29TH

INTERVARSITY BIOCHEMISTRY SEMINAR 2018

CODE-BREAKERS:
unlocking the future through science

EVENT BOOKLET

12 May 2018, Saturday

8.30AM — 5:30PM

LT 21 & 22,
Taylor's University Lakeside Campus

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Message from Professor Michael Driscoll, Vice Chancellor and President, Taylor's University

It gives me great pleasure to welcome all participants, distinguished guests, speakers and scientific exhibitors to the 29th Intervarsity Biochemistry Seminar (IBS) 2018.

I am pleased to note that we have received tremendous support from participants across Malaysia. We are delighted to have undergraduate students from both public and private universities converging here today at Taylor's University Lakeside Campus to share their final year research findings.

It is hoped that through this seminar students can widen their network and exchange knowledge with peers from other institutions. The seminar also aims to create awareness and generate enthusiasm for both academics and students on research, hence, acting as a driver to enhance research culture in the country.

At Taylor's University, we believe in breaking new ground and constantly reinventing our pedagogy. We are honoured to play an instrumental role in promoting science and technology initiatives specifically in the area of biochemistry in Malaysia through hosting this seminar.

Our most sincere appreciation goes to the Malaysian Society of Biochemistry and Molecular Biology (MSBMB) for initiating this annual event at the undergraduate level since 1986 to encourage young and talented scientists in presenting and sharing of research findings at the very early stage of their careers. We would also like to thank our sponsors for their generosity and kind support as well as all participants for making this event possible.

I wish all participants and everyone involved, a successful event.

Professor Michael Driscoll
Vice Chancellor and President
Taylor's University

Welcome Message by Professor Dr. Lim Yang Mooi, President of Malaysian Society for Biochemistry & Molecular Biology

Dear Participants,

It is my privilege to welcome you to the 29th Intervarsity Biochemistry Seminar 2018, which is held on 12th May 2018, at Taylor's University Lakeside Campus.

On behalf of the Malaysian Society for Biochemistry and Molecular Biology, I would like to extend my utmost gratitude to Taylor's University for accepting our invitation to co-organise the annual Intervarsity Biochemistry Seminar (IBS). My appreciation is also extended to the young and dynamic organising committees from Taylor's University School of Biosciences Club, as well as the advisors, who are committed to plan and organise this national seminar. "Well-done on your high working spirit and teamwork!"

This year, the theme for IBS is "Code-Breakers: Unlocking the future through science". It reflects precisely the need of more fundamental discoveries in biochemistry and molecular biology to overcome various aspects of scientific problems. To achieve this, MSBMB has been working with different public and private universities to organise IBS at undergraduate level since 1986. It is hoped that through IBS, more young and talented scientists can be nurtured at a very early stage of their careers. Hence, this seminar provides an important platform for undergraduate students to share their research findings and to learn on how to make an effective scientific communication. Apart from this, students will gain the experiences in widening their research networking and exchanging knowledge with their peers from different institutions, as well as to form friendships and find mentor.

Besides the presentations made by students, we are honoured to have Dr. Rajesh Ramasamy from University Putra Malaysia to share his research findings on stem cells in regenerative medicine and Dr. Liew Kah Leong from the Mind Psychological Services and Training to talk about the importance of self care among students. Definitely their sharing will stimulate and engage more exciting research discussions.

I also would like to take this opportunity to thank our sponsors for their strong support and generosity to make this seminar a success. Our sponsors are Esco, FC-BIOS, Biolution, ZK Trading, Matrioux, Apical Scientific, Biomed Global, Interscience, Bio-diagnostic, Canvio, NextGene, Chemopharm, MPH, BioRev, Eureka, and Lap Soon Print Station.

I thank you for your interest in this seminar and wish you to have an engaging and joyful meeting.

Professor Dr. Lim Yang Mooi
President, MSBMB

Foreword By
Bryan Yap Ju Min
Chairperson of Organising Committee
29th Intervarsity Biochemistry Seminar 2018

Warmest Greetings!

On behalf of Taylor's University and Taylor's School of Biosciences, I would like to express my heartfelt gratitude to everyone who has directly or indirectly made this Seminar a success. Special thanks to our advisors Dr. Adeline Chia Yoke Yin, Dr. Yap Wei Hsum, Dr. Neo Yun Ping, Dr. Tang Yin Quan, Dr. Caroline Chua Lin Lin, Dr. Lee Sau Har, and Dr. Lai Zee Wei who have given the organising committee much time, support and assistance throughout the preparation of the Seminar. Most of all, I would like to thank and congratulate my dedicated committee for the time that they have put in alongside me for the 29th Intervarsity Biochemistry Seminar 2018.

The Intervarsity Biochemistry Seminar, hosted in collaboration with the Malaysian Society for Biochemistry and Molecular Biology (MSBMB), aims to provide a platform for undergraduates in biological sciences to present and exchange ideas, as well as to highlight novel discoveries from their final year research projects. Through the Seminar, I hope that we can open new doors for the many participants and inspire more young scientists to move forward in their research interests and goals.

This year, the Seminar bears the theme of "Code-Breakers: Unlocking The Future Through Science", reflecting on the many talented and invaluable individuals dedicated to research in biological sciences. By breaking the code of life, they are the ones that discover the previously unknown and even the once impossible, and they are the ones who will unlock the future.

In addition, I would also like to extend my utmost thanks to our generous sponsors for their continuous support in the Seminar. Big thanks to Esco, FC-BIOS, Biolution, ZK Trading, Matrioux, Apical Scientific, Biomed Global, Interscience, Bio-diagnostic, Canvio, NextGene, Chemopharm, MPH, BioRev, Eureka, and Lap Soon Print Station. for contributing to the seminar. Special thanks to Dr Rajesh Ramasamy from Universiti Putra Malaysia and Dr Liew Kah Leong from The Mind Psychological Services and Training for taking time out to attend the Seminar and share their work with us.

Lastly, I would like to thank the participants for their interest and support in the Seminar. Without you, the Seminar would not be what is it today. I wish you all an enlightening and engaging journey throughout.

Bryan Yap Ju Min
Chairperson, IBS 2018

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SCIENTIFIC PROGRAMME

12 May 2018, Saturday

TIME	EVENT	VENUE
7:00	**Registration**	Lecture Theatre 21 & 22
8:30	**Welcome Address by Mr. Bryan Yap** Organising Chairperson	
8:40	**Welcome Address by Dr. Phelim Yong** Head of School, School of Biosciences, Taylor's University	
8:50	**Opening Address by Professor Michael Driscoll** Vice Chancellor and President, Taylor's University	
9:00	**Opening Ceremony**	
	Oral Presentation (A) - Innovative Medicine	
9:15	**Oral 1 - Goh Meng Shien (UMT)** Potential Inhibitor to Abnormal Involuntary Movement Disorder: Dimethoxy-terphenyl and 3-(4-Methoxy-phenyl)-dibenzofuran Targeting Monoamine Oxidase B	
9:30	**Oral 2 - Nor Aida binti Amran (UPM)** Evaluation of Solvent Effects on the Extraction of Phenolic Compounds and *In Vitro* Antidiabetic Potential of *Stevia rebaudiana* Extracts	
9:45	**Oral 3 - Adilet Beishenaliev (Nottingham)** Fabrication and Biocompatibility Assessment of Ultraviolet-crosslinked Fish Gelatin Nanofibers on Human Keratinocytes	
10:00	**Oral 4 - Nurhamimah Misuan (Monash)** Molecular Docking Analysis of Cobra Cytotoxin with Cell Death Receptors	
10:15	**Oral 5 - Nurul Sharmin binti Nordin (UM)** Epicardial Fat Thickness and Cardiometabolic Syndrome Among Malaysian	
10:30	**Oral 6 - Foo Yin Yin (UM)** Awareness and Knowledge on Metabolic Syndrome among Non-health Related University Students	

TIME	EVENT	VENUE
10:45	**Tea Break 1**	Level 2 Deck Area
	Poster Viewing	Student Life Centre
	Oral Presentation (B) Inventive Futuristic Science	Lecture Theatre 21 & 22
11:15	**Oral 7 - Mohammad Asyraf Adhwa bin Masimen (UMT)** Fast-MARNO: MARine naNOparticle Reducing Agent from Malaysian Store	
11:30	**Oral 8 - Mohamad Farihan Afnan bin Mohd Rozi (UPM)** Gene Expression Analysis of Carotenoid Related Genes in Different African Marigold (*Tagetes erecta Linnaeus*) and French Marigold (*Targetes patula Linnaeus*) Varieties	
11:45	**Oral 9 - Arlene Cherilyn Asun (UCSI)** Optimization in Production of Bioethanol from Oil Palm Empty Fruit Bunch (EFB)	
12:00	**Oral 10 - Teong Kim Chay (UKM)** The Effect of Glycerol Solvent on the Enzyme Activities of NAD+ - Glutamate Dehydrogenase from *Halobacterium salinarum* Strain NRC-1 at Different Temperatures	
12:15	**Oral 11 - Khor Jing Herng (TARUC)** Isolation and Characterization of Phytase Producing-Bacteria from Poultry Farm Soil with Chicken Faeces from Bukit Lagong	
12:30	**Oral 12 - Chen Zhe Kin (UKM)** Construction and Characterisation of *Burkholderia pseudomallei* arcA and FlgA Deletion Mutants	
12:45	**Guest Speaker 1 - Dr. Rajesh Ramasamy** UPM - *'Stem Cells: The Penicillin of 21st Century'*	
13:15	**Lunch**	
	Poster Viewing	
	Oral Presentation (C) Food Science & Technology	
14:30	**Oral 13 - Lim Jun Chiek (MAHSA)** *In vitro* CYP 3A4 Inhibitory Activity of *Moringa oleifera* Tea in rat liver microsomes	

TIME	EVENT	VENUE
14:45	**Oral 14 - Kho Kebing (UCSI)** Antioxidant Activities of Tea Prepared from Kenaf (*Hibiscus cannabinus L.*) Leaves at Different Maturity Stage	Lecture Theatre 21 & 22
15:00	**Oral 15 - Teoh Ee Yang (Nottingham)** Proteomic Analysis of Ripening Process in Tropical Mango *Mangifera indica cv. Chokanan*	
15:15	**Oral 16 - Zachary Sean Sia (Taylor's)** Effects of Steeping Time on Chemical Properties of *Strobilanthes crispus* Tea	
15:30	**Oral 17 - Angela Cheoh (TARUC)** Effect of Pre-treatments on the Production of Fermentable Sugars from Rice Husk	
15:45	**Tea Break 2**	Level 2 Deck Area
	Poster Viewing	Student Life Centre
16:15	**Guest Speaker 2 - Dr. Liew Kah Leong** The Mind Psychological Services & Training - '*The Importance of Self Care for Students'*	Lecture Theatre 21 & 22
16:45	**Prize Giving Ceremony**	
17:15	**Closing Address by Professor Lim Yang Mooi,** President of MSBMB	
17:30	**End of Seminar**	

Guest Speakers

Assoc. Professor Dr. Rajesh Ramasamy
Department of Pathology
Faculty of Health and Medical Sciences, UPM

Dr. Rajesh is an expert in the field of stem cell and immunity, where his research focuses on both human and animal mesenchymal stem cells and their immuno-modulatory properties. He also works on natural product and herbal research aimed at enhancing and rejuvenating the immune system. Throughout his career, he has secured many research grants and has an extensive list of publications. His passion in research has gained him many research awards and much recognition, both locally and internationally.

Stem Cells: The Penicillin of 21st Century

In today's talk, Dr. Rajesh will share how stem cells have emerged as an innovative remedy for many incurable diseases, sharing the fundamental knowledge on stem cells in treating diseases and maintaining good health.

Dr. Liew Kah Leong
Director & Corporate Trainer, The Mind Psychological Services and Training, Malaysia

Dr. Liew Kah Leong holds a Doctor of Philosophy in Science from Taylor's University. He is also a Pembangunan Sumber Manusia Berhad (PSMB) certified trainer (Certificate No. TTT/12862). With his passion for people development, he strongly believes that soft skills are equally as important as technical skills in the workforce and it is the difference between a great and an excellent employee. Dr. Liew is also a strong advocate of good mental health practices at the workplace and believes that all employees should be able to get access to mental health resources without prejudice.

The Importance of Self-care for Students

There are many different situations and experiences that students will face throughout their journey through tertiary education. Some will be memorable, some educational and others less than desirable. As life is dynamic, with various ups and downs, self-care is critical for students. It is an important coping mechanism and survival skill that should be present in all students to ensure that prolonged stressful times do not result in burnout. This session will allow students to understand how to practice self-care for themselves and to thrive through their tertiary education.

List of Oral Presenters

	NAME OF PARTICIPANTS
Oral 1	Goh Meng Shien Universiti Malaysia Terengganu
Oral 2	Nor Aida binti Amran Universiti Putra Malaysia
Oral 3	Adilet Beishenaliev University of Nottingham
Oral 4	Nurhamimah Misuan Monash University Malaysia
Oral 5	Nurul Sharmin binti Nordin University of Malaya
Oral 6	Foo Yin Yin University of Malaya
Oral 7	Mohammad Asyraf Adhwa bin Masimen Universiti Malaysia Terengganu
Oral 8	Mohamad Farihan Afnan bin Mohd Rozi Universiti Putra Malaysia
Oral 9	Arlene Cherilyn Asun UCSI University
Oral 10	Theong Kim Chay Universiti Kebangsaan Malaysia
Oral 11	Khor Jing Herng Tunku Abdul Rahman University College
Oral 12	Chen Zhe Kin Universiti Kebangsaan Malaysia
Oral 13	Lim Jun Chiek MAHSA University

	NAME OF PARTICIPANTS
Oral 14	Kho Kebing UCSI University
Oral 15	Teoh Ee Yang University of Nottingham
Oral 16	Zachary Sean Sia Taylor's University
Oral 17	Angela Cheoh Tunku Abdul Rahman University College

List of Poster Presenters

	NAME OF PARTICIPANTS
Poster 1	Kirubakkaran Ramachandran AIMST University
Poster 2	Ravini Srilal Monash University Malaysia
Poster 3	Chew Kah Yan Monash University Malaysia
Poster 4	Wesley See Zhi Chung Monash University Malaysia
Poster 5	Mohammad Fahimizadeh Monash University Malaysia
Poster 6	Nurken Bedigaliyev Monash University Malaysia
Poster 7	Chong Zhi Xiong University of Nottingham
Poster 8	Ho Jinn Shyuan University of Nottingham
Poster 9	Chew Hui Yee University of Nottingham
Poster 10	Hamsa Ashraf Mostafa Abdelhamid University of Nottingham
Poster 11	Goh Chin Yee University of Nottingham
Poster 12	Yee Kai Weng Tunku Abdul Rahman University College
Poster 13	Lee Hong Yew Tunku Abdul Rahman University College
Poster 14	Sandra Loo Jing-fiang Tunku Abdul Rahman University College

	NAME OF PARTICIPANTS
Poster 15	Law Chieu Shie Tunku Abdul Rahman University College
Poster 16	Tee Shuan Ling Tunku Abdul Rahman University College
Poster 17	Hardeep Kaur Taylor's University
Poster 18	Vincensa Nicko Widjaja Taylor's University
Poster 19	Tham Kar Yan Taylor's University
Poster 20	Effiong Paul Etim UCSI University
Poster 21	Heng Wen Li UCSI University
Poster 22	Kuan Wen Hao UCSI University
Poster 23	Tan Jeab Yuan UCSI University
Poster 24	Wong Yee Ying UCSI University
Poster 25	Kang Li Xia Universiti Kebangsaan Malaysia
Poster 26	Goh Ying Xian Universiti Kebangsaan Malaysia
Poster 27	Muhammad Haniff bin Abdul Manap Universiti Kebangsaan Malaysia
Poster 28	Teo Pei Woon Universiti Kebangsaan Malaysia
Poster 29	S'ng Yien Ping Universiti Kebangsaan Malaysia

	NAME OF PARTICIPANTS
Poster 30	Jeffery Low Tze Kuan University of Malaya
Poster 31	Maisarah binti Sulaiman University of Malaya
Poster 32	Fatin Azierah Fauzi Universiti Malaysia Terengganu
Poster 33	Nor Awatif Che Soh Universiti Malaysia Terengganu
Poster 34	Dhenmolly a/p Arumugam Universiti Malaysia Terengganu
Poster 35	Logieswariy a/p Perumal Universiti Malaysia Terengganu
Poster 36	Sarenyah a/p Manimaran Universiti Malaysia Terengganu
Poster 37	Nurul Hani binti Saruni Universiti Putra Malaysia
Poster 38	Amir Azizi bin Azizan Universiti Putra Malaysia
Poster 39	Norazilah binti Mohamad Universiti Putra Malaysia
Poster 40	Tan Hui Teng Universiti Putra Malaysia
Poster 41	Faeznur Suriani binti Muhamad Lana Universiti Putra Malaysia

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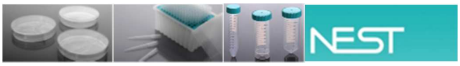

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Oral Presentation Abstracts

Category A:
Innovative Medicine

Oral 1

Potential Inhibitor to Abnormal Involuntary Movement Disorder: Dimethoxy-terphenyl and 3-(4-Methoxy-phenyl)-dibenzofuran Targeting Monoamine Oxidase B

Goh Meng Shien[1], *Fatin Azierah Fauzi*[1], *Fatimah Hashim*[1], *and Muhamad Fairus Noor Hassim*[1]*

[1]*School of Fundamental Science, Universiti Malaysia Terengganu, 21030 Kuala Nerus, Terengganu, Malaysia.*

**Corresponding Author: muhamad.fairus@umt.edu.my*

Abstract

Abnormal involuntary movements (AIM) disorder is symptom of Parkinson and seizure. Usually associated with false signalling of monoamine oxidase B (MAOB) associated pathways in synapse. Our study identifies new terphenyl based compounds that interacted with MOAB. Terphenyl is a compound that consists of a central benzene ring that attached to two phenyl groups. Cytotoxicity of Dimethoxy-terphenyl (14MP) and 3-(4-Methoxy-phenyl)-dibenzofuran (FD1) were assessed. Through computational approach, we identified potential proteins that interacted with the compounds and characterized the type of interaction. Cytotoxic assessment using MTT assay shows minimal cytotoxicity of 14MP and FD1 to NIH-3T3 cells and RAW 264.7 macrophages, however 14MP is more toxic than FD1. Homologous database screening to find proteins targeted by these compounds shows that 14MP has the highest probability to interact with estrogen receptors (ESRs) and MAOB. While for FD1 are microtubule-associated protein tau (MAPT) and growth factor, augmenter of liver regeneration (GFER) and MAOB. However, further molecular docking analysis shows that MAOB has the highest binding affinity with 14MP and FD1. Thus indicate potential inhibitor for MAOB from false breaking down dopamine hence causing AIM.

Oral 2

Evaluation of Solvent effects on the Extraction of Phenolic Compounds and *in vitro* Antidiabetic Potential of *Stevia rebaudiana* extracts.

Nor Aida Amran[1], *Suhaili Shamsi*[1], *and Uswatun Hasanah Zaidan*[1]*

[1]*Department of Biochemistry, Faculty of Biotechnology and Biomolecular Sciences, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia.*

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Abstract

Apart from being well known to the world as herb-based sweetening additive, *Stevia rebaudiana* (*S. rebaudiana*) and its phenolic compounds are considered as natural antidiabetic alternative to replace synthetic drugs that possess numbers of side effects. Therefore, this study was conducted to evaluate the solvent effects on the extraction of phenolic compounds of *S. rebaudiana* using water, methanol, ethanol and acetone as well as *in vitro* antidiabetic potential of the extracts. Quantification of the total phenolic content (TPC) and total flavonoid content (TFC) of the extracts were conducted using Folin-Ciocalteu reagent and aluminium chloride colorimetric method, respectively, while the antidiabetic activity of the extracts were determined by α-amylase inhibitory assay. As a matter of interest, TFC was found to be present at the highest concentration in ethanol extract (10.91 mg QE/g), while the presence of TPC showed no significant difference between water extract (6.65 mg GAE/g), methanol extract (6.96 mg GAE/g) and ethanol extract (6.43 mg GAE/g). These hence make more polar solvent as the most potential solvent for phenolic compounds recovery. In relation to the antidiabetic potential, the effects of the extracts in inhibiting α-amylase activity were investigated in vitro. Interestingly, among all *S. rebaudiana* extracts, water extract exhibited the most significant α-amylase inhibitory activity with IC_{50} = 8.63 µg/ml, comparable to synthetic drug, acarbose IC_{50} = 13.73 µg/ml. In addition, all the extracts were further analysed using HPLC and showed the abundance presence of steviol glycoside in the water extract, the principal compound suggested for treating diabetes. Furthermore, GC-MS analysis has shown the major compounds found in all extracts were phenol, benzofuranone, nerolidol, spathulenol, caryophyllene oxide, indanone, phytol, α-amyrin and several long chain fatty acids. These findings demonstrated that phenolic recovery was highly dependent on extraction solvent and the promising water extract as the best *α*-amylase inhibitory potential with greatest steviol glycoside recovery.

Keywords: *Stevia rebaudiana; Phenolic content; Steviol glycoside; α-Amylase inhibitory activity; Antidiabetic potential*

Oral 3

Fabrication and Biocompatibility Assessment of Ultraviolet-crosslinked Fish Gelatin Nanofibers on Human Keratinocytes.

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Abstract

This study aimed to explore a potential use of nanofibrous scaffolds based on fish-derived gelatin in tissue engineering due to its biological and economical merits. Extraction of gelatin was achieved via decalcification, sonication and lyophilization of mixed fish scales. To fabricate nano-scale architecture of scaffolds analogous to natural extracellular matrix, gelatin was rendered into nanofibrous matrices through electrospinning, resulting in the average diameter of 48±12 nm. The optimized procedure involved dissolving of 12% (w/v) gelatin in 90/10 (v/v) acetic acid/water, followed by electrospinning for 9 h. In order to improve water-resistant ability while retaining their biocompatibility, nanofibers were physically crosslinked with ultraviolet (UV) irradiation for 5 (UGN5), 10 (UGN10) and 20 (UGN20) min each side. On average, the diameter of treated nanofibers increased 4 folds after crosslinking, however Fourier Transform Infrared Spectroscopy analysis indicated no major alterations in the functional groups. A degradation assay showed that UGN5 and UGN10 remained in minimum essential medium for 14 days, while UGN20 degraded completely after 10 days. All treatments of UV-crosslinked nanofibers promoted cell adhesion and proliferation without causing an apparent cytotoxicity. HaCaT cells grew better on UGN5 compared to untreated control upon 1 day of incubation, while UGN20 had a long-term effect on cells exhibiting 25% increase in cell proliferation after 7 days. In a cell scratch assay, gelatin nanofibers were able to improve cell migration closing up to 79% of artificial wound within 24 h. The current findings provide a new insight for the UV-crosslinked gelatin nanofibers to be utilized as scaffolds in the future

Oral 4

Molecular Docking Analysis of Cobra Cytotoxin with Cell Death Receptors

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Abstract

Cytotoxin is a three-finger toxin present only in cobra venom as one of the major toxins. The actual mechanistic action of cytotoxicity remains not conclusive as few hypotheses were proposed besides direct lytic effects. The functional site of the toxin is located at the three hydrophobic loop tips of the toxin. The present work is aimed to investigate the interaction between cytotoxin with death receptors such as TNF- and Fas-ligand receptor families via protein-protein docking analysis. A cytotoxin sequence which can be universally expressed was constructed by multiple sequence alignment. The three-dimensional structure of the universal cytotoxin was later determined using homology modelling and structure validation by Ramachandran plot. The validated structure was examined for its dynamic movement in POPC membrane by molecular dynamic (MD) analysis. The proximity of toxin interaction with TNF- receptor and Fas-ligand receptor was visualised by ZDock with the calculation of intermolecular forces. Our results showed that one of the functional loops of the cytotoxin penetrated into POPC membrane. On the other hand, in the protein-protein docking, it was shown that all the three functional loops of the toxin interacted with TNF- receptor via Van der Waals and hydrogen bonding. Our findings suggest a possibility of cytotoxin triggers caspase-mediated apoptosis through non-covalent interactions with TNF- receptor.

Oral 5

Epicardial fat thickness and cardiometabolic syndrome among Malaysians

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Abstract

Epicardial fat is a form visceral cardiac fat deposit, located between the heart and the pericardium. Excessive epicardial fat is strongly associated with cardiometabolic syndrome, and has been proposed as a marker of cardiovascular disease risk. This study aims to retrospectively analyse cardiac fat depots imaged in UMMC patients underwent standard echocardiograph procedure for both ischemic and non-ischemic indication, and examine its association with ethnicity, overall BMI, dyslipidaemia (triglycerides, total and HDL cholesterol), blood pressure and glucose levels. A total of 157 patients were recruited, with 47% healthy individuals, and 53% of the patients with acute coronary syndrome. Mean epicardial fat thickness obtained was 4.03mm and interestingly, the thickness was found to be higher among those with acute coronary syndrome. Age was found to be significantly correlated with epicardial fat thickness, and Malays were also found to have thicker epicardial fat. However, no correlation was found with metabolic syndrome components, which may due to the small sample size and treatments received. Despite the limitations, this study is the first to provide preliminary data on thickness of epicardial fat across the difference ethnic groups presented with ACS. Further study is warranted to investigate its role as cardiovascular risk marker among Malaysians.

Keyword: Epicardial fat, Metabolic syndrome, Cardiovascular diseases

Oral 6

Awareness and Knowledge on Metabolic Syndrome among Non-health Related University Students.

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Abstract

Despite an increasing prevalence of metabolic syndrome (MetS) among young adults, little is known about the awareness level of university students about conditions leading to MetS. This cross sectional study aims to assess level of awareness and knowledge about conditions relevant to MetS among non-health related undergraduate students of University of Malaya. Students' anthropometric parametres including height, weight, waist circumference, visceral fat content and total body fat percentage were measured, followed by a face-to-face interviews with the use of a structured questionnaire to students who agree to participate in the study. We recruited a total of 371 respondents, with 45.9% female and 54.1% male students. Approximately 39% of the students were either overweight or obese, with very little knowledge about their risk and conditions associated with metabolic syndrome.

Keyword: Obesity, Metabolic syndrome, Knowledge and awareness

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Category B:
Inventive Futuristic Science

Oral 7

Fast-MARNO: MARine naNOparticle Reducing Agent from Malaysian Shore

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Abstract

Silver nanoparticles (AgNPs) is known for their excellent antimicrobial properties. There are many ways to synthesize AgNPs, but green synthesis of AgNPs possess few advantages such as environmentally friendly, low cost and biocompatible. Using marine invertebrate as a reducing agent in AgNPs synthesis is relatively new especially using local species of marine worm (polychaete), *Marphysa moribidii*. The synthesis time is relatively fast compared to other biosynthesis methods as the reduction process starts as soon as the silver nitrate solution is mixed with the crude extract of *M. moribidii*. The optimum time for the synthesis of AgNPs using extract of *M. moribidii* is between four to five days, based on the Surface Plasmon resonance (SPR) band exhibited by the AgNPs showing a single sharp peak formation approximately at 397 – 400 nm. Furthermore, a sharp peak formation in UV-vis spectroscopy shows the ability of the extract to reduce monodisperse AgNPs. The aqueous AgNPs from this synthesis can also be converted to solid form using the freeze-drying method. The AgNPs produced from the synthesis are spherical when analyzed with scanning and transmission electron microscopes (SEM and TEM). Antimicrobial assessments of AgNPs synthesized from *M. moribidii* including minimum inhibitory concentration and spread plate technique on bacteria and fungi indicated that the nanoparticles are able to function as antimicrobes.

Oral 8

Gene Expression Analysis of Carotenoid-related Genes in Different African Marigold (*Tagetes erecta* Linnaeus) and French Marigold (*Tagetes patula* Linnaeus) Varieties

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Abstract

Carotenoids are lipid-soluble pigments synthesized by all photosynthetic organisms and non-photosynthetic microorganisms. Carotenoids have received considerable attention due to their applications in biotechnology and various potential benefits to human body health. Lutein is a xanthophyll carotenoid which is essential for human eyes health. It is a major carotenoid in marigold plants which have high lutein concentration. The aimed of the study was to analyse carotenoids-related genes in *Tagetes erecta* L. and *Tagetes patula* L. varieties. Ten varieties of these plants with various flower colours were used in the study. RNA extraction was conducted followed by generation of complementary DNA. The expression of two genes that were related to carotenoid pathways were quantitatively measured using Real-Time qPCR. Another quantitative analysis was carried out to determine the total carotenoid content in the marigold flowers with different varieties. Gene expression analysis showed that the darker the flower colour, the higher the expression of the genes. However interestingly, white variety showed higher expression level of these genes as compared to yellow and orange varieties. This might be due to a mutation of the gene or due to the gene silencing occurrence in the white variety. Total carotenoids content analysis linearly showed that the darker the flower colour, the higher the total carotenoids content. The results throughout the study showed the relationships between the flower colour to the expression of carotenoids related genes and also the carotenoids content.

Keywords: *marigold, carotenoid, lutein, qPCR*

Oral 9

Optimization in Production of Bioethanol from Oil Palm Empty Fruit Bunch (EFB)

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Abstract

As the second highest producer of oil palm worldwide, Malaysia is burdened with a substantial amount of oil palm waste such as Oil Palm Empty Fruit Bunch (EFB). EFB is widely applied in fuel production, especially bioethanol production due to its high cellulose content upon acid or alkali hydrolysis. However, the optimization of the bioethanol fermentation conditions is demanded for the sustainable and cheaper bioethanol production. In this study, water and heat pre-treatment coupled with an enzymatic hydrolysis were performed to release the cellulosic glucose from EFB prior to the *Saccharomyces cerevisiae* fermentation for bioethanol production. The total moisture content of the pre-treated EFB and glucose concentration of the hydrolysate were also determined. The yield of ethanol, glucose consumption rate and cell concentration of fermentation with different pH and temperature were analyzed at the time interval of 24th hour and 96 hours using spectrophotometric method. Results showed the optimum condition for bioethanol fermentation using EFB was achieved with pH 4 at 30°C with addition of 3% (w/v) Yeast Extract with total ethanol yield (g/g) and efficiency (%) of 1.372 (g/g) and 137.151% respectively. In conclusion, pH 4 and 30°C with addition of 3% (w/v) Yeast Extract are the optimum conditions for a sustainable bioethanol fermentation using EFB as demonstrated in this study.

Keywords: alcoholic fermentation, bioethanol, sustainable, enzymatic hydrolysis

Oral 10

The Effect of Glycerol Solvent on the Enzyme Activities of NAD+- Glutamate Dehydrogenase from *Halobacterium salinarum* Strain NRC-1 at Different Temperatures

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Abstract

Hydrophobic unnatural amino acids have high potential in pharmaceutical industry. However, its production requires extreme environment such as high temperature and the usage of organic solvent, which made scientists targeting halophilic transaminase enzymes that are capable to function in low water activity solutions such as organic solvent and also at high temperatures. Thus, the objective of this experiment is to study the effect of an organic solvent, glycerol, towards the activity of NAD+-GDH from *Halobacterium salinarum* strain NRC-1 at different temperatures. *H. salinarum* strain NRC-1 was cultured in a halophilic salt medium for 168 hours at 37ºC before it was sonicated and NAD+-GDH was partially purified through heat treatment at 40ºC for 30 minutes. The enzyme activities were assayed at 340 nm for 1 minute in different concentration of glycerol (5 % - 25 %) under 3 different temperatures (50ºC, 60ºC and 70ºC). The assays were carried out in the presence and absence of 3.2 M NaCl. The results showed that the highest NAD+-HsGDH activity obtained was at 70ºC in 20 % glycerol with 510 % relative activity. This indicates that glycerol facilitates the stability and activity of NAD+-HsGDH at high temperature. However, in the absence of salt, as the temperature increases, the activity of NAD+-HsGDH decreased with only 141 % relative activity at 70ºC in 15 % of glycerol. This implies that NAD+-HsGDH is active in glycerol solvent and starts to become unstable as the temperature increases in the absence of NaCl.

Oral 11

Isolation and Characterization of Phytase Producing-Bacteria from Poultry Farm Soil with Chicken Faeces from Bukit Lagong

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Abstract

Phytic acid an anti-nutritional factor as it binds with proteins and minerals to form phytate complexes, which cannot be assimilated by the digestive system of many animals due to lack of enzyme phytase. Phytase hydrolyses phytic acid from food and therefore eliminates the antinutritional effect. The aim of this research was to isolate phytase-producing bacteria from poultry farm soil and chicken faeces. Phytic acid was extracted from organic wheat bran. Later, bacteria were cultured in phytate specific (PS) agar plates and those successfully produced halos on agar plates were considered as phytase producing-bacteria. Of the 21 isolates, five isolates showed halos (clear zones) around the colonies. Two isolates, S1.1 and S1.9 were chosen for phytase kinetic studies. In the condition of 50ºC and at pH5.5, phytase from S1.1 and phytase from S1.9 had activity of 8.17 x 10-8 U/ml and 1.32 x 10-7 U/ml respectively. Also, phytase from S1.1 was most active at 40ºC and at pH 5.5 while phytase from S1.9 was most active at 30ºC and at pH 6.5. Phytase from S1.1 had Vmax value of 0.86 mM/s and Km value of 136.993 mM while phytase from S1.9 had Vmax value of 0.46 mM/s and Km value of 56.965 mM. DNA of both isolates was successfully extracted. DNA of isolate S1.9 was amplified using PCR and it had size of about 1500bp. BLAST analysis of 16S rRNA gene sequences of isolate S1.9 revealed 99% sequence similarity to Bacillus sp. strain MTB17 (GenBank Accession No. MH062891.1). Keywords: Phytic acid, phytase, phytate, phytase producing-bacteria, isolation, characterization, poultry soil, poultry faeces, anti-nutrient

Oral 12

Construction and Characterisation of *Burkholderia pseudomallei* arcA and FlgA Deletion Mutants

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Abstract

Burkholderia pseudomallei is the causative agent of the tropical disease, melioidosis. This Gram-negative bacterium is present in wet soil and rice paddies in endemic areas. A previous study profiled the changes in gene expression between *B. pseudomallei* cultured in soil versus bacteria cultured in human plasma. Analysis of the respective transcriptomes revealed a number of bacterial genes that were overexpressed in plasma but not when the bacteria were grown in the natural soil habitat. Two genes, arginine deiminase (*arcA*) and flagella basal body P-ring biosynthesis protein (*FlgA*) were selected for further analysis. In this study, deletion mutants of these two genes were constructed by first amplifying the upstream (US) and downstream (DS) sequences of the target gene to be deleted and subsequently spliced together by SOEing PCR. Then, the resulting US-DS fragment was cloned into the non-replicative vector, pEXKm5, and transformed into the conjugative bacterial host, *Escherichia coli* RHO3. Conjugation was then performed between the *E. coli* RHO3 bearing the US-DS fragment and the wild type *B. pseudomallei*. Homologous recombination was noted resulting in the plasmid integrating into the genome of *B. pseudomallei* to form a merodiploid. The merodiploid was then resolved through a second homologous recombination event resulting in either wild type or mutant *B. pseudomallei*. Preliminary characterization of these two mutants (arcA and FlgA) was carried out by assessment of virulence via the killing assay utilising the *Caenorhabditis elegans* infection model. Findings from this study are expected to provide new knowledge on the role of arcA and FlgA proteins in contributing to *B. pseudomallei* pathogenicity.

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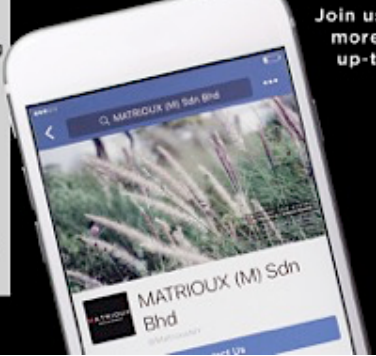

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Category C:
Food Science & Technology

Oral 13

In vitro CYP 3A4 Inhibitory Activity of *Moringa oleifera* Tea in rat liver microsomes

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Abstract

Moringa oleifera (Family: Moringaceae) have been widely used due to its high medicinal values as natural remedy to treat hypertension and diabetes and act as anti-inflammatory, anti-microbial agents. Numerous studies have been carried out for the chemical composition, bioactive compounds and antioxidant activity in different parts of *M. oleifera*. According to our best knowledge, there is no scientific study reported on the effect of *M. oleifera* tea on the cytochrome P450s in affecting drug metabolism in humans and experimental animals. The objective of this study is to examine the *in vitro* effect of *Moringa oleifera* seed tea on the aminopyrine metabolism catalysed by CYP3A4 in rat liver microsomes. Rat hepatic CYP3A4 activity was determined by measuring the rate of formaldehyde released from *N*-demethylation of aminopyrine based on the method described by Nash (1953). Results obtained showed that the *M. oleifera* seed tea prepared at 50 ˚C, 70 ˚C and 100 ˚C exhibited significant (p<0.05) inhibition in CYP3A4 activity in rat liver microsomes compared with the control group. In conclusion, there is a possibility that herb-drug interaction could occur with *M. oleifera* seed tea through inhibitory effect on CYP3A4 enzyme. However, this is a preliminary study and further works are needed to isolate and identify the biologically active ingredients of *M. oleifera* seeds that responsible for the inhibitory effect on CYP3A4 enzyme.

Keywords: Aminopyrine; CYP 3A4; Moringa seed tea; Rat liver microsomes.

Oral 14

Antioxidant Activities of Tea Prepared from Kenad (*Hibiscus Cannabinuls L.)* Leaves at Different Maturity Stage

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Abstract

Kenaf (*Hibiscus cannabinus* L.) is a fast-growing herbaceous plant that received great attention in industrial field of Malaysia as a valuable fiber crop due to its fibrous stem. Yet, different maturity of plants' leaves could affect the antioxidant capacities of the tea prepared. Therefore, the aim of this study was to determine the antioxidant activities of tea prepared from kenaf leaves at different maturity stages, which were 60, 90, 120 and 150 days after sowing (DAS). The analyses that carried out were total phenolic content (TPC), total flavonoid content (TFC), ferric reducing antioxidant power (FRAP), ABTS (3-ethylbenzothiazoline-6-sulphonic Acid**),** DPPH(2-2-diphenyl-1-picrylhydrazyl) radical scavenging assays and chromatographic analysis of phenolic and flavonoid compounds. Results showed that tea prepared from kenaf leaves at 150 DAS showed the highest antioxidant activity for TPC, DPPH and ABTS tested as compared to kenaf leaves at 60, 90 and 120 DAS. The tea from kenaf leaves at 150 DAS was then subjected to high performance liquid chromatography (HPLC) to quantify the phenolic and flavonoid compounds. Kenaf leaves tea contained mainly kaempferol, chlorogenic acid and caffeic acid. Hence, it deduced that the antioxidant activity in kenaf leaves increased when maturity increased. In short, leaves from 150 DAS was recommended for tea preparation since it possessed high antioxidant activities.

Keywords: Total phenolic content (TPC); Total flavonoid content (TFC); High Performance Liquid Chromatography (HPLC); Kaempferol; Chlorogenic acid; Caffeic acid.

Oral 15

Proteomic Analysis of the Ripening Process in Tropical Mango *Mangifera indica cv. Chokanan*

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Abstract

Mango (*Mangifera indica* L.) is an economically important fruit. However, the marketability of mango is affected by the perishable nature and short shelf life of the fruit. Therefore, a better understanding of the mango ripening process is a great importance towards extending the postharvest shelf life. Proteomics is a powerful tool that can be used to elucidate this complex process at the cellular and molecular levels. This study utilized 2-Dimensional gel electrophoresis (2D-GE) coupled with MALDI-ToF/ToF to isolate and identify differential proteins during the ripening process of the tropical mango, *Mangifera indica* (cv. 'Chokanan'). The comparative analysis between the ripening stages of mango fruit mesocarp revealed that 22 out of 252 proteins had lower abundance in the ripe stage compared to unripe stage. In addition, 15 proteins were exclusively present in the ripe stage (p< 0.05). A total of 11 selected differential proteins were analysed using MALDI-ToF/ToF mass spectrometer and identified with Mascot database. The analysis revealed abscisic stress ripening and beta-galactosidase involving in stress and pulp softening respectively. The proteomics coupled with mass spectrometer has provided immense insight towards events that characterize the ripening of mango fruit.

Keywords: Mango, Ripening, Proteomics, 2D-GE, MALDI-ToF/ToF

Oral 16

Effects of Steeping Time on Chemical Properties of *Strobilanthes crispus* Tea

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Abstract

Strobilanthes crispus is an Malaysian native herb with potential therapeutic benefits in cancer, diabetes and hypertension management. It is widely documented that the beneficial properties of *S. crispus* are attributed to its phenolic content, but little research has been done to correlate the content and activity of phenolics present in hot water extracts with respect to the steeping time. Understanding the effect of steeping time on phenolic extraction will allow individuals to maximise the benefits of consuming *S. crispus* tea. Dried *S. crispus* tea leaves were steeped in hot water (90 °C) for 20 min, 40 min and 60 min. Total phenolic and flavonoid content were determined using Folin-Ciocalteu and $AlCl_3$ methods, respectively. DPPH and ABTS radical scavenging assays were used to determine antioxidant activity. High performance liquid chromatography (HPLC) was used to quantify caffeine and phenolic compounds content. Phenolic and flavonoid content are the lowest in 60 min samples ($p=0.006$ and $p=0.002$, respectively). Antioxidant activity is the lowest in 60 min samples ($p<0.001$). Caffeine content is significantly higher in tea steeped for 60 min ($p=0.003$). Phenolic and flavonoid compounds may be heat labile and more decomposition occurred with longer heat exposure. Antioxidant activity of *S. crispus* correlates positively with phenolic and flavonoid content (correlation coefficient of 0.597 and 0.712, respectively), and may be attributed to them. Protocatechuic acid is found present in the tea. Caffeine may not be heat labile since extraction increases with longer steeping time. *S. crispus* tea prepared in sub-boiling water should be steeped for 20 min to minimise compound loss due to thermal degradation.

Oral 17

Effect of Pre-treatments on the Production of Fermentable Sugars from Rice Husk

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Abstract

This research was carried out to investigate the effect of different pre-treatment methods on the efficiency of enzymatic hydrolysis of rice husk for fermentable sugars production. Rice husk was pretreated with hydrochloric acid (HCl), citric acid ($C_6H_8O_7$), sodium hydroxide (NaOH) and sodium hydrogen carbonate ($NaHCO_3$) at different concentrations [5% (w/v), 10% (w/v), 15%(w/v)] and temperatures (60ºC, 100ºC, 130ºC) for 60 minutes. The pretreated rice husks were enzymatic hydrolysed and the best pre-treatment was selected based on the highest glucose yield. Lastly the fermentability of rice husk hydrolysate was determined via Saccharomyces cerevisiae fermentation. According to the experimental results, 15% (w/v) NaOH and 15% (w/v) NaHCO3 at 130ºC pre-treatment provided the highest glucose yield at 14.598±0.168g/L and 14.325±0.281g/L. Among the tested methods, NaOH-pretreated rice husk underwent the highest loss (86.0±3.4%), followed by NaHCO3-, C6H8O7- and HCl pretreated rice husks. High weight loss indicates better delignification. This result was verified by FTIR and SEM analysis. Lignin and hemicellulose removal after alkaline pre-treatments ease the enzymes penetration during enzymatic hydrolysis, hence produced high fermentable sugars yield. Through yeast S. cerevisiae fermentation, ethanol yield from the hydrolysate of NaOH-pretreated rice husk (18.668±0.026g/L) was higher than those produced from hydrolysate of NaHCO3-pretreated rice husk (17.758±0.046g/L). Thus, this study proved that 15% (w/v) NaOH pretreatment at 130ºC for 60 minutes is the best pretreatment for rice husk to enhance fermentable sugars production.

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Poster Presentation Abstracts

Poster 1

In Silico Analysis of Anthocyanin 3′-O- Beta - Glucosyltransferase cDNA Isolated From *Phaseolus vulgaris* L. Pod Tissue cDNA Library

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Abstract

The common bean is one of the most important legumes worldwide and known as an important source of nutrients for more than 300 million people in parts of Eastern Africa and Latin America. Common bean is also a major source of micronutrients such as iron, zinc, thiamin and folic acid. For the understanding of genes expression in *P. vulgaris* pod-tissue, research work to generate Expressed Sequence Tags (ESTs) was initiated by constructing cDNA libraries using 5-day and 20-day old bean-pod-tissues at Melaka Institute of Biotechnology. Altogether, 5972 cDNA clones were isolated to have ESTs. Anthocyanin 3′-O-beta-glucosyltransferase was one of the cDNA clones among the 5972 ESTs. For the further investigation, full length anthocyanin 3′-O-beta-glucosyltransferase cDNA clone sequence and deduced protein sequence was annotated. Analyses such as secondary and tertiary structure prediction of the deduced protein, active site prediction and phylogenetic analysis has been carried out based on the protein sequence of the anthocyanin 3′-O-beta-glucosyltransferase. The protein analysis shows that the enzyme is glutamate and valine rich. The predicted structure consists of 19 alpha helices and 13 beta strands. The primary analysis suggests that protein contains 12 active sites that interact with the ligand molecule. The primary results will be presented and discussed in the conference.

Keywords: cDNA, common bean, food, health, phaseomics, protein structure prediction

Poster 2

Investigation of the Anti-proliferative Effects of *Arctium lappa* Root Extracts

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Abstract

Arctium lappa L. (Asteraceae) is a biennial plant which is traditionally used for the treatment of various chronic skin conditions and used as a diuretic, blood purifying agent and a digestive aid. The aim of the study is to investigate the mechanism of action of different *A. lappa* root extracts in exhibiting anti-proliferative activity. *A. lappa* was extracted with ethanol, hexane and ethyl acetate and assayed for *in vitro* anti-proliferative using MTT assay against cancerous Hela, MCF-7, Jurkat cell lines and non-cancerous 3T3 cell lines. Induction of apoptosis was determined by cell morphological changes, mitochondrial membrane potential (MMP) and caspase-3/7 activity assay. Among all the extracts, ethyl acetate extract was the most potent solvent with the lowest IC_{50} value of 102.2 ± 42.4µg/ml on Jurkat cells, followed by ethanolic extract and ethyl acetate extract on Jurkat and MCF-7, respectively. The extracts also showed higher selectivity against Jurkat and MCF-7 cell lines. Both extracts induced apoptosis characterized by cellular morphological changes and disruption to MMP, while only ethyl acetate extracts displayed an increase in caspase-3/7 activity. These findings suggest that the ethyl acetate extracts of *A. lappa* have strong anti-proliferation potential and can induce intrinsic apoptosis through loss of MMP and caspase-3/7 activation. This study can lead to the discovery of new promising plant-derived drugs in chemopreventive and chemotherapeutic strategies.

Poster 3

Study of Nanofibrous Membrane for Exosome Isolation from Biofluids

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Abstract

Among a variety of cell-derived vesicles, exosomes are nanovesicles (~30–300nm diameter) released from various cell types for intercellular communication. Recently, these vesicles were found to play significant role in cancer development and thus emerged as a novel source of non-invasive cancer biomarkers. The current methods commonly used for the isolation of exosomes involve high-speed ultracentrifugation which is lengthy (6–8 hours) and frequently yields a relatively low recovery of exosomes. Therefore, in this project we aimed to design a nanoporous fibre-based microfluidic membrane to trap the exosomes from clinical urine sample. A nanofibrous membrane was constructed through electrospinning and the constructed membrane can be fitted into a filter membrane holder for the trapping of exosomes from the fluid sample. Scanning electron microscopy (SEM) analysis showed that the constructed nanofibers are highly porous (pore size = ~200 – 360 nm). The membrane was first tested with the suspension of isolated exosomes in PBS. SEM analysis showed vesicles with sizes ~ 200 nm are trapped in the membrane pores while some (~ 600 nm) are attached on the membrane. In the preliminary immunofluorescence analysis, exosome markers CD63 and CD9 were observed in vesicles that were trapped in the membrane pores. However, modification of the membrane is required to eliminate the background signal during fluorescence imaging. At this stage, we preliminarily proved that the constructed nanofibrous membrane shows capacity to isolate exosomes suspended in a buffer. Improvements to the membrane for better efficiency of exosome isolation from urine samples are in the progress.

Poster 4

Isolation and Identification of Extended-Spectrum Beta-Lactamase (ESBL) producing Enterobacteriaceae in *Corvus Splendens* (house crows) and *Columba livia* (feral pigeons) in Malaysia

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Abstract

The global widespread emergence ESBL-producing *Enterobacteriaceae* today merits a concern for the rise in antimicrobial resistance. ESBL has been reported to be widely distributed with high prevalence rate in hospitals and in wild animals such as in wild crows and pigeons. This study aimed to determine the prevalence of ESBL- producing *Enterobacteriaceae* in house crows and feral pigeons and to identify the bacteria putatively. A total of 76 crow carcasses was obtained from three municipal councils; Majlis Bandaraya Petaling Jaya (MBPJ, n=37), Majlis Perbandaran Klang (MPK, n=31), and Dewan Bandaraya Kuala Lumpur (DBKL, n=6) and a total of 32 crow droppings were collected from Section 15, Subang Jaya. A total of 75 pigeon droppings were collected from 2 different locations in Kuala Lumpur; Batu Caves (n=35) and Brickfields (n=40) respectively. Samples were plated on MacConkey agar supplemented with 1mg/mL cefotaxime and ceftazidime respectively. ESBL-producing *Enterobacteriaceae* was confirmed phenotypically by using Double Disc Synergy Test (DDST) and Combination Disc Test (CDT). For crows, the prevalence of ESBL- producing *Enterobacteriaceae* was the highest in DBKL (66.6%), followed by MPK (45.1%), MBPJ (35.1) and lastly, Section 15 (25.0%). For pigeons, the prevalence of ESBL- producing *Enterobacteriaceae* was the highest in Batu Caves (45.7%) followed by in Brickfields (22.2%). 173 putative Gram-negative bacteria were isolated from crows and pigeons. This study suggests that wild birds are a reservoir of ESBL-producing *Enterobacteriaceae* and may act as a vector for the dissemination of these resistant bacteria. Work is still ongoing to identify the ESBL- producing *Enterobacteriaceae* to species level and to determine the resistant genes that encode for ESBL.

Poster 5

Immobilized Bacteria for Self-healing Concrete

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Abstract

Crack formation in concrete, the most popular construction material worldwide, is one of the main reasons for concrete degradation, as cracks allow water & corrosive substances to seep inside concrete structures. To increase the service life of cement-based structures, researchers have investigated various modes of concrete self-healing. Certain bacterial species can remediate concrete structural faults by mineral precipitation, and have been central to biological self-healing concrete research. Such bacteria have been immobilized on various carriers. To the best of our knowledge, no previous study has provided a direct estimate of post-immobilization viability. This project is the first to provide a direct viability estimation of immobilized bacteria for concrete self-healing. We aimed to immobilize bacteria in calcium-alginate capsules, quantify the viability of encapsulated bacteria, assess spore leaching under simulated conditions & characterize the precipitation behavior of encapsulated bacteria. Post-encapsulation viability of spores was assessed by dissolving capsules to release spores for estimation of colony forming units. To assess precipitation behavior of encapsulated spores & spore leaching, capsules were resuspended in test solutions stimulating cement conditions, & placed in cement samples. No loss of viability was found during the encapsulation process. No spore leaching was detected under simulated conditions. As expected, calcium carbonate precipitation was only observed in capsules containing spores & nutrients, in the presence of calcium under alkaline conditions. Our findings point to alginate encapsulation as a promising strategy for concrete self-healing. Currently, impact of capsules on physical properties of cement are being investigated in our lab.

Poster 6

Investigation on the Anticancer Activity of a Benzimidazole Lead Compound

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Abstract

Sirtuins are class III histone deacetylases and were previously linked to various cancer types, while compounds based on benzimidazole structure were reported to possess sirtuin modulatory activities. Therefore, these compounds were hypothesized to possess anticancer properties. Our project was aimed to explore the anticancer activities of a benzimidazole compound 5VI in oral squamous cell carcinoma cells (OSCC). H103 as the cisplatin-sensitive OSCC and H314 as the resistant line were chosen as the cancer cells to be tested, while keratinocyte (HaCat) cells were employed as the normal counterpart in the experiments. MTT assay was used to evaluate the effect of 5VI in inhibiting the viability of the tested cell lines and we found 5VI significantly inhibits viability of cisplatin-resistant H314, with less toxicity on HaCat cells. This property confers to higher selectivity index of 5VI in compare to that of cisplatin. Previously, cisplatin was found to induce G1/S arrest in cancer cells. In this study, cell cycle analysis was performed using imaging flow cytometry and 5VI-treated H314 cells were found to be arrested at G2/M phase. Interestingly, combined treatment with both cisplatin and 5VI showed synergistic effect in inhibiting the viability of H314 cells, implicating the two compounds targeting different DNA damage checkpoints of cell cycle may enhance the killing effect in cisplatin-resistant OSCC. Together these findings suggest that benzimidazole compound 5VI, alone or in combination with cisplatin, probably a potential therapeutic candidate for improving the treatment of cisplatin resistant oral cancer.

Poster 7

Evaluation of the Phylogenetic Relationships and *In Vitro* Bioactivities of the Local *Pleurotus* Mushrooms

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Abstract

The *Pleurotus* genus contains various nutritious edible mushrooms. This study was aimed to evaluate the phylogenetic relationships of local *Pleurotus* isolates and the *in vitro* bioactivities of selected strains. Additionally, different extracting solvents were compared to determine extract with the best bioactivity profile. Eleven *Pleurotus* species strains were studied using DNA sequences amplified from specific internal transcribed spacer (ITS) regions to determine their phylogenetic relationships. Two strains (MP22 and MP37) were selected and subjected to extractions using ethanol, methanol and hot water, respectively. The extracts were compared for their *in vitro* bioactivities including determination of the total phenolic and flavonoids contents (TPC and TFC), anti-oxidation, anti-inflammatory and anti-bacterial properties. Seven strains were identified as *Pleurotus pulmonarius*, two strains as *Pleurotus eryngii* and one strain as *Pleurotus ostreatus*. Interestingly, MP37 appeared to be a dikaryotic isolate with two distinct ITS sequence types. The dikaryotic MP37 extracts exhibited higher TPC, TFC, anti-inflammatory and anti-bacterial properties than the monokaryotic MP22 *Pleurotus eryngii* extracts, except for the anti-oxidation properties. This suggests that phenolic and flavonoids contents might correlate with anti-inflammatory and anti-bacterial properties of the extracts. Generally, ethanol extract showed better bioactivities, followed by methanol and water extracts. In conclusion, the phylogenetic relationships of most strains were established successfully and *Pleurotus pulmonarius* is the predominant species among the samples. The uniqueness of MP37 as a dikaryon might provide it with better bioactivities compared to other monokaryon isolates. Better bioactivities shown by the alcohol extracts suggest that the studied mushrooms contain numerous useful, less-polar bio-compounds.

Keywords: Pleurotus, phylogenetic, phenolic, flavonoids, anti-inflammatory, anti-bacterial, anti-oxidation.

Poster 8

Comparative Study on the Antifungal Properties of the In-house Synthesized ZnO and WO_x Nanoparticles, and the Nano hybrids on *Rhodotorula mucilaginosa*

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Abstract

In 2011, out of RM4.3billion spent for healthcare sector in Malaysia, approximately RM640.7million (14.9% of the healthcare budget) was used to combat healthcare-associated infection, i.e. through clinical plastic ware. One specific example is catheter-related blood stream infections (CRBSIs) originated from fungi. Studies have shown that nanoparticles (NPs), such as Zinc Oxide (ZnO), possesses potent antimicrobial activity. We thus hypothesized that ZnO NPs could represent an economical alternative to antibiotic to resolve CRBSIs. This study aimed to compare the antifungal activity using the in-house synthesized ZnO and WO_x NPs, and their hybrids in which ZnO composited on the surface of WO_x in different duration (i.e. 24, 48 and 72 hours). *Rhodotorula mucilaginosa* (ATCC: 66034) was used as a fungi model in the study. The physicochemical properties of these NPs were first characterized using FESEM, FTIR, EDX and XRD. Two-fold broth micro-dilution method was conducted to obtain minimum inhibitory concentration (MIC) and minimum fungicidal concentration (MFC). Significant difference was observed in both MIC and MFC values of ZnO, which was 32µg/ml compare to that of WO_x NPs and the three hybrids, which were 2048µg/ml and 1024µg/ml, respectively (p<0.05, n=3). The inhibition kinetic study of ZnO NPs was performed using time kill assay and significant difference was found compared to other NPs after 6 hours (p<0.05, n=3). In conclusion, ZnO NPs possesses the most potent antifungal activity as compared to WO_x NPs and their hybrids. Therefore, it represents an economical alternative to combat CRBSIs.

Keywords: Rhodotorula mucilaginosa, minimum fungicidal concentration, catheter-related blood stream infections, minimum inhibitory concentration.

Poster 9

Comparing Antibacterial Activities of Newly Engineered Zinc Oxide Nanoparticles, Tungsten Oxide Nanoparticles and Zinc Oxide-Tungsten Oxide Nanohybrids against *Staphylococcus aureus*

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Abstract

Staphylococcus aureus, as a normal skin flora, can trigger severe Staph infection if the bacteria invade the bloodstream through wounds. In hospitals, fabrics are coated with metal oxide nanoparticles (NPs), such as zinc oxide (ZnO), to minimize the Staph infection. In this study, ZnO NPs, tungsten oxide (WO_x) NPs and ZnO-WO_x nanohybrids (NHs) with three different composite time (i.e. 24, 48 and 72 hours) were synthesized and their antibacterial activities were tested against *S. aureus* under non-UV and UV irradiation condition with various concentration, ranging from 8µg/ml to 1024µg/ml. The NPs synthesized were characterized by Fourier-transform infrared spectroscopy (FTIR), X-ray diffraction (XRD), Energy-dispersive X-Ray (EDX) and field emission scanning electron microscope (FESEM). The antibacterial activities of NPs were examined using two-fold broth microdilution method to obtain the minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC). Kinetics of killing was assessed using time-kill assay. Based on the MIC results, ZnO NPs exhibited greater inhibition with lower MIC values (128µg/ml) as compared to WO_x NPs that required 256µg/ml to kill *S. aureus* ($p<0.05$, $n=3$). Time-kill assay was carried out at 128µg/ml of NPs and the inhibitory effect of ZnO NPs was significant compared to WO_x NPs and the NHs after 3 hours ($p<0.05$, $n=3$). In conclusion, ZnO NPs was more potent in killing *S. aureus* than WOx, and their hybrids did not further improve the antimicrobial activity. Hence, ZnO NPs is still the most potent and economical metal oxide nanoparticles to combat Staph infection.

Poster 10

Antimuscarinic Activities of Three Lobeline Alkaloids from *Hippobroma longiflora*

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Abstract

Lobeline is an alkaloid well-known to possess a variety of biological activities, it had been used traditionally for treating asthma and respiratory illnesses. Available literature pertaining the antimuscarinic activities of lobeline is scarce, mostly because the studies were focused on its action towards other targets. The main objective was to elucidate the antimuscarinic properties of extracted lobeline and two other derivatives of this compound (alkaloids **2** and **3**) which contained different functional groups from *Hippobroma longiflora*, on the trachea of Sprague-Dawley rats. Organ bath experiment was employed to study each effect of lobeline and the other two derivatives i) on pre-contracted isolated rat trachea induced by carbachol as a muscarinic agonist, ii) effect on the basal tension and iii) effect of atropine (nonselective muscarinic antagonist) has been compared to lobeline. Lobeline and each derivative induced a significant full relaxation response of pre-contracted trachea at $1X10^{-4}$M while lobeline showed no activity on the basal tension. Lobeline and its two derivatives have pEC50 in mM-µM but were less potent as compared to atropine which demonstrated its pEC50 in nM, showing lobeline possess weak atropine-like activity. Furthermore, derivatives **2** and **3** were less active than lobeline, indicating that ester group is an important binding feature for the binding activity of the lobeline on the muscarinic receptors. Our results suggest that central muscarinic effect of lobeline or the derivatives appear possible, especially at higher dosages. Antimuscarinic properties of lobeline could be responsible for its traditional use to treat asthma.

Keywords: Lobeline, alkaloids, Hippobroma longiflora, antimuscarinic.

Poster 11

Fabrication and *in vitro* Biocompatibility of Sodium tripolyphosphate-crosslinked Chitosan-hydroxyapatite Scaffolds for Bone Regeneration

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Abstract

The fibrous scaffolds have been widely used for bone repair and regeneration due to their bone growth promotion properties. The aims of this study were to fabricate a novel chitosan-hydroxyapatite (CHA) scaffold cross-linked with sodium tripolyphosphate (TPP) and evaluate its *in vitro* cell biocompatibility. CHA scaffolds were fabricated via direct blending and lyophilization using different concentration (0.1 M, 0.2 M and 0.4 M) of TPP as crosslinker. Microstructure and chemical composition of CHA scaffolds were examined by using field emission electron microscope (FESEM) and Fourier transformed infrared spectroscopy (FTIR), respectively. The biodegradability of TPP-CHA scaffolds was studied for 30 days and *in vitro* compatibility and functionality were evaluated in osteoblast-like cells, MG63, in terms of cell adhesion, proliferation and early differentiation. All scaffolds showed an interconnected honeycomb-like microstructure except 0.4 M TPP-CHA scaffolds which demonstrated a compact and least porous structure with pore sizes of 62-185 µm. In contrast, 0.1 M TPP-CHA scaffolds exhibited highly porous structure with pore sizes of 74-207 µm. All TPP-CHA scaffolds degraded in similar range (7.7 - 9.7%). This outperformed un-crosslinked CHA scaffolds which lost their 90% structural integrity after 2-day immersion in the medium. The 0.1 M TPP-CHA scaffolds were evidently more biocompatible by promoting higher adhesion, proliferation and early differentiation of MG63. Overall, 0.1 M TPP-CHA scaffolds demonstrated the most promising physiochemical and biocompatible properties which can be used as an alternative regenerative material for bone tissue engineering.

Poster 12

Chemical Synthesis and Characterization of Copper Coated Insoles for Antibacterial Application

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Abstract

Bromodosis or commonly known as smelly feet has been known to cause discomfort and embarrassment to individuals with this medical condition. The major cause that leads to this condition is the metabolism of L-leucine to isovaleric acid by Staphylococcus epidermidis and the production of isovaleric acid, a cheesy smell volatile compound that leads to foul foot odour. To overcome this problem, one of the possible approaches is to inhibit the growth of Staphylococcus species and to avoid the production of metabolic end-product. At current, foot insoles available in the market such as charcoal insoles mainly focus at increasing moisture absorption, at the same time reducing smell and odour. Thus, the approach in this project is to synthesize copper coated insoles to inhibit foot-odour producing bacteria targeting on Staphyloccocus species. The copper coated insoles were synthesized based on chemical reduction method and stabilized by capping agent, ethylene glycol to prevent oxidation. Staphylococcus species was isolated and confirmatory tests such as Gram-staining, catalase test and DNA amplification using specific primer was carried out to reaffirm the strain. The result of 16S rDNA sequencing of isolated bacteria showed 97% similarity with Staphylococcus haemolyticus. Antimicrobial study shown there was statistically significant ($P<0.05$) difference in the zone of inhibition for Gram-positive and Gram-negative bacteria, including Staphylococcus haemolyticus between insoles with copper coatings and without any coatings. This indicated that the efficacy of copper in suppressing the growth of bacteria. The data proved the potential application of copper coatings on shoes insoles in foot odour control.

Poster 13

Investigation of Bacteria with Potential to Facilitate the Degradation of High-Density Polyethylene (Plastic)

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Abstract

High-density polyethylene (HDPE), a polyethylene thermoplastic, is the most commonly found non-degradable household waste. This project aimed to explore the bacteria with the potential to degrade HDPE. To do that, 14 strains of bacteria were first screened by growing them in Mineral Salts medium. Two bacteria strains, S3-B and S3-C, were found to grow in medium with HDPE plastic sheet,suggesting that they could utilize the plastic asthe carbon source . Bacteria Adhesion to Hydrocarbon (BATH) assay showed that S3-C had a significant lower absorbance of aqueous phase after phase separation in comparison to S3-B., indicating that S3-C has higher affinity to plastic than S3-B. Their cell viability was further quantified using Tetrazolium Chloride (TTC) reduction test and S3-C was observed to utilize HDPE plastics better for growth as its mean absorbance on Day 4 increased significantly from 0.0277 to 0.0423. On the contrary, the mean absorbance of S3-B on Day 4 was 0.02.

Keywords: Degradation, n-Hexadecane, hydrophobicity, Tetrazolium Chloride (TTC).

Poster 14

The Extraction of Keratin from Human hair Using Different Methods

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Abstract

The human hair consists of mainly microfibrillar keratins, a fibrous structural protein which is a family of intermediate filament protein. Keratin with a molecular mass of 40-65kDa, is known for its toughness and poor solubility therefore making it really difficult in extraction. Methods to extract keratin rapidly and efficiently from human hair are being developed as keratin is known to have useful properties which can contribute in many areas of public importance especially in biomedical field as keratin is part of the human body. This study is to determine which method for extracting keratin from human hair is the most effective and to determine whether gender, and age (adult, age 19-25 and children, age below 12) affect keratin mass as well as to investigate whether IR spectroscopy can be used for identification and analysis of the human hair. The Shindai method (DTT, thiourea and urea), alkaline-based method (beta-mercaptoethanol, thiourea and urea), and the conventional method (beta- mercaptoethanol, and urea) were used. The optimal conditions were picked for each method for comparison. The methods differed in the combination of thiourea and urea used in the presence of a reductant (beta-mercaptoethanol or DTT) to effectively extract keratin protein. Bradford colorimetric assay results showed that the Shindai method using DTT as a reductant with the combination of thiourea and urea had higher extracted protein concentration. SEM analysis showed that hair samples had lost some fibrous structures in the cortex after extraction. The results also showed hair extracted with the conventional method had the most deformed structure. According to the Bradford colorimetric assay results, gender did not affect keratin mass, keratin concentration was different among the individuals tested. It was also found that children's hair contained as much keratin protein as adults. Characteristic vibrations of different functional groups were obtained with the use of FTIR. The possibility of differentiating gender based on IR spectra of the human hair was explored, however, more research is needed to confirm the results.

Poster 15

ROS Lowering Potential of Black Face General in Liver Cells with Phytochemicals Identification.

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Abstract

Black Face General (*Strobilanthes crispus*) is a Malaysian herbal plant, proven scientifically to possess antioxidative properties. The aim of this study was to test the methanolic extract of *Strobilanthes crispus* (SME) for its hepatoprotective potential. The extract was first tested for the presence of various phytochemical constituents and total phenolic as well as total flavonoid contents. Next, the identities of phenolic compounds in the extract were confirmed using high performance liquid chromatography (HPLC). The extract was then subjected to DPPH radical scavenging assay and Reactive Oxygen Species (ROS) reducing test on liver cells to investigate its antioxidative and hepatoprotective effects, respectively. It was found that the SME contained tannins, phenolics, flavonoids, fixed oil, terpenoids as well as cardiac glycosides. The total phenolic content for SME was 36.269 + 1.306 mg GAE/g. Meanwhile, the total flavonoid content detected in SME was 1.687 + 1.222 mg QE/g. In addition, the phenolic compounds; chlorogenic acid, ellagic acid and also the flavonoid kaempferol were tentatively elucidated in SME. The DPPH radical scavenging activity of this extract was 95 % at the concentration of 1 mg/mL. When the liver cells were treated with 500 µg/mL of SME, 72 % ROS reduction was observed as compared to untreated control cells. It was speculated that the high phenolic content in S. crispus contributed to the high radical scavenging activity and ROS reduction ability. In a nutshell, *Strobilanthes crispus* showed potential to protect the human liver cells from oxidative damage.

Poster 16

Development of Standard Inoculation Procedures for Blood Disease Bacterium on Banana

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Abstract

The *Ralstonia solanacearum* is a bacterial pathogen with wide host range that causes bacterial wilt particularly in solanaceous plant and banana. This bacterium has caused a serious disease in banana called blood disease and has severed the banana industry in Malaysia, earning the nickname Blood Disease Bacterium (BDB). This research was undertaken to understand the growth of BDB under the in-vitro condition and develop a standard growth curve specifically for BDB. The BDB's growth curve developed was further utilised to develop a standard inoculation procedure for this disease. The BDB bacterium was isolated from infected banana plant sampled from Melaka. The Kelman's tetrazolium chloride (TZC) medium was used to isolate and purify the BDB from plant samples. Pure culture of the BDB were then multiplied using nutrient agar (NA) for growth curve development and inoculation purposes. Colony forming unit (CFU) count was performed for BDB with various dilutions prepared and measured using spectrophotometer which is the percent transmittance with the setting of 600nm wavelength. The CFU values counted were then used for development of growth curve. Growth curve developed was then utilised for the preparation of BDB suspensions with concentration of 10^6 ,10^8 , 10^{10} and 10^{12} CFU/mL for inoculation purpose. Banana seedlings (Kapuk variety) with 4-5 leaf stage were chosen for the inoculation due to their susceptibility to BDB. Each BDB treatment was repeated three times with sterile distilled water used as control treatment. Disease incidence and severity were observed and recorded post inoculation on weekly basis. This experiment has successfully induced the BDB symptoms on all BDB inoculated seedlings with 100% disease incidence. The disease severity recorded has showed that the BDB concentration of 106 CFU/mL is sufficient to cause the BDB symptom. Successful in re-isolation of the BDB from the wilted seedlings have fulfilled the Koch's postulates. The calibrated methods of plant pathogen inoculation have proven their feasibility which could contribute to better accuracy plant pathogen screening and development of resistant plant variety.

Poster 17

Lipase Production by *Burkholderia cenocepacia* Using 'Waste Oils' as Substrate in Shake Flask Culture

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Abstract

Lipases are an enzyme find immense application in food, diary, detergent and pharmaceutical industries. *Burkholderia* is the desired microorganism to produce lipase because of their unique properties which is high enantioselectivity and ability to react in various temperature and pH. Using waste oil as substrate in lipase production is an alternative for expensive substrates. The objectives of this study are to investigate the cell concentration and lipase activity by *Burkholderia cenocepacia* in varying concentrations (0.5, 1.0, 1.5, 2.0, 2.5, 3.0) % of waste sunflower oil and waste engine oil. Secondly, to identify the highest lipase activity among different types of waste oil. *Burkholderia cenocepacia* inoculum was incubated in nutrient broth and transferred into fermentation medium with varying concentrations of waste sunflower oil and waste engine oil. Fermentation process was carried out at 200 rpm and 37 °C for 72 hours. The results showed significant difference between cell concentration and lipase activity of waste sunflower oil and waste engine oil. Medium with 3.0% of waste sunflower oil achieved highest cell concentration (5.20 g/L ± 1.06) and maximum lipase activity of 12.56 U/ml ± 0.37. In medium with waste engine oil, highest cell concentration was achieved in 3.0%, which is 3.43 g/L ± 0.21 and highest lipase activity was achieved in medium with 2.5% waste engine oil (3.86 U/ml ± 0.38). Therefore, the strategies used for lipase production in this study act as an economical and ecological approach.

Poster 18

Awareness, Knowledge and Attitudes of Human Papillomavirus (HPV) and its Vaccine among Taylor's University Students

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Abstract

Establishment of cervical cancer with HPV-aetiology had raised a global alarming prevalence. Vaccination was proven for its prophylactic measure, albeit low vaccination uptakes among targeted populations. Local researches focused on rural area, leaving urban population untouched. Hence, analysing HPV and its vaccine perception in this vulnerable group is essential in reducing the incidence. A cross-sectional study was designed exclusively towards Taylor's University students in urban landscape with 425 voluntary participation, both online and approached. The knowledge level regarding HPV and its vaccine was measured from 13 assessable questions presented in the questionnaire. The mean total knowledge score was 5.26 ± 3.10 out of 13 which was found to be moderately knowledgeable. Female (N= 235) had a higher knowledge score in comparison to male (N= 190) at 5.58 ± 2.80 versus 4.87 ± 3.40, respectively ($p<0.05$) which was likely due to the disease predomination. As hypothesised, health-related school students (N= 171) outperformed other schools (N= 254) in mean total knowledge score (7.00 ± 2.95 versus 4.10 ± 2.62, respectively; $p<0.001$). In general, individual score depends on participant's gender and educational background ($\chi2= 25.426$, $p<0.01$ and $\chi2= 105.337$, $p<0.001$, respectively). Low vaccination uptakes (28.47%) were seen among research populations. Students accept the vaccine following physician's recommendation and reject due to its cost. A positive attitude was seen as the majority (88.71%) wished to know more about HPV. Overall, present results signify the importance of creating a perception regarding HPV and its vaccine, ultimately promote vaccine uptake for nationwide HPV reduction.

Poster 19

Evaluate the Potential of *Sargassum polycystum* Alginate as Natural Preservatives in Soap

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Abstract

Sodium alginate is a common polysaccharide that is found abundantly in the cell walls of brown seaweeds. Their structure and yield may differ according to the type of species and the methods of extraction. This study aims to evaluate the radical scavenging activity of *Sargassum polycystum* sodium alginate (NaAlg) harvested with and without formalin and the degree of lipid peroxidation of the facial soap product with the alginate samples. The DPPH$^{\bullet}$ scavenging activity was significantly higher for NaAlg (aqueous) with EC_{50} = 0.75 mg mL^{-1} compared to NaAlg (formalin) (EC_{50} = 1.95 mg mL^{-1}). The concentration of alginate added to the soap formulation was optimized based on the EC_{50} values obtained. The soap with NaAlg (aq) showed an increment of 28.25 % in antioxidant activity compared to the sample without extracts (control). Thus, could be due to the pigments that remained in the NaAlg samples in the water extraction method. The rancidity of the soaps after two weeks of curing was measured with peroxide assay with the lowest lipid peroxidation observed in the soap with NaAlg (aq) at 1.867 meq kg^{-1} compared to NaAlg (fm) and control at 1.350 and 2.600 meq kg^{-1}, respectively. Therefore, the incorporating of NaAlg (fm) may delay the rancidity of the soap and can prolong their shelf-life without the need for synthetic preservatives.

Poster 20

Neurite Outgrowth Stimulatory Effect of *Termitomyces heimii* Extracts

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Abstract

Dementia is a neurodegenerative disorder that has currently become a global epidemic. Tremendous effort has been put together by several researchers around the world to eradicate this disease but it has proved futile. This has led to alternative approaches in investigating plants and fungi to utilize their potential in the fight against dementia. Therefore, the focus of this study is to investigate the neuritogenic potential of *Termitomyces heimii* extracts on pheochromocytoma cells (PC12 cells). *T.heimii* is known for its edible taste and therapeutic potentials. In this study *T.heimii* mushroom powder underwent hot water and ethanol extraction respectively. The aqueous and ethanol extracts at concentrations of 20µg/ml to 1280µg/ml showed no cytotoxicity to the PC12 cells. Three concentrations (20ug/ml, 160ug/ml and 1280µg/ml) of both the aqueous and ethanolic extracts were used to induce neurite outgrowth in the PC12 cells. *T.heimii* ethanolic extracts at 20µg/ml recorded the highest average neurite length of 132.51±30.74 µm. *T.heimii* aqueous treatment on the PC12 cells showed an increase in the average neurite length from 39.35±68.18µm to 99.37±16.06µm and 120.37 ±9.67µm. Aqueous extracts alone and aqueous extracts plus nerve growth factor (NGF) at a concentration of 160µg/ml induced the highest neurite bearing percentage on PC12 cells at 16.30% ±3.75µm and 16.60%±5.50µm. In conclusion, the *T.heimii* aqueous and ethanolic extracts within concentration range of (20µg/ml- 160µg/ml) stimulates neurite outgrowth of PC12 cells. Further study needs to be carried out to identify the bioactive compounds in *T.heimii* that are responsible for the neurite outgrowth stimulatory properties.

Poster 21

Determination of Circulating Dengue Virus Serotypes Around UCSI University South Wing Campus Using Reverse Transcription Polymerase Chain Reaction

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Abstract

Dengue virus is the leading cause of global, fatal diseases, such as dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS). The dengue infection cases were reported annually as they were increased sustainably, over the world. In the middle of 2016, several UCSI students had suffered dengue infections. Thus, a study was conducted in UCSI University South Wing Campus, in order to determine the dengue serotypes in field-caught adult *Aedes* mosquitoes. The mosquitoes were collected by three different methods, which referred as DIY mosquito trap, self-capturing, and UV mosquito trap. Total 1,147 mosquitoes were captured from September until December 2017. They were 156 of *Aedes* mosquitoes and 991 of non-*Aedes* mosquitoes. UV mosquito trap was the most effective approach to collect mosquitoes. The collected *Aedes spp.* mosquitoes were differentiated based on their physical features. The RNA of mosquito was extracted through TRIzol method. Then, the dengue virus serotypes in all 99 *Aedes* mosquitoes were determined through reverse transcription- polymerase chain reaction. The dengue virus serotypes can be detected on a single mosquito; the RNA in brain and thorax of mosquito were enough for viral detection sensitivity. 56.57 % of DENV-2 was revealed as single infection. The co-circulating of dengue serotypes was detected in individual mosquitoes, as 22.43% was suspected of dual or triple infection mixed with DENV-1, DENV-2, and DENV-4. Yet, DENV-2 was the commonest genotype that discovered on mixed DENV in a single mosquito. In conclusion, the predominant dengue serotype detected around UCSI South Wing Campus was DENV2.

Poster 22

Tyrosinase Inhibition and Antioxidant Properties of Malaysian Coastal Plants

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Abstract

Mangrove ecosystems play an important role in protecting coasts against erosion, as nurseries for young fish and a habitat for valuable seafood such as the mangrove crab. Despite their importance, mangroves are frequently converted into oil palm estates. Mangrove plantations such as the one in Matang, Perak is are very successful conservation methods but such success stories are rare. Mangroves are cultivated in such plantations as firewood for charcoal making but the leaves remain mostly unutilised. In our current study, we have shown that the leaves of many mangrove and coastal trees have good antioxidant and tyrosinase inhibiting properties with potential application as anti-aging and skin-whitening cosmeceuticals, respectively. Furthermore, using sequential extraction with solvents of different polarities, it is possible to isolate the active phytochemicals from the complex plant matrix. The antioxidant properties of *Rhizophora apiculata*, *Syzygium grandis* and *Bruguiera gymnorrhiza* were determined based on their total phenolic content (TPC), free radical scavenging activity expressed as ascorbic acid equivalent antioxidant capacity (AEAC) and ferrous ion chelating (FIC). Tyrosinase inhibiting properties were determined using the modified dopachrome method with L-DOPA as substrate. From the results of this study, the value obtained by *S. grandis* extracted with methanol showed the highest total phenolic content (139.30 ± 0.0025 mg GAE/100g) and DPPH radical scavenging activity (179.32 ± 27.84 mg AA/g). In terms of tyrosinase inhibition, *S. grandis* and *R. apiculata* exhibited strong tyrosinase inhibition when extracted with dichloromethane (88.3 ± 4.7%, 78.2 ± 7.3%).

Poster 23

Formulation of a Double-coated Mucoadhesive Film Containing Live Lactococcal Vaccine for Oral Administration

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Abstract

Vaccine administration via the oral route into the gastrointestinal (GI) tract has several advantages over systemic injection such as ease of administration and the ability to generate both mucosal and systemic immune responses. However, peptide antigens delivered via this route are often degraded by the harsh GI environment such as stomach acid, proteases, pancreatin enzymes and bile salts. Therefore, in this study, a novel oral vaccine delivery method is proposed using a recombinant *Lactococcol lactis* NZ9000 strain as a live vector. This approach employs the incorporation of a double coated film consisting of sodium alginate and Lycoat as the inner coat, which is then loaded into gelatin capsules with an outer enteric Eudrgit® L-100 55 coating which enables a pH dependent breakdown above pH 5.5 to protect against gastric digestion. The final product was then subjected to *in vitro* simulated gastric fluid (SGF) of pH 2 and simulated intestinal fluid (SIF) of pH 7 to assess its survivability. The product has 93±0.49% yield, and demonstrated enhanced protection against SGF and SIF digestion with an increase of 69±0.67% and 40±8.23% survivability respectively compared to unprotected controls after 6 hours of sequential digestion. This translates to a 3.5 folds increase in survivability. Therefore, the present oral delivery system shows great promise for future oral vaccination applications capable of utilizing the intestinal lining which is rich in Peyer's patches and other gut associated lymphoid tissues for enhanced immune responses.

Poster 24

Glycosylated Sulfonylurea Activates Insulin Dependent Signaling Pathway in Insulin Resistant L6 Muscle Cell via PI3K and GLUT4 Genes

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Abstract

Type 2 diabetes (T2D) associated with insulin resistance has accounted for 90% to 95% among all diabetes cases. Impairment in insulin signaling pathway has been found to be the main cause of insulin resistance. Skeletal muscle serves as crucial site for treatment of Type 2 diabetes. The focus of this study was to determine the effect of a newly synthesized glycosylated sulfonylurea (NSGS) on insulin signaling pathway in insulin resistance skeletal muscle cell. Differentiated L6 muscle cells from Rattus Norvegicus were induced insulin resistance with high insulin and glucose. The insulin resistance muscle cell, were treated with NSGS after cytotoxicity test. The expression of PI3K and GLUT4 genes involved in insulin signaling was evaluated using qPCR The study showed that PI3K and GLUT4 was less expressed in the induced insulin resistance cells treated with saline, but was highly expressed in the group treated with NSGS. The result confirmed that newly synthesized glycosylated sulfonylurea molecular mechanism is through the activation of insulin dependent signaling pathway and the fold changes of these genes (PI3K and GLUT4) was higher in NSGS treated group compared to standard drug Metformin. Newly synthesized glycosylated sulfonylurea was able to reactivate the insulin resistance the PI3K and GLUT4 pathway and fold changes is more compared to Metformin.

Keyword: insulin, muscle, NSGS, antidiabetic, Metformin, PI3K ,GLUT4

Poster 25

Antimalarial Properties Of Sodium Tungstate In Combination With Artesunate In *Plasmodium berghei* NK65-Infected ICR Mice

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Abstract

Due to the emergence and spread of malarial parasite resistance to common anti-malarial drugs, novel anti-malarials are urgently sought after. A plausible strategy is to use combination therapeutics to restore efficacy of standard anti-malarial drugs. The present study involved evaluation of sodium tungstate, a compound reported to exhibit anti-inflammatory effects in numerous animal studies, for anti-malarial activities either alone or in combination with the anti-malarial drug, artesunate. Using the four-day suppressive test, intraperitoneal administrations of 1,2,3,4 mg/kg BW artesunate into *P. berghei*-infected mice each resulted in dose-dependent chemosuppression ranging from 59.23 to 70.89%. Median survival time of the infected animals treated with 1 mg/kg BW artesunate was significantly improved (21.5 days) as compared to non-treated control (18.5 days). On the other hand, infected animals treated with 30 and 50 mg/kg BW tungstate each showed 28.91±5.11and 59.61±8.19% parasitaemia suppression respectively with no apparent improvement in median survival time. Combination treatment of infected mice with artesunate (1 mg/kg BW) and 30 or 50mg/kg BW tungstate resulted in chemosuppression of 81.31±3.18% and 58.65±8.17% respectively; and median survival time of 29 and 18.5 days. Our findings suggest that artesunate-tungstate combination treatment using 30 mg/kg BW sodium tungstate was able to increase the anti-malarial activity of artesunate alone with respect to chemosuppression and survivability thus potentially useful for adjunctive therapeutic against malaria.

Poster 26

Construction of the *Burkholderia pseudomallei fliL* Deletion Mutant

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Abstract

Burkholderia pseudomallei is an etiological agent of melioidosis, a rare but serious tropical disease. Different human and animal isolates exhibit differences in phenotypic traits such as antibiotics resistance and virulence. Previously, a genome sequence alignment between two local *B. pseudomallei* isolates, D286 (highly virulent strain) and H10 (low virulence), was performed and a number of genome level differences were noted. The gene D286_3096 which encodes for the FliL protein was present in the D286 strain but not in H10. Flagella are important bacterial components required for adhesion to and invasion of host cells proposing that the FliL protein could be a *B. pseudomallei* virulence factor. In this study, a *fliL* deletion mutant was constructed via homologous recombination using pEXKm5, a non-replicative plasmid in *B. pseudomallei*. Initially, the upstream fragment (US) and downstream fragment (DS) of the *fliL* gene were amplified and fused together before cloning into the pEXKm5 vector. The recombinant plasmid was then transformed into *E. coli* RHO3, a conjugative *E. coli* strain. Compliant allele replacement of the corresponding homologous chromosomal domain with the US-DS fragment was allowed to occur between *E. coli* RHO3 and *B. pseudomallei* D286. This resulted in a mixed population of either wild type *B. pseudomallei* or the *fliL* deletion mutant. Transformants were screened and a successfully constructed *B. pseudomallei fliL* deletion mutant was confirmed by sequencing.

Poster 27

Anti-malarial Effects of Insulin in a Mouse Model of Severe Malaria

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Abstract

Insulin, a key hormone responsible for the regulation of carbohydrate, lipid and protein metabolism has been reported to exhibit anti-inflammatory effects in various studies. The anti-inflammatory action of insulin is mediated by the PI3K-Akt axis which leads to the inhibition of glycogen synthase kinase-3 (GSK3), a pivotal kinase in the regulation of inflammatory response upon infection. We have previously shown that LiCl, a GSK3 inhibitor suppressed plasmodial parasite development in a murine model of malarial infection. Here we investigated the anti-malarial effects of insulin using ICR mice infected with *Plasmodium berghei* NK65. Intraperitoneal administrations of 0.5 and 1.0 U insulin for four consecutive days each into *P. berghei*-infected mice resulted in 41.3 and 46.4% suppression of parasitaemia in erythrocytes respectively. The median survival time of the insulin-treated infected mice (15-17.5 days) were not significantly different from that in non-treated control animals (16.5 days). Findings from the present study indicate moderate anti-malarial activity of insulin. Further evaluations are required to determine the potential use of insulin for adjunctive therapeutics against malaria.

Poster 28

Elucidation of the effect of Methanol on NAD^+-Glutamate Dehydrogenase from *Halobacterium salinarum* Strain NRC-1 at Different Temperatures

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Abstract

Halobacterium salinarum strain NRC-1 is an extremophile that grows optimally in high saline environments and is known as extreme halophile. The low water activity in hypersaline solutions are similar to those in organic solvents, proposing the fact that halophilic protein are able to maintain its stability and activity in organic solvents. The purpose of this study is to determine the effect of methanol as an organic solvent on the activity of the enzyme NAD^+-glutamate dehydrogenase (GDH) from *H. salinarum* strain NRC-1 at different temperatures. *H. salinarum* strain NRC-1 was cultured in a halophile growth medium at 37 °C for 144 hours. The culture was harvested and the cell pellet was sonicated. The crude extract underwent heat treatment at 40 °C for 30 minutes to partially purify NAD^+-GDH. Enzyme activities were assayed at 340 nm in different concentrations of methanol (5% - 25% (w/v)) for 1 minute at 50 °C, 60 °C and 70 °C. Enzyme assays were also done in the absence of salt to observe whether methanol is able to substitute the function of salts. Results indicated that the higher the temperature assayed and the concentration of methanol applied, the lower the enzyme activities, both in the presence and absence of salts. In the absence of salts, the enzyme activities are relatively low throughout the methanol concentration tested. In conclusion, methanol is not an ideal organic solvent to replace the function of salt in maintaining activity of NAD^+-GDH from *H. salinarum* strain NRC-1.

Poster 29

Expression and Characterization of Alpha-Terpineol Synthase Recombinant Protein From *Aquilaria malaccensis*

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Abstract

Aquilaria malaccensis is one of the most expensive woods in the world. It is economically important for its ability to produce resinous agarwood or gaharu as a result of pathological and secondary defense system. Due to the fragrance and pharmacological properties, it is widely used as medicine, perfumes and incense-making. The monoterpene, alpha-terpineol, was found as one of the metabolites produced from the resin. Formation of alpha-terpineol is catalysed by alpha-terpineol synthase (ATS) which gene has been isolated and inserted into the expression vector, pET-28 in *E. coli* Rosetta-gami previously. Therefore, the aim of this study was to express, purify and characterise the recombinant ATS protein. Two ATS gene constructs with (ATS-sp) and without chloroplastid transit peptide (ATS-m) have been cloned into pET-28 expression vector. The recombinant protein was expressed at 30 ^{o}C by induction with 0.3 mM IPTG and purified using HisTrap column connected to AKTA-Purifier System. The results showed that the optimum temperature for recombinant protein expression was 20 ^{o}C for better solubilisation because the protein tends to aggregate at higher temperature and lower temperature enables proper folding of protein. In addition, the addition of 10% glycerol had also reduced protein aggregation markedly and purification of homologous recombinant protein. Both recombinant ATS proteins, ATS-m and ATS-sp, were successfully purified with the size of 64 and 69 kDa, respectively. This study will be continued with enzyme assay using Malachite Green Phosphate Assay Kit. Information on the enzyme activities will provide better understanding on how this enzyme participate in formation of the agarwood resin.

Poster 30

The Use of Performance Enhancing Drugs Among Gym-goers Throughout Klang Valley

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Abstract

The consumption of performance-enhancing drugs such as anabolic steroids, clenbuterol and growth hormones among gym-goers in Malaysia is rising, even though the use is illegal. More significantly, the non-medical uses of performance-enhancing drugs are associated with significant health risks such as cardiovascular, hepatic, endocrine, psychosocial and psychiatric disorders as well as death. This study aims to examine the use of performance-enhancing drugs among gym-goers in Klang-valley area and explore the psychological, social and cultural factors contributing to the use of these drugs. Self-administered questionnaire were distributed at fitness centres throughout the Klang-Valley area. We recruited a total of 200 gym goers and approximately 30% of the gym goers admitted to using performance enhancing drugs. The most common type of performance enhancing drugs used among the gym goers were anabolic steroids, and main motives for using the agents is to promote endurance and enhance physical appearance. Most respondents are aware of the adverse effects, but despite acknowledging the adverse effect, most respondents are still willing to abuse them for the desired outcome.

Keyword: Performance enhancing drugs, Drug abuse, Gym-goers

Poster 31

Prevalence of Obesity and Diabetes among Women with Endometrial Cancer in University Malaya Medical Centre (UMMC)

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Abstract

Several factors influence the risk of developing endometrial cancer, including hormone replacement therapy, birth control pills, pregnancy. A body mass index of >30kg/m^2 and poor blood glucose control are recently associated with increased risk and lower age of diagnosis for endometrial cancer. Malaysia is particularly vulnerable to this emerging health threat, given the newly recognized obesity and type II diabetes epidemic in the population. This retrospective study thus aims to determine the prevalence of obesity and diabetes among women with endometrial cancer in University Malaya Medical Centre (UMMC). A total of 106 patients with endometrial cancer were reviewed in this study. Out of these, 57% of these patients were diabetic, while 37% of them were obese, with the Indians patients with endometrial cancer has the highest proportion of being diabetic.

Keyword: Endometrial cancer, Obesity, Diabetes

Poster 32

Euphoria Over Life: Psychedelic Terphenyl Derivatives Inducing Hallucination Directing Cyclin-Dependent Kinases Toward Cell Death

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Abstract

For ages, natural psychedelic resources have been used by shamans of ancient tribes during religious ceremony. In modern medicine, these compounds were prescribed to relieve severe distress and depression on cancer patients. Despite medical benefit abuse of these compounds have become prevalent in our society. These compound usually interacted with cannabinoid receptor 1 (CNR1) on neuron cell causing hallucination, and on other cell-types. In this study, chemically synthesized terphenyl derivatives; 1,3-di(phenyl)benzene (13P) and 1,4-di(phenyl)benzene (13-BPB) interaction with human and its animal model were assessed. These two derivatives are analogues found in fungi although their functional molecular mechanism is unknown. Besides, terphenyl derivatives known to have pharmacological activities - antifungal, anti cancer, anticoagulant. Our study designed include in-vitro assessment and in-silico model of 13P and 13-BPB interaction to the molecular mechanism in human and its animal model, mice. Cytotoxicity assessment using MTT shown that treatment of 13P on NIH-3T3 and RAW 264.7 have significant reduction in cell viability at 0.4 mM while for 13-BPB was at 0.016 mM and 0.08 mM, respectively. Virtual database screening based on homologous compounds identified possible interaction with 15 different proteins from receptors, enzymes and transcription factors, in human and mice. Further docking analysis shows both terphenyl derivatives binding affinities (pKd/pKi) are the highest with CNR1 and estrogen receptors (ESRs). Pathway analysis shows, CNR1 activate neuronal signalling and together with ESRs activate of MAPK and RAP1 signalling pathways that activate cyclin-dependent kinases dictating the cell-fate in cell cycle and proliferation.

Poster 33

Comparison of Two Housekeeping Genes (18S rRNA and GAPDH) of Microalgae *(Chlorella vulgaris)* Grown Under Nitrogen Limited Condition

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Abstract

Microalgae have received attention to become alternative fuel due to shortage of fossil fuel. The studies of lipid synthesis pathway and the gene expression analysis of microalgae is crucial to understand more about genes that play roles in lipid synthesis. The use of real-time polymerase chain reaction (PCR) in gene expression analysis is the best choice and it necessitates housekeeping genes (HKGs) as internal standard controls. It is essential to establish stable reference genes for the proper normalization. This study aimed at evaluating the stability of two HKGs of microalgae, *Chlorella vulgaris* which were 18S rRNA and GAPDH that grown under nitrogen limited condition. *C. vulgaris* were grown in complete F/2 media with $NaNO_3$ concentration of 8.82×10^{-4} M for control and 2.2×10^{-4} M of $NaNO_3$ for treatment condition which was 25% of the control concentration. The cultures were grown for 28 days and RNA extraction was done for every 7 day intervals. Cycle threshold (Ct) values of control and treatment were generated from real-time PCR to evaluate the stability of HKGs. Results showed a significant stable expression of GAPDH in control and treatment conditions which were 37.23 ± 0.30 and 36.44 ± 0.53, respectively. Meanwhile, Ct value for 18S rRNA showed significant unstable gene expression which was 11.99 ± 0.73 in control and 13.75 ± 0.96 in treatment condition. Thus, GAPDH can be used in the future as a reference gene in the study of gene expression of *C. vulgaris* for lipid production.

Keywords: Chlorella vulgaris, Housekeeping gene, Nitrogen limitation, Real-time PCR

Poster 34

New Brain Study Model from Marine Polychaete, *Diopatra claparedii*

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Abstract

Neurodegenerative diseases (ND) are emerging threats to population worldwide. Marine worms or polychaetes have the potential to serve as a new animal model for ND due to their ability to regenerate. *Diopatra claparedii* Grube, 1878 is a tropical polychaete species found along the west coast of Malay Peninsula is capable to regenerate both anterior and posterior ends prior to injury or self-amputation. The nervous systems of intact and regenerating *D. claparedii* was observed histologically using haematoxylin and eosin (H&E) stain and microscopes. The complete nervous system of *D. claparedii* from the brain (anterior) towards the tail (posterior) displayed the presence of ventral nerve cord, lateral nerves and ganglia. Intriguingly, the nervous system found in the polychaete is similar to the basic nervous system in human. Results from this study can be used as a primary reference for suitability of *D. claparedii* as an animal model to study ND occurred in human. The model is better than other established animal models including mice, rats, *Danio rerio* (zebrafish), *Drosophila melanogaster* (fruit fly) and *Caenorhabditis elegan* (nematode) because of rapid brain cell regeneration, simple and represents to the basic human nervous system.

Poster 35

MyWonderCream: Malaysian Marine Based Wound Cream

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Abstract

Acute wound cases are increasing every year. It is important to treat the wound at its early stage before it turns into a chronic wound and difficult to heal. Current treatment in wound healing has many adverse impacts and looking for alternative. MyWonderCream is formulated using a local marine polychaete, *Marphysa moribidii*. *M. moribidii*; a local polychaete has a promising potential as a new and cheaper option with minimal side effects in wound healing because of its regenerative ability. However, to best of our knowledge no study has been conducted to prove this notion. Hence, this study aimed to determine the effectiveness of aqueous polychaete extract, *M. moribidii* in wound healing treatment. Samples were collected from the upper tidal flat region of Pantai Kelanang, Morib mangrove, Selangor. The samples were finely pulverised and lyophilized by freeze dryer to form a powdery-form extract. To study the wound healing properties, three different concentrations 0.3% (w/w), 1.0% (w/w), and 2.0% (w/w), of aqueous extract emulsifying ointment of *M. moribidii* was applied on full thickness wound in Sprague Dawley rat model. Wound contraction and histopathological analysis were taken to determine its effectiveness in wound healing. Results demonstrated that aqueous *M. moribidii* extracts showed rapid significant different in wound healing treatment after applied on rats even at lower concentration, 0.3% w/w compared to controls at 0.4% (w/w) concentration i.e., commercial antiseptics; acriflavin and gamat ointment (sea cucumber extract). The wounded tissue stained with Masson's trichrome stain provides an understanding of wound healing process. The results validated the collagen deposition and re-organisation of collagen fibres for tissues treated with 0.3% (w/w) *M. moribidii* extract can be comparable to tissues treated concentration of commercial antiseptics.

Poster 36

Effect of Carbon Sources in the Biosynthesis of Poly(3-Hydroxybutyrate) Using *Novosphingobium panipatense* UMTKB-4

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Abstract

Petroleum-based plastics are a threat to the ecosystem due to its non-biodegradable properties. In such situation, poly(3-hydroxybutyrate) [P3HB] a biodegradable microbial biopolymer has proven as a promising candidate to combat this environmental damage. In this study, biosynthesis of P3HB batch fermentation is conducted using inexpensive carbon substrates such as glucose, fructose, sucrose and glycerol using locally isolate bacterium known as the *Novosphingobium panipatense* under nitrogen limiting condition. The P3HB monomers are generated through various PHA metabolic pathways depending on the stress growth condition. The ability of *N. panipatense* in utilizing a range of carbon substrates was explored throughout this study by regulating the concentration of various carbon sources to enhance the P3HB yield. The growth of *N. panipatense* revived in nutrient rich (NR) broth ranging from 0.20 O.D. to 0.22 O.D. was further transferred into mineral salt medium (MSM) with fixed ammonium chloride (0.5g/L) to promote P3HB accumulation. The C/N ratio at 20 and 30 were tested. Methanolysis process was conducted using methanol and sulphuric acid [85%:15% (v/v)] and refluxed at 100^0C. Subsequently, gas chromatography (GC) was conducted to analyse the P3HB content. The highest P3HB yield (13.54 ± 1.18 wt%) was obtained at the C/N ratio at 30 with glycerol as the sole carbon source. Based on this study, it is proven that *N. panipatense* UMTKB-4 is capable of producing P3HB with component of by-product as the sole carbon source. Thus, more value-added green material can be produced from the conversion of agro-industrial by-products which are abundant in Malaysia.

Keywords: Polyhydroxyalkanoates, Poly(3-hydroxybutyrate), Novosphingobium panipatense, methanolysis, Gas chromatography.

Poster 37

Evaluation and characterisation of biosurfactant produced by Antarctic hydrocarbon-degrading *Pseudomonas* sp. ADL15 and *Rhodococcus* sp. ADL36

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Abstract

Bioremediation on hydrocarbon contaminants using microbial species is an attractive approach due to the production of surface active agents. The biological surfactants lower the surface tension of hydrophobic substrate thus enhancing hydrocarbon degradation. The aim of this study is to analyse the production of biosurfactant from two different Antarctic strains, *Pseudomonas* sp. ADL15 and *Rhodococcus* sp. ADL36. Bushnell- Haas broth was used as a culture medium with diesel as a sole carbon source. The presence of biosurfactant was qualitatively evaluated using drop collapse and oil spread test. Emulsification index test (EI%) was carried out for quantitative method to detect the presence of biosurfactant. Different quantitative analyses were carried out to determine the biomolecule content of biosurfactants such as phenol-sulphuric assay (carbohydrate), Lowry assay (protein) and Soxhlet extraction (lipid). Functional characterisation to confirm its chemical nature was done using Fourier transform infrared spectroscopy (FTIR). Qualitative assessment of both Antarctic strains showed a positive production of biosurfactants. The emulsification index of biosurfactant from strain ADL15 was 48.6% and 55.5% for strain ADL36. Biosurfactant from strain ADL36 showed higher carbohydrate and protein content (0.08 mg/mL, 0.54 mg/mL) compared to biosurfactant from strain ADL15 (0.04 mg/mL, 0.33 mg/mL). However, the lipid content was higher in strain ADL15 (80%) than strain ADL36 (62%). This might due to the different optimum growth for each strain. FTIR spectra for both strains were seen similar with the presence of hydroxyl, carbonyl, and amide group. The result throughout the study might prove that the biosurfactant produced by both strains could be classified as a lipoprotein.

Poster 38

Enhancing Recombinant Thermostable Bacterial Lipase Expression in *Pichia guilliermondii* Strain SO using Different Media

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Abstract

Pichia guilliermondii strain SO which was isolated from spoiled orange has been used as a host to express recombinant bacterial thermostable lipase under the regulation of an alcohol oxidase promoter (AOXp). The lipase originating from *Geobacillus zalihae* strain T1 has a huge potential in industrial application due to its thermostability. However, the existing production medium used for lipase expression by this yeast was expensive and the yield was low. In addition, the use of methanol to induce AOXp for lipase expression has created a safety issue in food and pharmaceutical industries. Therefore, this study aims to investigate the lipase expression in the complex media with and without methanol induction. In order to reduce the production cost, the recombinant strain was cultivated in a minimal medium using different concentrations of sorbitol. The result showed that methanol supplemented medium (YPM), gave the highest lipase activity with 17.80 U/ml which was 1.41-fold higher than the control YPTM medium. While a similar medium without methanol induction (YP) produced the highest lipase activity of 2.92 U/ml which was 1.72-fold higher than the control (BMY pH 10). On the other hand, 2% (w/v) sorbitol gave the highest lipase activity with 0.89 U/ml in minimal medium which was 1.12-fold higher than reported in previous study (0.79 U/ml). Strain SO has produced the lipase optimally after 24 hours cultivation in all media. Using YPM and YP medium, the cost of production was reduced to 18% and 52%, respectively compared to previous study. The methanol contamination was overcome using YP medium. In conclusion, the newly optimized medium could be used to improve the production of thermostable T1 lipase in strain SO with high yield, minimal cost and without methanol contamination.

Keywords: yeast, alcohol oxidase promoter, Pichia guilliermondii, lipase, protein expression

Poster 39

Effect of Fructooligosaccharide (FOS) on Nitric Oxide Production in *Salmonella enteritidis* Lipopolysaccharide Induced Zebrafish (*Danio rerio*) Larvae

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Abstract

Salmonella enteritidis infection (salmonellosis) is a common bacterial disease that affects the intestinal tract due to contaminated water or food. During infection, inducible nitric oxide synthase (iNOS) in macrophage cells activated and secrete more nitric oxide (NO), as a host defence to kill the pathogen. But, continuous secretion of NO into highest amount can cause inflammation due to production of reactive nitrogen oxide species (RNS) which is harmful to cells. Currently, probiotic has been used as a dietary supplement to increase good bacteria but it cannot be used to reduce inflammation in the gut. Due to its limitation, prebiotic become an alternative to replace the probiotic. Fructooligosaccharide (FOS) is one example of commercial prebiotic. Thus, this study aimed to evaluate the effect of fructooligosaccharide (FOS) on NO production in *Salmonella enteritidis* lipopolysaccharides (LPS) induced zebrafish (*Danio rerio*) larvae. First, *Salmonella enteritidis* lipopolysaccharide (LPS) concentration was optimized by measuring the relative fluorescence unit (RFU) of NO secretion in zebrafish larvae at 5 day of postfertilization (dpf). Then, the acute toxicity and NO inhibitory effect by FOS were measured on salmonella LPS induced zebrafish larvae (5 dpf). Results showed that 30 µg/mL of salmonella LPS demonstrated the highest concentration of NO secretion with 13,000 RFU. Interestingly, FOS did not show any toxicity effects towards zebrafish larvae (2-8 dpf) at highest concentration of 1000 µg/mL. In addition, FOS at lower concentration of 250 µg/mL showed significant inhibitory effect towards NO secretion in salmonella LPS induced zebrafish larvae (5 dpf) with 28% ($P<0.05$) of NO reduction. Thus, our preliminary findings showed that FOS has the potential to reduce NO secretion in gastrointestinal tract in zebrafish larvae.

Keywords: Nitric oxide, Fructooligosaccharide, Lipopolysaccharide, Prebiotic, Zebrafish

Poster 40

Amplification of Carotenoid Biosynthesis Gene and Total Carotenoid Content Analysis Upon Stress Treatment in *Chlorella sp.*

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Abstract

Humans have exploited various carotenoids producers such as microalgae to synthesize carotenoids which are mainly utilized for their antioxidant properties and a source of organic food colourant. The current global trade in microalgal carotenoids is estimated to reach $1,428.12 million by 2019. A green alga, *Chlorella* sp. is vastly found throughout the environment and widely studied due to its high productivity of secondary metabolites and oil content but somehow local species are currently underexplored. This work aims to explore the gene responsible for production of high value carotenoid astaxanthin, beta-carotene oxygenase (*CrTO*) and the effect of stress towards total carotenoid production in *Chlorella sp*. Verification of the alga species was carried out via 18S rRNA amplification. RNA extraction was carried out and amplification of *CrTO* gene fragment using specifically designed primers were successful. Besides that, the total carotenoids content were quantified via spectrophotometric assay after the cells were treated with NaCl, NaOCl and Cu^{2+} to induce both salinity and oxidative stress. Total carotenoids content were increased to up to 4-fold compared to control post-treatment application. Results from this study gave insights which are beneficial in understanding microalgae's responses towards abiotic stress via the synthesis of carotenoids.

Keywords: Chlorella sp., carotenoids, carotenogenesis, salinity stress, oxidative stress

Poster 41

Nutritional Value and Antioxidant Potential of Bidar (*Zizyphus mauritiana)* Fruits and Leaves

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Abstract

Zizyphus mauritiana (Bidara) is among underutilized fruit-bearing plants that can grow well in warm climate especially in Peninsular Malaysia. Pronunciation with respect to Bidara recorded in al-Qur'an and al-Hadith has accentuated its special side. Bidara plants are well known for their use in traditional medicine due to high nutritive values, however their medicinal properties remain unknown. Recently, they are receiving interest in their nutraceutical value and pharmacological properties. Thus, this study was aimed to analyse nutritional and phytochemicals content, caloric value, as well as antioxidative potential of Bidara fruits and leaves using water and methanol extract. Bidara fruits and leaves were found to contain 82.67, 0.40, 0.67, 6.02, 0.34, 9.84 g/100g and 49.00, 4.52, 2.20, 35.13, 0.36, 8.79 g/100 g of moisture, ash, fat, fibre, protein and carbohydrate content, respectively. The caloric value of fruits and leaves were 47.29 kcal/100 g and 56.40 kcal/100 g, respectively. Total phenolics (TPC) and flavonoids (TFC) content in methanol extract for both fruits and leaves were higher, accounted 68.3 µg/ml, 193.2 µg/ml, 13.14 µg/ml and 203.71 µg/ml, respectively as compared to water extract. It has been found that the methanol extract of leaves has shown an excellent free radical scavenging activity based on IC_{50} value in DPPH assay with 49.83 µg/ml comparable to standard Trolox, 28.2 µg/ml, meanwhile fruits extract showed IC_{50} value of >200 µg/ml. In addition, GCMS analysis of both fruits and leaves extracts has identified the major compounds of phenol, methyl palmitate, methyl linoleate and squalene were present. Furthermore, there were also phytol, methyl stearate, vitamin E and stigmasterol present in the leaves extract. These findings demonstrated strong positive correlation between TPC and TFC content with antioxidant activity of the methanol extracts of Bidara fruits and leaves. Thus, these properties make the Bidara fruits and leaves as promising candidates for nutraceutical.

Keywords: Zizyphus mauritiana; Nutritional composition; Phenolic content; Antioxidant, Nutraceutical.

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