductor-like screening model for real solvents (COSMO-RS) model was employed to calculate the distribution coefficient and selectivity of 63 ILs consisting 7 imidazolium-based cations and 9 anions. This study found that small alkyl chain may resulted higher FA selectivity. This result may partly explain by the fact that the larger sterically hindered effect with FA that produce by the larger alkyl group in imidazolium cycle of ILs. This present study lays the groundwork for future research on selection of ILs and validate them experimentally for FA extraction from fermentation broth.



#### Dynamics of Yield and Chlorophyll Content of Four Kangkong (*Ipomea reptans Poir*) Sequences with Soilless Cultivation System Due to Direct and Residual Effects of Vermicompost Application

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Keywords: Yield, Chlorophyll content, Residual Effect, Vermicompost, Soilless Culture

Abstract. From the slow release of nutrients in organic fertilizers, in addition to the impact on the current growing season (direct effect), the application of these fertilizers in conventional crop cultivation systems had a residual effect on subsequent crops. However, studies on the residual effects of organic fertilizer left over from the previous growing season in the soilless cultivation of vegetable crops are quite rare. The present study describes the dynamics of yield and chlorophyll content of kangkong as direct and residual effects of vermicompost for four consecutive plantings with soilless cultivation systems also the comparison with inorganic fertilizer treatment. This research was a pot experiment conducted in a greenhouse. The experimental design used was a Randomized Complete Block Design with five levels of vermicompost rates (100, 200, 300, 400, and 500 g pot<sup>-1</sup>) and one control treatment using inorganic fertilizer. The application of vermicompost was only carried out in the first cropping. While this using inorganic fertilizer was supplemented in each cropping for four consecutive plantings. The results showed that during four plantings, in overall mean, fresh weight per plant and per pot tended to increase at the second planting, ranging from 35-54% compared with the first cropping and then it will increase in decreasing percentage in the third until the fourth planting. The content of chlorophyll A during the four plantings was relatively constant, while the content of chlorophyll B and total chlorophyll was highest in the first planting and subsequently decreased until the fourth planting. For four planting sequences, the higher yields were found at vermicompost fertilizer applied a dose of 400-500 g pot<sup>-1</sup> and were not significantly different from the treatment using inorganic fertilizers (control).



#### Estimating Zero Waste Index and Resident Waste Participation In Indonesian Middle City

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**Keywords:** Zero Waste Index, zero waste, waste behavior, waste collection system, waste diversion, waste generation, recycle, reuse, waste reduction, Banda Aceh

**Abstract:** The municipal city has tried to provide the best solid waste services as possible, but the increase in these services does not necessarily increase public participation in managing waste. The objective of this research is to measure the performance of municipal solid waste management while Banda Aceh – Indonesia. The research method uses the Zero Waste Index tool and community surveyed to get a more comprehensive picture of performance in overcoming waste problems. The results can be concluded that the Banda Aceh city government is still achieving a small Zero Waste Index which is 0.28. The majority of the population does not get waste socialization (76.07%), does not sort (75.21%), does not recycle waste (68.31%) and only 54.70% of the community collect used items for resale. The results of the two studies show that it is hard for Banda Aceh to achieve the goal of 30% waste reduction by 2025.



# DAY 2 SESSION 3E



#### Longan and Mango as an Alternative Source to Enhance the Yeast Community in Microbial Inoculant

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Keywords: effective microorganisms, indigenous microorganisms, biofertilizer, yeast

**Abstract.** Microbial inoculants are beneficial microorganisms applied to plants or the soil to promote plant growth and control pest disease and weed. Microbial inoculants isolated from local surroundings, known as Indigenous microorganisms inoculants (IMO). The performance of the IMO is varies depending on the sources and local environment. Therefore, it is important to identify the right sources to enhance the performance of the IMO. This research aims to determine the source to enhance the yeast community in IMO. Longan and mango were chosen as the sources of yeasts. The IMO was fermented for a week, and the microorganisms group were identified. Then, the IMO was applied on the okra and tested for physical, chemical and proximate analyses. Both IMO with mango and IMO with longan showed a higher population of yeast compared to control. However, IMO with mango showed the best performance in terms of harvesting time and proximate analyses. The soil treated with both IMOs also showed higher potassium and calcium. To conclude, plants treated with both IMOs showed better performance than control. Thus, IMO with longan and IMO with mango may potentially enhance the yeast community in IMO, improve the plant growth and benefit the agriculture sector.

#### Photodegradation of Reactive Blue 4 using Suspension of Anatase-Titanium Dioxide and Corn cob

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Keywords: photodegradation-adsorption, suspension, titanium dioxide, corn cob, reactive blue

Abstract. Textile dyeing often employs reactive dyes. The dye wastewater contains hazardous materials and is toxic to humans and the environment. Photodegradation using a semiconductor photocatalyst is a promising alternative approach for water purification and wastewater treatment. However, the photocatalyst's low adsorption ability is a problem in the photocatalysis process. To compensate for this shortcoming, photocatalyst content must be combined with an adsorbent. Raw corn cob and titanium dioxide (TiO<sub>2</sub>) were used in this photocatalysis. Due to a synergistic impact, raw corn cob's ability to adsorb and titanium dioxide's ability to photodegrade organic pollutants from water bodies is expected to boost the removal performance. The degradation of Reactive Blue 4 (RB4) as a targeted dye was carried out in this research using a suspended mixture of commercial anatase TiO<sub>2</sub> and raw corn cob under UV light. The effect of initial pH solution, initial dye concentration and contact time, TiO<sub>2</sub>-corn cob dosages, and the influence of other pollutants were investigated as factors influencing photodegradation-adsorption of RB4. SEM and FTIR were used to characterize the TiO<sub>2</sub>-corn cob. The high removal rate of RB4 was obtained at a low pH (pH 2) and RB4 concentration of 40 ppm. The increased dose of TiO<sub>2</sub>-corn cob improved the RB4 dye removal performance. In conclusion, combining photodegradation and adsorption systems as a hybrid treatment method resulted in a synergistic increase in the efficiency of RB4 removal.

#### Selected Heavy Metals Concentration from Road Surface and Road Shoulder Soils Associated with Run-off

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Abstract. Pollutants produced by motor vehicles on the road especially heavy metals flow along the surface runoff on the road surface and eventually permeate to the ground on the shoulder of the road. The concentration of selected heavy metals on the road surface and road shoulder soils along the East-West highway in front of UMK Jeli Campus, Kelantan, Malaysia was studied. The main objective of the study was to determine the concentration of selected heavy metals, namely Zn, Pb, and Cu associated with run off from the road surface and in the soil at the road shoulder. The water and soil samples were collected from ten stations along the East-West Highway and analyzed for the concentration of selected heavy metals using using Perkin-Elmer Atomic Absorption Spectrometer (Perkin-Elmer Corporation, 1996). The results show that the mean concentration of Cu in surface run off on the road surface is 0.0102 mg/L, mean concentration of Pb was recorded as 0.0670 mg/L and the mean concentartio of Zn was recorded as 0.0754 mg/L. All the parameters measured was below the USEPA Stormwater Benchmark Limit. On the other hand, the mean concentration of Cu, Pb and Zn in the road shoulder soils were much higher as compared to road surface run off and was recorded as 0.6227 mg/L, 2.1221 mg/L and 4.5097 mg/L respectively. All the mean concentration of heavy metals in road shoulder soils were higher as compared to the Natural Range of Heavy Metals (NRHM) and Critical Limits for Heavy Metals Concentration (CLHMC) in soil. However for both samples, there were no significant different (P>0.05) of heavy metals concentration between sampling stations. The values of the heavy metal suggest that vehicle is the main source of heavy metals contamination in the run off of road surface and road shoulder soils since there are no other activities in the vicinity. The results of the study provide information on the concentration of heavy metals in the run off of road surface and road shoulder soils that can be used as a basis to develop the Stormwater Concentration Limit in surface run off and Heavy Metal Allowable Limits in soil for Malaysia.

SiCIABC2



# DAY 2 SESSION 3F

#### Amperometric Enzyme-Free Glucose Sensor Based on Gold Nanoparticle Decorated Titanium Dioxide Nanotube

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**Keywords:** non-enzymatic glucose sensor, amperometric, gold nanoparticles, titanium dioxide nanotube.

Abstract: In the contemporary world, diabetes mellitus is an egregious complication among people. A susceptible enzyme-free nanocomposite glucose sensor is evaluated based on gold nanoparticles (Au NPs) immobilized on titanium dioxide nanotubes(TiO<sub>2</sub> NTs). TiO<sub>2</sub> NT were synthesized by a facile anodic oxidation method and Au NPs synthesized via the citrate reduction method were then loaded on TiO<sub>2</sub> nanotube surface through drop-casting by using chitosan. The synthesis and loading of Au NPs were evaluated by scanning electron microscope (SEM), X-ray powder diffraction (XRD) and cyclic voltammetry (CV). The anodized  $TiO_2$  nanotube plays an important role in facilitating the electron transfer. The electrochemical performance of the Au NPs/TiO<sub>2</sub> NT nanocomposite electrode towards glucose was evaluated by cyclic voltammetry and amperometry in 0.15 M NaOH solution. The developed nanocomposite electrode was found to be very effective in the concentration ranging from 0.1 mM to 120 mM with a detection limit(LOD) of 30  $\mu$ M (based on S/N=3) at a working potential of 0.16 V, where the electrocatalytic mechanism was based on the oxidation of glucose to gluconolactone with consequent reduction of Au to Au(OH)<sub>2</sub>. Furthermore, this proposed glucose sensor exhibited high sensitivity, faster amperometric response, stability and selectivity against interferences. The results implied that Au NPs/TiO<sub>2</sub> NT nanocomposite sensor could be a promising material for glucose sensing.

SiCIABC2

#### Preparation, Spectroscopic and Pharmacological Evaluations of 2-{(*E*)-[(2-{(*Z*)-[(3,4dimethoxyphenyl)methylidene]amino}ethyl)imino]methyl}phenol ligand and its Metal(III) complexes

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Keywords: Schiff base, Spectral studies, Metal(III) complexes, Antibacterial, Radical scavengers

Abstract. Series of new metal(III) complexes of the type  $[M(L)(H_2O)nCl_2]$  obtained by the reaction of M(III) salts and Schiff base (HL) where [HL = 2-{(E)-[(2-{(Z)-[(3,4dimethoxyphenyl)methylidene]amino}ethyl)imino]methyl}phenol and M = Cr(III), Fe(III), Al(III), Ti(III) and Ru(III)] in fixed molar ratio 1:1, have been synthesized and characterized by elemental analyses, molar conductance, FT-IR, UV-Vis spectral, and thermal analyses (TGA and DTA). The IR study shows that the ligand coordinates the metal ions to form mononuclear complexes via an oxygen and two nitrogen atoms of the phenolic group and azomethine group respectively, thereby acting as a tridentate chelating compound. Conductance measurements indicate the complexes are non-electrolytes. Electronic spectra studies indicate an octahedral geometry around metal ions. Thermal analysis of the complexes indicates that the decomposition occured in differentt steps. Scavenging ability of DPPH and ABTS radicals by the as-synthesized was studied for their antioxidant potentials. The study revealed that the compounds are capable of scavenging DPPH radicals in a dose-dependent pattern, (Cr(III);  $IC_{50} = 2.30 \pm 0.46 \mu M$  for DPPH and Ti(III); IC<sub>50</sub> = 7.45 $\pm$ 1.66 µM for ABTS) were the most active. The results suggested that the complexes displayed higher antimicrobial activities compare to ligand against selected sttrains, while ciprofloxacin as standard drug by disk-diffusion agar method.



#### Chitin and Chitosan Preparation from Malaysian Black Soldier Fly Biomass: A preliminary study

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Keywords: chitin, chitosan, black soldier fly (BSF), larvae, pupae, cocoon, FTIR

Abstract. Chitin, as well as its deacetylated variant chitosan, has a wide range of applications in biomedical, agricultural, environmental and food industries. Currently, chitin is commercially produced from crustacean shells rather than fungal or insect sources. In this study, chitin from different lifecycle phases of the black soldier fly (BSF) was extracted and deacetylated into chitosan. Both BSF chitin and chitosan were further subjected to FTIR analysis. The chitin extraction vield % was obtained according the following order: to cocoon>pupae>larvae>prepupae. The yield of chitosan recovery followed a similar trend, except for the cocoon sample which had the lowest recovery. All samples have a deacetylation degree of more than 90 % except for chitosan from prepupae. FTIR profiles indicated all chitin extracted were in the  $\alpha$ -form while the deacetylated chitosan matched closely to the commercially available chitosan. Overall, this study indicated that BSF biomass from different lifecycle phases could be a promising alternative resource for industrial chitin and chitosan production.


## DAY 2 SESSION 4A

## Siciabc21

## Effect of Temperature and Fermentation Time on Protease Production from Fish Waste Hydrolysate

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Keywords: protease, fish waste hydrolysate, temperature, fermentation time, Bacillus cereus

Abstract. The fish processing industries generate huge amounts of by-products which cause serious environmental and health problem. Various disposal methods have been introduced including fermentation, hydrolysate and fish oil production in order to avoid wasting of these byproducts. The environmental problems related with waste disposal can be reduced as the low cost of fish by-products contains nutrients can enhance the microbial growth and useful for enzyme production. The aim of this research is to investigate the effect of temperature and fermentation time on the protease production from fish waste hydrolysate by using Bacillus strain (Bacillus cereus). In this study, the fish waste sample was taken from Keropok Lekor CM115 factory at Kuantan, Pahang. The pre-treatment and fish waste hydrolysate were carried out and the experiment was continued with the production of protease. The effect of fermentation time was studied at every 4 hr while the effect of temperature was investigated at temperature ranged from 30 °C to 60 °C. The protease activity and total protein content were determined by protease assay with tyrosine as a standard and Bradford method, respectively. The results showed the maximum protease production of 45.63 U/mL at 48 hr of fermentation time and 44.908  $\pm$  6.14 U/mL at temperature of 50 °C. The current study provides an insight into the effects of cultivation conditions towards protease production from local fish waste industries for further optimization study to enhance the protease production.

Production of Cellulase and Protease from Empty Fruit Bunch and Palm Oil Mill Sludge via Solid-State Fermentation

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**Keywords:** cellulase, protease, empty fruit bunch, palm oil mill sludge, physical content, extraction ratio, solid state fermentation

Abstract. Empty fruit bunch (EFB) and palm oil mill sludge (POMS) are capable of being good substrate sources for the production of cellulase and protease enzymes via solid-state fermentation (SSF). The SSF is one of the favourable techniques that can minimize the production costs and able to generate huge amounts of enzymes. The objective of this research is to determine the highest cellulase and protease activity produced during SSF using agriculture waste. The substrate was prepared by mixing EFB and POMS according 1:2 (w/w) weight ratio. The samples were harvested every 3 days interval of fermentation process until the substrate profile was constant. In the first stage of study, the physical content of fermented mixtures for each interval were characterized according to pH, conductivity, temperature, moisture content, volatile solid and bulk density. In the second stage, the crude enzymes were prepared by extracting the fermented mixtures with buffer for 45 min using 1:2, 1:3, 1:5, 1:7 and 1:10 (w/v) ratios. The cellulase and protease activity were then determined by enzyme assays with glucose and tyrosine as a standard, respectively. Upon the observation, the optimal conditions for cellulase and protease productions were found in alkaline condition (pH 8-9) with 74-76% of moisture content at the temperature of 31-33°C. Among the extraction ratio tested, 1:2 (w/v) and 1:5 (w/v) ratios exhibited that the solid wastes were capable to generate high amounts of particular hydrolytic enzymes via SSF. In the present study, the extraction ratio of 1:2 (w/v) was found to be the highest yield of cellulase  $(5187.35 \pm 131.46 \text{ FPU/g DW})$ . Using 1:5 (w/v) of extraction ratio, the highest amount of protease was found  $80.61 \pm 2.31$  U/g. Both enzymes were produced highest yield on Day 9 of SSF. Therefore, the EFB and POMS have a potential as low-cost source for cellulase and protease productions.

## Effect of Different Supported Heteropoly Acid on the Catalytic Hydrothermal Conversion of Cellulose into Formic Acid

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Keywords: heteropoly acid, cellulose conversion, formic acid, acid catalyst

**Abstract.** Cellulose is an abundant biomass has recieved considerable attention as a renewable precursor to the formation of valuable chemicals. The overall strategy in this research is to produce formic acid from cellulose using direct catalytic hydrothermal method. Heteropoly acid (HPA) has been considerable to be an effective cellulose valorisation catalyst. In this study, a heterogeneous catalyst system is develop by preparing different types of HPA on hydrotalcite. Three type of HPA-HT namely Phosphotungstic acid-hydrotalcite (PTA-HT), phosphomolybdic acid-hydrotalcite (PMA-HT) and silicotungstic acid-hydrotalcite (STA-HT) were prepared by the impregnation method. These prepared catalysts were characterized using FTIR, XRD, BET and FESEM-EDX. The catalytic reaction was carried out in hydrothermal vessel and the activity was determined using HPLC-DAD to observed FA production. To avoid bias during investigation, calcined HT was used for cellulose conversion and compared with each HPA-HT. All three catalysts were successfully impregnated on the calcined HT, as proven by XRD, FTIR, and EDX. According to the finding, PMA-HT result give the highest cellulose conversion (86%) and FA yield (8.5%) as compared to PTA-HT and STA-HT due to acidity and strong redox properties of PMA. Herein, we reported effects of different HPAs towards FA yield.



# DAY 2 SESSION 4B

SiCIABC2I

## Computational Drug Discovery Targeting SARS-CoV-2 Main Protease Towards a Treatment for COVID-19

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**Keywords:** SARS-CoV-2 main protease, natural compounds, drug-likeness, MD simulations, MMPBSA calculations

Abstract. The serious pandemic of coronavirus disease 2019 (COVID-19), started in Wuhan City of China in late December 2019, has undoubtedly been a global health emergency that severely affects the world population. The disease is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). One of the crucial proteins of SARS-CoV-2 is its main protease (M<sup>pro</sup>), a cysteine protease that plays important role in the viral replication. Therefore, M<sup>pro</sup> has become an attractive drug target for chemotherapeutic intervention. In this study, an in silico screening of natural compounds from the ZINC database was performed in order to identify inhibitors targeting the active site of SARS-CoV-2 Mpro. By using combined computational methods including docking-based visual screening, drug-likeness evaluation, molecular dynamics simulations, and MMPBSA calculations, the screening platform could identify three promising compounds. These include ZINC253412009, ZINC65297929, and ZINC65298044 that exhibited satisfactorily low free binding energy levels of  $-28.555 \pm 15.713$ ,  $-28.548 \pm 11.785$ , and  $-28.203 \pm$ 12.663 kcal/mol, respectively. These compounds show significant interactions with key residues lining the M<sup>pro</sup> active site, warranting their high potential to be developed further. Future *in vitro* confirmation and viral challenge experiments are also needed to obtain a more detailed pharmacological profiles of the candidate compounds.



## Substituent Effects on the Reactivity, Absorption Spectroscopy and Electronic Properties of a Series of Ruthenium-Schiff Base Complexes-A DFT Study

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Keywords: DFT and TDDFT studies; global indices; NBO analysis; ruthenium complexes

**Abstract.** The present work concentrates on theoretical investigations of the substituent effects on the reactivity, electronic properties and UV-vis spectra of a series of ruthenium-Schiff base complexes using Density Functional Theory (DFT). Four complexes are studied herein, where *N*-(22-hydroxyphenyl)benzaldimines is the Schiff base differing in the *para*-substituent (R) on the benzaldehyde fragment ( $R = CH_3$ , H, Cl, CF\_3). B3LYP/SDD-6-31G(d,p) level of theory has been used for computational studies (Gaussian 16). All the structures have been optimized and the compositions of the frontier molecular orbitals analyzed. The energies of HOMO and LUMO and the global indices parameters have been calculated to elucidate the reactivity of the complexes. Time-dependent density functional theory (TDDFT) has been performed to study the electronic absorption parameters. The effect of solvent polarity upon absorption spectra has also been observed. Natural Bond Orbital (NBO) analysis of the complexes has been conducted to examine the charge distribution on the donor and acceptor atoms.

## In Silico Molecular Modeling Studies of Novel 5,6,7-trimethoxy-Naryl-2-styrylquinolin-4-amines Derivatives as Tubulin Polymerization Inhibitors against Human Breast Cancer Cells

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**Keywords:** Cancer, 5,6,7-trimethoxy-Naryl-2-styrylquinolin-4-amines derivatives, 3D-QSAR, CoMFA, CoMSIA, docking, ADMET

**Abstract.** The World Health Organization (WHO) considers cancer as the deadliest disease, according to the increase in death in the 21st centuries. In the search for new therapeutic molecules, a series of forty-three 5,6,7-trimethoxy-Naryl-2-styrylquinolin-4-amines derivatives as tubulin polymerization inhibitors against human breast cancer cells, were studied based on the three-dimensional quantitative structure-activity relationship. This study was built using comparative molecular field analysis (CoMFA) and comparative molecular similarity indices analysis(CoMSIA) contours. The generated models were in accordance with the model acceptance criteria. The two contours obtained specify the types of groups that can be added to increase the activity, based on these findings from the consideration of these methods we designed new compounds, and having high inhibitory activity. Docking molecular as an important method, is performed for exploring the interactions between the ligand and the protein. Some newly proposed compounds showing good results of ADMET (adsorption–distribution–metabolism–excretion–toxicity). These compounds are important against human breast cancer cells and all of them are easy to synthesize.

## In Silico Molecular Modeling Studies of Novel 5,6,7-trimethoxy-Naryl-2-styrylquinolin-4-amines Derivatives as Tubulin Polymerization Inhibitors against Human Ovarian Carcinoma

Reda El-mernissi <sup>1,a</sup><sup>\*</sup>, Khalil El khatabi <sup>1,b</sup>, Ayoub Khaldan <sup>1,c</sup>, Soukaina Bouamrane <sup>1,d</sup>, Larbi Elmchichi <sup>1,e</sup>, Mohammed Aziz Ajana <sup>1,f</sup>\*, Tahar Lakhlifi <sup>1,g</sup> and Mohammed Bouachrine <sup>2,h</sup>

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**Keywords:** Cancer, 5,6,7-trimethoxy-Naryl-2-styrylquinolin-4-amines derivatives, 3D-QSAR, CoMFA, CoMSIA, docking, ADMET

**Abstract.** The World Health Organization (WHO) considers cancer as the deadliest disease, according to the increase in death in the 21st centuries. In the search for new therapeutic molecules, a series of forty-six 5,6,7-trimethoxy-Naryl-2-styrylquinolin-4-amines derivatives as against the human ovarian carcinoma, were studied based on the three-dimensional quantitative structure-activity relationship. This study was built using comparative molecular field analysis (CoMFA) and comparative molecular similarity indices analysis (CoMSIA) contours. The generated models were in accordance with the model acceptance criteria. The two contours obtained specify the types of groups that can be added to increase the activity, based on these findings from the consideration of these methods we designed new compounds, and having high inhibitory activity. Docking molecular as an important method, is performed for exploring the interactions between the ligand and the protein. Some newly proposed compounds showing good results of ADMET (adsorption–distribution–metabolism–excretion–toxicity). These compounds are important against human ovarian carcinoma and all of them are easy to synthesize.



# DAY 2 SESSION 4C

## Screening of Catechol Dioxygenase Gene among Bacterial Communities Isolated from Anthropogenic Contaminated Area in Pahang, Malaysia

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**Keywords:** anthropogenic area, catechol dioxygenase, hydrocarbon-tolerant, polymerase chain reaction, screening

**Abstract.** Development of industrial, recreational and urban area in Pahang have introduced hydrocarbons into the environment. This event harboured a community of indigenous bacteria with degradation enzyme known as catechol dioxygenase, that able to degrade hydrocarbons. This enzyme has been found in gram positive and gram negative bacteria which commonly found in anthropogenic area. In this study, bacteria communities that tolerant towards hydrocarbons have been successfully isolated from two contaminated river and one pristine area. The presence of catechol dioxygenase gene from the isolated bacterial samples was then screened using a pair of specific primers by Polymerase Chain Reaction (PCR) amplification. Result obtained from the screening of catechol dioxygenase gene can provide a preliminary insight regarding enzyme-related mechanisms in hydrocarbon-degrading bacteria which could improve the development of bioremediation process that use enzyme as the remediation tools and eliminate hydrocarbon contaminants from the environment.

### An Adsorbent Based on Humic Acid-like and Carboxymethyl Cellulose for Efficient Pollutant Removal from Synthetic Wastewater

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**Keywords:** horse dung humic acid, carboxymethyl cellulose, magnetite, adsorption, Pb(II) and Rhodamine B pollutant

Abstract. Adsorbents from green and sustainable source are highly desirable for practical applications. In this study, humic acid-like substance extracted from dry horse dung powder and carboxymethyl cellulose (CMC) were adopted to fabricate a composite immobilized on magnetic precipitates of  $Fe_3O_4$ . The as-prepared adsorbent, denoted as HAL-CMC/Fe<sub>3</sub>O<sub>4</sub>, was analyzed by infrared spectroscopy (FT-IR), X-ray diffraction (XRD), transmission and scanning electron microscopy equipped with energy dispersive X-ray (TEM and SEM-EDX), thermo gravimetric analysis (TGA), and vibration sample magnometer (VSM). Application to the synthetic wastewater of Pb(II) and Rhodamine B (RhB), a high Langmuir monolayer adsorption capacity of 63.38 and 42.78 mg/g was achieved over HAL-CMC/Fe<sub>3</sub>O<sub>4</sub>, respectively. The fabricated adsorbent was also demonstrating quick and easy retraction of pollutant-loaded adsorbent by an external magnet with the magnetic strength of 40.7 emu/g. Based on the estimated free adsorption energy of Dubinin-Radusckevich (D-R) isotherm model, the adsorption interaction of both Pb(II) (9.76 kJ/mol) and RhB (12.39 kJ/mol) with HAL-CMC/Fe<sub>3</sub>O<sub>4</sub> was mainly occured by ion exchange mechanism. Adsorption rate analysis at the initial adsorbate concentration ranged from 50 to 400 mg/L of both Pb(II) and RhB showed that the rapid adsorption generally occurs in early 20 minutes then slow down and reaches equilibrium after 180 minutes. The Ho (pseudo second order) kinetics model represent approvidely the adsorption of both Pb(II) and RhB onto the adsorbent. The developed adsorbent is also reusable with 72.3% of stability in pH 11. Therefore, the adsorbent of HAL-CMC/Fe<sub>3</sub>O<sub>4</sub> is suggested to be a promising candidate for adsorption applications.

**SiCIABC2** 

## Effectiveness of EM Mudball treatment for pollution remediation of Balok river

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Keywords: Balok river, Effective Microorganisms (EM), metagenomic, mudballs, water quality

Abstract. Industrial activities in Pahang, localized at Gebeng, are known with arising issues of water pollution. The most affected part is the Balok river which carries the effluent released by anthropogenic activities. Department of Environment (DOE) Water Quality Index Classification has classified Balok river in Class III that required extensive treatment. This study was conducted to investigate the efficacy of Effective Microorganisms (EM) mudballs to improve the water quality of Balok river. The measured parameters including dissolved oxygen (DO), biological oxygen demand (BOD), chemical oxygen demand (COD), pH, temperature, total suspended solid (TSS) and ammonia nitrogen (NH<sub>3</sub>N) were measured using Hydrolab and HACH machines. The water quality monitoring was carried out from July 2020 until July 2021 at three different locations; the upstream, middle stream and downstream. On January 2021, Water Quality Index (WQI) for upstream was recorded at 85.929, middle stream was 87.289 whereas downstream was 85.085. As for July 2021, the reading for upstream was 83.564, middle stream was 85.1 and downstream was 84.879. These data indicated that Balok river showed positive improvement from Class III to Class II as the values of WQI was within 76.5 to 92.5. Some sediments samples were collected for metagenomic analysis which was conducted within the first 6 months of the study. Results revealed that the bacterial community structure of middle stream exhibited a remarkable shift compared to that of the upstream. Species that predominate Balok river were belonged to family of Rhodocyclaceae and Burkholderiaceae which classified in the phylum of proteobacteria. Through this study, EM mudballs were found to be one of the most promising technology in pollution remediation of river in Malaysia.



# DAY 2 SESSION 4D

## Reuse of Agricultural Waste to Adsorp Fe Metal Content in Acid Mine Water

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Keywords: agricultural wastes, activated carbon, adsorption, Fe metal, acid mine water

**Abstract.** Adsorption of Fe contained in acid mine drainage by adsorbents from agricultural wastes (citronella plant waste (cymbopogon S.P), langsat fruit peel (Lansium domesticum cortex) and coconut shell (Cocos nucifera L.)). The results on the preparation of activated carbon with chemical methods, agricultural waste which carbonized at 300°C, fulfilled all the requirements of SNI 01-1682-1996. Meanwhile, the carbon activated with H<sub>3</sub>PO<sub>4</sub> more fulfilled all the requirements set out in SNI 06-3730-1995. The best activated carbon in adsorp Fe metal in acid mine water is at 4 g with percent removal, langsat peel activated carbon is 70.10%; 55.99% on citronella waste activated carbon and 90.20% on coconut shell activated carbon. Data analysis of the effect of concentration on adsorption capacity used the Langmuir and Freundlich isotherm equations. Langmuir equation obtained maximum adsorption capacity (q<sub>max</sub>) activated carbon langsat peel = 38.91 mg/g;  $K_L$ =76.67 Kmol/L and R<sup>2</sup>=0.6413; citronella waste activated carbon produced q<sub>max</sub> = 16.50 mg/g;  $K_L$ =73.15 Kmol/L and R<sup>2</sup>=0.6369. In Freundlich's equation,  $K_r$ =17.08 Kmol/L; R<sup>2</sup>=0.5409 on langsat peel activated carbon;  $K_r$ =16.49 Kmol/L; R<sup>2</sup>=0,5704 on citronella waste activated carbon and  $K_r$ =20.08 Kmol/L; R<sup>2</sup>=0.1754 on coconut shell activated carbon.

## Malay Poison: A study on *Melaluca cajuputi* extract as potential natural herbicide to suppress aquatic weed growth

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**Keywords:** *Melaleuca cajuputi*, ethnoscience, phenolic compound, natural herbicide, Malay poison, aquatic weed

Abstract. Malays, are skilled and well known in the art of poisoning. Various poisons are used in a variety of ways and the fact that most of their properties, either poison or intoxicant, as well as their medicinal value obtained from the animal and vegetable kingdoms. One of Myrtacea family, *Melaleuca cajuputi* (gelam) has been reported in traditional Malay medicinal practices for various functions and purposes. However, its natural extract has not been well studied; therefore, the present study aimed to characterize the chemical composition of the *M. cajuputi* and assess the effect on weed growth and microbial activities. The finding revealed that three major phenolic acid compounds (Ferulic acid, Vanillic acid and Caffeic acid) and twenty volatile compounds were detected with 493.92±6.88 µg GAE/g DW total phenolic content. The effect of leaves extract of *M. cajuputi* on both aquatic weeds showed an inhibitory activity against *Glossostigma elatinoides* and *Rotala rotundifolia* growth as treated by different concentration range from 10g/L to 50g/L. As for microbial activities, *Staphylococcus aureus, Escherichia coli, Methicillin-resistant Staphylococcus aureus* (MRSA), *P. aeruginosa, S. epidermis* and *Candida albicans* were inhibited. Thus, these findings are important because it is the first report of traditional Malay poison plant species used in Malaysia as potential natural herbicide.



## Using Management System Standards for Improving Organisational and National Perception. A Case of ISO 37001:2016

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Keywords: ISO 37001; Corruption Perception Index; National Rank; Quality of Life

**Abstract.** International organisation for standardisation (ISO) regularly develops management system standards that are globally adopted. In 2016, it released ISO 37001:2016, a new standard on anti-bribery management. This standard can be helpful not only in curbing malpractices related to bribery and corruption in business organisations but also in governments, public sector and non-profit organisations. Transparency-International, a non-profit organisation, releases annual country ranking about corruption perception in different countries. Countries execute rigorous programmes to improve their rank. This paper analyses data about proliferation of ISO 37001:2016 in a country and assesses its correlation with corruption perception rank of that country using rank correlation method. The number of ISO 37001 certifications in a country are obtained from annual ISO surveys and corruption perception ranks are made publicly available by Transparency International. The rank correlation between these two ranks is used to assess possible impact of ISO 37001 adoption on managing corruption perception of that country. The results show weak positive correlation between two rankings. It is however noteworthy that the ISO 37001:2016 is currently in its nascent stage and the findings may require re-validation as the standard matures.

## Assessment of Drinking Water Quality Using the NSFWQI Model: A Case Study of Alzuhur Water Supply Station and Quarters Included in The Distribution Network

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Keywords: Drinking water quality, NSFWQI, Alzuhur water supply station.

**Abstact**. In the current study, the water quality was evaluated using the NSFWQI model for the Alzuhur water supply station and evaluated with the residential quarterss covered by the water supply, as 120 water samples were collected for one year since the water entered the plant and after treatment, in addition to that eight sites of residential quarters covered by a water distribution network, such as Anuwr, Almishraq, Aliielam, Albiker, Altaamim, Alsinaeiu and Aliikha quarters... etc. The results of the NSFWQI values indicated the relative deterioration of the water before treatment as a result of the increase of fecal coliform bacteria, as it was from the medium-quality water category, while the water quality after treatment and the rest of the studied sites in the water category was of good quality because the NSFWQI values ranged between (73.8 to 78.6) due to not exceeding the studied characteristics of the international standard limits.

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## DAY 2 SESSION 4E

## Characterizing Groundwater Turbidity Reduction by Using a Magnetic Biocarbon Adsorbent Composite (MBAC): Process Optimization

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**Keywords:** activated carbon, adsorbent, factorial design, iodine number, response surface methodology, turbidity

Abstract. The usage of groundwater as drinking water source in many parts of Kelantan encourages the research and development of various cost-effective alternative adsorbent material for turbidity reduction and drinking water purification. The preparation, characterization, and use of a magnetic biocarbon adsorbent composite (MBAC) is introduced in this study as an option to treat turbid groundwater. In contrast to commercial activated carbon (CAC), peak shifts and peaks denoting Fe-O bending were observed in the FTIR spectrum of MBAC. X-ray diffraction (XRD) pattern confirmed of a y-Fe<sub>2</sub>O<sub>3</sub> (maghemite) and Fe<sub>3</sub>O<sub>4</sub> (magnetite) embedded biocarbon composite lattice. The adsorption process for turbidity reduction by MBAC and CAC was investigated. A factorial design matrix consisting of four parameters were tabulated, namely, adsorbent dosage (0.02, 0.04, and 0.06 g), agitation time (15, 30, and 60 min), agitation rate (150, 200, and 250 rpm), and two adsorbent particle size ranges (M:  $300 < x \le 500$ , and Q:  $\le 45 \mu m$ ). The predictive model was validated with 0.04 g MBAC of  $\leq$  45 µm in particle size, agitated at 150 rpm, for 48 min, that attained 98.76% turbidity removal efficiency with a final NTU reading of 0.40. Conversely, CAC removed 84.84% for a final NTU reading of 3.07. Overall, the iron oxide impregnated biocarbon composite showed better turbidity reduction capability compared to CAC. The findings of this work support the potential application of MBAC as an alternative adsorbent for the treatment of groundwater sourced drinking water.



## Synthesis and Application of Positively Charged and Magnetically Separable Magnetite/Silica-Ammonium as an Effective Platinum(IV) Adsorbent

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Keywords: Adsorption, Effective adsorbent, Magnetite/Silica-Ammonium, Platinum(IV)

**Abstract.** Platinum is the valuable metal that widely used in industry, electronics, and catalysts. The use of Platinum has a significant impact on the production of waste, necessitating effective metal recovery. This study investigated the recovery of Platinum(IV) from wastewater using a positively charged and magnetically separable Magnetite/Silica-Ammonium (MSA). The MSA was prepared by co-precipitation procedure of silica-decorated quaternary ammonium in the Fe<sup>3/</sup>Fe<sup>3+</sup> solution. The characterization result of the MSA by FT-IR, X-ray diffraction (XRD), SEM-EDX, and Vibration Sample Magnetometer (VSM) demonstrated the succes of MSA synthesis. The application of MSA to the Pt(VI) solution occurred at pH optimum 6,0 with the easy and quick retraction of MSA-loaded Pt(VI) by 29.3 emu/g magnetic strength of external magnet. The adsorption isotherm study followed the Freundlich model (R<sup>2</sup>=0.9895) with the  $K_r=2.57\times10^2$  mol/g. The monolayer capacity by Langmuir showed the remarkable performance of 139.09 mg/g adsorption capacity through the ion exchange interaction mechanism based on the Dubinin-Radushkevich energy ( $E_{D,R}=8,3$  kJ/mol). The kinetics study was fitted well to the Pseudosecond-order model indicated the fast adsorption of Pt(VI) into the MSA surface.



## The Molluscicidal Plant Extracts to Control Golden Apple Snails (Pomacea canaliculata)

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**Keywords:** Plant molluscicide Niclosamide, Molluscicidal plant, Median concentration, Golden apple snail, *Pomacea canaliculata*, Molluscicidal efficiency.

Abstract. Golden apple snail (*Pomacea canaliculata*) is a freshwater snail, it's been introduced to Thailand in 1980s. Recently, the snails were reported the most severe rice's pest in Thailand. The Department of Agriculture of Thailand recommended to use Niclosamide as chemical molluscicide; nevertheless, the natural product such as plant molluscicide option is better. It is safer, cheaper and shows lower impact to the environment than using chemicals. There are 6 representative plants to be experiment on the snails. This study's use static aquatic toxicology technique within 48 hours. During intoxicated snails, mortality rate will be recorded for median concentration (LC<sub>50</sub>), the plant that shows the lowest LC<sub>50</sub> value will be considered the highest efficiency of molluscicidal effect. Crude water extract 6 molluscicidal plants revealed the LC<sub>50</sub> as follows: Thevetia peruviana(334.39ppm), *Calotropis* gigantea(148.0ppm), Lantana *camara*(391.13ppm), *Camellia oleifera*(6.21ppm), *Hyptis* suaveolens(888.31ppm) and Erythrophleum succirubrum(399.69ppm). The Niclosamide is used for the positive control and it showed the LC<sub>50</sub> as 0.42 ppm. Therefore, C. oleifera reveals the highest molluscicidal effect. The combination of molluscicidal efficiency of C. oleifera and Niclosamide were reduced by 50% when 4.4 days and 4.2 days have passed respectively both compounds will completely decomposition after 15 days.

## 5.8 GHz Circularly Polarized Rectangular Microstrip Antenna Arrays Simulation for Point-to-Point Application

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Keywords: Circularly Polarized · Microstrip Antenna

Abstract. The limitation of single patch of rectangular microstrip antenna which are low gain and narrow bandwidth will not accomplished a good performance in wide applications. In this paper, the design and simulation of rectangular microstrip antenna arrays for improving antenna gain is performed for point-to-point application. The proposed design is composed of four elements microstrip antenna with an array configuration operating at 5.8 GHz. Each element is constructed from four truncated arrays radiating elements and an inclined slot on each patch which capable to achieve circular polarized capability. The design of the 2x1 and 2x2 of rectangular microstrip array antenna was implemented from the designed of single rectangular patch antenna as the basic building element. The designed 2x1 and 2x2 array were fed by microstrip transimmision line which applied a technique of quater wave impedance matching. The antenna design was etched on Rogers RT 5880 substrate with 2.1 and 1.53 mm of dielectric constant and thickness respectively. All the designed structure were simulated in CST software. The main results of the designed antennas were compared in terms of gain, axial ratio and return loss. Based on the return loss simulation results, the designed antennas resonated exactly at the desired resonant frequency of 5.8 GHz which indicates good antenna designs. Compared to the single patch antenna having an antenna gain of 8.26 dB, the 2x1 and 2x2 arrays achieved a gain of 10.24 dB and 13.29 dB respectively. The results show that the designed rectangular microstrip antenna arrays have an improved gain performance over the single patch antenna.



## DAY 2 SESSION 4F



### Direct Energy Conversion from *Metroxylon Sagu* via Multienzyme Catalysis in Enzymatic Biofuel Cell

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**Keywords:** Metroxylon sagu; Enzymatic biofuel cell; Direct energy conversion; Biomass substrate; Multienzyme catalysis

Abstract. Biomass substrates have been widely utilized in the production of biofuel by simultaneous saccharification and fermentation (SSF) method. Biomass sources from the plant are preferable to produce biofuel because of the high sugar content. Adapting the SSF method, this work reported direct energy conversion from *Metroxylon sagu* via multienzyme catalysis in enzymatic biofuel cell (EBFC). *Metroxylon sagu* or locally called sago is an industrial crop which mostly found in Mukah, Sarawak. Sago is a type of starch, mainly consists of amylose and amylopectin structures. In this study, the polysaccharides will be transformed into glucose by using alpha-amylase (a-amylase) and glucoamylase (GAmy) enzymes. The factors affecting the multienzyme catalysis such as the substrate concentration (0.5 - 2.5 w/v %), enzymes loading (50  $-200 \,\mu$ l), pH (3-11) and time (0-200 min) were varied to obtain the optimized condition of glucose production. The produced glucose content was analyzed using microplate reader and Nuclear Magnetic Resonance (NMR) spectroscopy. Then, the glucose will be directly utilized as the fuel in EBFC and involved in the oxidation reaction at the bioanode. The oxidation of glucose by glucose oxidase (GOx) enzyme, will release electrons and consequently generate current. The oxidation of the glucose was monitored in cyclic voltammogram (CV) at different scan rates using potentiostat equipment. The CV result of EBFC employing the direct produced glucose are comparable to the EBFC employing commercial glucose. This multienzyme catalysis simplifies the multi-step process involved in the transformation of polysaccharides into glucose. Fig. 1 shows the schematic of the multienzyme catalysis system in an EBFC which represents a simple one-pot energy production from direct utilization of biomass.



Fig. 1: Schematic of multienzyme catalysis system in enzymatic biofuel cell.

### Dangerous Health and Beauty Purchase through Supplement and Food-Drug Interphase Products: Attaining Impossible Healthy and Beauty Body from Medical Staff and Practitioners' Perspective

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Keywords: supplements, steroid, health, beauty, Food-Drug Interphase (FDI)

**Abstract.** Health supplements and Food-Drug Interphase (FDI) products might adversely affect individuals. When cases involving the use of health supplements and FDI items are on the rise, this study seek to learn more about medical practitioners' diagnoses and treatment experiences with patients' usage of and access to such supplements and products. Furthermore, this study uses an ethnography qualitative approach to investigate the individual consumers' perspective based on medical staff and practitioners' diagnoses and treatment experience. Data were collected from the Intensive Care Unit (ICU) at one general hospital in Pahang where a semi-structured interview was conducted with a group of selected participants representing medical staff (one medical assistant and one nurse) and practitioners (three medical doctors) who consented to share their experiences diagnosing and treating patients who used health supplements and FDI products. Thematic analysis was used to evaluate audio recordings transcribed, de-identified, and analysed using Nvivo11 software.

## Contamination Level, Source Identification and Health Risk Assessment of Heavy Metals from the Surface water of Riruwai Mining Area, Northwestern Nigeria

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**Keywords:** Contamination levels, heavy metals, human health risk, Riruwai mining area, surface water

**Abstract.** Contamination of surface water by heavy metals (HMs) from mining activities is a major concern all over the world due to their potential health hazards. In this study, the concentrations of seven HMs (As, Cd, Cr, Hg, Mn, Pb, and Zn) were measured to evaluate their contamination levels, sources, and potential health risks among the local inhabitants. The results show that the average concentrations of HMs in surface water decrease in the order of Zn > Mn > Cr > Hg > Cd > As > Pb, with all values exceeding the recommended limits except for Mn. Pearson correlation, factor, and cluster analyses indicate a strong association between As, Cr, Hg, Mn, and Pb, suggesting a common source (anthropogenic source). While Cd and Zn might come from different source (geogenic source). Contamination degree (C<sub>d</sub>) indicates that 70 % of the surface water was polluted by HMs. Non-cancer risks in both children and adults were within the safe limit, indicating no potential adverse effects. However, the carcinogenic risks of As and Cd exceed the threshold limit of 1 x 10<sup>4</sup>. The findings of this study could be useful for effective monitoring and control of surface water pollution in the study area.

SiCIABC2I

## Adsorption of Methylene Blue using Tea Waste Treated with Alkaline Potassium Hydroxide

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Keywords: adsorbent, methylene blue, alkaline-treated tea waste

**Abstract.**Textile dyes which are known to be poisonous, mutagenic, and carcinogenic to human health and the environment are found in water bodies, posing a severe environmental threat. The well known adsorption approach, which uses low-cost agricultural waste as an adsorbent, has recently been extensively explored for water remediation. The ability of tea waste (*Camellia Sinensis*) species treated with alkaline-potassium hydroxide (KOH) to adsorb methylene blue (MB) dye from dye contaminated wastewater was investigated. The influence of experimental parameters including pH, initial dye concentration and contact time, temperature and adsorbent dosages on the alkaline-KOH treated tea waste adsorption process were studied. SEM and FTIR were used to characterize the KOH treated tea waste adsorbent. The pH 10 condition was shown to be the best for attaining the highest percent of methylene blue removal. The optimal adsorption for methylene blue was greatly detected at 120 minutes of 100 mg/L. The removal of methylene blue was excellent at a temperature of 60°C and 0.1 g of KOH treated tea waste dose was chosen as the most favourable for the adsorption of methylene blue. Finally, the synthetic wastewater was examined under optimal conditions and recorded 97% methylene blue removed.











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