5th International Conference on Biosciences and Medical Engineering (ICBME 2023)

in parallel with

4th Bionanotechnology Research Seminar and Conference (BIONANOSEM 2023)

"Advances in Nanotechnology for Biosciences and Medical Engineering"

PROGRAMME & ABSTRACT BOOK

30th - 31st August 2023
Bali, Indonesia

EDITED BY

Nik Ahmad Nizam Nik Malek
Siti Nur Sakinah Ahmad
Sabariah Ajis
Nor Suriani Sani

Fourth Edition 2023

Programme and Abstract Book
5th International Conference on Biosciences and Medical Engineering (ICBME 2023)
in parallel with
4th Bionanotechnology Research Seminar and Conference (BIONANOSEM 2023)

Editor:
NIK AHMAD NIZAM NIK MALEK
SITI NUR SAKINAH AHMAD
SABARIAH AJIS
NOR SURIANI SANI

https://research.utm.my/csnano/icbme-iciat-2023/
https://research.utm.my/csnano/icbme-2023/

5th International Conference on Biosciences and Medical Engineering (ICBME 2023)

in parallel with

4th Bionanotechnology Research Seminar and Conference (BIONANOSEM 2023)

"Advances in Nanotechnology for Biosciences and Medical Engineering"

30th - 31st August 2023

Four Points by Sheraton, Ungasan – Bali

Indonesia


GREEN HONEY
GREEN HONEY
Award - Winning
Green Honey from Borneo
"Green Honey" is produced by bees that prey on chlorophyll in the tropical rainforest of Borneo. As a result, the honey is green in color and has a sweet and strong flavor that is different from other honey.
100% Natural Green Honey:
• Chlorophyll
• Amoni Acids
• Vitamins
• Antioxidants
• Various Minerals
• Long-lasting
• No Additives and Artificial Colors.
Green Honey Benefit :
√ Nour. & moist. skin & lungs
√ Detox. & relieve coughing
√ Antibact. & anti-inflam. properties
√ Enhance immune sys.
√ Prevent aging & anti-aging
√ Promote cell regen
Wholly Owned by:
NS FIELD

youbaby™
www.youbaby.my

Enjoy Daily's Care
Care For Your Baby

5th International Conference on Biosciences and Medical Engineering (ICBME 2023)

in parallel with

4th Bionanotechnology Research Seminar and Conference (BIONANOSEM 2023)

"Advances in Nanotechnology for Biosciences and Medical Engineering"

30th - 31st August 2023

Four Points by Sheraton, Ungasan – Bali

Indonesia

Organized by

Udayana University, INDONESIA
Universiti Teknologi Malaysia, MALAYSIA

In collaboration with

Centre for Sustainable Nanomaterials (CSNano) UTM
International Islamic University Malaysia, MALAYSIA
Ondokuz Mayis University, TURKEY

TABLE OF CONTENT

Foreword by Chairman Udayana University	iii
Foreword by Co-Chairman I Universiti Teknologi Malaysia	iii
Foreword by Co-Chairman II Udayana University	iii
Foreword by Co-Chairman III Ondokuz Mayis University	iii
Organizing Committee	iii
Program Schedule	iii
List of Abstracts	xx
Collection of Abstracts	1 - 88
Acknowledgement	89

FOREWORD BY CHAIRMAN

We are very grateful for successfully organizing the joint conference of the 5th International Conference on Biosciences and Medical Engineering 2023 (ICBME 2023) and the 2nd International Conference on Innovative Agricultural Technology 2023 (ICIAT 2023). This joint conference aims to showcase significant research advancements in Nanotechnology research in Biosciences & Medical engineering, as well as sustainable agri-food systems in agricultural technology. Specifically for ICBME 2023, it is aligned with the 4th Bionanotechnology Research Seminar (BIONANOSEM 2023) and the theme is "Advances in Nanotechnology for Biosciences and Medical Engineering".

This joint conference was held in collaboration between the Faculty of Agricultural Technology, Udayana University and Department of Biosciences, Universiti Teknologi Malaysia; Department of Biotechnology, International Islamic University Malaysia; and Ondokuz Mayıs University. We are pleased to welcome you all to this conference, where the best researchers from around the world gather to discuss the results of bio-based research.

This joint conference covers a broad field with various disciplines such as biosciences, biomedicine, biology, agricultural technology, and nanotechnology. Therefore, this joint conference can be a forum for researchers, academics, professionals and students to exchange ideas, knowledge and experiences in related fields. The main aim of this conference is to share the latest scientific findings from researchers around the world and to learn from each other's research and to improve the welfare of humanity.

We would like to express our sincere thanks to the keynote speakers, plenary speakers, invited speakers, oral and poster presenters, and all participants who have contributed to this conference. Many thanks to NS Field Sdn Bhd, YouBaby Million Sdn Bhd, Spa Factory Bali, Kaori, Made Tea, Bali Alus Botanical, BUCHI Switzerland, Wiralab, Mandiri Taspen, and Thermo Fisher Scientific for supporting us. We would also like to express our sincere appreciation to all the contributing organizations: Warmadewa University, Undhira University, Mataram University, Brawijaya

University and the conference organizing committee who have worked hard and wholeheartedly to make this conference a success. We couldn't have done it without all of you.

We hope that this conference will benefit all of us. On behalf of the organizing committee, we are pleased to welcome all participants to the 5th International Conference on Biosciences and Medical Engineering 2023, 2nd International Conference on Innovative Agricultural Technology 2023.

Finally, we wish you to enjoy the conference and have a fruitful experience and networking.

Thank you,

Chairman

Dr. Ida Bagus Wayan Gunam
Department of Agroindustrial Technology
Faculty of Agricultural Technology
Universitas Udayana (UNUD), Bali Indonesia

FOREWORD BY CO-CHAIRMAN I

Bismillahirahmanirrahim,

Assalamualaikum and Salam Sejahtera,

It is very grateful that we are successfully organizing the joint conference of the 5th International Conference on Biosciences and Medical Engineering 2023 (ICBME 2023) and the 2nd International Conference on Innovative Agricultural Technology 2023 (ICIAT 2023). For the ICBME 2023, it is parallel with 4th Bionanotechnology Research Seminar (BIONANOSEM 2023) and the theme for ICBME-BIONANOSEM 2023 is “Advances in Nanotechnology for Biosciences and Medical Engineering”. This joint conference is a collaboration between Department of Biosciences and Centre of Sustainable Nanomaterials (CSNano) from Universiti Teknologi Malaysia, Faculty of Agricultural Technology from Udayana University Indonesia, Department of Biotechnology from International Islamic University Malaysia and Ondokuz Mayıs University. We are delighted to welcome you all to this exciting conference, where top minds from around the globe have gathered to influence the future of biosciences, medical engineering, agriculture, and nanotechnology.

Transdisciplinary research is essential in this new era to keep up with the rapid rate of technological development. The term "bio" or "living things" refers to a broad field that includes many disciplines such as biomedicine, biology, agriculture, and nanotechnology. Therefore, this joint conference could serve as a venue for professionals, researchers, academicians, and students to exchange ideas, knowledge, and experiences in these fields. The primary goals of this conference are to share our findings with researchers worldwide and to learn from one another's research. Our shared objective is to advance sustainability and human well-being.

In conjunction with ICBME 2023, this conference will also feature BIONANOSEM 2023. The main goal of this BIONANOSEM 2023, which was started by CSNano UTM, is to advance knowledge, research, and development in the field of nanotechnology, particularly in the field of bioscience (bionanotechnology). The market for bionanotechnology is expanding daily and the industry is

expanding quickly. According to a report on global bionanotechnology published by www.prnewswire.com, the market for bionanotechnology, which was estimated to be worth US$104.8 billion in 2022, is expected to grow to US$160.3 billion by 2030, expanding at a CAGR of 5.5% from 2022 to 2030. This is consistent with the adjustments made following the COVID-19 pandemic. One of the report's segments, the pharmaceuticals and biotechnology industry, is anticipated to grow at a 6.3% CAGR and reach US$110.3 billion by the end of the analysis period. As a result, it is anticipated that the field of bionanotechnology will see a lot of research, products, and services in the near future.

We see these conferences as strong forces for important change as we share insights, trade ideas, and present breakthroughs during these gatherings. Collaboration between various fields has a great potential to generate original solutions. The concepts cultivated in these discussions have the potential to develop into ground-breaking studies, ground-breaking innovations, and paradigm-shifting methods that will influence the future of our planet.

We sincerely thank all attendees, speakers, sponsors, and organisers for their tireless efforts to advance sustainable development, technology, and science. We appreciate the efforts of the entire organising committee in making this event a success. Many thanks to NS Field Sdn Bhd and YouBaby Million Sdn Bhd for supporting us. Take advantage of this chance to push boundaries, question accepted wisdom, and spark creative ideas that will pave the way for a more promising and peaceful future. Welcome to the 5th International Conference on Biosciences and Medical Engineering 2023, the 2nd International Conference on Innovative Agricultural Technology 2023, and the 4th Bionanotechnology Research Seminar (BIONANOSEM 2023). Together, let us explore, collaborate, and forge ahead on this remarkable journey of discovery and transformation.

Thank You

Co-Chairman I

Assoc. Prof. Ts. ChM. Dr. Nik Ahmad Nizam Nik Malek
Acting Director, Institute Ibnu Sina for Scientific and Industrial Research, Universiti Teknologi Malaysia
Director, Centre for Sustainable Nanomaterials, Universiti Teknologi Malaysia
Universiti Teknologi Malaysia

FOREWORD BY CO-CHAIRMAN II

Dear Researchers, Authors, and Esteem Readers,

It is a great satisfaction that I write this Foreword to the Book of Abstract for the Joint Conference of the 5th International Conference on Biosciences and Medical Engineering 2023 (ICBME 2023) and the 2nd International Conference on Innovative Agricultural Technology 2023 (ICIAT 2023).

Welcome to Bali Island, Indonesia where the Conference is held. We are honored to be a host of the conference that intended to provide a discussion forum, establish a research network and find global partners for future collaboration. The parallel sessions of the conference are the place for scientists, engineers, and the stakes holders to share their research results, and exchange new ideas, information, and application related to the theory, design, development, testing, or evaluation in the scope area of the conference.

The conference includes more than 10 concurrent sessions in which there are invaluable presentations by both national and international presenters. The conference is expected to bridge the gap between academics, researchers, and policymakers.

Appreciation goes to presenters, participants, sponsors, student volunteers and well-wishers, and all other people who have directly or indirectly and magnificently contributed to making this joint conference a success. I extend my very best wishes to you wherever you may be around the world.

Co-Chairman II
Dr. Ni Nyoman Sulastri
Faculty of Agricultural Technology, Udayana University, Indonesia

FOREWORD BY CO-CHAIRMAN III

Ladies and Gentlemen,

I extend a warm and hearty welcome to all participants of the 5th INTERNATIONAL CONFERENCE ON BIOSCIENCES AND MEDICAL ENGINEERING (ICBME) 2023 from across the European continent.

Esteemed Dignitaries, Respected Researchers, and Valued Attendees,

Welcome to the 5th International Conference on Biosciences and Medical Engineering (ICBME) 2023! As we gather here from diverse corners of the world, we not only come together as professionals but also as global citizens, united by a common goal of advancing science and enhancing lives.

I am delighted to offer a special greeting to our colleagues from the captivating continent of Asia. Your presence not only enriches the cultural tapestry of our conference but also symbolizes the wide-reaching influence of our collective endeavors. Hailing from Europe, I appreciate the immense potential of intercontinental collaboration. The exchange of ideas, methodologies, and perspectives across regions fuels innovation that knows no geographical bounds.

While our origins may differ, our aspirations are harmoniously aligned: to push the boundaries of knowledge in biosciences and medical engineering. Our challenges are intricate and often necessitate interdisciplinary solutions that bridge geographical gaps. This conference serves as a precious opportunity for us to initiate meaningful collaborations spanning continents. Envision the possibilities that arise when Asian ingenuity meets European creativity or the fervor of the East merges with the vision of the West.

In the spirit of global camaraderie, I encourage all of you to actively connect with your counterparts from various corners of the world. Engage in discussions that extend beyond lecture halls and conference rooms. Discover shared interests and complementary expertise that could lay the foundation for collaborative research ventures, knowledge exchange initiatives, and partnerships that transcend borders. The connections we establish here possess the potential to accelerate scientific advancement in ways we are yet to fully comprehend.

Once again, I express my gratitude to each one of you for gracing this event with your presence. May you relish your time in Bali during these two days of the conference.

Thank you.

Co-Chairman III
Dr. Yilmaz Kaya
Ondokuz Mayis University, Samsun, Türkiye

ORGANIZING COMMITTEE

Patron
Prof. Dr. Ir. I Nyoman Gde Antara
Rector Udayana University

Prof. Ir. I Made Anom Sutrisna Wijaya
Dean Faculty of Agricultural Technology, Udayana University

Chairman
Dr. I.B.W. Gunam
Udayana University, Indonesia

Co-Chairman I
Assoc. Prof. Ts. ChM. Dr. Nik Ahmad Nizam Nik Malek
Universiti Teknologi Malaysia

Co-Chairman II
Dr. Ni Nyoman Sulastri
Udayana University, Indonesia

Co-Chairman III
Dr. Yilmaz Kaya
Ondokuz Mayis University, Turkey

General Secretary & Advisor
Prof. Dr. Fahrul Huyop
Universiti Teknologi Malaysia

General Secretary Promotion
Assoc. Prof. Dr. Azzmer Azzar Abdul Hamid
International Islamic University Malaysia

General Secretary Planning
Dr. Ts. Hamzah Nasir
International Islamic University Malaysia

Treasurer
Dr. Eng. I Made Mahaputra Wijaya (Coordinator)
Udayana University, Indonesia

Assoc. Prof. Dr. ChM. Roswanira Ab. Wahab
Universiti Teknologi Malaysia

I Nyoman Adnyana
Dr. I. A Bintang Madrini
Udayana University, Indonesia

Secretariat
Dr. IGA Lani Triani
Juliantika Dewi
Ni Made Dwi Susantini
Luh Putu Trisna Darmayanti
Mentari Kinasih
I Gede Arya Sujana
I. A. Pridari Tantri
Ni Made Indri Hapsari Arihantana
Sayi Hatiningsih
Ir. I G. N. Apriadi Aviantara
I G.K. Arya Arthawan
Udayana University, Indonesia

Siti Nur Sakinah Ahmad
Sabariah Ajis
Nurul Adhah Saini
Nurshamimi Atikah Zareman
Nani Sazana Hamdan
Shahrul Nizam Mahmod
Universiti Teknologi Malaysia, Malaysia

Programme/Public Relation/Souvenirs
Venue/Accommodation

Dr. I Dewa Ayu Anom Yuarini
Cokorda Anom Bayu Sadyasmara
Desak Kartika
I Gede Mahendra Putra
Made Surya Pramana Mahardika
Ni Kadek Pramana Putri
Ni Kadek Ratningsih Dewi Parwati
Udayana University, Indonesia

Field Trip
Dr. Made Mahaputra Wijaya
Udayana University, Indonesia

Promotion/Programme Sponsorship & Exhibition
Dr. Luh Putu Wrasiati
Dr. Desak Made Wihandani
Dr. Ni Nengah Dwi Fatmawati
Dr. Luh Suriati
Pande Suparyana
Dr. A.A.P. Agung Suryawan Wiranatha
Dr Dewi Indira Laksmi
A.A. Sri Wiadnyani
Ida Ayu Rina Pratiwipuja
Udayana University, Indonesia

PROGRAM SCHEDULE

WEDNESDAY, AUGUST 30th

Time (GMT + 8)	Duration	Program	Venue
8:00 - 9:00	1:00	Registration	Pandawa Ballroom
9:00 - 9:05	0:05	Welcome Adress by MC	
9:05 - 9:10	0:05	Opening Dance - Janger Kontemporer Dance	
9:10 - 9:13	0:03	Singing Indonesia Raya	
9:13 - 9:15	0:02	Praying	
9:15 - 9:25	0:10	Welcoming Speech by Chairman of 5th ICBME2023 & 2nd ICIAT 2023 - Dr. Gunam	
9:25 - 9:35	0:10	Welcoming Specch by Dean of Faculty of Agricultural Technology (FTP) UNUD	
9:35 - 9:45	0:10	Welcoming Speech by UTM - Prof. Dr fahrul Huyop	
9:45 - 10:00	0:15	Opening by Rector of UNUD	
10:00 - 10:10	0:10	Photo Session	
10:10 - 10:40	0:30	**Coffee Break**	
10:40 - 12:15	1:35	**Keynote Session** Keynote Speaker 1 : (30') (Dr. Gyorgy Szekely - King Abdullah University of Science and Technology, Saudi Arabia) - ICBME Keynote Speaker 2 : (30') (Prof. Sakae Shibusawa - Professor Emeritus Tokyo University of Agriculture and Technology, Japan) - ICIAT Moderator : (QnA - 5' + 30')	
12:15 - 14:00	1:45	**Lunch - Poster Presentatition and Exhibition - Judging Session**	
14:00 - 17:00	3:00	**Parallel Session 1 & 2 - Detail schedule separately (include Coffe Break)**	ICBME - Balangan 1, 2 and 3 ICIAT - Padang-padang 1 and 2

THURSDAY, AUGUST 31st

Time (GMT + 8)	Duration	Program	Venue
8:00 - 8:30	0:30	Registration	Each room
8:30 - 12:00	3:30	**Parallel Session 3 & 4** **(Include Coffee Break)**	CBME - Balangan 1, Balangan 2 and Balangan 3 ICIAT - Padang-padang 1 and Padang-padang 2
12:00 - 13:30	1:30	**Lunch - Poster Presentatition and Exhibition - Judging Session**	Balangan Area
13:30 - 14:15	0:45	Award announcement - ICBME and ICIAT Closing Ceremony - Assoc. Prof. Ts. ChM. Dr. Nik Ahmad Nizam Nik Malek & Dr. Ni Nyoman Sulastri	Balangan Room

PARALLEL SESSION - Day 1

Time (GMT + 8)	Duration	BALANGAN 1
		Floor Manager: Dr Muhammad Hariz asraf
SLOT BALANGAN 1.1 **Chairperson: Assoc Prof Dr Azzmer Azzar Abdul Hamid (IIUM)**		
14:00 - 14:30	0:30	**Plenary I:** Prof. Fatchiyah F. (Brawijaya University, Indonesia)
14:30 - 14:45	0:15	**Invited Speaker:** Dr Nurul Hidayah Samsulrizal (International Islamic University Malaysia)
14:45 - 14:55	0:10	P-003 Hamizah Shahirah Hamezah
14:55 - 15:05	0:10	P-004 I Gede Arya Sujana
15:05 - 15:15	0:10	P-015 Nur Amanina Johari
15:15 - 15:25	0:10	P-017 Najatul Su Ad Abdullah
15:25 - 15:40	0:15	**Coffee Break**
SLOT BALANGAN 1.2 **Chairperson: Prof Dr Nugrahaningsih WH (Universitas Negeri Semarang, Indonesia)**		
15:40 - 16:10	0:30	**Plenary IV:** Prof. I Gusti Ngurah Kade Mahardika (Udayana University, Indonesia)
16:10 - 16:25	0:15	**Invited Speaker:** Assoc Prof Dr Anita Narang (Acharya Narendra Dev College, University of Delhi)
16:25 - 16:35	0:10	P-030 Nor Wajihan Muda
16:35 - 16:45	0:10	P-031 Nor Faezah Ansari
16:45 - 17:00	0:15	**Invited Speaker:** Anna Safitri (Brawijaya University, Indonesia)

PARALLEL SESSION - Day 1

Time (GMT + 8)	Duration	BALANGAN 2
		Floor Manager: Ts. Dr. Mohd. Faez bin Sharif
SLOT BALANGAN 2.1 **Chairperson: Prof. Dr. Ir. I Gede Putu Wirawan (Udayana University, Indonesia)**		
14:00 - 14:30	0:30	**Plenary II:** Prof. Dr Shahrul Hisham Zainal Ariffin (Universiti Kebangsaan Malaysia)
14:30 - 14:45	0:15	**Invited Speaker:** Dr Mohd Hamzah Mohd Nasir (International Islamic University Malaysia)
14:45 - 14:55	0:10	P-024 Thiribuvanesvari Duraivelu
14:55 - 15:05	0:10	P-025 Dewi Ratih Tirto Sari
15:05 - 15:15	0:10	P-028 Aedrianee Reeza Alwi
15:15 - 15:25	0:10	P-029 Varohthini K. Maharaja
15:25 - 15:40	0:15	**Coffe Break**
SLOT BALANGAN 2.2 **Chairperson: Prof. Dr. Fahrul Huyop (Universiti Teknologi Malaysia)**		
15:40 - 15:55	0:15	**Invited Speaker:** Ts Dr Rosnani binti Hasham (Universiti Teknologi Malaysia)
15:55 - 16:10	0:15	**Invited Speaker:** Assoc Prof Dr Noraslinda Muhamad Bunnori (International Islamic University Malaysia)
16:10 - 16:20	0:10	P-037 Nur Hidayah
16:20 - 16:30	0:10	P-038 Laili Nurzaidah
16:30 - 16:45	0:15	P-033 Nur Fatin Najihah Mat Husin

PARALLEL SESSION - Day 1

Time (GMT + 8)	Duration	BALANGAN 3 - BioNanoSem2023
		Floor Manager: Dr Siti Salwa Alias
SLOT BALANGAN 3.1 Chairperson: Assoc Prof Dr Lee Siew Ling, UTM		
14:00 - 14:30	0:30	**Plenary III:** Prof Dr Nikos Hadjichristidis (King Abdullah University of Science and Technology, Saudi Arabia)
14:30 - 14:45	0:15	**Invited Speaker:** Assoc Prof Ts ChM Dr Nik Ahmad Nizam Nik Malek (Universiti Teknologi Malaysia)
14:45 - 14:55	0:10	P-083 Husnul Khotimah
14:55 - 15:05	0:10	P-011 Sharel Raj Jonson Raju
15:05 - 15:15	0:10	P-010 Atieya Abdul Hadi
15:15 - 15:25	0:10	P-016 Muhammad Redza Mohd Radzi
15:25 - 15:40	0:15	**Coffee Break**
SLOT BALANGAN 3.2 Chairperson: Dr Juan Matmin, UTM		
15:40 - 15:55	0:15	**Invited Speaker:** Assoc Prof Dr Alyza Azzura Abd Rahman Azmi (Universiti Malaysia Terengganu)
15:55 - 16:10	0:15	**Invited Speaker:** Prof Dr Agustina Tri Endharti (Brawijaya University, Indonesia)
16:10 - 16:20	0:10	P-048 Nur Rabiatul Syuhaidah Mohamed Rusidi
16:20 - 16:30	0:10	P-051 Wan Nur Iwani Wan Rushdi
16:30 - 16:45	0:15	**Invited Speaker:** Assoc Prof Dr Shahrul Bariyah Sahul Hamid (Universiti Sains Malaysia)

PARALLEL SESSION - Day 2

Time (GMT + 8)	Duration	BALANGAN 1
SLOT BALANGAN 1.3 **Chairperson: Dr. I Made Mahaputra Wijaya (Udayana University)**		
8:30 - 8:45	0:15	**Invited Speaker:** Dr. Praseetha Prabhakaran (Universiti Teknologi Malaysia)
8:45 - 9:00	0:15	**Invited Speaker:** Prof Ts Dr Tengku Haziyamin Tengku Abdul Hamid (International Islamic University Malaysia)
9:00 - 9:10	0:10	P-043 Amir Shafiruddin Nordin
9:10 - 9:20	0:10	P-044 Nurul Fatin Syamimi Khairul Anuar
9:20 - 9:45	0:25	**Coffee Break**
SLOT BALANGAN 1.4 **Chairperson: Assoc Prof Dr Alyza Azzura Abd Rahman Azmi (UMT)**		
9:45 - 10:00	0:15	**Invited Speaker:** Assoc Prof Dr Surinder Kaur (Sri Guru Tegh Bahadur Khalsa College, University of Delhi)
10:00 - 10:15	0:15	**Invited Speaker:** Dr Widya Abd Wahab (International Islamic University Malaysia)
10:15 - 10:25	0:10	P-075 Yuslinda Annisa
10:25 - 10:35	0:10	P-080 Nuning Winaris
10:35 - 10:45	0:10	P-047 Balqis Nurul Huda Armadi
10:45 - 10:55	0:10	P-046 Evi Susanti
10:55 - 11:05	0:10	P-014 Nur Nadia Batrisyia Arman
11:05 - 11:15	0:10	
11:15 - 13:30	2:15	**Lunch**
13:30 - 14:15	0:45	**Closing Ceremony**

PARALLEL SESSION - Day 2

Time (GMT + 8)	Duration	BALANGAN 2
SLOT BALANGAN 2.3 Chairperson: Dr Mohd Hamzah Mohd Nasir (IIUM)		
8:30 - 8:45	0:15	**Invited Speaker:** Assoc Prof Dr Dayang Norulfairuz Abang Zaidel (Universiti Teknologi Malaysia)
8:45 - 9:00	0:15	**Invited Speaker:** Prof Dr Nugrahaningsih WH (Universitas Negeri Semarang, Indonesia)
9:00 - 9:10	0:10	P-053 Sakae Horisawa
9:10 - 9:20	0:10	P-057 Afrida Sitompul
9:20 - 9:45	0:25	**Coffee Break**
SLOT BALANGAN 2.4 Chairperson: Assoc Prof Dr Roswanira Ab wahab (UTM)		
9:45 - 10:00	0:15	**Invited Speaker:** Dr Mohd Faez Sharif (International Islamic University Malaysia)
10:00 - 10:15	0:15	**Invited Speaker:** Prof Dr Sri Rahayu Lestari (Universitas Negeri Malang, Indonesia)
10:15 - 10:25	0:10	P-069 Abdullah Nur Hakami
10:25 - 10:35	0:10	P-076 Che Muhammad Khairul Hisyam Ismail
10:35 - 10:45	0:10	P-060 Rafal Firas Jaber
10:45 - 10:55	0:10	P-081 Hermalina Sinay
10:55 - 11:05	0:10	P-092 Wenny Surya Murtius
11:05 - 11:15	0:10	P-094 Dr. Mufeed Jalil Abdulabbas Ewadh
11:15 - 13:30	2:15	**Lunch**
13:30 - 14:15	0:45	**Closing Ceremony**

PARALLEL SESSION - Day 2

Time (GMT + 8)	Duration	BALANGAN 3
SLOT BALANGAN 3.3 Chairperson: Ts Dr Rosnani binti Hasham (UTM)		
8:30 - 8:45	0:15	**Invited Speaker:** Assoc Prof Dr Azzmer Azzar Abdul Hamid (International Islamic University Malaysia)
8:45 - 9:00	0:15	**Invited Speaker:** Assoc Prof Dr Normah Haron (International Islamic University Malaysia)
9:00 - 9:10	0:10	P-045 Nur Nadiah Abdul Rashid
9:10 - 9:20	0:10	P-059 Nurul Elia Aqila Abu Rahim
9:20 - 9:45	0:25	**Coffee Break**
SLOT BALANGAN 3.4 Chairperson:Ts. Dr. Naji Mahat Arafat (UTM) (UTM)		
9:45 - 10:00	0:15	**Invited Speaker:** Prof. Dr. Ir. I Gede Putu Wirawan (Udayana University, Indonesia)
10:00 - 10:15	0:15	**Invited Speaker:** Dr Desak Made Wilhandani (Udayana University, Indonesia)
10:15 - 10:25	0:10	P-012 Vigneswari Sevakumaran
10:25 - 10:35	0:10	P-055 Asita Elengoe
10:35 - 10:45	0:10	P-077 Aluh Nikmatullah
10:45 - 10:55	0:10	P-082 Aulia Rahmi Pawestri
10:55 - 11:05	0:10	P-085 Indah Sri Rejeki Naibaho
11:05 - 11:15	0:10	**Invited Speaker**: Ali Aqeel Salim (Universiti Teknologi Malaysia)
11:15 - 13:30	2:15	**Lunch**
13:30 - 14:15	0:45	**Closing Ceremony**

LIST OF ABSTRACTS AND PRESENTERS

LIST OF ABSTRACTS AND PRESENTERS

Speaker	Title and Name	Page
Keynote	**Sustainable Pharmaceutical Separations via Continuous Nanofiltration** Gyorgy Szekely, *King Abdullah University of Science and Technology, Saudi ARabia*	**1**
Plenary	**Exploring the Frontier of Stem Cells: Tissue Regeneration and Drug Discovery** Shahrul Hisham Zainal Ariffin, *Universiti Kebangsaan Malaysia*	**2**
Plenary	**In-situ Formation of Silica Nanoparticles Decorated with Well-Defined Chains of Linear and Non-Linear Structures** Nikos Hadjichristidis, *King Abdullah University of Science and Technology, Saudi Arabia*	**3**
Plenary	**An Orchestra of Cellular Senescence, Inflammaging, Aging and Age-Related Disease: Mechanism and Therapy** Fatchiyah F., *Brawijaya University, Indonesia*	**4**
Plenary	**DNA-Recombinant Based Vaccine Technology: The Promises and Pitfalls** I Gusti Ngurah Kade Mahardika, *Udayana University, Indonesia*	**5**

Code	Title and Name	Page
P-001	**Seasonal Variation in Browning and Contamination of *Acacia nilotica* Nodal Explants** Anita Narang, *University of Delhi, India*	**6**
P-003	**Effects of Tocotrienol Rich Fraction Extracted from Palm Oil on Brain Proteome Profiles in Alzheimer's Disease Mouse Model** Hamizah Shahirah Hamezah, *Universiti Kebangsaan Malaysia*	**7**
P-004	**Optimization of *Candida orthosilosis* R5I3 Growth Media using the Response Surface Methodology** I Gede Arya Sujana, *Udayana University, Indonesia*	**8**
P-005	**Microencapsulation of Bioactive Compounds from *Ruellia tuberosa* L. Using Gum Arabic for Therapeutic Applications** Anna Safitri, *Brawijaya University, Indonesia*	**9**
P-006	**Development and Assessment of CRISPR/Cas9- Construct Towards Drought Tolerance in Rice (*Oryza sativa* subsp. *indica*)** Nurul Hidayah Samsulrizal, *International Islamic University Malaysia*	**10**
P-007	**Fabrication and Characterization of Graphite-based Membrane for Human Liver Cancer Cell Entrapment** Shahrul Bariyah Sahul Hamid, *Universiti Sains Malaysia*	**11**
P-008	**Antibacterial Wound Healing Application of Bio-Inspired Green Silver Nanoparticles** Nik Ahmad Nizam Nik Malek, *Universiti Teknologi Malaysia*	**12**
P-009	**Development of Mobile App for the Understanding of Nanomedicine** Nik Ahmad Nizam Nik Malek, *Universiti Teknologi Malaysia*	**13**
P-010	**Multifaceted Computational Analysis of Phytosynthesized Silver Nanoparticles (AgNPs) towards Resistant Bacteria** Atieya Abdul Hadi, *Universiti Teknologi Malaysia*	**14**
P-011	**Synergistic Antibacterial Effect of Silver Nanoparticles using *Zingiber officinale* and *Azadirachta indica*** Sharel Raj Jonson Raju, *Universiti Teknologi Malaysia*	**15**
P-012	**Promising Development of Polyhydroxyalkanoates: A Sustainable Bioplastic for Next Generation Biomaterial** Vigneswari Sevakumaran, *Universiti Malaysia Terengganu*	**16**

Code	Title and Name	Page
P-014	**Basil/ZnO as Green Materials towards Removal of Amilodipine-Based Pharmaceutical Waste** Nur Nadia Batrisyia Arman, *Universiti Teknologi Malaysia*	**17**
P-015	***In vitro* Inhibitory Effect of Andrographolide on Fatty Acid Synthesis in Breast Cancer** Nur Amanina Johari, *Universiti Teknologi Malaysia*	**18**
P-016	**Chemo-Photothermal Effects of Drug-Loaded Nanomaterial in Breast Cancer Immunoregulation** Muhammad Redza Mohd Radzi, *Universiti Teknologi Malaysia*	**19**
P-017	**Diversity Of Bacterial Communities in The Southern Kuantan Coastal Water Area** Najatul Su Ad Abdullah, *International Islamic University Malaysia*	**20**
P-020	**Increased Number of CD4+ and CD8+ T Cells in the Thymus of Mice (*Mus musculus*) Exposed to Cigarette Smoke After Administration of Java plum (*Syzgium cumini*) Fruit Extract** A A S A Sukmaningsih K., *Udayana University, Indonesia*	**21**
P-021	**Rosmarinic Acid-Rich Fraction from *Orthosiphon aristatus* Induces Apoptosis in Prostate Cancer Cells** Rosnani Hasham, *Universiti Teknologi Malaysia*	**22**
P-022	**Synergistic Effects of Combined Cisplatin and *Clinacanthus nutans* Extract on Triple Negative Breast Cancer Cells** Praseetha Prabhkaran, *Universiti Teknologi Malaysia*	**23**
P-023	**Larvicidal Activity and Morphological Alteration Induced by Pulutan Leaves Extracts in *Aedes aegypty* Linn.** Ngurah Intan Wiratmini, *Udayana University, Indonesia*	**24**
P-024	**Ultrasound-Assisted Extraction (UAE) of Ajwa Date Seed (*Phoenix dactylifera* L.): RSM-Based Optimisation for Extract's Total Yield and UPLC-QTOF/MS Characterisation of its Saccharides** Thiribuvanesvari Duraivelu, *Universiti Putra Malaysia*	**25**
P-025	**Molecular Docking, Dynamic Simulation, and ADMET Studies of Caulerpin Performed HMG-CoA Reductase Inhibition** Dewi Ratih Tirto Sari, *Universitas Ibrahimy, Indonesia*	**26**
P-026	**Salivary Protein as Biomarker for Early Childhood Caries** Noraslinda Muhamad Bunnori, *International Islamic University Malaysia*	**27**
P-027	**The Antioxidant Properties of Active Fraction of The Cashew Shoots (*Anacardium occidentale*)** Normah Haron, *International Islamic University Malaysia*	**28**

Code	Title and Name	Page
P-028	**Optimization of Qiagen Argus X-12 QS Investigator Kit for blood samples on FTA card for kinship investigations** Aedrianee Reeza Alwi, *Universiti Teknologi Malaysia*	**29**
P-029	**Review of Forensic Anthropological Assessment of Skulls for Sex, Age and Ancestry in Asian Population in Asia** Varohthini K.Maharaja, *Universiti Teknologi Malaysia*	**30**
P-030	**Electrokinetic Supercharging-Capillary Zone Electrophoresis Approach by Online Preconcentration for Determination of Cocaine and Morphine in Entomological Samples** Nor Wajihan Muda, Universiti Teknologi Malaysia	**31**
P-032	**In silico Interaction of Nisin-Like *Lactococcus lactis* Bacteriocin with Selected Quorum Sensing Protein Members from *Vibrio sp.*** Tengku Haziyamin Tengku Abdul Hamid, *International Islamic University Malaysia*	**32**
P-033	**Anticancer Activity of *K. alvarezii* Crude Extract Collected from Sabah Coast** Nur Fatin Najihah Mat Husin, *Universiti Teknologi Malaysia*	**33**
P-035	**Glucose Uptake Activity of *Ganoderma lucidium* QRS 5120 in L6 Myotube Cell** Faez Sharif, *International Islamic University Malaysia*	**34**
P-036	**Molecular Recognition Of Furin Cleavage Site (FCS) From Sars-CoV-2 Spike by Furin Protease (FP) using Coarse-Grained Simulation** Azzmer Azzar Abdul Hamid, *International Islamic University Malaysia*	**35**
P-037	**Assosiation of Litter Size and Gonadotropin-Releasing Hormone Receptor (GNRHR) in Senduro and Ettawa Crossbreed Goat** Nur Hidayah, *Brawijaya University, Indonesia*	**36**
P-038	**The Anti-Cancer Activity of Nanoliposome *Hedyotis corymbosa* Targeting Estrogen Receptor-Alpha in Breast Cancer Cells: in silico and in vitro Studies** Laili Nurzaidah, *Universitas Brawijaya, Indonesia*	**37**
P-039	**Nano-sized Solution to Micro-sized Problem: Imine-Functionalized Nanoparticles for Effective Microplastic Removal from Water** Alyza Azzura Abd Rahman Azmi, *Universiti Malaysia Terengganu*	**38**
P-040	**Development of Powdered Sacha Inchi-infused Oil using Maltodextrin (DE15) and Sodium Caseinate as Encapsulating Materials** Widya Abd Wahab, *International Islamic University Malaysia*	**39**

Code	Title and Name	Page
P-041	***Danio rerio*: A Versatile in vivo Tool for High-Throughput Biomedical Screening** Mohd Hamzah Mohd Nasir, *International Islamic University Malaysia*	**40**
P-042	**The Antibiotic Susceptibility Pattern of *Sreptococcus suis* Isolated from Clinical Specimens at Prof. IGNG Ngoerah Hospital, Denpasar during 2016 – 2022** I Putu Bayu Mayura, *Udayana University, Indonesia*	**41**
P-043	**Antimicrobial Activity of Crude Leech Saliva Extract (CLSE) Protein from Different Starvation Times of Local Leech *Hirudinaria manillensis*: A Preliminary Study** Amir Shafiruddin Nordin, *University College of MAIWP International, Malaysia*	**42**
P-044	**In silico Mutation on *Acinetobacter haemolyticus* Lipase KV1 for the Degradation of Polyethylene Terephthalate (PET)** Nurul Fatin Syamimi Khairul Anuar, *Universiti Teknologi Malaysia*	**43**
P-045	***In silico* Design of DNA Hairpin Aptamer for The Detection of Ovarian Cancer Biomarker, Human Epididymis Protein 4 (HE4)** Nur Nadiah Abdul Rashid, *International Islamic University Malaysia*	**44**
P-046	**Production Optimization and Characterization of Fish Protein Hydrolysate (FPH) from Milkfish *Scales (Chanos chanos Forsskal*) Enzymatically using Papain** Evi Susanti, *Universitas Negeri Malang, Indonesia*	**45**
P-047	**Cadmium Biosorption by Non-Living Biomass of *Rhodopseudomonas* sp. strain SBL** Balqis Nurul Huda Armadi, *Universiti Teknologi Malaysia*	**46**
P-048	**Development of Non-Polar Imine Compound Functionalized Magnetic Mesoporous Silica Nanoparticles for Microplastics Removal from Water** Nur Rabiatul Syuhaidah Mohamed Rusidi, *Universiti Malaysia Terengganu*	**47**
P-051	**Development of Magnetic Mesoporous Silica Nanoparticles Functionalized with Polar Imine Moiety as a Potential Polystyrene Microplastics Removal from Water** Wan Nur Iwani Wan Rushdi, *Universiti Malaysia Terengganu*	**48**
P-052	**Sustainable Approach to Manage Agro-Waste through Cultivation of Edible Mushrooms** Surinder Kaur, *University of Delhi, India*	**49**

Code	Title and Name	Page
P-053	**Influence of Growth Stages on Species Identification and Typing of Basidiomycetes Based on Whole cell protein Information using MALDI TOF MS** Sakae Horisawa, *Kochi University of Technology, Japan*	**50**
P-054	**Enzymatic Hydrolysis of Collagen Hydrolysates from Barramundi Skin using Alcalase and Papain** Dayang Norulfairuz Abang Zaidel, *Universiti Teknologi Malaysia*	**51**
P-055	**Molecular Docking Studies on Phytoconstituents against APC, EGFR and MSH2** Asita Elengoe, *Lincoln University College Malaysia*	**52**
P-057	**Bacterial Community Structure in Log Piles Used as Foundations Analyzed by the Next-Generation Sequencing** Afrida Sitompul, *Kochi University of Technology, Japan*	**53**
P-059	**Adsorption Immobilization of Cyclodextrin Glucanotransferase on Activated Rice Husk Biochar: The Effects of Process Parameters** Nurul Elia Aqila Abu Rahim, *Universiti Teknologi Malaysia*	**54**
P-060	**AML1-ETO Fusion Gene Detection and Frequency in Acute Myeloid Leukemia Patients** Rafal Firas Jaber, *University of Wasit, Iraq*	**55**
P-063	***Elaeocarpus grandiflorus* Increased Immunoglobulin G Activity and Total Protein of Rat Induced Sheep Red Blood Cell** Nugrahaningsih WH, *Universitas Negeri Semarang, Indonesia*	**56**
P-066	**Accurate and Rapid Detection of SARS-CoV-2: Leveraging the Power of Reverse Transcription Loop-Mediated Isothermal Amplification (RT-LAMP) and Lateral Flow Immunochromatography Assay** Derich Shalbie Simon, *Universiti Malaysia Sabah, Malaysia*	**57**
P-067	**Proximate Composition and Identification of Organic Acids in Different Percentages of Cream and Campaka (*Michelia champaka L*) Oil** Ni Made Suaniti, *Udayana University, INdonesia*	**58**
P-068	**Distribution of *Arundo donax*, an Energy Crop and Serious Invasive Species, in Shikoku, Japan using Google Maps** Yoh Sakuma, *Ehime University, Japan*	**59**
P-069	**Bioethanol Production from Wild Cassava *(Manihot glazoiovii* Muel. Arg) with Combination of Microbial Concentration and Fermentation Times using Simultaneous Saccharification and Co-Fermentation Technique** Abdullah Nur Hakami, *Udayana University, Indonesia*	**60**

Code	Title and Name	Page
P-070	**Immunoglobulin Yolk of *Canine Parvovirus* and its Biological Activity after Freeze-Dried** I Gusti Ayu Agung Suartini, *Udayana University, Indonesia*	**61**
P-071	**Phytochemical Screening and Evaluation of Antibacterial Activity of Single Aged Garlic on Gram-Positive and Gram-Negative Bacteria** Nur Athirah Othman Basri, University College Of MAIWP International, Malaysia	**62**
P-072	**Single Bulb Garlic a Promising Antiadipogenic Agent: Bioactivity and Bioavailability Enhancement Strategy** Sri Rahayu Lestari, *Universitas Negeri Malang, Indonesia*	**63**
P-073	**Embryotoxicity and Teratogenic Effects of Local Jamu Maajun on Zebrafish (*Danio rerio*)** Zulfa Binti Zakuan, *University College of MAIWP, Malaysia*	**64**
P-074	**Comparing Age-Wise Reference Intervals for Serum Urea and Creatine Levels among ESRD Subjects: A Single-Centre Experience** Muhammad Asyraf Salleh, *University College of MAIWP, Malaysia*	**65**
P-075	**In-Silico Study of Active Compounds on Doro Putih (*Strychnos lucida*) as an Anti-Breast Cancer Agent Through Inhibition of The MAPK Pathway** Yuslinda Annisa, *Universitas Brawijaya, Indonesia*	**66**
P-076	**Computational Discovery of Human ACE-2 Inhibitors from Malaysian Kelulut Honey against COVID-19** Che Muhammad Khairul Hisyam Ismail, *International Islamic University Malaysia*	**67**
P-077	**Phenotypic and Biochemicam Changes During Maturation of Bidara (*Ziziphus mauritiana* L.) Fruits, Bima Ecotype.** Aluh Nikmatullah, *University of Mataram, Indonesia*	**68**
P-078	**Cetuximab and Liposome-Nanoparticle using *Pleurotus ostreatus* Extract for Targeted EGFR and TIMP-1-Expressing Colorectal Cancer Combination Therapy** Agustina Tri Endharti, *Universitas Brawijaya, Indonesia*	**69**
P-079	**Exploration of Four Bali Medicinal Plants Showing from an Anti-inflammatory to Aphrodisiac** I Gede Putu Wirawan, *Udayana Brawijaya, Indonesia*	**70**
P-080	**Transcriptional Responses of Porcine Intestinal Organoids Exposed to Acetate and Butyrate** Nuning Winaris, *Universitas Brawijaya, Indonesia*	**71**

Code	Title and Name	Page
P-081	**Local Corn Cultivar from Kisar Island Maluku: Its Potential and Development for Future Functional Food** Hermalina Sinay, *University of Pattimura, Indonesia*	**72**
P-082	**Harnessing the Power of Gut-Brain Axis: Probiotic Supplementation Ameliorates Neurological Symptoms in Cerebral Malaria** Aulia Rahmi Pawestria, *Universitas Brawijaya, Indonesia*	**73**
P-083	**Protective Effect of Combination Gel Transfersome Centella asiatica Extract and Nanoemulsion of Rosemary Essential Oil against UVB-Induced Skin Aging in BALB/C Mice** Husnul Khotimah, *Universitas Brawijaya, Indonesia*	**74**
P-085	**Structural and Microbiology Analysis of Entrapped IS258 in Na-Alginate Matrix Upon Repetitive Batch Bio-Ethanol Fermentation** Indah Sri Rejeki Naibaho, *Udayana University, Indonesia*	**75**
P-087	**Effect of Media Type and pH on the Growth of Isolate R5I4 in the Early Stage of Fermentation** I Made Febriana, *Udayana University, Indonesia*	**76**
P-090	**The Effect of Hexane Extract of *Caulerpa racemosa* on HT-29 Cell Line by Suppressing PI3K/AKT Pathway** Happy Kurnia Permatasari, *Brawijaya University, Indonesia*	**77**
P-091	**Effect of Fluctuations in Temperature on the Life Cycle of the Forensically Important Calliphoridae fly *Chrysomya rufifacies* (Macquart 1843) (Diptera)** Sarika Bansode, *Kelkar Education Trust's V.G.Vaze College of Arts, Science and Commerce, INdia*	**78**
P-095	**Microbial Degradation Potential of Microplastic using Cutinase-like Microplastic Degrading Enzyme from *Cryptococcus* sp.** Habeebat Adekilekun Oyewusi, *Federal Polytechnic Ado Ekiti, Nigeria*	**79**
P-096	**Analysis of Decolorization Potential of Dye from a Bacterium Isolated from the Hypersaline Lake** Habeebat Adekilekun Oyewusi, *Federal Polytechnic Ado Ekiti, Nigeria*	**80**
P-097	**Synergistic Effect of Medicinal Plants on Liver Damage** Tooba Lateef, *University of Karachi, Pakistan*	**81**

Code	Title and Name	Page
P-098	**Determination of Heavy Metals in Some Selected Herbal Medicinal Preparations Marketed in Kano State, Nigeria** Zainab Auwal Zigau, *Bauchi State University, Nigeria*	**82**
P-099	**Identification of Bacterial Strain Isolated from Antarctica Able to Degrade Dalapon** Yilmaz Kaya, *Yildiz Technical University, Turkey*	**83**
P-062	**Design, Development, and Usability Evaluation of MSU-TCTO Abalone Hatchery Water Temperature Monitoring System (WaTeMS)** Charisa F. Llema, *Mindanao State University – Tawi-Tawi College of Technology and Oceanograph, Philippines*	**84**
P-100	**Understanding Composting and Microbial Behavior in Algerian Urban Areas** Fatma Zohra Derias, *University of Benahmed Mohamed, Algeria*	**85**
P-101	**Characterization of the Genetic Diversity of Citrus Species of Nepal using Simple Sequence Repeat (SSR) Markers** Nabin Narayan Munankarmi, *Tribhuvan University, Nepal*	**86**
P-102	**Green Honey from Banggi Island: A Comprehensive Study on its Physical and Chemical Properties** Nanthini Rajindran, *Universiti Teknologi Malaysia*	**87**
P-064	**Anticancer Robustness of Gold-Silver-Cinnamon Nanohybrids** Ali Aqeel Salim, *Universiti Teknologi Malaysia*	**88**

Keynote

Sustainable Pharmaceutical Separations via Continuous Nanofiltration

Gyorgy Szekely
King Abdullah University of Science and Technology (KAUST), Saudi Arabia
Corresponding author: gyorgy.szekely@kaust.edu.sa

Abstract
Separating molecules dissolved in organic solvents is particularly important in pharmaceutical processing, where separations can account for as much as 70% of the total manufacturing cost. Membrane-based separations, and in particular nanofiltration, have been recognized as sustainable technologies allowing molecular sieving under mild conditions. Recent developments in solvent-resistance nanofiltration resulted in high performance membrane materials. The latest generation of membranes are more robust, and they can operate under harsh conditions including extreme pH and polar aprotic solvents. Moreover, the membranes have excellent selectivity, low molecular weight cut-off with reasonable throughout. These novel membranes enable open new opportunities for various applications such as (bio)pharmaceutical purification and concentration, solvent, reagent and catalyst recovery. Hybrid processes consisting of continuous-flow reactors and membrane separation units are on the rise. In situ solvent recovery coupled to continuous adsorption processes for the isolation of bioactive plant-derived compounds also demonstrated significant improvement in process sustainability

Keywords: pharmaceutical filtration; nanofiltration; membrane

Plenary

Exploring the Frontier of Stem Cells: Tissue Regeneration and Drug Discovery

Shahrul Hisham Zainal Ariffin
Faculty of Science and Technology, Universiti Kebangsaan Malaysia, Malaysia
*Corresponding author: hisham@ukm.edu.my

Abstract

Stem cells are classified into four types: embryonic stem cells, cord blood stem cells, adult stem cells, and induced pluripotent stem cells (iPSC). Given the difficulties of obtaining stem cells from embryos or cord blood and the risk of developing IPSC, adult stem cells have emerged as the best source for tissue regeneration and drug development. The primary source of adult stem cells has been identified as bone marrow. Nevertheless, the process of extracting marrow is uncomfortable for the patient. Alternative sources, such as peripheral blood and dental pulp stem cells from mice and humans, have been explored. The existence of two stem cell types in mouse/murine and human peripheral blood, notably suspension and adherent cells, refers to hematopoietic and mesenchymal stem cells, which may be separated after being cultured *in vitro* for 7 days (human blood) and 14 days (mouse blood). Mesenchymal stem cells, in addition, can be extracted from dental pulp tissue via enzyme digestion. Human stem cells derived from these teeth are known as deciduous tooth stem cells (SHED) and dental pulp stem cells (DPSC), respectively. Isolated human and mouse peripheral blood stem cells can differentiate into osteoblasts and chondrocytes, which secrete a real bone-like matrix, and osteoclasts, which degrade the bone matrix. Dental pulp stem cells were also reported to differentiate into osteoblast and neuron, but not osteoclast. As a result, these types of stem cells rival bone marrow stem cells as an alternative source for tissue regenerative treatment and drug discovery. The advancement of stem cell research is expected to significantly improve disease treatment, improving living standards while fostering a sustainable society. This acquired knowledge can offer the public a better understanding of the various options available in the medical and dental fields, beyond traditional approaches like medications and surgeries.

Plenary

In-situ Formation of Silica Nanoparticles Decorated with Well-Defined Chains of Linear and Non-Linear Structures

F. Aldakheel, K. Ntetsikas, A. Yudhanto, G. Lubineau, N. Hadjichristidis*
King Abdullah University of Science and Technology (KAUST), Saudi Arabia
*Corresponding author: Nikolaos.Hadjichristidis@kaust.edu.sa

Abstract
Grafting nonpolar polymer chains onto the surface of polar nanoparticles (e.g., silica) is an effective way to enhance particle/matrix interactions and thus promote their homogeneous dispersion within a nonpolar matrix, leading to improved mechanical properties. Current grafting methods have not yet produced nanoparticles with well-defined polymers on the surface and high grafting density. In this work, we used anionic polymerization high vacuum techniques to synthesize ω-tetraethyl orthosilicate (TEOS) PS, PS-b-PI, (PS)2PS-TEOS, (PS)2PI-TEOS, and (PS)2PI-b-PS-TEOS macromonomers (precursors) and then by hydrolysis/ condensation of macromonomers the in-situ formation of grafted silica nanoparticles (NPs) (Scheme). The molecular characteristics of the precursors (polymer-TEOS) were determined by ^{1}H NMR, SEC, and MALDI-ToF. The formation of polymer@SiO_2 NPs by FT-IR, ^{29}Si solid-state NMR, TEM, TGA, and DLS. Blends of polymer@SiO_2 with commercially available PS and synthesized thermoplastic elastomer (PS-b-PI-b-PS), were obtained either in melt by extrusion or in solution by evaporation. The role of polymer@SiO_2 on the mechanical properties and morphological features of the matrices was examined by tensile testing and SEM. The proposed general method controls the molecular weight, chemical composition, particle size and grafting density of nanoparticles and effectively improves the mechanical characteristics of the nanocomposites.

Keywords: nanoparticles; polymer; polymer-TEOS

Plenary

An Orchestra of Cellular Senescence, Inflammaging, Aging and Age-Related Disease: Mechanism and Therapy

Fatchiyah Fatchiyah[a,b,*]
[a]Dept. Biology, Faculty of Math. & Natural Science, Brawijaya University, Indonesia
[b]RC Smart Molecule of Natural Genetics Resources, Brawijaya University, Indonesia
*Corresponding author: fatchiya@ub.ac.id

Abstract
Aging is a natural physiological process characterized by a decreased response to various types of stress such as mitochondrial dysfunction, DNA damage, epigenetics, inflammatory factors, and oxidative stress. The complex pathway mechanisms involved in longevity, age-related disease origin, inflammation, and metabolic dysfunction make up the senescence-associated secretory phenotype (SASP) that is a hallmark of cellular senescence. In obese people, the percentage of body fat increases due to increased expansion of visceral adipose tissue, limited lipid storage capacity and uncontrolled distribution of adipose tissue. Interestingly, these adipose cells are older than the body of obese people. In obese people, hyperplasia adipose cells characterized by reduced adipogenesis, dysfunctional adipose tissue, and inflammation-dependent cell senescence triggered by SASP progression and certain interleukins. This study aims to reveal specific bioactive compounds to regulate the aging mechanism in senescence adipose cells into a homeostatic state through appropriate mechanisms. This study concludes that the regulation of PPAR-γ signaling by specific bioactive compounds may produce beneficial effects in preventing cellular senescence from the progression of adipocyte aging.

Keywords: Aging; adipose tissue; bioactive compounds; cellular senescence; inflammation

Plenary

DNA-Recombinant Based Vaccine Technology: The Promises and Pitfalls

Gusti N Mahardika[a]*, Tri Komala Sari[b], Henri P. W. Sudipa[c], Bayu K. Mahardika[a]
[a]The Animal Biomedical and Molecular Biology Laboratory, Faculty of Veterinary Medicine, Udayana University, Jl Sesetan-Markisa 6A, Denpasar – Indonesia
[b]Virology Laboratory, Faculty of Veterinary Medicine, Udayana University, Jl. Sudirman, Denpasar-Indonesia
[c]Bacteriology and Micology Laboratory, Faculty of Veterinary Medicine, Udayana University, Jl. Sudirman, Denpasar-Indonesia
*Corresponding author: gnmahardika@unud.ac.id

Abstract
Global vaccine industry is a multi-billion-dollar business to provide protein and protection of health of global community. The traditional vaccine production has the main substantial limitation of the need to handle infectious agent, which is not manageable in developing countries. The modern DNA-recombinant based vaccine technology, such as mRNA, DNA, sub-unit, and adenovirus vectored vaccines, allows researchers and vaccine companies to develop vaccine seeds immediately so it can be made timely ready for global animal husbandry and human population. The pandemic Covid-19 has demonstrated that DNA-recombinant based technology did allow vaccine companies to produce the antidot of the pandemic which lessened its devastating impact. Although the technology is very promising, there are pitfalls in applying it for wider use, such as vaccine delivery, possible long-term impacts of nucleic acid application and the release of live engineered vector. This paper is critically discussing the DNA-recombinant based vaccine technology, it advantages and limitations, and the future negative impact to be anticipated.

Keywords: DNA-recombinant based vaccine; global protein supply; human health protection;

P-001

Seasonal Variation in Browning and Contamination of *Acacia nilotica* Nodal Explants

Anita Narang[a]*, Anupama Shukla[a], Surinder Kaur[b]
[a]Department of Botany, Acharya Narendra Dev College, University of Delhi
[b]Department of Botany, SGTB Khalsa College, University of Delhi
*Corresponding author: naranganita08@gmail.com

Abstract
A major problem encountered in establishing axenic cultures is the high rate of contamination and browning of explants and media. Contamination is initiated in explants excised from either soil-borne tissues or from adult trees. To reduce this, the use of several sterilizing agents (Tween 20, chlorine water, silver nitrate, mercuric chloride, etc.) or a wash in antibiotic solution or culturing the explants on an antibiotic containing medium has been recommended by many researchers. During the present investigations, contamination was a serious problem encountered in establishing in vitro cultures of *Acacia nilotica* old tree nodal explants. Contamination was controlled by sterilizing the explants by washing in polysan (5%, v/v), thorough washing under tap water, 70% alcohol treatment and finally, 0.1% $HgCl_2$ treatment. Plant tissues release phenolic substances through their cut ends, which turn the media dark brown and prove toxic to the tissues. Addition of various antioxidants (PVP, AC, ascorbic and citric acids, sodium sulphate etc.), quick transfer of explants to fresh medium twice or thrice, at a few days interval may overcome the problem in some cases. Initial collection of explants in antioxidant solution and a wash in antioxidant solution prior to inoculation was helpful in reducing the phenolic exudation in the present investigations. Addition of antioxidant (100 mg/1 citric acid) to the medium also checked browning to some extent. The rate of infection and browning of explants varied in different seasons; maximum being during winters and minimum during summers. This was inversely related to the morphogenic response of explants i.e. maximum caulogenesis occurred in vitro during July and August.

Keywords: $HgCl_2$-mercuric chloride; PVP-polyvinyl pyruvic acid; activated charcoal

P-003

Effects of Tocotrienol Rich Fraction Extracted from Palm Oil on Brain Proteome Profiles in Alzheimer's Disease Mouse Model

Hamizah Shahirah Hamezah[a,*], Lina Wati Durani[b], Nor Faeizah Ibrahim[c], Daijiro Yanagisawa[b], Hanafi Ahmad Damanhuri[c], Wan Zurinah Wan Ngah[c], Ikuo Tooyama[b]
[a]Institute of Systems Biology (INBIOSIS), Universiti Kebangsaan Malaysia, 43600, UKM Bangi, Selangor, Malaysia
[b]Molecular Neuroscience Research Center, Shiga University of Medical Science, 520-2192, Otsu, Shiga, Japan
[c]Department of Biochemistry, Universiti Kebangsaan Malaysia Medical Centre, 56000, Kuala Lumpur, Malaysia
*Corresponding author: hamizahshahirah@ukm.edu.my

Abstract
Alzheimer's disease (AD) is a neurodegenerative disorder marked by cognitive impairment. The effect of vitamin E analogs on AD is still unclear. Therefore, this study was conducted to evaluate the effect of tocotrienol rich fraction (TRF) on AD mouse model. APP/PS1 mice received TRF orally for 10 months. Proteomics analysis was performed on the mice brain using LC-MS/MS. TRF altered proteins in the specific brain regions of APP/PS1 mice. The expression of amyloid beta protein in hippocampus was modulated by TRF treatment. TRF potentially exerts its neuroprotective effects in the brain by modulating proteins involved in various biochemical pathways.

Keywords: Alzheimer's disease; tocotrienol; memory; brain; proteomics

P-004

Optimization of *Candida orthosilosis* R5I3 Growth Media using the Response Surface Methodology

I Gede Arya Sujana[a,b*], Ida Bagus Wayan Gunam[a,b*], I Made Mahaputra Wijaya[a,b], and I Wayan Wisma Pradnyana Putra[a,b]
[a]Department of Agroindustrial Technology, Faculty of Agricultural Technology, Udayana University, Bukit Jimbaran, Badung Bali 80361, Indonesia
[b]Laboratory of Bioindustry, Faculty of Agricultural Technology, Udayana University, Bukit Jimbaran Badung Bali 80361, Indonesia
*Email: ibwgunam@unud.ac.id, igedearyasujana2@gmail.com

Abstract
Media is materials that can be used for the growth of microorganisms including bacteria, yeast and mold. Nutrients in the media must meet the basic needs of the microbes being cultured. In this study, the growth medium for *Candida orthosilosis* strain R5I3 that has been optimized is the concentration of each content of Yeast Extract Peptone Glucose medium. The method used in this study was Response Surface Methodology (RSM), and from this method, 20 experimental treatments have been suggested. In this experiment, the analysis that was carried out were changes in pH, total dissolved solids, reducing sugars, total ethanol, and optical density (OD) values. The optimal results obtained in this study were yeast content of 0.6% (v/v), peptone of 0.9 (v/v), and glucose of 7.5% (v/v). The analysis results obtained were final pH value of 3.85, final total dissolved solids (TDS) of 2.4% Brix with a TDS reduction of 66.20% from the initial TDS value. In addition, final reducing sugar was 2.32 mg/mL with a reduction value of 35.64%, total ethanol produced was 2.49% (v/v), and optical density value was 2.55 at a wavelength of 660 nm. The results of this study will be useful for optimizing the growth of the R5I3 strain when used in the bioethanol production process.

Keywords: *Candida orthosilosis* strain R5I3; media; optimization; response surface methodology

P-005

Microencapsulation of Bioactive Compounds from *Ruellia tuberosa* L. Using Gum Arabic for Therapeutic Applications

Anna Safitri[a,b], Firza Rajasa[a], Nabila Almayda[a]
[a]Department of Chemistry, Faculty of Mathematics and Natural Sciences, Brawijaya University, Jl. Veteran, Malang 65145, Indonesia
[b]Research Centre of SMONAGENES (Smart Molecules of Natural Genetic Resources), Brawijaya University, Jl. Veteran, Malang 65145, Indonesia
*Corresponding author: a.safitri@ub.ac.id

Abstract
The bioactive compounds naturally present in plants have great importance due to their biological characteristics. These substances could lose their active characteristics since they are highly unstable. Microencapsulation is one of the techniques to improve stability and protect these compounds. In this work, *R. tuberosa* L. aqueous extracts microcapsules were prepared using a spray-drying method by varying pH, gum Arabic concentration, and stirring time. The encapsulation efficiency (EE), characteristics, alpha-amylase inhibition activity, and release behaviour of the microcapsules were investigated. The results highlighted that the highest encapsulation efficiency for the microcapsules was obtained at pH 5, gum Arabic concentration of 1% (w/v), and 90 min of stirring time (52.7% EE). The alpha-amylase inhibition assay from microcapsules resulted in the IC_{50} value of 71.61 ± 0.13 µg/mL, demonstrating high biological activity. Results of characterization using SEM showed that the surface of the microcapsules produced was still heterogeneous, with a tendency to be spherical, with various sizes ranging from 0.933 to 3.08 µm. The bioactive substances from microcapsules were released during intervals of 30-150 min at pH values of 1.2 and 7.4. Only 3.51% of the bioactive substances were released at pH 1.2 after 120 min, compared to 55.78% at pH 7.4. Overall, this work confirms the possibility of developing plant extracts with preserved biological activity using the produced microcapsules.

Keywords: Alpha-amylase; concentration; gum Arabic; microencapsulation; pH; *Ruellia tuberosa* L; stirring time

P-006

Development and Assessment of CRISPR/Cas9- Construct Towards Drought Tolerance in Rice (*Oryza sativa* subsp. *indica*)

Nurul Hidayah Samsulrizal[a,b,e,*], Anis Afuza Md-Yusof[a], Nurul Asyikin Mohd-Zim[a,c], Amin-Asyraf Tamizi[a,d], Mohd-Syahmi Salleh[a], Nur Sabrina Ahmad-Azmi[a,b], Zarina Zainuddin[a,b]
[a]Department of Plant Science, Kuliyyah of Science, International Islamic University Malaysia, 26300, Kuantan, Pahang, Malaysia.
[b]Plant Productivity and Sustainable Resource Unit, Kuliyyah of Science, International Islamic University Malaysia, 26300, Kuantan, Pahang, Malaysia.
[c]FGV R&D Sdn. Bhd., FGV Innovation Centre, PT. 23417 Lengkuk Teknologi, 71760, Bandar Enstek, Negeri Sembilan, Malaysia.
[d]Biotechnology and Nanotechnology Research Centre, Malaysian Agricultural Research and Development Institute (MARDI), 43400 Serdang, Selangor, Malaysia.
[e]Research Unit for Bioinformatics and Computational Biology (RUBIC), Kulliyyah of Science, International Islamic University Malaysia, Jalan Sultan Ahmad Shah, Kuantan, Pahang, Malaysia.
*Corresponding author: hidayahsamsulrizal@iium.edu.my

Abstract
The great majority of the population on earth consume rice (Oryza sativa) as their primary source of carbohydrates, however, seriously threatened by the onset of climate change has posed a significant threat to the cultivation of this staple crop. The revolution of genome editing technology has opened a new era in crop improvement. Hence, this study aims to isolate, characterise, and develop the CRISPR/Cas9 construct for SUMO E2-Conjugating Enzyme (*OsSCE1*) gene. Development of CRISPR/Cas9 constructs involved several stages, (1) characterisation of *OsSCE1* gene, (2) sgRNA design, (3) vector construction, (4) *Agrobacterium* and *in-planta* transformation and (5) molecular validations. The *OsSCE1* gene was verified by sequencing, showing 99% identity with *O. sativa* on chromosome 10. The 20 bp sgRNA was designed manually with the help of gRNA prediction programmes including CCTop, and Benchling, and the CRISPR constructs (Level 0, 1 and 2) were confirmed by sequencing. Then, the transgenic rice plants harboring sgRNA: Cas9 targeting IR64 's *OsSCE1* gene were generated via *Agrobacterium* mediated *in-planta* transformation. Leaves of two-month-old plants were subjected to selection assay (300 mg/L kanamycin) and kanamycin-resistant plants were labelled as putative transformants. Polymerase chain reaction (PCR) amplification of Cas9 and *OsSCE1* genes using specific primers verified the integration of the transgenes in 29 T0 lines. The mutations were discovered by examining the targeting location on the genome of the relevant transgenic plants. Sequencing analysis revealed the presence of six transgenic lines (D8, C4, C14, B15, C21, and B18) that exhibited a mutagenesis efficiency of approximately 9% for the OsSCE1 gene. This finding suggests that sgRNA: Cas9-induced gene- targeting could be employed to specifically alter agricultural traits and the CRISPR-Cas9 system has the potential to be a highly effective tool for crop breeding trait enhancements.

Keywords: CRISPR/Cas9; Oryza sativa; rice; drought; OsSCE1 gene.

P-007

Fabrication and Characterization of Graphite-based Membrane for Human Liver Cancer Cell Entrapment

Nabila Mohd Zailana[a], Siti Noor Fazliah Mohd Noor[b], Shahrul Bariyah Sahul Hamid[a]*
[a]Department of Biomedicine, Advanced Medical and Dental Institute, Universiti Sains Malaysia, Sains@Bertam, 13200 Kepala Batas, Penang, Malaysia
[b] Department of Dental Science, Advanced Medical and Dental Institute, Universiti Sains Malaysia, Sains@Bertam, 13200 Kepala Batas, Penang, Malaysia
*Corresponding author: shahrulbariyah@usm.my

Abstract

Introduction: Circulating liver cancer cells are emerging as predictors of cancer progression. Therefore, early monitoring by employing nanotechnology is the method of choice for providers of medical care to establish definitive diagnosis for intervention due to its precision and rapid detection advantages. **Objective:** The current study aims to fabricate and characterize graphite-based membrane for the entrapment of circulating liver cancer cells. **Methods**: Graphite-based membrane was fabricated using phase-inversion method. Briefly, graphite powder was oxidized through modified Hummer's method. Polyvinyl alcohol (PVA) was used as a surfactant for membrane stability. Enhancement of membrane stability was achieved through the addition of bioactive glass and polyethylene glycol within the graphite and PVA matrix. Morphological characterizations were analyzed using field emission scanning electron microscope with energy dispersive spectroscopy for surface characteristics, porosities and elemental particulates distribution of the membrane. **Results and Discussion**: Rough surface with different porosity distribution suggests that the size of pores is influenced by the biomaterial composition and particle's size. **Conclusion:** The membrane is suitable for further evaluation for filtration of circulating liver cancer cells.

Keywords: Graphite oxide membrane; liver cancer; polyethylene glycol; bioactive glass

P-008

Antibacterial Wound Healing Application of Bio-Inspired Green Silver Nanoparticles

Nik Ahmad Nizam Nik Malek[a,b]*, Mustaffa Shamsuddin[c], Juan Matmin[b,c], Khairunadwa Jemon[a], Azman Abd Samad[a], Muhammad Hariz Asraf[a,b]
[a]Department of Biosciences, Faculty of Science, Universiti Teknologi Malaysia, 81310 UTM Johor Bahru, Johor, Malaysia
[b]Centre for Sustainable Nanomaterials (CSNano), Ibnu Sina Institute for Scientific and Industrial Research (ISI-SIR), Universiti Teknologi Malaysia, 81310 UTM Johor Bahru, Johor, Malaysia
[c]Department of Chemistry, Faculty of Science, Universiti Teknologi Malaysia, 81310 UTM Johor Bahru, Johor, Malaysia
*Corresponding author: niknizam@utm.my

Abstract
The market demand for silver nanoparticles (AgNP) as a highly effective antibacterial agent is substantial, surpassing other antibacterial agents and antibiotics. However, the conventional synthesis methods utilizing toxic chemical reducing agents impose limitations on its applications. To address this challenge, a greener approach employing plant extracts as reducing agents has been explored, with the potential to facilitate the utilization of AgNP in human wound healing applications. This research program aims to comprehensively investigate the antibacterial and wound healing properties of AgNP synthesized from plant extracts, particularly focusing on selected Malaysian herbs. The screening process identified plant extracts with high reducing ability and antioxidant activity, resulting in higher yields of AgNP. The synthesis of AgNP using plant extracts obtained from tissue culture requires optimization of plant growth as a prerequisite for efficient bioreduction of AgNP. The biosynthesized AgNP exhibits characteristic features, including peaks in the UV-Vis spectrum at approximately 430 nm, spherical and heterogeneous shapes with sizes ranging from 10 to 50 nm, and remarkable antibacterial activity. Additionally, immobilizing the biosynthesized AgNP onto aluminosilicates such as zeolites and kaolinite demonstrates their sustained antibacterial efficacy. Therefore, the bio-inspired green synthesis of AgNP using plant extracts holds great promise as an antibacterial wound healing agent.

Keywords: Silver nanoparticles; biosynthesis; antibacterial; wound healing

P-009

Development of Mobile App for the Understanding of Nanomedicine

Nik Ahmad Nizam Nik Malek[a,b]*,Corrienna Abdul Talib[c], Nur Shafina Mohd Nor[c], Ibrohim[d], Juan Matmin[b,e], Lee Siew Ling[b,e], Praseetha Prabhakaran[a], Nor Suriani Sani[f]
[a]Department of Biosciences, Faculty of Science, Universiti Teknologi Malaysia, 81310 UTM Johor Bahru, Johor, Malaysia
[b]Centre for Sustainable Nanomaterials (CSNano), Ibnu Sina Institute for Scientific and Industrial Research (ISI-SIR), Universiti Teknologi Malaysia, 81310 UTM Johor Bahru, Johor, Malaysia
[c]Department of Educational Sciences, Mathematics and Creative Multimedia, Faculty of Social Sciences and Humanities, Universiti Teknologi Malaysia, 81310 UTM, Skudai, Johor, Malaysia
[d]Biology Department, Faculty of Mathematics and Natural Sciences, State University of Malang, Indonesia
[e]Department of Chemistry, Faculty of Science, Universiti Teknologi Malaysia, 81310 UTM Johor Bahru, Johor, Malaysia
[f]Institute of Human Centered Engineering (iHumEn), Department of Deputy Vice Chancellor (Research & Innovation), Universiti Teknologi Malaysia, 81310 UTM Johor Bahru
*Corresponding author: niknizam@utm.my

Abstract
Nanomedicine, an emerging field at the intersection of nanotechnology and medicine, holds great promise for revolutionizing healthcare by enabling targeted diagnostics and treatments at the molecular level. However, due to its complex nature, understanding nanomedicine concepts and applications can be challenging for healthcare professionals, researchers, and the general public. To bridge this knowledge gap and promote awareness, we present the development of a mobile application aimed at enhancing the understanding of nanomedicine, and we named it as “MyNanoRia”. The MyNanoRia provides users with easily available knowledge about the concepts, methods, and applications of nanomedicine as an interactive educational tool. Specific facets of nanotechnology, nanomedicine, nanomaterials, and cancer are covered in this app. MyNanoRia also includes definitions for certain key words. This app's creation required consulting subject-matter specialists, such as chemists, biologists, and medical scientists. The development of MyNanoRia is challenging since nanotechnology is a multidiscipline topic that truly emphasises scientific understanding, but the intended users are those who know little to nothing about it. The creation of MyNanoRia app for comprehending nanomedicine seeks to close the knowledge and awareness gap between science and the general public, enabling researchers, healthcare professionals, and the general public to fully appreciate the promise of nanotechnology in healthcare.

Keywords: Nanomedicine, mobile app, nanotechnology

P-010

Multifaceted Computational Analysis of Phytosynthesized Silver Nanoparticles (AgNPs) towards Resistant Bacteria

Atieya Abdul Hadi[a], Nik Ahmad Nizam Nik Malek[a,b]*, Syazwani Itri Amran[a], Juan Matmin[c], Hendra Susanto[d]
[a]Department of Biosciences, Faculty of Science, Universiti Teknologi Malaysia, 81310 Johor Bahru, Johor, Malaysia
[b]Centre for Sustainable Nanomaterials (CSNano), Ibnu Sina Institute for Scientific and Industrial Research (ISI-ISIR), Universiti Teknologi Malaysia, 81310 UTM Johor, Malaysia
[c]Department of Chemistry, Faculty of Science, Universiti Teknologi Malaysia, 81310 Johor Bahru, Johor, Malaysia
[d]Department of Biology, State University of Malang, Indonesia
*Corresponding author: niknizam@utm.my

Abstract
In recent years, computational methods have enabled accurate simulations and cost-effective drug design for nanomaterial applications. Phytosynthesized silver nanoparticles (AgNPs) from *Persicaria odorata* extract have broad bactericidal activity that obscures their accurate antibacterial mechanisms, preventing significant progress as potential drugs. In this study, computational approaches using STITCH 5.0, molecular docking and density functional theory (DFT) were used to investigate the binding affinities between AgNPs and bacterial proteins of *Pseudomonas aeruginosa* and methicillin-resistant *Staphylococcus aureus*. The STITCH 5.0 analysis showed that AgNPs have a high confidence value of ≥ 0.8 for the membrane-bound efflux proteins of *P. aeruginosa* associated with bacterial resistance. In contrast for MRSA, AgNPs bind to various intrinsic proteins that disrupt cell homeostasis with a confidence value of > 0.6. Molecular docking analyses showed that flavonoids in *P. odorata* have the ability to specifically inhibit target proteins and promote bactericidal activity. DFT studies of the frontier molecular orbitals (HOMO and LUMO) and molecular electrostatic potential (MEP) revealed that flavonoid Procyanidin A1 has active conjugation sites, which accounts for its outstanding antioxidant ability. The results of this work demonstrate that the effective bactericidal interaction between AgNPs and flavonoids of *P. odorata* against drug-resistant bacteria can be essentially inferred using reliable computational tools, which may accelerate the development of effective antimicrobial agents for the future.

Keywords: Silver nanoparticles; antibacterial; computational; Density Functional Theory; docking

P-011

Synergistic Antibacterial Effect of Silver Nanoparticles using *Zingiber officinale* and *Azadirachta indica*

Sharel Raj[a], Nik Ahmad Nizam Nik Malek[a,b]*, Praseetha Prabhakaran[a,c], Mohd Hayrie Mohd Hatta[d], Rabiatul Basria S.M.N. Mydin[e],
[a]Department of Biosciences, Faculty of Science, Universiti Teknologi Malaysia (UTM), 81310 Skudai, Johor, Malaysia
[b]Centre for Sustainable Nanomaterials (CSNano), Ibnu Sina Institute for Scientific and Industrial Research (ISI-ISIR), Universiti Teknologi Malaysia (UTM), 81310 Skudai, Johor, Malaysia
[c]Cancer and Infectious Diseases (CAID) Research Group, Universiti Teknologi Malaysia, 81310 Skudai, Johor, Malaysia
[d]Centre of Research & Development, Asia Metropolitan University, 81750 Johor Bahru, Malaysia
[e]Researcher of Advanced Medical & Dental Institute (AMDI), Universiti Sains Malaysia, 13200 Kepala Batas, Pulau Pinang, Malaysia
*Corresponding author: niknizam@utm.my

Abstract
Infections from multidrug-resistant bacteria are increasing worldwide. Therefore, our study was aimed to biosynthesize silver nanoparticles (AgNPs) using *Zingiber officinale* and *Azadirachta indica* aqueous extracts. Ultraviolet-visible spectrophotometry (UV-Vis) was utilized to characterize the synergistic biogenic AgNPs. The results demonstrated the extracts' potential to act as stabilizing and reducing agents. Biosynthesized AgNPs were evaluated for synergistic antibacterial activity against *Escherichia coli* (*E. coli*) ATCC 11229 using disk diffusion assay. The zones of inhibition proved that synergistic AgNPs have significant antibacterial effects against *E. coli*. The results suggest that the synergistic effects of biosynthesized medicinal plants may provide an alternative to commercial antibiotics.

Keywords: Antibiotic-resistance; *Z. officinale*; *A. indica*; synergistic; antibacterial activity

P-012

Promising Development of Polyhydroxyalkanoates: A Sustainable Bioplastic for Next Generation Biomaterial

Vigneswari Sevakumaran
Institute of Marine Biotechnology, Universiti Malaysia Terengganu, 21030 Kuala Nerus, Terengganu, Malaysia
Corresponding author: vicky@umt.edu.my

Abstract
Bacterial plastic is plastic which is produced by microorganisms under specific conditions. Polyhydroxyalkonoates (PHAs) are bacterial plastics that bacteria produce under conditions of low concentrations of important nutrients. This bacterial derived biopolymer is highly sought after by researcher's world over due to its high levels of biocompatibility and inert *in-vivo* degradation products. This makes it a desirable candidate to be tailored as scaffolds for tissue engineering and regenerative medicine. Therefore, PHAs are being extensively innovated for biomedical applications. The wide range of biomedical applications includes drug delivery systems, implants, tissue engineering, scaffolds, and artificial organ constructs. Among the various types of PHAs, P(3HB-*co*-4HB) had gained much attention due to their biodegradability, biocompatibility, and non-cytotoxicity. In order to increase the cell-scaffold interactions and to enhance the cell proliferation, surface modification of the PHA copolymer was carried out. PHAs in various forms are being extensively researched for biomedical applications so as to bring about the future vision for PHAs as biomaterials for the advancement of research and technology. Various surface modification methods such as nanofabrication and chemical modification are employed to develop this bacterial polymer for potential biomedical application.

Keywords: polyhydroxyalkanotaes; biocompatibility; biodegradable

P-014

Basil/ZnO as Green Materials towards Removal of Amilodipine-Based Pharmaceutical Waste

Nur Nadia Batrisyia Arman[a], Siti Salwa Alias[a,b]*, Nik Ahmad Nizam Nik Malek[b,c], Muhammad Hariz Asraf[c]
[a]Department of Physics, Faculty of Science, Universiti Teknologi Malaysia, 81310 Skudai, Johor Bahru, Malaysia
[b]Centre for Sustainable Nanomaterials (CSNano), Ibnu Sina Institute for Scientific and Industrial Research (ISI-ISIR), Universiti Teknologi Malaysia, 81310 UTM Johor, Malaysia
[a]Department of Biosciences, Faculty of Science, Universiti Teknologi Malaysia, 81310 Skudai, Johor Bahru, Malaysia
*Corresponding author: siti.salwa@utm.my

Abstract
Pharmaceutical waste such as amlodipine has caused major environmental problems due to the inefficiency of the pharmaceutical waste removal system. However, the study obtained that amlodipine is facing pharmaceutical disposal issues by using the incineration process. Photocatalysts are materials that change the rate of a chemical reaction on exposure to light. Nanostructure ZnO is a photocatalysis material based on the larger initial rates of activities and its absorption efficiency of solar radiations that can be produced using several methods such as hydrothermal while Ag nanoparticles (AgNPs) as heterogeneous photocatalysis. However, there are limitations while using hydrothermal process to produce ZnO nanoparticles. Thus, in this study, the optimum characteristics of nanostructures ZnO adapted from other studies and nanoparticle Ag will be coated on 0.5 g green basil seed to create basil/ZnO/Ag (BZAg). The finest morphology and optical characteristics of BZAg will be chosen for green adsorption-photodegradation of amlodipine at 5 mg. Synthesis nanostructure ZnO using zinc nitrate (precursor), ethanol as solvent, and NaOH as additive to control alkaline condition of solution. Hydrothermal at high temperature was chosen as the synthesis method and calcination was used to remove any impurities during the synthesis process. Several characterisation techniques including X-ray diffraction (XRD), high-resolution transmission electron microscopy (HRTEM) and photoluminescence (PL) were used to characterise the structural properties of nanostructure ZnO. Meanwhile the optical properties of nanostructure ZnO was determined by ultraviolet-visible (UV-Vis) spectroscopy and Raman spectroscopy. Next, by using Fourier transform infrared (FTIR), O-H bond can be detected, and the production of the material could be confirmed. The composite of BZAg is obtained using a direct coating method and characterise its physical properties by optical microscope (UV-Vis). Later the adsorption, photocatalytic and self-cleaning of BZAg towards 5 mg amlodipine-based pharmaceutical waste was determined in dark and under UV light irradiation for 4 hours. XRD and HRTEM results show the synthesised ZnO has nanorod hexagonal structure with the average size of 44.6 nm. The UV-Vis analysis obtained the band gap energy (Eg) of in a range ~3.19 eV. From this study, the sustainability of pharmaceutical disposal technology could ensure better quality of environment and water for the future generations. Initiatives like these can cut waste and emissions alike and help to gain public favour as consumers continue to go green in their purchasing habits of sustainable development goal 6 (Clean water and sanitation) and goal 14 (Life below water).

Keywords: Amlodipine; synthesis ZnO; hydrothermal; structural properties; green adsorbent

P-015

In vitro Inhibitory Effect of Andrographolide on Fatty Acid Synthesis in Breast Cancer

Nur Amanina Johari[a], Nurriza Ab Latif[a], Rosnani Hasham[b,c], Khairunadwa Jemon[a,*]
[a]Department of Biosciences, Faculty of Science, Universiti Teknologi Malaysia, 81310, Skudai, Johor
[b]Institute of Bioproduct Development, Universiti Teknologi Malaysia, 81310 Skudai, Johor
[c]Department of Bioprocess and Polymer Engineering, School of Chemical and Energy Engineering, Faculty of Engineering, Universiti Teknologi Malaysia, 81310 Skudai, Johor
*Corresponding author: khairun_nadwa@utm.my

Abstract
Deregulated fatty acid synthesis has emerged as a promising cancer therapeutic target. However, a safe and effective fatty acid synthesis inhibitor is clinically limited. This study aims to investigate the inhibitory effect of Andrographolide (ADR) on fatty acid synthesis in MCF7 breast cancer cells. MCF7 cells were treated with different ADR concentrations prior to flow cytometry and immunocytochemistry (ICC) analyses. ICC staining revealed that ADR significantly reduced key proteins for fatty acid synthesis. Furthermore, ADR treatment also significantly increased the number of apoptotic cells compared to untreated. Results from this study suggest that ADR-induced cell death resulted from fatty acid synthesis inhibition in breast cancer.

Keywords: Andrographolide; fatty acid synthesis; breast cancer; apoptosis

P-016

Chemo-Photothermal Effects of Drug-Loaded Nanomaterial in Breast Cancer Immunoregulation

Muhammad Redza Mohd Radzi[a], Maheza Irna Mohamad Salim[b], Nik Ahmad Nizam Nik Malek[a,c], Khairunadwa Jemon[a,d,*]
[a]Department of Biosciences, Faculty of Science, Universiti Teknologi Malaysia (UTM), 81310 Skudai, Johor, Malaysia
[b]Diagnostics Research Group, School of Biomedical Engineering and Health Sciences, Universiti Teknologi Malaysia (UTM), 81310 Skudai, Johor, Malaysia
[c]Centre for Sustainable Nanomaterials (CSNano), Ibnu Sina Institute for Scientific and Industrial Research (ISI-ISIR), Universiti Teknologi Malaysia (UTM), 81310 Skudai, Johor, Malaysia
[d]Cancer and Infectious Diseases Research Group, Health and Wellness Research Alliance, Universiti Teknologi Malaysia (UTM), 81310 Johor Bahru, Johor, Malaysia
*Corresponding author: khairun_nadwa@utm.my

Abstract
Chemo-photothermal therapy is one of the potential alternative strategies to treat breast cancer. Nevertheless, knowledge on its immunotherapeutic benefits in tumour microenvironment were still scarce. Hence, this study aimed to investigate the immunomodulatory effects in tumour microenvironment. Present study performed flow cytometry analysis to target immune cells post-treatment. The results displayed significant infiltration in the percentage of $CD4^+$, $CD8^+$, macrophages and NK cells population ($P>0.05$). Moreover, treated tumour recorded low frequency of Tregs population. Altogether, this study revealed that treatment strategy promoted the infiltration of adaptive and innate immune cells in breast tumour microenvironment.

Keywords: Breast cancer, nanomaterials, chemotherapy, phototherapy, immunoregulation

P-017

Diversity Of Bacterial Communities in The Southern Kuantan Coastal Water Area

Najatul Su Ad Abdullah[a,b*], Muhammad Asraf Ridhuan Sapiee[a], Muhammad Faiz Hanapiah[a], Mohd Azrul Naim[b]
[a]Department of Marine Science, Kulliyyah of Science, International Islamic University Malaysia.
[b]Research Unit for Bioinformatics and Computational Biology (RUBIC), Kulliyyah of Science, International Islamic University Malaysia (IIUM), Kuantan, Pahang, Malaysia.
*Corresponding author: najatul@iium.edu.my

Abstract
The Southern Kuantan coastal water areas is previously undocumented for coral reefs, but the richness of its benthic biodiversity have an impact on the abundance and diversity of bacterial communities living in various organic matter sources, which is in the seawater and sediment. Bacterial communities within the coral reef habitat may interact and provide corals with essential services like biogeochemical activities in the aquatic ecosystem. This research is pioneer to investigate the bacterial community in the southern Kuantan coastal water area via 16s rRNA amplicon sequencing. A total of 14 distinct phyla were identified, with Proteobacteria being the most prevalent and followed by Bacteriodota. Several families such as Thiobacillaceae, Actinomarinaceae, Enterobacteriaceae, and Aeromonadaceae can only be found in specific source samples, suggesting that bacterial communities may be shaped due to fluctuating environments. By performing bacterial gene analysis, it is possible to better understand the diversity of bacterial communities based on their relative abundance and interactions within the marine ecosystem.

Keywords: Bacterial communities; coral reefs; Kuantan coastal water

P-020

Increased Number of CD4+ and CD8+ T Cells in the Thymus of Mice (*Mus musculus*) Exposed to Cigarette Smoke After Administration of Java plum (*Syzgium cumini*) Fruit Extract

A A S A Sukmaningsih K*, Ngurah Intan Wiratmini, Ni Made Rai Suarni
Biology Study Program, Faculty of Mathematics and Natural Sciences, Udayana University, Bukit Jimbaran, Badung, Bali, Indonesia 80364
*Corresponding author: sukmaningsih@unud.ac.id

Abstract
Java plum fruit has an activity to reduce free radicals. Uncontrolled free radicals will reduce the immune system in the body. This study aims to determine the compounds, antioxidant activity, and potential of java plum fruit as an immunomodulator. An immunomodulator is a compound or substance that affects the humoral and cellular immune systems. The study was conducted on differences in the number of CD4+ and CD8+ T cells in the thymus of mice exposed to cigarette smoke for 35 days. Java plum that has been freeze-dried is macerated with water. The mice were divided into a control group (KO), commercial cigarettes (K1), java plum fruit extract (K2), cigarettes and java plum fruit extract (K3), as well as a group of mice with cigarettes and java plum fruit extract which were applied to the filter (K4). Java plum fruit extract was administered orally at a dose of 180 mg/kg BW along with exposure to cigarette smoke and java plum fruit extract was coated on cigarette filters at a dose of 180 mg/kg BW. The results showed that java plum fruit extract had an IC50 activity value against DPPH in the very strong category, namely 24.15 mg/L. LCMS data shows java plum fruit extract has various kinds of antioxidants. Flow cytometry analysis of T lymphocyte cells isolated from the thymus that expressed CD4+ and CD8+ showed that java plum fruit extract given to mice orally or applied to cigarette filters was able to increase the number of CD4+ and CD8+ T cells significantly ($p<0.05$). CD4+ T cells increased by 70% (3.6 million cells), and CD8+ T cells increased by 38% (3.1 million cells).

Keywords: *Syzgium cumini*; cigarette smoke; CD4+; CD8+

P-021

Rosmarinic Acid-Rich Fraction from *Orthosiphon aristatus* Induces Apoptosis in Prostate Cancer Cells

Rosnani Hasham[a,b]*, Siti Hasyimah Suhaimi[a], Rahimah Sabtu[a]
[a]Department of Bioprocess and Polymer Engineering, Faculty of Chemical Engineering, Universiti Teknologi Malaysia, 81310 Skudai, Johor, Malaysia
[b]Centre for Sustainable Nanomaterials (CSNano), Ibnu Sina Institute for Scientific and Industrial Research, Universiti Teknologi Malaysia, 81310 Skudai, Johor, Malaysia
*Corresponding author: r-rosnani@utm.my

Abstract
Prostate cancer is one of the most commonly diagnosed cancers in men. High expression of androgen has been identified as the main contribution to this disease. Almost all prostate cancers begin with an androgen-dependent prostate cancer state, which then develops into androgen-independent prostate cancer or castration-resistant prostate cancer. Activation of the PI3K/Akt/mTOR pathway has often been found in many cases of castration-resistant prostate cancer. This pathway is identified as a powerful pathway for the inhibition of prostate cancer. Several herbal plants have been reported for their anti-cancer ability to inhibit the pathways of PI3K/Akt/mTOR due to their phytochemical content. Thus, this project focused on recent plant phytochemical findings that inhibit the PI3K/Akt/mTOR pathway to induce apoptosis, as well as the new extraction techniques used to obtain the bioactive compound that inhibits the PI3K/Akt/mTOR pathway. On the other hand, cancer nanotechnology, also known as drug design and development, uses a variety of nanotechnologies to promote the fundamental problems with cancer treatments and to create safer and more effective therapeutics. In our recent studies, we have developed chitosan-based nanoparticles for targeted drug delivery systems for anti-cancer agents from plants due to their favorable biodegradability and biocompatibility qualities.

Keywords: Anti-cancer; plant extract nanotechnology; targeted delivery

P-022

Synergistic Effects of Combined Cisplatin and *Clinacanthus nutans* Extract on Triple Negative Breast Cancer Cells

Nur Fitriyani Afiqah Binti Abu Bakar[a], Yeo Zhin Leng Yeo[a], Faisal Hussin[b], Priya Madhavan[c], Vuanghao Lim[d], Khairunadwa Jemon[a], and Praseetha Prabhakaran[a]
[a]Department of Biosciences, Faculty of Science, Universiti Teknologi Malaysia, Skudai, Malaysia
[b]Department of Chemistry, Faculty of Science, Universiti Teknologi Malaysia, Skudai, Malaysia
[c]School of Medicine, Faculty of Health and Medical Sciences, Taylor's University, Subang Jaya, Malaysia
[d]Advanced Medical and Dental Institute, Universiti Sains Malaysia, Kepala Batas, Penang, Malaysiaa
*Corresponding author: praseetha@utm.my

Abstract
Triple negative breast cancer (TNBC) is the most invasive breast cancer subtype enriched with cancer stem cells. TNBCs do not express estrogen, progesterone, or human epidermal growth factor receptor 2 (HER2) receptors, making them difficult to be targeted by existing chemotherapy treatments. In this study, we attempted to identify the effects of combined cisplatin and *Clinacanthus nutans* treatment on MDA-MD-231 and MDA-MB468 breast cancer cells, which represent TNBC subtypes. The phytochemical fingerprint of *C. nutans* ethanolic leaf extract was evaluated by LC-MS/MS analysis. We investigated the effects of cisplatin (0-15.23 mg/mL), *C. nutans* (0-50 mg/mL), and a combination of cisplatin (3.05 mg/mL) and *C. nutans* (0-50 mg/mL), on cell viability, proliferation, apoptosis, invasion, mRNA expression in cancer stem cells (CD49f, KLF4), and differentiation markers (TUBA1A, KRT18) in TNBC cells. In addition, we also studied the interaction between cisplatin and *C. nutans*. Derivatives of fatty acids, carboxylic acid ester, and glycosides, were identified as the major bioactive compounds with potential anticancer properties in *C. nutans* leaf extract. Reductions in cell viability (0-78%) and proliferation (2-77%), as well as a synergistic anticancer effect, were identified in TNBC cells when treated with a combination of cisplatin and *C. nutans*. Furthermore, apoptotic induction via increased caspase-3/7 activity (MDA-MB-231: 2.73-fold; MDA-MB-468: 3.53-fold), and a reduction in cell invasion capacity to 36%, were detected in TNBC cells when compared to single cisplatin and *C. nutans* treatments. At the mRNA level, cisplatin and *C. nutans* differentially regulated specific genes that are responsible for proliferation and differentiation. Our findings demonstrate that the combination of cisplatin and *C. nutans* represents a potential treatment for TNBC.

Keywords: Apoptosis; cisplatin; *Clinacanthus nutans*; differentiation; Triple Negative Breast Cancer (TNBC)

P-023

Larvicidal Activity and Morphological Alteration Induced by Pulutan Leaves Extracts in *Aedes aegypty* Linn.

Ngurah Intan Wiratmini[a]*. Ni Made Suartini[a], Ni Wayan Bogoriani[b], Firman Andani[a], Tiffani Angelita Putri Mileva[a]
[a]Biology Department, Faculty of Mathematics and Natural Sciences, Udayana University, Bukit Jimbaran Campus, Badung, Bali, Indonesia
[b]Biochemistry Department, Faculty of Mathematics and Natural Sciences, Udayana University, Bukit Jimbaran Campus, Badung, Bali, Indonesia
*Corresponding author: wiratminiintan@unud.ac.id

Abstract
Synthetic larvicides are known to bring harmful effects to the environment as well as promoting resistance in disease vectors including *Aedes aegypti.* Pulutan (*Urena lobata* L.) is a plant known for its potential use as natural larvicides due to its content of secondary metabolites (i.e. alkaloids and flavonoids). This study aimed to investigate the larvicidal activity and morphological alteration of *Aedes aegypti* larvae induced by *pulutan* leaves extract. This experimental, completely randomized design study used various concentration of *pulutan* crude leaves extract (0%; 0.1%; 0.5%; 1%; 1.5%; 2%; 2.5%; 3%; and 3.5%), previously dissolved in 96% of ethanol, then administered to twenty 3rd instar *Aedes aegypti* larvae. Post-hoc Mann-Whitney analysis result showed that controls, 0.1% and 0.5% concentration group were significantly different ($p<0.05$), while the rest showed 100% mortality rate ($p>0.05$). In conclusion, 0.1%; 0.5%; and 1-3.5% of *pulutan* (*Urena lobata* L.) leaves extract was associated with 10%; 55%; and 100% mortality rate in in *Aedes aegypti* larvae, respectively. The observed morphological alterations of *Aedes aegypti* larvae including body color; increased length of larval neck; antennal damage; narrowed digestive tract; widened anal segment; irregular growth of hair (setae) on thorax, abdomen, and anal segment; as well as hair loss on segment 4-7.

Keywords: *Urena lobata* L.; mortality; morphology; larvae

P-024

Ultrasound-Assisted Extraction (UAE) of Ajwa Date Seed (*Phoenix dactylifera* L.): RSM-Based Optimisation for Extract's Total Yield and UPLC-QTOF/MS Characterisation of its Saccharides

P. Thirubuvanesvari-Duraivelu[a], Siti Salwa Abd Gani[a,b,c,*], Masriana Hassan[d], Mohd Izuan Effendi Halmi[e]
[a]Natural Medicine and Product Research Laboratories (NaturMeds), Institute of Bioscience (IBS), Universiti Putra Malaysia (UPM), 43400 Serdang, Selangor, Malaysia
[b]Halal Products Research Institute (HPRI), Universiti Putra Malaysia (UPM), Putra Infoport, 43400 Serdang, Selangor, Malaysia
[c]Department of Agriculture Technology, Faculty of Agriculture, Universiti Putra Malaysia (UPM), 43400 Serdang, Selangor, Malaysia
[d]Department of Pathology, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia (UPM), 43400 Serdang, Selangor, Malaysia
[e]Department of Land Management, Faculty of Agriculture, Universiti Putra Malaysia (UPM), 43400 Serdang, Selangor, Malaysia
*Corresponding author: ssalwaag@upm.edu.my

Abstract
Often overlooked as waste in the date industries, date seed possesses a plethora of untapped health benefits and nutraceutical components yearning to be discovered. Current study applies Box-Behnken design via response surface methodology (RSM) in optimising the ultrasound–assisted extraction (UAE) conditions namely, ethanol (EtOH) concentration, extraction time and temperature) for the recovery of phytoconstituent from Ajwa date seeds (*Phoenix dactylifera* L.). Identification of saccharides that unveils the sugar rich matrix in date seed and oftentimes embedded to secondary metabolites were evaluated using UPLC-QTOF/MS. Optimum conditions for the retrieval of an in-range total yield were found to be at 77% EtOH, 39 min and 70°C. Under the optimised condition, the experimental total yield (0.270 ± 0.0063 g/2g powder) closely aligned with the predicted value, validating the suitability of the developed model. Furthermore, principal carbohydrate components revealed in the extract include isomaltose, mannotriose, galactose, raffinose and stachyose, while secondary metabolite with glycosidic linkage, such as spinosin, homoplantaginin and kaempferol-3-O-β-D-glucopyranoside was tentatively identified via UPLC-QTOF/MS analysis. These results provide the basis for future investigation of date seed nutritional value which could serve as functional food for human apart from listing the saccharide rich matrix that interacts with the secondary metabolites.

Keywords: Date seed; response surface methodology (RSM); total yield; UPLC-QTOF/MS; saccharides

P-025

Molecular Docking, Dynamic Simulation, and ADMET Studies of Caulerpin Performed HMG-CoA Reductase Inhibition

Dewi Ratih Tirto Sari[a,b*], Siti Dina Mega Araofah[a]
[a]Pharmacy Department, Faculty of Medical Science, Ibrahimy University, Situbondo, East Java, Indonesia
[b]Research Center of SMONAGENES, Brawijaya University, Malang, East Java, Indonesia
*Corresponding author: dewiratihtirtosari@ibrahimy.ac.id

Abstract
Caulerpin is a red pigment of the caulerpaceae green algae family, promoting anticancer, anti-inflammatory, antiviral, and antimicrobial properties. Caulerpin also possess unique structural moiety and well known inhibited the cancer cell. However, the inhibition of caulerpin in cholesterol synthesis has not been reported yet. Therefore, the current study tested caulerpin against HMG-CoA reductase by molecular docking, dynamic simulation, and ADMET predictions. The caulerpin was carried out the 3D structure from PubChem Database, while the HMG-CoA reductase was downloaded from Protein Data Bank with accession number 1HWI. Caulerpin and HMG-CoA reductase was interacted using molegro virtual docker version 5.0. the docking results were visualized by Discovery Studio ver 21.1.1. Dynamic simulation of ligand – protein was performed by Webgro. The ADMET properties was conducted by PKCSM online server. The docking study performed interaction of caulerpin with several active sites of HMG-CoA reductase protein and generated lower binding energy than Fluvastatin. Besides that, the caulerpin might inhibited HMG-CoA reductase allosterically. The molecular dynamic revealed the stability of caulerpin – HMG-CoA reductase interactions, ADMET study also showed a proper absorption, distribution, metabolism, excretion, and low toxicity. This study suggested that the caulerpin potentially blocked HMG-CoA reductase and revealed a potential drug for hypercholesterolemia.

Keywords: ADMET properties; caulerpin; dynamic simulation; hypercholesterolemia; molecular docking

P-026

Salivary Protein as Biomarker for Early Childhood Caries

Noraslinda Muhamad Bunnori[a,e*], Nor Asilah Harun[c,d], Mohd Zamani Zulkifli[b,e], Siti Nurul Fatihah Azahan[b,e], Husna Saidin[a], Khazlin Afiqah Khazan[a]
[a]Department of Biotechnology, Kulliyyah of Science, International Islamic University Malaysia, 25200 Kuantan, Pahang, Malaysia
[b]Department of Physics, Kulliyyah of Science, International Islamic University Malaysia, 25200 Kuantan, Pahang, Malaysia
[c]Department of Paediatric Dentistry and Dental Public Health, Kulliyyah of Dentistry, International Islamic University Malaysia, 25200 Kuantan, Pahang, Malaysia
[d]Dental and Maxillofacial Surgery Unit, Sultan Ahmad Shah Medical Centre (SASMEC), 25200 Kuantan, Pahang, Malaysia
[e]IIUM Photonics and Quantum Centre (iPQC), Kulliyyah of Science, International Islamic University Malaysia, 25200 Kuantan, Pahang, Malaysia
*Corresponding author: noraslinda@iium.edu.my

Abstract
Early childhood caries (ECC) has a significant global impact on children's oral health-related quality of life (OHRQoL). Early screening is crucial, and salivary protein has emerged as a promising biomarker for ECC detection. This study explores the potential of salivary protein as a biomarker for ECC, investigating its correlation with caries activity through the analysis of total protein concentration, protein profiles, refractive index, and biophotonic detection using a single-mode fiber. The study examines correlations between caries-free individuals, those with low caries activity, and those with high caries activity, based on total salivary protein concentration measured using the Bradford Assay and salivary protein profiles characterized by SDS PAGE. Samples from Group 3 (HC6) with the highest dmft score and Group 1 (CF1) with the cleanest teeth were selected to explore the potential of biophotonic application in measuring total salivary protein. The protein concentration in Group 3 (high caries group) was 1.015 ± 0.03 mg/mL, the highest among the groups. SDS PAGE analysis revealed various salivary protein bands with molecular weights ranging from 10.5 to 175 kDa, potentially corresponding to albumin, secretory IgA, lactoferrin, amylase, enolase 1, zinc-α2-glycoprotein, and basic and acidic PRPs. Measurements of the refractive index (RI) showed a higher RI value for the sample from Group 3 compared to the sample from Group 1, indicating differences between individuals with higher caries activity and caries-free individuals. Biophotonic analysis using a single-mode fiber demonstrated that different concentrations of total protein exhibited distinct spectra. These findings suggest that total salivary protein concentration can serve as a biomarker for ECC.

Keywords: Early childhood caries; salivary protein; biomarker; biophotonic

P-027

The Antioxidant Properties of Active Fraction of The Cashew Shoots (*Anacardium occidentale*)

Normah Haron[a]*, Puteri Nur Farahin[a], Noor Hasniza Mat Zin[a], Deny Susanti Darnis[b]
[a]Department of Biotechnology, Kulliyyah of Science, International Islamic University Malaysia (IIUM), Jln Sultan Ahmad Shah, 25200 Kuantan, Pahang, Malaysia.
[b]Department of Chemistry, Kulliyyah of Science, International Islamic University Malaysia (IIUM), Jln Sultan Ahmad Shah, 25200 Kuantan, Pahang, Malaysia
*Corresponding author: normahh@iium.edu.my

Abstract
Cashew shoots (*Anacardium occidentale)* exhibits high antioxidant activity to control lipid peroxidation and scavenge free radicals and contribute to the antidiabetic properties. In this study, the *A. occidentale* shoots crude extract was fractionated into four fractions, namely *n*-hexane, ethyl acetate, *n*-butanol and water fractions. The active fraction of *A. occidentale* shoots extract was identified by comparing the antioxidant activity using the DPPH assay, the concentration of selected polyphenol compounds (gallic acid, ferulic acid, quercetin and kaempferol) through HPLC analysis. The presence of flavonoids (myricetin, quercetin and kaempferol) in the active fraction of *A. occidentale* shoots extract were further determined through LC/MS-QTOF and H-NMR analysis. Results showed that the ethyl acetate fraction of *A. occidentale* shoots extract had the lowest EC_{50} value (0.011 ± 0.001 mg/mL) in the DPPH assay, indicated the highest antioxidant activity as compared to other fractions ($p<0.05$). For the HPLC analysis, the same fraction (ethyl acetate) was found to have highest concentration of gallic acid (117.14 ± 2.63 µg/g) and ferulic acid (9.77 ± 0.47 µg/g) ($p<0.05$) as compared to other fractions of *A. occidentale* shoots extract. However, the quercetin was observed in ethyl acetate, hexane and butanol fractions with the highest concentration of 16.25 ± 1.11 µg/g in ethyl acetate fraction. High concentration of polyphenols in ethyl acetate fraction of *A. occidentale* shoots extract indicated its high antioxidant activity. Therefore, the ethyl acetate fraction of *A. occidentale* shoots extract was considered as the most active fraction in terms of highest antioxidant activity and highest content of polyphenol compounds (gallic acid, ferulic acid and quercetin). The ethyl acetate fraction of *A. occidentale* shoots extract was then further characterized by using LC/MS-QTOF and H-NMR analysis. It was found that the flavonoids (myricetin, quercetin and kaempferol) are present in ethyl acetate fraction of *A. occidentale* shoots extract.

Keywords: antioxidant activity; *Anacardium occidentale*; DPPH assay; HPLC analysis; ethyl acetate fraction

P-028

Optimization of Qiagen Argus X-12 QS Investigator Kit for blood samples on FTA card for kinship investigations

Aedrianee Reeza Alwi[a,b], Naji Arafat Mahat[c,d]*, Faezah Mohd Salleh[a], Seri Mirianti Ishar[e], Mohammad Rahim Kamaluddin[f] and Mohd Radzniwan A. Rashid[g]
[a]Department of Biosciences, Faculty of Science, Universiti Teknologi Malaysia (UTM), 81310 Johor Bahru, Johor, Malaysia
[b]Department of Chemistry Malaysia, Jalan Abdul Samad, 80100 Johor Bahru, Johor, Malaysia
[c]Department of Chemistry, Faculty of Science, Universiti Teknologi Malaysia (UTM), 81310 Johor Bahru, Johor, Malaysia
[d]Centre for Sustainable Nanomaterials, Ibnu Sina Institute for Scientific and Industrial Research, Universiti Teknologi Malaysia (UTM), 81310 Johor Bahru, Johor, Malaysia
[e]Faculty of Health Sciences, Universiti Kebangsaan Malaysia (UKM), 43600 Bangi, Selangor, Malaysia
[f]Psychology and Human Well Being Research Centre, Faculty of Social Sciences and Humanities, Universiti Kebangsaan Malaysia (UKM), 43600 Bangi, Selangor, Malaysia
[g]Family Medicine Unit, Faculty of Medicine and Health Science, Universiti Sains Islam Malaysia (USIM), Bandar Baru Nilai, 71800, Nilai, Negeri Sembilan, Malaysia.
*Corresponding author: naji.arafat@utm.my

Abstract
The utilization of X-chromosomal short tandem repeats (X-STRs) analysis has been proven useful for forensic investigation particularly in resolving complex kinship cases. The Qiagen Argus X-12 QS Investigator Kit enables co-amplification of 12 X-STRs as well as Amelogenin for sex determination and one autosomal marker. Considering that the X-STRs analysis has yet to be incorporated in forensic DNA caseworks in Malaysia, optimization of Qiagen Argus X-12 QS Investigator Kit proves relevant for ensuring the reliability and validity of the analysis. The optimization studies were performed on blood samples on FTA card using the reduced polymerase chain reaction (PCR) volume and capillary electrophoresis sample preparation based on the relevant internal validation parameters (*viz.*, cycle sensitivity, analytical threshold, sensitivity and stochastic, accuracy and precision, concordance and contamination assessment). Under the optimized conditions (purified 1.2 mm blood sample on FTA card, 10 µL of PCR reaction at 21 cycles, 27 s capillary electrophoresis injection time), good DNA profiles were obtained with peak height ratios above 0.7 and heterozygous peak heights in relative fluorescent unit ranging between 3,000 and 12,000. Hence, the optimization studies provided acceptable results, consistent with the the quality assurance standards for forensic DNA testing laboratories, while improving the cost effectiveness of the analysis.

Keywords: Optimization; X-STRs; Qiagen Argus X-12 QS Investigator Kit; blood samples; reduced PCR volume

P-029

Review of Forensic Anthropological Assessment of Skulls for Sex, Age and Ancestry in Asian Population in Asia

Varohthini Maharaja[a], Naji Arafat Mahat[a,b]*Roswanira Abdul Wahab[a], Salina Hisham[c], Khoo Lay See[d], Dzulkiflee Ismail[e], Nurfarhana Hassan[f]
[a]Department of Chemistry, Faculty of Science, Universiti Teknologi Malaysia (UTM), 81310 Johor Bahru, Johor, Malaysia.
[b]Centre for Sustainable Nanomaterials, Ibnu Sina Institute for Scientific and Industrial Research, Universiti Teknologi Malaysia (UTM), 81310 Johor Bahru, Johor, Malaysia.
[c]Department of Forensic Medicine, Hospital Serdang, Ministry of Health Malaysia, Kajang, Malaysia.
[d]National Institute of Forensic Medicine, Hospital Kuala Lumpur, Jalan Pahang, 50586 Kuala Lumpur, Malaysia.
[e]Forensic Science Programme, School of Health Sciences, School of Health Sciences, Universiti Sains Malaysia, Health Campus, 16150 Kubang Kerian, Kelantan, Malaysia.
[f]Mathematical Sciences Studies, College of Computing, Informatics, and Media, Universiti Teknologi MARA Cawangan Johor, Kampus Segamat, Segamat 85000, Malaysia.
*Corresponding author: naji.arafat@utm.my

Abstract
Human identification is particularly important in disaster victim identification (DVI) and/or forensic investigations. As the primary confirmatory tests (e.g., DNA and fingerprint) require comparative samples and often expensive, the secondary means of identification of forensic anthropology has been acquiring popularity. Forensic anthropologists reconstruct a biological profile by establishing important anthropological traits (e.g., sex, age and ancestry) from bones like skulls using the available standards. Despite being an important contributing element for assessing anthropological traits, utilization of skulls remains scarce in Asia (the most populated continent), especially for multi-ethnicity countries like Malaysia. The current advancement of technology has resolved the limitation of absent/limited skeletal reference collection with the application of virtual anthropology. Hence, this review paper aims to highlight the overview, applications of forensic anthropological standards for human identification using computed tomography scanned images of skull in an Asian perspective, as well as its challenges and future insights.

Keywords: Forensic anthropology; skulls; Asian populations; sex; age and ancestry; computed tomography

P-030

Electrokinetic Supercharging-Capillary Zone Electrophoresis Approach by Online Preconcentration for Determination of Cocaine and Morphine in Entomological Samples

Nor Wajihan Muda[a], Naji Arafat Mahat[a,b]*Aemi Syazwani Abdul Keyon[a], Mohamed Afiq Mohamed Huri[a]
[a]Department of Chemistry, Faculty of Science, Universiti Teknologi Malaysia (UTM), 81310 Johor Bahru, Johor, Malaysia
[b]Centre for Sustainable Nanomaterials, Ibnu Sina Institute for Scientific and Industrial Research, Universiti Teknologi Malaysia (UTM), 81310 Johor Bahru, Johor, Malaysia
*Corresponding author: naji.arafat@utm.my

Abstract
Cocaine and morphine can affect the oviposition and development patterns of forensically important insects, which may subsequently affect the accuracy of the postmortem interval estimation. Hence, developing simultaneous and specific determination methods for such drugs in necrophagous larvae appears relevant. The online preconcentration technique, namely electrokinetic supercharging (EKS) with capillary zone electrophoresis (CZE), was evaluated for determination of cocaine and morphine in necrophagous insects. This method was comprehensively optimized for its buffer condition, leading electrolyte (LE), terminating electrolyte (TE), and sample injection in EKS preconcentration. The optimum conditions utilized were as follows: background electrolyte consisting of 30 mM sodium dihydrogen phosphate containing 20% methanol (v/v); hydrodynamic injection (HI) of 40 mM NaCl (50 mbar, 60 s) as the LE; sample injection (+10 kV, 20 s) followed by the HI of 100 mM L-alanine (50 mbar, 10 s) as the TE. The separation was conducted at +25 kV with UV detection at 200 nm. Calibration curves in the range of 50-300 ppb for cocaine and morphine were prepared in larvae with coefficient of determination (R^2) greater than 0.995. The limit of detection and limit of quantitation for cocaine were 35 ppb and 117 ppb, while the same for morphine were 15 ppb and 51 ppb, respectively. The percentage recoveries for cocaine and morphine were within 80-120 %. The intra- and inter-day accuracies and precision for cocaine and morphine were < 10%. Therefore, the simultaneous CZE method developed proves as sensitive and can be of applied value for determining cocaine and morphine in necrophagous larvae for forensic entomotoxicological casework.

Keywords: Forensic entomotoxicology; cocaine; morphine; larval samples; capillary zone electrophoresis

P-032

In silico Interaction of Nisin-Like *Lactococcus lactis* Bacteriocin with Selected Quorum Sensing Protein Members from *Vibrio sp.*

Ahmad 'Ammar Zainudin[a], Azzmer Azzar Abdul Hamid[a,b], Tengku Haziyamin Tengku Abdul Hamid[a,b*]
[a]Department of Biotechnology, Kulliyyah of Science, International Islamic University Malaysia, Jalan Istana, 25200 Kuantan, Malaysia
[b]Research Unit for Bioinformatics and Computational Biology (RUBIC), Kulliyyah of Science, International Islamic University Malaysia, 25200, Kuantan, Pahang, Malaysia.
*Corresponding Author: haziyamin@iium.edu.my

Abstract
Vibrio parahaemolyticus is a disease-causing bacterium responsible for acute hepatopancreatic necrosis disease (AHPND); or referred to as Early Mortality Syndrome (EMS) disease in shrimp aquaculture. Infected shrimp shows sign of pale or shrunken hepatopancreas that disrupts the digestive tract. Quorum sensing mechanism is one of a common method of communication used by bacteria in survival or adapting to the changing environment. *Vibrio parahaemolyticus* may use quorum sensing mechanism during shrimp colonisation; or in eliciting its pathogenicity. In a quorum sensing pathway, an autoinducer is initially activated which subsequently triggers other virulent gene expression. Studies have shown that there are 3 quorum sensing proteins leading to virulent gene expression: namely LuxO, AphA and OpaR. Thus, the activation or suppression of any of these proteins could antagonise the pathogen and render them harmless to the host. It is anticipated that nisin-like bacteriocin (a short peptide) from *Lactococcus lactis* was found to be able to antagonise the *V. parahaemolyticus* by disrupting or interfering with quorum sensing mechanism in bacteria. To test on this, LuxO, AphA and OpaR were computationally docked with bacteriocin from *L. lactis.* Having constructed the structures of these 3 three proteins via homology modelling, each protein was then docked with bacteriocin. Docking interaction with bacteriocin showed that LuxO bind with the lowest binding energy (-214.72 kcal/mol), followed by OpaR (-208.39 kcal/mol) and AphA (-195.29 kcal/mol). In addition to polar interaction, hydrophobic interaction plays key role in the binding of bacteriocin with LuxO, but not with AphA and OpaR. Thus, interaction of LuxO protein with bacteriocin will set series of gene expression necessary to make bacteria harmless. Thus, quorum sensing protein LuxO can be considered as a potential target in future works on antagonising *V. parahaemolyticus* to address EMS disease.

Keywords: Quorum sensing proteins; Acute Hepatopancreatic Necrosis Disease (AHPND); Early Mortality Syndrome (EMS); vibrio parahaemolyticus, nisin like bacteriocin

P-033

Anticancer Activity of *K. alvarezii* Crude Extract Collected from Sabah Coast

Nur Fatin Najihah Mat Husin[a], Anisa Natasha Jefri[a], Khairunadwa Jemon[a], Nor Rizan Kamaluddin[b], Nurriza Ab Latif[a]*
[a]Department of Biosciences, Faculty of Science, Universiti Teknologi Malaysia, 81310, Skudai, Johor.
[b]Cancer Research Centre (CaRC), Institute for Medical Research (IMR), National Institutes of Health (NIH), Block C, No.1, Jalan Setia Murni U13/52 Seksyen U13 Setia Alam, 40170 Shah Alam, Selangor, Malaysia.
*Corresponding author: nurriza@utm.my

Abstract
K. alvarezii is a red seaweed that grows abundantly in East Malaysia and found to be rich in bioactive constituents. The crude extract of *K. alvarezii* has been reported to exhibit promising pharmacological effects such as anticancer activity by suppressing the proliferation of cancer cells. This study aims to evaluate the antiproliferative and apoptosis effect of *K. alvarezii* crude extract on K562 human leukemia cells. *K. alvarezii* crude extract treatment showed cytotoxic effect by inhibiting K562 cells viability. Distinct morphological characteristic was observed on the treated cells as compared to the untreated indicating the cells undergoing apoptosis. Results from this study highlights the potential of *K. alvarezii* crude extract to have anticancer activity.

Keywords: *K. alvarezii*; anticancer; antiproliferative; apoptosis; leukemia cells

P-035

Glucose Uptake Activity of *Ganoderma lucidium* QRS 5120 in L6 Myotube Cell

Faez Sharif[a,b]*, Nur 'Aqilah Mohd Shamsuri[a], Nur Hafizah Azizan[a], Wan Abd Al Qadr Imad Wan-Mohtar[c]
[a]Department of Biotechnology, Kulliyyah of Science, International Islamic University Malaysia, Kuantan, Malaysia
[b]Research Unit for Bioinformatics and Computational Biology (RUBIC), Kulliyyah of Science, International Islamic University Malaysia, Kuantan, Pahang, Malaysia
[c]Functional Omics and Bioprocess Development Laboratory, Institute of Biological Sciences, Faculty of Science, Universiti Malaya, Kuala Lumpur, Malaysia
*Corresponding author: faez@iium.edu.my

Abstract
The increasing prevalence of diabetes mellitus alongside the advancements in industry and technology underscores the urgency to eliminate this disease. *Ganoderma lucidum*, renowned for its anti-diabetic, anti-microbial, and anti-inflammatory properties, is widely utilized as a therapeutic medication. The aim of this study was to investigate the glucose uptake activity of exopolysaccharides (EPS) derived from the identified Malaysian *Ganoderma lucidum* strain QRS 5120 on the L6 myoblast cell line. To achieve this, Ganoderma pellets were cultured using a bioreactor, and EPS were extracted from the pellet for testing its glucose uptake activity. EPS production peak at day 12 (83 g/L) of the cultivation. The extracted EPS underwent a sulfation process to enhance compound solubility and flexibility. This was confirmed by Fourier-transform infrared spectroscopy (FTIR), where sulfation resulted in a sharp vibrational stretch at 1622 cm^{-1}, while unsulfated EPS exhibited a medium stretch at 1632 cm^{-1}. The glucose uptake activity assay revealed that a significantly lower concentration of residual glucose was observed at 500 µg/L (0.43 mg/mL) and 200 µg/L (0.45 mg/mL) when compared to the control group, indicating that EPS has a stimulatory effect on glucose uptake activity in L6 myotube cell lines. Consequently, from this preliminary study, it was shown that the EPS derived from the Malaysian strain *Ganoderma lucidum* QRS 5120 exhibits glucose uptake activity in skeletal muscle cells.

Keywords: *Ganoderma lucidum*; glucose uptake; exopolysaccharides

P-036

Molecular Recognition Of Furin Cleavage Site (FCS) From Sars-CoV-2 Spike by Furin Protease (FP) using Coarse-Grained Simulation

Siti Aishah Sufira Nor Hishamuddin[a,b], Mohd Hamzah Mohd Nasir[a,b], Jeyanthi A/P Suppiah[c], Ernie Zuraida Ali[d], Khairul Bariyyah Abd Halim[a,b], Azzmer Azzar Abdul Hamid[a,b]*

[a]Department of Biotechnology, Kulliyyah of Science, International Islamic University Malaysia (IIUM), Bandar Indera Mahkota, 25200 Kuantan, Pahang, Malaysia.
[b]Research Unit for Bioinformatics and Computational Biology (RUBIC), Kulliyyah of Science, International Islamic University Malaysia (IIUM), Bandar Indera Mahkota, 25200 Kuantan, Pahang, Malaysia.
[c]Virology Unit, Infectious Disease Research Center (IDRC), Institute for Medical Research (IMR), Ministry of Health, Shah Alam, Selangor, Malaysia
[d]Inborn Error of Metabolism (IEM) and Genetic Unit, Nutrition, Metabolism and Cardiovascular Research Center (NMRC), Institute for Medical Research (IMR), Ministry of Health, Shah Alam, Selangor, Malaysia
*Corresponding author: azzmer@iium.edu.my

Abstract

SARS-CoV-2, a novel coronavirus responsible for the COVID-19 pandemic, has caused widespread disruption and necessitated global lockdown measures. While sharing similarities with the previous SARS virus, SARS-CoV-2 possesses unique attributes, notably the presence of a distinctive furin cleavage site (FCS) of Spike protein. The FCS, characterized by the amino acid sequence XRRAR, plays a critical role in viral infectivity. However, there is limited information on the potential impact of newly emerging mutations at the FCS. In this study, we assessed the molecular recognition of FCS by Furin Protease (FP) using coarse-grained simulation in GROMACS 2022. The triplication simulations were conducted for 2 μs and compared between existing FCS (Wildtype, Delta, and Omicron) and three designed charged FCS mutations (P681L, P681E & P681D). Molecular dynamics simulations showed all complexes stabilized their conformations with consistent energy and minimal molecular changes at ~15 Å. Specifically, the basic FCS system has a significantly higher Solvent Accessible Surface Area (SASA) and exposed residue area, which are ~8.0 nm^2 and ~7.5 nm^2 compared to the acidic system, ~1.9 nm^2 and ~1.3 nm^2. Despite the less accessible area of acidic FCS, FP can still recognize and bind to the cleavage site with consistent interaction but low binding affinity. This may explain the difficulty of spike activation and the low virus's survivability. Overall, significant findings from this study provide evidence for the rapid replacement of the wildtype variant, the Delta variant's heightened severity, and the Omicron variant's exceptional infectiousness based on the FCS binding properties.

Keywords: Furin cleavage site; furin protease; COVID-19; coarse-grained simulation; spike protein

P-037

Assosiation of Litter Size and Gonadotropin-Releasing Hormone Receptor (GNRHR) in Senduro and Ettawa Crossbreed Goat

Nur Hidayah, Tri Eko Susilorini, Ari Ardiantoro, Wike Andre Septian, Guruh Prasetyo, Heri Damayanti, Ahmad Zarkasi Efendy, Suyadi*
Department of Animal Reproduction, Faculty of Animal Sciences, Brawijaya University, Malang, Indonesia
*Corresponding author: suyadi@ub.ac.id

Abstract
This study aimed to investigate Senduro goat (SG) and Ettawa Crossbreed Goat (ECG) on association of litter size and *Gonadotropin-Releasing Hormone Receptor* gene using the PCR-RFLP method. Litter size data and blood sample were taken from seventy-six Senduro goats and thirty-five Ettawa crossbreed goats. There are two steps in this research (in the field and laboratory). The research in the field was taking blood sample and litter size data. DNA isolation, amplification as well as restriction were conducted in the laboratory. This study showed that Senduro goat gave higher litter size (1.5 ± 0.2) significantly ($P<0.05$) than Etawa crossbreed goat (1.3 ± 0.15). Molecular analysis of DNA isolation was precise, then the amplification and restriction analysis used enzyme Msp1 (CCGG) with a product length of 702 bp revealed AA genotype in GNRHR gene fragment. Allele frequencies and genotypes obtained in Senduro goat and Ettawa crossbreed goat GNRHR genes are monomorphic. Eventually, GNRHR gene between Senduro and Ettawa crossbreed goat did not associated with litter size.

Keywords: Senduro goat; Ettawa Crossbreed Goat; Litter Size; PCR-RFLP; GNRHR gene

P-038

The Anti-Cancer Activity of Nanoliposome *Hedyotis corymbosa* Targeting Estrogen Receptor-Alpha in Breast Cancer Cells: in silico and in vitro Studies

Laili Nurzaidah[a], Sofy Permana[b], Agustina Tri Endharti[c,d*]
[a]Master Program in Biomedical Sciences, Faculty of Medicine, Universitas Brawijaya, Indonesia
[b]Department of Biology, Faculty of Mathematic and Natural Sciences, Universitas Brawijaya Indonesia
[c]Department of Parasitology, Faculty of Medicine, Universitas Brawijaya, Indonesia
[d]Biomedical Central Laboratory, Faculty of Medicine, Universitas Brawijaya, Indonesia
*Corresponding author: tinapermana.fk@ub.ac.id

Abstract
Breast cancer (BC) expresses high levels of the Estrogen Receptor Alpha (ER -alpha). This study aimed to discover a natural active compound from *Hedyotis corymbosa (H. corymbosa)* with anti-cancer properties that targeted ER-alpha (ER alpha) in breast cancer cells. This study used molecular docking to analyze the interaction between ER alpha and active compounds from *H. corymbosa*. The compounds' properties were assessed, and the *H. corymbosa* extract was converted into nanoliposomes. The nanoliposomes' characteristics were examined, combined with tamoxifen, and applied to breast cancer cell cultures. Viability, proliferation, and ER alpha expression were evaluated, and statistical tests were conducted ($p < 0.05$). Findings indicate that compounds from *H. corymbosa* extract, particularly rutin, can effectively inhibit ER-alpha binding to estradiol. Rutin also acts as a substrate for P-glycoprotein, transporting small molecules to binding sites. The nanoliposomes derived from *H. corymbosa* exhibit favorable characteristics, such as a spherical shape, monodisperse size distribution (73.01 ± 39.24 nm), and stability (-49.8 ± 8.24 mV). Nanoliposome *H. corymbosa* at a dose of 100 µg/mL, in combination with tamoxifen, significantly reduces ER alpha expression but does not significantly affect cell viability. Combining *H. corymbosa* extracts with tamoxifen at specific concentrations (10 mg/mL and 16 mg/mL) enhances the treatment's efficacy, with an IC50 value of 11.4 mg/mL. The combination treatment group can be administered for up to 72 hours, reducing T47D breast cancer cell proliferation through the flavonoid's pro-oxidant effects. Therefore, *H. corymbosa* extract and nanoliposomes are promising therapeutic approaches for breast cancer treatment.

Keywords: Breast cancer; Estrogen Receptor Alpha; *Hedyotis corymbosa*; nanoliposom; T47D

P-039

Nano-sized Solution to Micro-sized Problem: Imine-Functionalized Nanoparticles for Effective Microplastic Removal from Water

Alyza Azzura Azmi[a,b*], Nur Rabiatul Syuhaidah[a,b], Wan Nur Iwani Wan Rushdi[a,b], Wan Mohd Khairul Wan Mohamed Zin[b], Sofiah Hamzah[c], Nor Salmi Abdullah[d], Nasehir Khan E.M. Yahya[d]
[a]Microplastics Research Interest Group (MRIG), Faculty of Science and Marine Environment, Universiti Malaysia Terengganu, Kuala Nerus, 21030 Terengganu, Malaysia
[b]Faculty of Science and Marine Environment, Universiti Malaysia Terengganu, Kuala Nerus, 21030 Terengganu, Malaysia
[c]Faculty of Ocean Engineering Technology and Informatics, Universiti Malaysia Terengganu, Kuala Nerus, 21030 Terengganu, Malaysia
[d]Water Quality Laboratory, National Water Research Institute of Malaysia (NAHRIM), Lot 5377, Jalan Putra Permai, Rizab Melayu Sungai Kuyoh, Seri Kembangan, 43300, Selangor, Malaysia
*Corresponding author: alyza.azzura@umt.edu.my

Abstract
Plastics, known as synthetic polymers, composed of long chain-like molecules with high molecular weight, are a major environmental concern due to their persistence and potential toxicity. Upon release into the environment, plastic debris undergoes fragmentation, forming micron-sized particles called microplastics. Microplastics act as vectors for the long-term sorption of aromatic contaminants, leading to increased toxicity when ingested by organisms. Therefore, the development of reliable techniques for removing microplastics from environmental water sources is of utmost importance. In this study, we investigated the potential of imine-containing derivatives with varying numbers of hydroxyl groups and aromatic rings as functional linkers on the surface of mesoporous silica nanoparticles (MSNPs) for microplastic adsorption. The physicochemical properties of the imine-MSNPs were thoroughly characterized, revealing polydisperse nanospheres with high crystallinity and strong superparamagnetic properties. To assess the sorption capacity of the developed system, polystyrene (PS) microplastics was employed, known for their enhanced sorption capacity for aromatic compounds due to π-π interactions. The performance of microplastic removal was evaluated by considering parameters including imine- MSNPs concentration, size, and loading of PS. Our findings demonstrated that the interaction between phenanthrene and nitrobenzene-loaded polystyrene and imine- MSNPs was primarily governed by non-covalent interactions involving π-system and dipole-dipole forces. In contrast, the interaction with polar compounds was predominantly driven by hydrogen bonding. Notably, smaller PS microplastics exhibited higher loading of aromatic compounds, thereby promoting a higher removal rate of polystyrene microplastics. Importantly, the imine-MSNPs is a promising material to the end, as it combines ease of use with minimum technological requirements and expected to be a success towards clean and safe water supply.

Keywords: Imine; intermolecular forces; microplastics; magnetic mesoporous silica nanoparticles; removal

P-040

Development of Powdered Sacha Inchi-infused Oil using Maltodextrin (DE15) and Sodium Caseinate as Encapsulating Materials

Widya Abd Wahab
Department of Biotechnology, Kulliyyah of Science, International Islamic University Malaysia (IIUM), 25200 Kuantan, Pahang Darul Makmur
Corresponding author: widya@iium.edu.my

Abstract

Plukenetia volubilis, or sacha inchi (inca nut) seed oil has gained more recognition worldwide to be consumed as health-promoting food or supplement, due its unique content of unsaturated fatty acids (FA) including omega-3 (ω3), omega-6 (ω6) and omega-9 (ω9). Sacha inchi oil has been associated with the reduction of blood pressure, LDL (bad) cholesterol, and inflammation along with the improvement of HDL (good) cholesterol levels. However, due to its high content (93%) of FA, sacha inchi oil might have a short shelf life which reduces its functional bioactivities and results in undesirable organoleptic properties. Conversion of oil to powder could preserve against the degradation, allow the fortification with antioxidants such as essential oils and raise the sensory characteristics of the food. Therefore, this work was aimed to develop powdered sacha inchi oil using microencapsulation. Sacha inchi oil added with essential oil was emulsified using a combination of maltodextrin (DE15) and sodium caseinate. The infused-sacha inchi powder was obtained following the dehydration of freeze-drying. Analysis of the encapsulated powder infused with *Zingiber zerumbet* essential oil indicated that the moisture, total oil content, and surface oil content were 2.43%, 29.85%, and 17.61%, respectively. Whereas the encapsulated powder infused with *Eucalyptus sp.* essential oil indicated that the moisture, total oil content, and surface oil content were 2.66%, 17.10%, and 8.64%, respectively. Gas chromatographic analysis revealed that almost all content linoleic and linolenic acids were retained after the microencapsulation, for both products: encapsulated powder infused with *Zingiber zerumbet* and the encapsulated powder infused with Eucalyptus essential oil. In view of this development, the use has been intended as a dry mix salad dressing or as a more palatable sachet-size powdered supplement, with all the nutritional values retained.

Keywords: sacha inchi; microencapsulation; maltodextrin (DE15); sodium caseinate

P-041

Danio rerio: A Versatile in vivo Tool for High-Throughput Biomedical Screening

Khairiah Razali[a], Mohd Hamzah Mohd Nasir[b,c]
[a]Department of Basic Medical Sciences, Kulliyyah of Medicine, International Islamic University Malaysia (IIUM), Kuantan, Pahang, Malaysia
[b]Department of Biotechnology, Kulliyyah of Sciences, International Islamic University Malaysia (IIUM), Kuantan, Pahang, Malaysia
[c]Research Unit for Bioinformatics and Computational Biology (RUBIC), Kulliyyah of Science, International Islamic University Malaysia (IIUM), Kuantan, Pahang, Malaysia.
*Corresponding author: hamzahn@iium.edu.my

Abstract
Danio rerio, commonly known as zebrafish, is a highly versatile model organism for biomedical research due to its genetic similarity to humans, rapid development, and high fecundity. This versatility allows for diverse applications at different life stages, including the use of zebrafish embryos for teratogenic assays, larvae for behavioral and cancer implant studies, and adults for toxicology, behavioral research, neuroscience, metabolism, and hyperglycemic investigations. Zebrafish embryos offer a transparent and externally developing system, facilitating non-invasive observation of embryonic development and efficient screening of compounds for teratogenic effects. They provide a cost-effective model for studying developmental abnormalities and uncovering the underlying mechanisms of birth defects. Zebrafish larvae, with their small size and ease of handling, serve as a practical platform for high-throughput behavioral screenings and investigations into tumor growth, metastasis, and drug responses through human tumor xenograft implantation. Adult zebrafish are invaluable for toxicological studies, enabling the evaluation of chemical toxicity through acute and chronic exposure experiments. They also serve as a model for exploring complex behaviors, neurobiological processes, and metabolism-related research. Adult zebrafish contribute to our understanding of social behavior, learning and memory, anxiety, addiction-like behaviors, as well as lipid metabolism, energy homeostasis, and drug metabolism. Furthermore, adult zebrafish can be employed for hyperglycemic studies by utilizing repeated blood sampling. This technique allows for the monitoring of glucose levels in response to various treatments or genetic manipulations, providing valuable insights into the regulation of hyperglycemia and metabolic disorders. In summary, *Danio rerio*, the zebrafish, represents a versatile in vivo tool for biomedical screening across a wide range of investigations. The zebrafish model system serves as a valuable link between basic research and clinical applications, advancing our understanding of human biology and facilitating the development of novel therapeutic approaches.

Keywords: Zebrafish; hyperglycaemic; blood-glucose; repeated blood sampling

P-042

The Antibiotic Susceptibility Pattern of *Sreptococcus suis* Isolated from Clinical Specimens at Prof. IGNG Ngoerah Hospital, Denpasar during 2016 – 2022

I Putu Bayu Mayura[a]*, Ni Made Adi Tarini[a], Ni Made Susilawathi[b], Putu Yuliandari[a], Ni Nengah Dwi Fatmawati[a]
[a]Department of Microbiology, Faculty of Medicine, Udayana University, Bali, Indonesia
[b]Departmen of Neurology, Faculty of Medicine, Udayana University, Bali, Indonesia
*Corresponding author: bayu_mayura@unud.ac.id

Abstract
The zoonotic bacteria *Streptococcus suis* causes meningitis in humans. Recently, *S. suis* meningitis has become a major health concern in Indonesia, particularly in Bali. The antibiotic susceptibility pattern of *S. suis* in Bali remains unknown. The purpose of this research was to determine the antibiotic susceptibility pattern of *S. suis* isolates in Bali. Clinical specimens were obtained from the Clinical Microbiology Laboratory of Prof. IGNG Ngoerah Hospital. The Vitex2 Compact (Biomeriuex®) was used to identify and test the sensitivity of isolates from 2016 to 2022. Sixty-nine *S. suis* isolates were successfully isolated, mostly from cerebrospinal fluid. The majority of *S. suis* isolates were serotype 2 (95.65%), with the remainder being serotypes 1/2. (4.35%). 100 percent of isolates were sensitive against Benzylpenicillin, Ampicillin, Cefotaxime, Ceftriaxone, Levofloxacin, Linezolid, and Vancomycin. All isolates showed resistance toward Tetracycline (100%), however, 1 isolate was also resistant toward Erythromycin (1.45%) and Clindamycin (1.45%). Few isolates of *S. suis* were successfully isolated in this investigation, which may be due to the low number of *S. suis* illnesses reported and the inability of regional hospitals in Bali to detect infections caused by *S. suis.* Intriguingly, we discovered one isolate that was resistant to Tetracycline, Erythromycin, and Clindamycin; this corroborated the idea that human *S. suis* isolates exhibited co-resistance to Tetracyclines and Macrolides/Lincosamides. This result is extremely valuable for future research to detect Tn*916*-like conjugative transposons in mechanisms of co-resistance between these three antibiotics that have been described solely in porcine isolates.

Keywords: *Streptococcus suis*; susceptibility pattern; co-resistant; Bali; Indonesia

P-043

Antimicrobial Activity of Crude Leech Saliva Extract (CLSE) Protein from Different Starvation Times of Local Leech *Hirudinaria manillensis*: A Preliminary Study

Amir Shafiruddin Nordin[a]*, Wan Mohd Azizi Wan Sulaiman[b], Nur Athirah Othman Basri[a], Jamaliah Mohd Isa[c], Norfarah Asyikin Baharudin Anthony[c]
[a]Department of Medical Sciences and Technology, Faculty of Health Sciences, University College MAIWP International (UCMI), 68100 Batu Caves, Kuala Lumpur, Malaysia
[b]Faculty of Pharmacy, University College of MAIWP International (UCMI) Batu Caves 68100, Kuala Lumpur, Malaysia
[c]Department of Laboratory, University College of MAIWP International (UCMI) Batu Caves 68100, Kuala Lumpur, Malaysia
*Corresponding author: shafiruddin@ucmi.edu.my

Abstract
Hirudinaria manillensis is the freshwater leeches found in Peninsular Malaysia displays various fascinating antimicrobial and biochemical studies. The saliva of *Hirudinaria manillensis* is a good model for studying the annelid body's evolution in leech therapy. This study aimed to evaluate protein and microbial activity concentration using crude leech saliva extracts (CLSE). CLSE was collected after feeding leeches on the phagostimulatory solution through the parafilm membrane. The total protein concentration was estimated using the Bradford assay. The antimicrobial activity of CLSE of *Hirudinaria manillensis* was assessed using disc diffusion and minimal inhibitory concentration tests. Few studies have reported that the influence of the production of protein concentration and secretion of large quantities of CLSE is dependent on the duration of starvation. From the results, it was obvious that the concentration of protein of CLSE still reasonably dropped after 4 weeks to 8 weeks. The total protein concentration was 49.8 ± 0.0331 mg/L, at the 2 weeks and decreased to 40.34 ± 0.0529 mg/L at 4 weeks, in the last 8 weeks it dropped drastically to 24.45 ± 0.00265 mg/L. The decrease in the concentration of protein in the CLSE after the eighth week is believed to be related to the exhaustion of the leeches condition. In microbial activity observation using disk diffusion test showed that CLSE collected after a starvation period of 4 weeks has a remarkable inhibitory against inoculum *E. coli*, *Klebsiella pneumoniae,* and *Salmonella enterica* except for *Staphylococcus aureus*. But after the fourth week to the eighth week, there was no significant change in the inhibitory zone against all test organisms. These results show that the starvation period of leeches significantly increases the total protein concentration in the CLSE. CLSE's findings in the antimicrobial activity test prove the effect of zone inhibition on certain organisms. This showed similar findings to the results in studies that have been conducted by several researchers. The study of relationship between starvation and protein concentration on microbial activity needs to be studied in more depth since the collected CLSE is often an obstacle to obtaining a sufficient volume of CLSE.

Keywords: starvation, Crude Leech Saliva Extract (CLSE); total protein concentration; disk diffusion test; antimicrobial activity

P-044

In silico Mutation on *Acinetobacter haemolyticus* Lipase KV1 for the Degradation of Polyethylene Terephthalate (PET)

Nurul Fatin Syamimi Khairul Anuar[a,b], Roswanira Abdul Wahab[b,c,*], Fahrul Huyop[a], Yahaya. M. Normi[d,e]
[a]Department of Biosciences, Faculty of Science, Universiti Teknologi Malaysia, Johor Bahru 81310, Malaysia
[b]Enzyme Technology and Green Synthesis Research Group, Department of Chemistry, Faculty of Science, Universiti Teknologi Malaysia, Johor Bahru 81310, Malaysia
[c]Department of Chemistry, Faculty of Science, Universiti Teknologi Malaysia, Johor Bahru 81310, Malaysia
[d]Enzyme and Microbial Technology Research Center, Faculty of Biotechnology and Biomolecular Sciences, Universiti Putra Malaysia, Serdang 43400, Malaysia
[e]Department of Cell and Molecular Biology, Faculty of Biotechnology and Biomolecular Sciences, Universiti Putra Malaysia, Serdang 43400, Malaysia
*Corresponding author: roswanira@kimia.fs.utm.my

Abstract
Polyethylene terephthalate (PET) accumulation could be potential hazards to the environment due to its high resistance to biodegradation. Therefore, *Acinetobacter haemolyticus* lipase KV1 enzyme may be able to tackle future PET waste by introducing *in silico* mutagenesis. This study first modified LipKV1 enzyme by deleting the lid region, which prevented PET substrate from entering the active site. Several LipKV1 binding site residues predicted by COACH and MOLE 2.0 were further mutated into alanine to expand the PET-binding space. Docking results revealed that lipase Var9 (-6.2 kcal/mol), Var18 (-6.0 kcal/mol), and Var181 (-6.0 kcal/mol) produced lower binding affinity in comparison to wild-type LipKV1 (-2.5 kcal/mol) and LipKV1_LE mutant (-5.3 kcal/mol). TfCut2, the reference structure, gave a considerably lower affinity (-4.6 kcal/mol) when compared to the generated LipKV1 variants, suggesting that lipases had higher affinity toward PET prior to active site mutation. MD simulations of LipKV1 variants in complex with PET produced good conformations in RMSD (~0.35 nm). Meanwhile, RMSF data revealed that mutated and catalytic residues of LipKV1 variants fell within acceptable fluctuation limits (<0.5 nm). Thus, this research offered a new strategy in computational lipase design with increased PET hydrolytic activity as a means to eradicate PET from the environment.

Keywords: Lipase KV1; mutation; polyethylene terephthalate; degradation; active site

P-045

In silico Design of DNA Hairpin Aptamer for The Detection of Ovarian Cancer Biomarker, Human Epididymis Protein 4 (HE4)

Nur Nadiah Abdul Rashid[a,d,e,*], Mohd Hamzah Mohd Nasir[b,d], Nurasyikin Hamzah[c,d], Izzat Fahimuddin Mohamed Suffian[a], Azzmer Azzar Abdul Hamid[b,d]
[a]Department of Pharmaceutical Technology, Kulliyyah of Pharmacy, International Islamic University of Malaysia, Bandar Indera Mahkota, 25200, Kuantan, Pahang, Malaysia
[b]Department of Biotechnology, Kulliyyah of Science, International Islamic University of Malaysia, Bandar Indera Mahkota, 25200, Kuantan, Pahang, Malaysia
[c]Department of Chemistry, Kulliyyah of Science, International Islamic University of Malaysia, Bandar Indera Mahkota, 25200, Kuantan, Pahang, Malaysia
[d]Research Unit for Bioinformatics and Computational Biology (RUBIC), Kulliyyah of Science, International Islamic University Malaysia, Bandar Indera Mahkota, Kuantan, Pahang, Malaysia
[e]Department of Chemistry, Centre for Foundation Studies, International Islamic University of Malaysia, 26300, Gambang, Pahang, Malaysia
*Corresponding Author: nadiahrashid@iium.edu.my

Abstract
Human epididymis protein 4 (HE4) is an ovarian cancer (OC) biomarker which has been studied extensively to aid the prognosis of OC. In this study, the three-dimensional (3D) structure of HE4, modelled by AlphaFold, is used to design DNA hairpin aptamers, which have the potential to pre-screen the presence of the OC biomarker. Molecular docking between the HE4 model with five DNA aptamers (A1 to A5) revealed that the A3-HE4 complex has the lowest binding energy (-6.5 kcal/mol) while the A5-HE4 complex formed the highest number of hydrogen bonds (H-bonds). However, the A4-HE4 complex, with a binding energy of -6.0 kcal/mol proved to be the most suitable DNA aptamer, as it formed 24 H-bonds with five at the loop of the hairpin aptamer. Subsequently, the A4 hairpin was mutated to 256 hairpins (H1 to H256). Analysis of the molecular docking and molecular dynamic (MD) simulations, which include the root-mean-square-deviation (RMSD,) radius of gyration, and H-bond occupancy, manifested that H256 is the most promising DNA hairpin aptamer against HE4. It exhibited a binding energy of -11.6 kcal/mol and a high number of H-bonds at the hairpin loop throughout the simulation. This research outcome holds potential for future OC diagnostic applications, offering a deeper understanding of the interactions between the protein and the aptamers.

Keywords: HE4; DNA hairpin aptamer; binding energy; RMSD; hydrogen bond

P-046

Production Optimization and Characterization of Fish Protein Hydrolysate (FPH) from Milkfish *Scales (Chanos chanos Forsskal*) Enzymatically using Papain

Ginta Ayu Wulansari[a], Najla Aulia Arief[b], Evi Susanti[a,b]*
[a]Department of Chemistry, Faculty of Mathematics and Natural Sciences, State University of Malang, Indonesia
[b]Biotechnology Program, Department of Applied Sciences, Faculty of Mathematics and Natural Sciences, State University of Malang, Indonesia
*Corresponding author: evi.susanti.fmipa@gmail.com

Abstract
This study aims to produce the optimum method of Fish Protein Hydrolysate (FPH) production from milkfish scales with papain. The highest yield of 45.70 ± 0.594% was obtained from 1 gram of *pre-treatment* NaOH milkfish scales with 0.305 U papain in phosphate buffer pH 7 with a total volume of 8 mL, incubated at room temperature for 3 hours, continued at 75°C for 1 hour and 90°C for 5 minutes. Fourier Transform-Infrared (FTIR) spectroscopy analysis showed that the FPH produced had a typical spectrum indicating the presence of peptide bonds, 10-35 kDa, having antibacterial against bacteria *Escherichia coli* and *Staphylococcus aureus*, and antioxidant with an IC50 of 81.91 ppm.

Keywords: Milkfish scales; hydrolysed fish protein; papain; milkfish

P-047

Cadmium Biosorption by Non-Living Biomass of *Rhodopseudomonas* sp. strain SBL

Balqis Nurul Huda Armadi, Shafinaz Shahir, Zaharah Ibrahim, Siti Halimah Hasmoni*
Department of Biosciences, Faculty of Science, Universiti Teknologi Malaysia, 81310, Johor Bahru, Johor Malaysia
*Corresponding author: sitihalimah@utm.my

Abstract
Cadmium, a toxic heavy metal, is frequently released into the environment through various human activities such as mining, production and use of phosphate fertilizers, and disposal of waste. It poses a significant threat as cadmium can accumulate in aquatic organisms and agricultural crops, ultimately leading to human exposure and potential toxicity through ingestion. Biosorption is a sustainable biotechnological approach which contributes to the minimization of cadmium pollution. It also has various advantages over conventional methods because it is cost-effective, environmental friendly, and is a reversible and fast process. The biosorption capacity of cadmium by *Rhodopseudomonas* sp. strain SBL was investigated via one factor at a time (OFAT) method with various environmental factors such as biomass dosage, pH of cadmium solution, incubation temperature, and contact time between cadmium and *Rhodopseudomonas* sp. strain SBL. The final concentration after biosorption process was then quantitatively analysed by Perkin Elmer Atomic Absorption Spectrophotometer (AAS). The results were calculated and analysed, and it showed that *Rhodopseudomonas* sp. strain SBL removed the highest amount of cadmium with 0.5 mg/ mL of non-living *Rhodopseudomonas* sp. strain SBL biomass at pH 5 of cadmium solution, 30°C incubation temperature and at 30 minutes. The data obtained also fit into the pseudo-second order model.

Keywords: *Rhodopseudomonas* sp.; Purple Non-Sulfur Bacteria (PNSB); Atomic Absorption Spectrophotometer (AAS); biosorption; cadmium

P-048

Development of Non-Polar Imine Compound Functionalized Magnetic Mesoporous Silica Nanoparticles for Microplastics Removal from Water

Nur Rabiatul Syuhaidah Mohamed Rusidi[a,b], Wan Nur Iwani Wan Rushdi[a,b], Wan Mohd Khairul Wan Mohamed Zin[b], Sofiah Hamzah[c], Wan Mohd Afiq Wan Mohd Khalik[a,b], Nor Salmi Abdullah[d], Nasehir Khan E.M. Yahya[d], Alyza A. Azmi[a,b,*]

[a]Microplastic Research Interest Group (MRIG), Universiti Malaysia Terengganu, 21030 Kuala Nerus, Terengganu, Malaysia.
[b]Faculty of Science and Marine Environment, Universiti Malaysia Terengganu, 21030 Kuala Nerus, Terengganu, Malaysia.
[c]Faculty of Ocean Engineering Technology and Informatics, Universiti Malaysia Terengganu, 21030 Kuala Nerus, Terengganu, Malaysia.
[d]National Water Research Institute of Malaysia (NAHRIM), Lot 3557, Jalan Putra Permai, Rizab Melayu Sungai Kuyoh, 43300 Seri Kembangan, Selangor.
*Corresponding author: alyza.azzura@umt.edu.my

Abstract

Microplastics (MPs) pollution in the environment has recently been documented as an emerging environmental problem due to their detrimental impacts to the aquatic environment and human health. MPs have great characteristics including large specific surface area and strong hydrophobicity that allow them to adsorb the pollutants including heavy metals, organic pollutants and inorganic pollutants in the water. Nanotechnology approaches for microplastics removal have gained significant attention as potential solutions to mitigate the environmental impact of MPs pollution. In this study, phenanthrene and nitrobenzene were used as a pollutant on the surface PS MPs and nonpolar-imine compound with the presence of benzene ring functionalized magnetic mesoporous silica nanoparticles (naphthaldehyde-*m*MSNPs) were developed as a potential material for PS MPs loaded pollutants removal from water. The physicochemical properties of naphthaldehyde-*m*MSNPs including morphology, nature characteristics, vibrational, elemental composition, and magnetic properties were determined using SEM-EDX, HR-TEM, XRD, FTIR, XPS and VSM. The optimization for removal efficiency by naphthaldehyde-*m*MSNPs with initial concentration (0.1–3.1 mg/L), PS MPs size (150-425 µm), and PS MPs loading (50-750) were investigated for each pollutant by 17 experiments designed via BBD-based RSM. The regression analysis of phenanthrene and nitrobenzene shows a good fit of the experimental data to the quadratic model with coefficient of determination (R^2) value of 0.9868, model F-value of 58.04 and (R^2) value of 0.9820, model F-value of 42.48 which shows that both models were significant. The ANOVA shows that the most relevant individual factor was the concentration of imine-*m*MSNPs, followed by loading of PS MPs and size of PS MPs. The percentage removal efficiency of PS MPs was affected by all of the factor and the strong π-π interactions between nonpolar-imine-*m*MSNPs and PS MPs loaded pollutants.

Keywords: Magnetite mesoporous silica; microplastics,;nanotechnology; imine compound; microplastic removal

P-051

Development of Magnetic Mesoporous Silica Nanoparticles Functionalized with Polar Imine Moiety as a Potential Polystyrene Microplastics Removal from Water

Wan Nur Iwani Wan Rushdi[a,b], Nur Rabiatul Syuhaidah Mohamed Rusidi[a,b], Wan Mohd Khairul Wan Mohamed Zin[a,b], Sofiah Hamzah[c], Wan Mohd Afiq Wan Mohd Khalik[a,b], Nor Salmi Abdullah[d], Nasehir Khan E.M. Yahya[d], Alyza A. Azmi[a,b]*

[a]Microplastic Research Interest Group (MRIG), Faculty of Science and Marine Environment, Universiti Malaysia Terengganu, 21030 Kuala Nerus, Terengganu, Malaysia.
[b]Faculty of Science and Marine Environment, Universiti Malaysia Terengganu, 21030 Kuala Nerus, Terengganu, Malaysia.
[c]Faculty of Ocean Engineering Technology and Informatics, Universiti Malaysia Terengganu, 21030 Kuala Nerus, Terengganu, Malaysia.
[d]Water Quality Laboratory, National Water Research Institute of Malaysia (NAHRIM), Lot 5377, Jalan Putra Permai, Rizab Melayu Sungai Kuyoh, 43300, Seri Kembangan, Selangor, Malaysia.
*Corresponding author: alyza.azzura@umt.edu.my

Abstract

Polystyrene (PS) is a prevalent type of microplastic (MP) found in the environment. Its hydrophobic surface and high sorption capacity make it an excellent vector for long-term sorption of both polar and non-polar aromatic pollutants. This poses substantial risks to both aquatic ecosystems and human health and necessitating the development of efficient techniques for MP removal. In this study, we employed a magnetic separation technique to extract PS MPs from water. To facilitate this process, magnetic mesoporous silica nanoparticles (mMSNPs) were synthesized and functionalized with a polar imine compound containing a hydroxyl group (imine-mMSNPs) through a condensation reaction, which resulted in the creation of a magnetic medium carrier. The physicochemical properties of the imine-mMSNPs, encompassing morphology, crystallinity, vibrational and elemental composition, were comprehensively characterized using SEM-EDX, HR-TEM, XRD, VSM, FTIR, and XPS analyses. The optimization of experimental conditions for PS MP removal was achieved through the implementation of response surface methodology (RSM) based on Box-Behnken designs (BBD). The statistical analysis demonstrated the significance of the models, as evidenced by p-values <0.0001 for PS@Phenanthrene and PS@Nitrobenzene, respectively. The proposed equations exhibited strong agreement with experimental outcomes, yielding high regression R2 values of 0.9860 for PS@Phenanthrene and 0.9854 for PS@Nitrobenzene. An analysis of variance (ANOVA) revealed that the concentration of imine-mMSNPs was the most influential parameter, followed by the loading of PS MPs and the size of PS MPs. The concentration of imine-mMSNPs, along with the polarity of nitrobenzene and phenanthrene, exerted significant effects on the percentage of removal performance, which can be attributed to intermolecular forces such as π-π interactions and ionic hydrogen bonding.

Keywords: Microplastics; imine; magnetic mesoporous silica; intermolecular forces

P-052

Sustainable Approach to Manage Agro-Waste through Cultivation of Edible Mushrooms

Surinder Kaur[a]*, Gurpreet Kaur[a], Anita Narang[b]
[a]Department of Botany, Sri Guru Tegh Bahadur Khalsa College, University of Delhi
[b]Department of Botany, Acharaya Narendra Dev College, University of Delhi
*Corresponding author: surinder@sgtbkhalsa.du.ac.in

Abstract
Agriculture based country like India generates huge amounts of agricultural and food wastes which have potential to be recycled. These agro-wastes like wheat or rice straw, sawdust or wood chip, sugarcane bagasse, cotton waste and cotton seed hull, corn cob, rice or wheat bran, chicken or horse manure can be used for cultivation of nutrient rich food in the form of mushroom. Mushroom cultivation not only reduces disposal problems caused by residue accumulation but also provides an economically acceptable alternative for the production of high-quality food. This is regarded as an environmental friendly solution with potential economic benefit. Moreover, by-products like spent mushrooms can be used as animal feed and crop fertilizer. The technique of mushroom cultivation on agro-waste also check air pollution associated with burning which is a common agro-waste disposal method used by farmers. Its cultivation can be one of the rational methods to utilize locally available wastes. The mushrooms chosen for cultivation are *Pleurotus* (oyster mushroom), *Calocybe* (milky mushroom) which are edible, are easy to cultivate and don't need huge investment. The other reason of selecting them is their booming demand in India and related culinary, nutritional and health benefits. We compared the yield and biological efficiency of these mushrooms on different agrowastes like wheat, rice, saw dust and sugarcane bagasse separately and in combinations. We found that yield of milky mushrooms is more on rice compost as compared to oyster mushroom. However, there is no significant difference observed in the yield of these mushrooms on wheat compost.

Keywords: Agrowastes; saw dust; sugarcane bagasse; oyster mushroom; milky mushroom

P-053

Influence of Growth Stages on Species Identification and Typing of Basidiomycetes Based on Whole cell protein Information using MALDI TOF MS

Sakae Horisawa*, Koki Iwamoto
School of Engineering Science, Kochi University of Technology, 185 Miyanokuchi, Tosayamada, Kami-city, Kochi, Japan
*Corresponding author: horisawa.sakae@ukochi-tech.ac.jp

Abstract
The accurate identification of basidiomycetes is necessary in various fields, such as microbial utilization, medical applications, hygiene management, and agriculture. Currently, identification methods using DNA have been developed and are frequently used due to their high detection sensitivity and reliability. However, DNA cloning is time-consuming, and the cost of analyzing a large number of base sequences is high. Therefore, we investigated an identification method based on information about proteins in the cells that is rapid, simple, and cost-effective. In this method, we used MALDI-TOF MS to generate spectra combining all relatively small peptides (2000-20000 Da) present in the cells. Databases of spectra have been created for bacteria and yeasts, but there have been fewer reports for filamentous fungi. This study aimed to examine the identification and typing of basidiomycete species. During mycelial cultivation, strains exhibiting different mycelial morphologies depending on the growth stage were observed, and the influence of this growth stage on the MS spectra was investigated. Mycelia on agar media were collected, washed with ethanol to prevent cellular degradation and inactivate protein-degrading enzymes, and then subjected to vacuum drying. Proteins extracted using 70% formic acid and acetonitrile were analyzed by observing the mass spectra of the test strains using AutoflexTM speed (Bruker, Bremen, Germany). The acquired spectra were compared between different strains or different cultivation times, and the similarity was calculated as a score using MALDI Biotyper (ver.3). The spectral patterns for all of the peptides produced in the cells were characteristic of the fungal species or strain, indicating the possibility of using the extracted proteins to identify fungal species and detect intraspecific variation even in the filamentous fungi, the basidiomycetes. However, the spectral pattern changed in some species such as *Bjerkandera adusta*, in which the coloration and morphology of the colony changed depending on the growth stage. If the proliferation stages were identical, the spectral patterns were highly reproducible. Therefore, it is thought that the identification corresponding to various growth stages will be possible by registering the spectra of various proliferation stages in the database.

Keywords: Wood-rotting fungi, identification; MALDI TOF MS; Biotyper

P-054

Enzymatic Hydrolysis of Collagen Hydrolysates from Barramundi Skin using Alcalase and Papain

Umi Hartina Mohamad Razali[a,b], Lim Dao Sen[a], Harisun Yaakob[c], Norizah Sarbon[d], Nur Hidayah Zainan[a], Dayang Norulfairuz Abang Zaidel[e,f]*

[a]Food and Biomaterial Engineering Research Group, Faculty of Chemical and Energy Engineering, Universiti Teknologi Malaysia, 81310 Johor Bahru, Malaysia
[b]Faculty of Food Science and Nutrition, Universiti Malaysia Sabah, UMS Road, 88400 Kota Kinabalu, Sabah, Malaysia
[c]Institute of Bioproduct Development, School of Chemical & Energy Engineering, Faculty of Engineering, Universiti Teknologi Malaysia, 81310 Johor Bahru, Johor, Malaysia
[d]Faculty of Fisheries and Food Science, Universiti Malaysia Terengganu, Kuala Nerus, Terengganu 21030, Malaysia
[e]Department of Chemical and Environmental Engineering, Malaysia-Japan International Institute of Technology, Universiti Teknologi Malaysia, 54100 Kuala Lumpur, Malaysia
[f]Innovation Centre in Agritechnology for Advance Bioprocessing, Universiti Teknologi Malaysia, Pagoh Campus, 84600 Pagoh, Johor, Malaysia
*Corresponding author: dnorulfairuz@utm.my
y

Abstract

Barramundi skin, a by-product of the fish processing industry, has shown potential as an alternative collagen and collagen hydrolysate source. However, the commonly used acid extraction method to produce collagen rendered a low yield requires a lengthy time and is not environmentally friendly. Thus, enzymatic hydrolysis, with a suitable type of enzyme, such as Alcalase and Papain were applied in order to obtain the hydrolysate that contains bioactive peptides. The resulting collagens hydrolysate were evaluated for their colour, hydroxyproline and protein recovery content, FTIR spectra, antioxidant activity and solubility. Enzyme concentration of 1%, 2% and 3% were used in the hydrolysis. Alcalase 1% was the most suitable enzyme and enzyme concentration which possesses 61.44% of ABTS radical scavenging, 0.03479 mg/mL of protein recovery content and 85% of solubility on all the study range of pH. Besides, both collagen hydrolysate obtained from both enzymes showed the ability to open up the triple helix structure of crude collagen in the analysis of FTIR spectroscopy.

Keywords: Collagen, collagen hydrolysate, barramundi skin, Alcalase, Papain, physicochemical properties

P-055

Molecular Docking Studies on Phytoconstituents against APC, EGFR and MSH2

Asita Elengoe
Department of Biotechnology, Faculty of Applied Science, Lincoln University College, 47301 Petaling Jaya, Malaysia
Corresponding Author: asitaelengoe@yahoo.com

Abstract
Colon and rectum cancer is the third leading cause of death worldwide, accounting for nearly 1.93 million deaths in 2020. The search for a cancer cure is never-ending. It has been discovered that certain plant chemicals have anti-cancer effects. Consequently, phyto-compounds may hold the potential for novel therapeutic development. In this study, the three-dimensional (3-D) structure of colon cancer cell line proteins, adenomatous polyposis coli (APC), epidermal growth factor receptor (EGFR) and MutS homolog 2 (MSH2) were generated, and docking with plant compounds (allicin, gingerol, catechin, indicaxanthin and naringenin) was studied. Swiss model was used to develop the 3-D structure of the protein models. After that, the protein models were evaluated by protein validation tools such as PROCHECK, ProQ, ERRAT and Verify 3D programs. Finally, each protein was docked successfully with allicin (PubChem ID: 65036, gingerol (PubChem ID: 442793), catechin (PubChem ID: 9064), indicaxanthin (PubChem ID: 6096870) and naringenin (PubChem ID: 932) using SwissDock server and viewed via Discovery Studio (DS) 4.0 software. The analyses revealed that the protein structures were stable after the validation process. The best binding affinity of the target protein-phytoconstituents complexes (APC-allicin, EGFR-indicaxanthin and MSH2-gingerol) were -7.56, -7.55 and -7.50 kcal/mol respectively. These proteins had the most stable bond with their phyto-compounds. The interaction between protein and phytocompound complexes is now being studied, which will aid in developing novel prescription drugs.

Keywords: Adenomatous polyposis coli (APC), Epidermal growth factor receptor (EGFR), Docking, Gingerol, MutS homolog 2 (MSH2)

P-057

Bacterial Community Structure in Log Piles Used as Foundations Analyzed by the Next-Generation Sequencing

Sitompul Afrida[a]*, Sakae Horisawa[a], Tadashi Hara[b]
[a]School of Engineering Science, Kochi University of Technology, Kami City, Kochi, 782-8502, Japan
[b]Science and Technology Unit Kochi University, Akebono-cho, Kochi, Kochi, 780-8502, Japan
*Corresponding author: afrida@kochi-tech.ac.jp

Abstract
The characteristics of soft soil or fluid-like soil trigger liquefaction during an earthquake due to loss of soil shear strength and increased pore water pressure. Thus, log piles inserted into the ground have been shown to effectively mitigate the liquefaction. However, it is necessary not only to assess the effect of placing piles in the ground for soil improvement but also to determine the biological deterioration of the logs. Many research papers have reported patterns of bacterial degradation in log piles but it is such a rare report on microbial community structure in log piles. Therefore, our research focused on the relationship between bacterial communities in soil and log piles used as foundations. It may bacteria communities in the soil affect biodegradation in the logs. In this study, the extraction of bacterial DNA from soil and logs was analyzed by the next-generation sequencing (NGS) method because this method could provide significant information data about microbial communities quickly, accurately, and objectively. The community structures of bacteria in soil and log samples were sequenced based on the V3-V4 genes of 16s rDNA. Soil samples contained 42 phyla, but only 17 phyla had a relative abundance of ≥ 1%. Of the 17 phyla, five showed the most dominant such as *Proteobacteria*, *Actinobacteriota*, *Firmicutes*, *Bacteroidota*, and *Acidobacteriota*. On the other hand, sequencing results from logs found 17 phyla and three main phyla that revealed the most bacterial communities namely *Proteobacteria*, *Actinobacteriota*, and *Firmicutes*. Bacterial diversity at the genus level with an abundance ≥ 1% showed 23 genera in soil and 21 genera in log. The genera found in soil and logs were quite different. Only four genera of *Proteobacteria* had similarities such as *Sphingomonas*, *Pleomorphomonas*, *Massilia*, dan *Allorhizobium-Neorhizobium-Pararhizobium-Rhizobium*. From the results shown, we concluded that the bacterial communities present in logs buried for 590 days (± 1.6 years) did not originate entirely from the soil. Most likely the bacterial communities in the log have existed before the logs were inserted into the ground as a foundation.

Keywords: Bacteria, log pile, next-generation sequencing, foundation

This research was supported by JSPS KAKENHI Grant Number 22H02408.

P-059

Adsorption Immobilization of Cyclodextrin Glucanotransferase on Activated Rice Husk Biochar: The Effects of Process Parameters

Nurul Elia Aqila Binti Abu Rahim[a], Nur Izyan Binti Wan Azelee[a,b], Siti Fatimah Zaharah Mohd Fuzi[c], Nasratun Masngut[d], Nor Hasmaliana Abdul Manas[a,b,*],
[a]Faculty of Chemical and Energy Engineering, Universiti Teknologi Malaysia, 81310 Skudai, Johor, Malaysia.
[b]Institute of Bioproduct Development, Universiti Teknologi Malaysia, 81310 Skudai, Johor, Malaysia
[c]Department of Technology and Natural Resources, Faculty of Applied Sciences and Technology, Universiti Tun Hussein Onn Malaysia, Pagoh Campus, Panchor 84600, Johor, Malaysia
[d]Faculty of Chemical and Process Engineering Technology, Universiti Malaysia Pahang, Lebuhraya Tun Razak, 26300 Gambang, Pahang, Malaysia.
*Corresponding author: hasmaliana@utm.my

Abstract
Cyclodextrin glucanotransferase (CGTase) is known as a multifunctional enzyme that converts starch into cyclodextrin (CD), a functional compound that is widely used in pharmaceutical and food industries. CGTase is extremely sensitive under harsh reaction conditions and the free enzyme form is impossible to be recycled, thus making CD production expensive. Therefore, enzyme immobilization technique is introduced to improve the CGTase stability to ensure high production of CD with high recyclability. In this study, CGTase was immobilized by adsorption method on an activated rice husk biochar (RHB) as the support matrix. The effects of parameters such as immobilization time (6, 12,18, 24) hr, immobilization temperature (15, 20, 25, 30)ºC, the ratio of RHB to CGTase volume (1:3, 1:5, 1:10, 1:15), the agitation rate (100,150, 200, 250,300) rpm, and the pH (4, 5, 6, 7, 8) on CGTase immobilization were studied. pH 5 was the best pH achieved for the CGTase immobilization, with a 86.69% of immobilization yield. The optimal temperature and contact time that produced the highest immobilization performance were 20 ºC and 12 hr, respectively. Meanwhile, the optimum agitation rate achieved at 200 rpm and the ratio RHB:CGTase was optimum at 1:5. The immobilized CGTase were found has the capability to increase the CGTase stability and recyclability, and RHB as the suitable and valuable added product as the support matrix for the immobilization process to increase the CD production.

Keywords: Activated biochar; effects of parameters; cyclodextrin glucanotransferase; enzyme immobilization; adsorption

P-060

AML1-ETO Fusion Gene Detection and Frequency in Acute Myeloid Leukemia Patients

Rafal F. J. Aleiqabie[a], Ahmed D. Jabbar[b], Fahrul Huyop[c]*
[a]Department of Pathological analysis, College of Science, University of Wasit, Iraq.
[b]Department of Biology, College of Science, University of Wasit, Iraq.
[c]Department of Biosciences, Faculty of Science, Universiti Teknologi Malaysia, 81310 UTM Johor Bahru, Malaysia.
Corresponding author: fahrul@utm.my

Abstract
Fusion genes are the consequences of rearrangement and instability of genomic material. There have been approximately 800 distinct fusion genes found in human cancer, the majority of them recorded in hematological cancers. The basic forms of chromosomal rearrangements that lead to fusion gene formation are deletion, inversion, translocation, and amplification which in their turn are the outcome of aberrant DNA transcription. This study aims to detect frequency of the AML1-ETO fusion gene which according to studies are the most common fusion in acute myeloid leukemia patients, among Iraqi AML patients by nested PCR and flow cytometry assay for further detection and conformation. Results indicated that AML1-ETO fusion was detected in 19 AML patient with percentage of 31.67%. in conclusion, this research indicated the frequency of AML1-ETO fusion gene in Iraqi AML patient's cases relying on the most frequent fusions suggested by previous studies, providing a further knowledge about the type of AML in hope to widen the patient's therapeutic strategies.

Keywords: Fusion gene; Myloid leukimia; EML-1ETO

P-063

Elaeocarpus grandiflorus Increased Immunoglobulin G Activity and Total Protein of Rat Induced Sheep Red Blood Cell

Nugrahaningsih WH*, Necya Melynia Daniardi
Biology Department Universitas Negeri Semarang, Jl. Raya Sekaran-Gunungpati, Semarang, Indonesia
*Corresponding author: nugrahaningsihwh@mail.unnes.ac.id

Abstract
Immune system is important factor to prevent virus attacks such as Covid 19. *Elaeocarpus grandiflorus* contains active compounds including flavonoids, saponins, polyphenols and tannins. The main flavonoids found in *E. grandiflorus* are kaempferol, quercetin, procyanidin, naringin, orientin, iso orientin, vitexin, isovitexin, rutin, luteolin and epicatechin. Kaempferol and quercetin show their role in anti-inflammatory and immune system enhancement. The purpose of this study was to examine the effect of *E. grandiflorus* leaves extract on the immunoglobulin G activity and total protein of rat induced by sheep red blood cells. A total of 25 Wistar rats were randomly divided into 5 groups. A suspension of ethanol extract of *E. glandiflorus* leaves was given on day 1-7 with a concentration of 100 mg/kg BW (P1), 200 mg/kg BW (P2), 400 mg/kg BW (P3), Na.CMC 1% w/v (Neg control) and mix herbal immunostimulant (positive control). On day 7 the rat was intraperitoneally injected 1 mL 2% v/v sheep red blood cells as antigen. The blood was taken from the orbital vein on day 12. The IgG activity was examined by agglutination test. The total protein determination test uses a photometric test based on the biuret method in the form of blood serum. The average of agglutination titers was 3.77 (neg control), 3.89 (pos control), 3.77 (P1), 3.65 (P2) and 4.61 (P3). By the statistics analyzed only P3 group that showed the difference. The average value of total protein of the five groups tested was 1.440 mg/dL (neg control), 1.000 mg/dL (pos control), 1,180 mg/dL (P1), 1.220 mg/dL (P2), 1.460 mg/dL (P3. The statistical analysis of total serum protein values obtained by the positive control group against the experimental group had no significant difference. There is an indication of the same effect between supplement with ethanol extract of *E. grandiflorus* leaves. It can be concluded that the extract of *E. grandiflorus* has the potential to be developed as an immunostimulant.

Keywords: E. grandifloras; immunostimulant; kaempferol; quercetin; total protein

P-066

Accurate and Rapid Detection of SARS-CoV-2: Leveraging the Power of Reverse Transcription Loop-Mediated Isothermal Amplification (RT-LAMP) and Lateral Flow Immunochromatography Assay

Derich Shalbie Simon, Chee Wei Yew and Vijay Kumar*
Biotechnolgy Research Institute, Universiti Malaysia Sabah, 88400 Kota Kinabalu, Sabah, Malaysia
*Corresponding author: vijay@ums.edu.my

Abstract
To control the spread of COVID-19, it is important to promptly detect and isolate individuals who are infected in the early stages of infection. However, the current diagnostic methods present drawbacks such as high costs, time-intensive processes, and varying levels of accuracy. Furthermore, the mutations at primer binding sites of SARS-CoV-2 variants leads to evasion of detection via existing PCR-based tests, further diminishing the reliability of conventional tests. To tackle this challenge, a promising solution is the implementation of a reverse transcription loop-mediated isothermal amplification (RT-LAMP) in combination with a lateral flow immunochromatographic assay. This approach offers a rapid and user-friendly molecular test with the potential to overcome the limitations of existing diagnostic methods. In this study, the conserved regions of all SARS-CoV-2 variants were identified on the Envelope, Membrane and Nucleocapsid genes, and LAMP primers were subsequently designed with modifications of DIG-Biotin or Fluoresceine-Biotin, to be used for visualization via lateral flow immunochromatographic assay. Using synthetic genes as the positive control, specificity and sensitivity tests were conducted on using both LAMP and PCR-based tests for comparison to the gold standard. Specificity tests were conducted by screening the gene sequences of closely related coronaviruses gathered from Genbank, followed by running the assays on control genes of related coronaviruses; SARS-CoV, MERS-CoV and IBV. The sensitivity was assessed by conducting the assay on positive controls of 10-fold dilution, to obtain the detection limit of assays. The results showed that the LAMP based primers were specific only towards the positive control plasmid, leaving no amplification on the other coronaviruses. Whereas the LAMP assay detection limit was found to be as little as 10^2 copies depending on the target site. This was equivalent to the detection limit of PCR-based tests on the same target. In conclusion, the RT-LAMP in combination with lateral flow immunochromatographic assay proved to be a simple, highly specific, and sensitive method for the rapid molecular diagnosis of COVID-19.

Keywords: RT-LAMP; Lateral Flow Immunochromatographic assay; SARS-CoV-2; envelope gene; membrane gene; nucleocapsid gene

P-067

Proximate Composition and Identification of Organic Acids in Different Percentages of Cream and Campaka (*Michelia champaka L*) Oil

Ni Made Suaniti[a*], I Nyoman Putu Riasa[b], Putu Udiyani Prayika Putri[a]
[a]Department of Chemistry, Faculty of Mathematics and Natutral Sciences, Udayana University, Bali Indonesia
[b]Department of Plastic Surgery, Faculty of Medicines, Udayana University, Bali Indonesia
*Corresponding author: madesuaniti@unud.ac.id

Abstract
Cream as a skin protector from UV exposure requires other ingredients from nature to utilize Virgin Coconut Oil (VCO) as a development of laboratory-scale chemical analysis. The purpose of this study was to identify organic acids and the composition of water content, volatile compounds, ash, and fixed carbon in cream and cream added with enfleurat champaka with various weight percentages. The analytical methods used were Proximate and Gas Chromatography-Mass Spectrometry (GC-MS). The results of proximate analysis showed that the lowest water content in cream added with enfleurat champaka with a volatile compound content of more than 70%. Identification of organic acid compounds by GC-MS, well separated and varied in type and amount. The detected acidic compounds such as limonene, acetic acid, octanoic acid, hexadecanoic acid, oleic acid, and lauric anhydride.

Keywords: Campaka oil, cream, identification, organic acid, proximate

P-068

Distribution of *Arundo donax*, an Energy Crop and Serious Invasive Species, in Shikoku, Japan using Google Maps

Makoto Nagase[a], Asahiko Yoshikawa[a], Sakae Horisawa[b], Masahiro Inoue[c], Yoh Sakuma[c]*
[a]Faculty of Science, Ehime University
[b]School of Engineering Science, Kochi Univ. Technology,
[c]Graduate School of Science and Engineering, Ehime University
*Corresponding author: sakuma.yo.mg@ehime-u.ac.jp

Abstract
Arundo donax is a large grass native to East Asia. In JAPAN, it grows naturally along the coasts of the southwestern half of the country and is common in Shikoku Island, especially along the Pacific coast. Because of its high growth rate and robustness to environmental disturbances, *A. donax* has attracted attention as an energy crop for 2nd generation biofuel production and for use bioremediation of wastelands. On the other hand, *A. donax* has been introduced into Europe, North America, and Australia, and is considered one of the most dangerous invasive species. *A. donax* does not produce fertile seeds but reproduces vegetatively by buds at each node of the culm. Presumably, culms that became detached from the main body due to some cause, such as strong winds during typhoons have become established themselves where they were washed ashore and have expanded their distribution area. Despite these interesting characteristics, no detailed distribution survey has been conducted in Japan. Due to the large and unique dome-shaped plant type, it is identifiable on Google Maps satellite photos, and with higher reliability on Street View. Therefore, by using this information available on the Internet, we can efficiently conduct distribution surveys with a minimum of field work. We identified colonies in Shikoku Island using Google Maps. We set up a 2 km square grid of 5476 plots in Shikoku Island, and surveyed 1820 plots, excluding mountainous areas. As a result, we identified a total of 15613 *A. donax* colonies. In addition, we have evaluated these colonies in relation to environmental factors such as climate and topography.

P-069

Bioethanol Production from Wild Cassava *(Manihot glazoiovii* Muel. Arg) with Combination of Microbial Concentration and Fermentation Times using Simultaneous Saccharification and Co-Fermentation Technique

Abdullah Nur Hakami[a], Ida Bagus Wayan Gunam[a,b]*, I Wayan Arnata[a], I Gede Arya Sujana[b]
[a]Department of Agroindustrial Technology, Faculty of Agricultural Technology, Udayana University, Bukit Jimbaran, Badung Bali 80361, Indonesia
[b]Laboratory of Bioindustry, Faculty of Agricultural Technology, Udayana University, Bukit Jimbaran Badung Bali 80232, Indonesia
*Corresponding author: ibwgunam@unud.ac.id

Abstract
The use of fossil fuels has been increasing every year, followed by the resulting environmental damage. Efforts to overcome these problems can be done by switching to alternative renewable energy sources, one of which is bioethanol. Bioethanol is a fuel derived from plants that contain glucose, starch, and cellulose. One of the plants that has potential as a raw material is wild cassava (*Manihot glaziovii* Muel. Arg), wild cassava contains about 40-70% starch. This study aims to determine the effect of a combination of microbial concentration and fermentation time in the production of bioethanol by co-culture technique of isolates R5I3, R5I4, and *Aspergillus niger*. The microbial concentrations used in this study were 1.5%, 3%, and 4.5% (*v/v*) and the fermentation time used in this study were 5, 6, and 7 days. The research stages include; gelatinization of wild cassava flour, simultaneous saccharification and co-fermentation, and distillation. The results obtained to produce the highest total ethanol was at a microbial concentration of 4.5% (*v/v*) with a fermentation time of 7 days, the ethanol produced was 2.01±0.26% (w/v). While the final total soluble solids produced was 5.70±0.28 %Brix, with a final pH of 3.25±0.07 and a final reducing sugar of 0.974±0.11 mg/mL.

Keywords: Bioethanol; fermentation time; microbial concentration; simultaneous saccharification and co-fermentation; wild cassava

P-070

Immunoglobulin Yolk of *Canine Parvovirus* and its Biological Activity after Freeze-Dried

Suartini IGAA[a]*, Suarsana IN[b], Nyoman Mantik Astawa[a]
[a]Veterinary Biochemistry Laboratory, Faculty of Veterinary Medicine, Udayana University.
[c]Veterinary Immunology Laboratory, Faculty of Veterinary Medicine, Udayana University
*Corresponding author: aa_suartini@unud.ac.id

Abstract
The use of antibodies for the treatment of various diseases is growing very rapidly. Antibodies for therapy are generally formulated in liquid form and stored at freezing temperatures, making them very susceptible to various stress factors. Temperature fluctuations and shock factors during storage can reduce the biological activity of antibodies. Freeze-dried is the best method used to stabilize proteins/antibodies. Damage to antibodies during the freeze-dried process can be prevented by adding a stabilizer. Yolk Immunoglobulin (IgY) anti Canine parvovirus is an antibody that has been proven effective in curing dogs infected with CPV. CPV infection is very dangerous in unvaccinated puppies with a mortality rate of up to 90% even vaccinated dogs can be infected with this virus. This study aims to find the best formula and stabilizer for freeze-dried IgY anti-CPV so that its biological activity remains optimal. The freeze-dried IgY process for pure anti-CPV uses the HETOTRAP CT-60 apparatus, while the in vitro IgY biological activity test uses the HI test. The results showed that the best formula for IgY anti-CPV was: IgY (5 mg/ml) + sucrose (50 mg/ml) + 65 mg/ml Trehalose + 5ml Tween 80. The optimal biological activity of IgY anti-CPV was 27 HI units. Morphology and topography of IgY anti-CPV and mineral composition in the samples, the best in the sample formulas F1A, F2A and F4A.

Keywords: IgY; *Canine parvovirus*; antibodies; freeze-dried; formula

P-071

Isolation and Identification of Microorganisms from Malaysian Local Leech *Hirudinaria manillensis* Associated with a Sterilization Technique

Nur Athirah Othman Basri[a], Nur Sa'adah Ab Rahman[a], Nurul Aini Ahmad[a], Amir Shafiruddin Nordin[a] , Jamaliah Md Isa[b], Norfarah Asyikin Baharudin Anthony[b], Wan Azizi Wan Sulaiman[c]
[a]Faculty of Health Science, Department of Medical Science and Technology, University College of MAIWP International (UCMI) Batu Caves 68100, Kuala Lumpur, Malaysia
[b]Department of Laboratory, University College of MAIWP International (UCMI) Batu Caves 68100, Kuala Lumpur, Malaysia
[c]Faculty of Pharmacy, University College of MAIWP International (UCMI) Batu Caves 68100, Kuala Lumpur, Malaysia
*Corresponding author: athirah@ucmi.edu.my

Abstract
Hirudinaria manillensis is one of the species that are well-known for their benefits to treat vascular disorders among alternative and complementary medicine practices. Sterilization methods in reducing bacterial colonies on *H. manillensis* are medically important to lower the risk of bacterial infections after the therapy session. The concern was that when leeches expose to the patient's wounds, they can introduce their own bacterial flora, potentially leading to infections. This study focuses on isolating and identifying microorganisms that address this issue, by conducting with various antibiotic solutions to disinfect the leeches. Four commercially available antibiotics (ciprofloxacin, chloramphenicol, co-amoxiclav, and amoxicillin) were used in this study. A total of 24 leeches isolated from the mouths and surface area of *H. manillensis* were tested for antibiotic susceptibility. The bacteria found from the mouth and leech surface before the sterilization process are *Aeromonas sp*., *Chryseobacterium gambrini*, and *Bacillus cereus* which is categorized as pathogenic bacteria to humans. Based on the susceptibility, it was observed that all the isolated bacteria were found to be susceptible to ciprofloxacin, and chloramphenicol, but not to co-amoxiclav and amoxicillin. This study also found that the bacterial species *Aeromonas sp*., *C. gambrini*, and *B.cereus* have displayed resistance against co-amoxiclav and amoxicillin. Among all the antibiotics tested, ciprofloxacin was found to be the best and significant as bactericidal agent p-value = 0.0381(p-value<0.05). These findings propose that pre-treating the leeches with ciprofloxacin before their application to the patient could potentially offer benefits in preventing invasive infections and observing post treating leech behaviour should be one of the areas of focus in future.

Keywords: Sterilization; ciprofloxacin; leech; Aeromonas sp.; bactericidal; susceptibility test

P-072

Single Bulb Garlic a Promising Antiadipogenic Agent: Bioactivity and Bioavailability Enhancement Strategy

Sri Rahayu Lestari[a*], Abdul Gofur[a], Suharti[b], Yunita Rakhmawati[a], Alif Rosyidah El Baroroh[a], Dewi Sekar Miasih[a], Yuslinda Annisa[c], Liza Md. Salleh[d]
[a]Department Biology, Faculty of Mathematics and Natural Sciences, Universitas Negeri Malang, 65145, Malang, Jawa Timur, Indonesia
[b]Department Chemistry, Faculty of Mathematics and Natural Sciences, Universitas Negeri Malang, 65145, Malang, Jawa Timur, Indonesia
[c]Department Biology, Faculty of Mathematics and Natural Sciences, Universitas Brawijaya, 65145, Malang, Jawa Timur, Indonesia
[d]Department of Bioprocess Engineering, Faculty of Chemical Engineering, Universiti Teknologi Malaysia, 81310, Skudai Johor
*Corresponding author: srirahayulestari@um.ac.id

Abstract
Single bulb garlic is one of the indigenous Indonesian plants widely used as an ingredient in herbal medicine. The results of in vivo studies conducted prove the potential of single bulb garlic in inhibiting and reducing cholesterol synthesis, inducing a decrease in cholesterol and blood lipid levels in obesity-related metabolic syndrome models. Single bulb garlic have 5 times higher content of active compounds compared to regular garlic. However, the utilization of active compounds in singular garlic is less than optimal due to its lipophilic properties, volatility, intense aroma and low stability in gastrointestinal fluids, which reduces the bioavailability of garlic compounds to the systemic circulation after oral administration. Self-nanoemulsifying drug delivery system (SNEDDS) is becoming one of the new delivery and solubilization techniques that is gaining wide attention due to its excellent properties in improving the solubility and oral absorption rate of drugs/active compounds with poor solubility in water. SNEDDS has the potential to control the release rate of active compounds and lead to increased bioavailability of active compounds in the gastrointestinal tract, as well as optimize the potential of single-bulb garlic extract as an antiadipogenic agent. The use of SNEDDS was shown to improve the stability of the active compound of single-bulb garlic in gastrointestinal simulation, increase bioavailability, non-induced hemolysis, and maintain its antioxidant capacity. In vitro evaluation of adipogenesis models showed that SNEDDS of single bulb garlic extract had low toxicity and was able to suppress the expression of adipogenesis-specific mediators and inhibit lipid droplet formation in adipocyte cells.

Keywords: single bulb garlic, anti-adipogenic agent

P-073

Embryotoxicity and Teratogenic Effects of Local Jamu Maajun on Zebrafish (*Danio rerio*)

Zulfa Zakuan[a]*, Rushduddin Al-Jufri Roosli[a] , Nur Diyana Mahmood[a], Syarifah Nabila Syed Jaafar[a], Wan Azizi Wan Sulaiman[b]*
[a]Department of Medical Sciences, Faculty of Health Sciences, University College of MAIWP International
[b]Faculty of Pharmacy, University College of MAIWP International
*Corresponding author: zulfa@ucmi.edu.my

Abstract
Complementary and alternative medicine is widely available and heavily used especially in Asia as there are diversity in medicinal plants and its practices is ingrained in the culture. In Malaysia, locally sourced herbal supplements known as Maajun is generally taken orally as postpartum care, general well-being, or as pain relief. Although there are several reports on adulterated Maajun products in the market, this alternative supplement still has its own demand and markets in spite lacking in study of its toxicity. This study assesses the toxicity of two popular local brand Maajun on the embryo of zebrafish. Wild-type zebrafish embryos were exposed to different concentrations (0-1600 µg/ml) of Maajuns to test the embryotoxicty and teratogenicity from 6 hours post fertilization (hpf) until 120 hpf. Developmental endpoints were scored, and Therapeutic Index (TI) was calculated using ratio of LC50/E50. Generally increasing concentration and exposure time increases the mortality rate of the embryo. Both Maajuns were shown to have toxicity at concentration above 400 µg/ml and 200 µg/ml and teratogenicity at above 100 µg/ml and 400 µg/ml, respectively for MJ 1 and MJ 2. At higher concentrations, coagulations of embryos, delayed hatching of embryos and abnormal developmental points were apparent in the larvae such as skeletal deformities and low motility. Therapeutic Index values for both products ranged from 0.98-1.16 at different concentration points tested. In conclusion, traditional Maajun poses significant toxic effects on embryo of zebrafish and detailed assessments are needed for human consumption.

Keywords: Complementary and alternative medicine; Maajun; embryotoxicity; *Danio rerio*

P-074

Comparing Age-Wise Reference Intervals for Serum Urea and Creatine Levels among ESRD Subjects: A Single-Centre Experience

Muhammad Asyraf Salleh[a], Wan Mohd Azizi Bin Wan[b]*, Vasudevan Ramachandran[a]
[a]Faculty of Health Sciences, University College of MAIWP International, Kuala Lumpur, Malaysia
[b]Faculty of Pharmacy, University College of MAIWP International, Kuala Lumpur, Malaysia
*Corresponding author: drwanazizi@ucmi.edu.my

Abstract
Haemodialysis (HD) is usually conducted for the renal replacement therapy for end-stage renal disease (ESRD) patients. This study aims to determine the prevalence and correlation of Serum Urea and Creatine levels of age categories among ESRD patients undergoing haemodialysis. In this preliminary cross-sectional study, 102 subjects were recruited from outpatient Centre of Excellence Haemodialysis, Taman Batu Muda, Malaysia. The data were recorded form the patients' medical record and tabulated. The demographic characteristics of the subjects were presented using percentage and the reference range was calculated on 102 ESRD subjects (age range 22 to 80 years). The reference ranges of Serum Creatine (SCr), Urea, Uric acid and Serum ferratin (SFe) were <133mmol/l, 1.7 - 8.4 mmol/l, 0.14 – 0.34 mmol/l and 40 - 200 µg/l for males and females respectively. There was a female predominance (n=53) over males (n=49). The mean age of the subjects was 54.26±13.85 and the dry weight was 65.88±14.57 among the ESRD subjects. Among all the three ethnics, Malay was higher (94.1%) compared to the other ethnics. Most of the subjects were married (77.5%) followed by single (16.7%) status. When male and female subjects were analyzed age-group wise, the data showed a significant difference in mean SCr values ($p<0.05$) in three age groups (21-40, 41-60 and 61-80 years), however there was no significant among Urea, Uric Acid and SFe levels ($p>0.05$). Elevated SCr levels among females are common and are strongly associated with all the age ranges. Longitudinal studies are required to determine the clinical outcomes of individuals with elevated levels of SCr, Urea, Uric Acid and SFe and to examine factors related to the progression of renal disease in the community too. In addition, this study needs further analysis on drug adverse effects and complimentary medicine in reducing the blood pressure and diabetes among haemodialysis subjects.

Keywords: ESRD; Urea; Creatinine

P-075

In-Silico Study of Active Compounds on Doro Putih (*Strychnos lucida*) as an Anti-Breast Cancer Agent Through Inhibition of The MAPK Pathway

Yuslinda Annisa[a], Siti Mariyah Ulfa[b], Sri Rahayu Lestari[c], Fatchiyah Fatchiyah[a], Nashi Widodo[a*]
[a]Department of Biology, Faculty Mathematics and Natural Science, Universitas Brawijaya, 65145, Malang, Indonesia
[b]Department of Chemistry, Faculty Mathematics and Natural Science, Universitas Brawijaya, 65145, Malang, Indonesia
[c]Department of Biology, Faculty Mathematics and Natural Science, Universitas Negeri Malang, 65145, Malang, Indonesia
*Corresponding author: widodo@ub.ac.id

Abstract
Breast cancer is the most widely diagnosed type of cancer and the most common cause of cancer-related death in women worldwide, with a prevalence of one-third of all types of cancer affecting women. Herbal products as a source of bioactive compounds have a high diversity and varied benefits. Many studies have been conducted using various plant extracts as anticancer by focusing on various cancer cell death pathways. Specific molecular mechanisms of herbal bioactive compounds are needed as a basis for the development of anticancer drugs that work in a targeted and effective. The in-silico approach can be used to predict the specific molecular mechanism of the active compound *Strychnos lucida.* Research methods include selecting active compounds, predicting bioactivity, drug-likeness, protein target prediction, data mining, molecular docking, molecular dynamics simulation, and visualization of results. The bioactivity screening results showed that there are 6 potential anticancer compounds from *Strychnos lucida*, namely 3-O-caffeolyquinic acid, adenosine, loganin, secoxyloganin, sweroside, and tachioside. Docking analysis showed the best inhibitory activity of 3-O-caffeolyquinic acid on MAPK3, MAPK9, and MAPK8 based on binding affinity, amino acid residue profile, and number of hydrogen bonds. Molecular dynamics simulation showed a stable interaction between 3-O-caffeolyquinic acid/MAPK9 compared to its native ligand. Bioactive compounds from *Strychnos lucida* have potential as inhibitors of the MAPK pathway, which acts as a key regulator of cellular signaling in cell cancer.

Keywords: Breast cancer; *Strychnos lucida*; molecular docking; molecular dynamics; MAPK pathways

P-076

Computational Discovery of Human ACE-2 Inhibitors from Malaysian Kelulut Honey against COVID-19

Che Muhammad Khairul Hisyam Ismail[a,b*], Azzmer Azzar Abdul Hamid[a,b], ,Mohd Ridzuan Mohd Abd Razak[d], Khairani Idah Mokhtar[c], Widya Lestari, Basma Ezzat Mustafa Alahmad[c], Azlini Ismail[c*]

[a]Department of Biotechnology, Kulliyyah of Science, International Islamic University Malaysia, 25200 Kuantan, Pahang Malaysia

[b]HD Research Unit for Bioinformatics & Computational Biology, Kulliyyah of Science, International Islamic University Malaysia, 25200 Kuantan, Pahang Malaysia

[c]Department of Fundamental Dental and Medical Sciences, Kulliyyah of Dentistry, International Islamic University Malaysia, 25200 Kuantan, Pahang, Malaysia.

*Corresponding author: dr_azlini@iium.edu.my

Abstract

In December 2019, the world was threatened with severe acute respiratory diseases (COVID-19), affecting public health and causing pandemic worldwide. The novel coronavirus, known as SARS-CoV-2, was initially reported to have originated in Wuhan, Hubei province, China. As of now, the virus continues to emerge and spread, giving rise to new variants with distinct characteristics, including improved transmissibility, severity, and the ability to evade the immune system. Such condition urges researcher to explore alternative treatment besides vaccination and FDA-approved drugs. When it comes to natural product, honey is a natural sweetener that has been consumed for decades due to its medicinal and nutritional properties. Kelulut honey (KH), a local Malaysian honey, has recently gained attention due to its unique flavour and taste. However, the potential of KH to exhibit antiviral effects against SARS-CoV-2 remains unexplored. Therefore, this study aims to investigate the ability of phytochemical compounds from KH to inhibit the human ACE-2 receptor using in silico approaches. KH sample from Kuantan, Pahang were subjected to sugaring-out assisted liquid extraction (SULLE) and LC-MS-QTOF analysis for non-targeted metabolite profiling. Prior to docking, 10 ACE-2 protein ensemble was created through a 100 ns molecular dynamic simulation, and an ensemble docking-based virtual screening approach was used to identify phytochemical compounds from KH with high binding affinity to ACE-2. LC-MS-QTOF analysis revealed 110 phytochemical compounds identified in KH. Among the compounds tested, 4,4'-Stilbenedicarboxamidine and 6,7-Dimethyl-9-(2-acetoxyethyl)isoalloxazine consistently demonstrated the lowest free binding energy to 10 ACE-2 protein conformations. Specifically, they exhibited free binding energies of -9.719 kcal/mol and -9.473 kcal/mol, respectively, at the ACE-2 active site, surpassing the potent inhibitor MLN 4760, which had a free binding energy of -9.353 kcal/mol. Moreover, 4,4'-Stilbenedicarboxamidine and 6,7-Dimethyl-9-(2-acetoxyethyl)isoalloxazine capable of modulate ACE-2 allosteric site with free-binding energy of -7.305 kcal/mol and -7.464 kcal/mol, respectively. Molecular dynamics simulation and MMPBSA analysis showed stable binding interaction to both active and allosteric sites of ACE-2. KH's compounds demonstrate potential for preventing SARS-CoV-2 binding to ACE-2 receptors, suggesting its possible use as a preventive measure or in combination with other COVID-19 treatments. Further experimental studies are necessary to validate the antiviral properties of KH and its potential therapeutic applications against SARS-CoV-2.

Keywords: Kelulut Honey, LC-MS-QTOF, Phytochemical compound, Molecular docking, and Molecular Dynamic Simulation.

P-077

Phenotypic and Biochemicam Changes During Maturation of *Bidara* (*Ziziphus mauritiana* L.) Fruits, Bima Ecotype.

Nikmatullah A[a]*, Nairfana I[b], Sarjan M[c], Layyina N[d]
[a]Agroecotechnology Study Program, Faculty of Agriculture, University of Mataram.
[b]Faculty of Agriculture Technology, University of Technology Sumbawa.
[c]Postgraduate, University of Mataram.
[d]Biology Study Program, Faculty of Mathematic and Natural Sciences, University of Mataram.
*Corresponding author: aluh_nikmtullah@unram.ac.id

Abstract
Bidara is an important tree grown naturally in semi-arid and arid region of Sumbawa Island and found from West Sumbawa to Bima regions. The fruit has an economic and nutritional values for the community, and some types of bidara fruits are consumed and sold in traditional markets during the fruiting season (commonly, July to August). The bidara fruits are known for the nutritional and medicinal values, and the quality of the fruits are varied depending on the variety, maturation stages and growing environment. This study examines morphological and biochemical changes during maturation of nine bidara ecotypes, grown naturally in Bima region of Sumbawa Island. The fruits of nine bidara ecotypes were harvested in July 2023, and then grouped into five different developmental stages, based on the color of the fruits. At mature stage (stage 3; S3), the nine different ecotypes have either round or oblong fruits, with fruit size from 1.410 to 2.018 cm (length) and 1.240 to 2.057cm (width), weight between 1.50 and 3.73 g, total soluble solid content (TSS) between 11.3 and18.1°Brix. The titratable acidity (TA) and reduced sugar of the fruits increases from S1 to S3 and then decreases at S4 and S5 for seven ecotypes, but for two ecotype the increase in TA is observed to S4. On the other hand, flavonoid content decreased from S1 and S2 toward the maturation. In all fruits, the S1 remains unripe, but the S2 reaches S3 (optimum maturity) after 2 days of storage at ambient temperature.

Keywords: Bidara; titratable acidity; reduced sugar; flavonoid; maturity

P-078

Cetuximab and Liposome-Nanoparticle using *Pleurotus ostreatus* Extract for Targeted EGFR and TIMP-1-Expressing Colorectal Cancer Combination Therapy

Agustina Tri Endharti[a]*, Elsafira Akrama Nabilahasna[b], Sofy Permana[c]
[a]Department of Parasitology, Faculty of Medicine, Universitas Brawijaya, Malang
[b]Master Program in Biomedical Sciences, Faculty of Medicine, Universitas Brawijaya, Malang, Indonesia
[c]Department of Biology, Faculty of Mathematics and Natural Sciences Universitas Brawijaya, Malang
*Corresponding author: tinapermana.fk@ub.ac.id

Abstract
Background: Colorectal cancer is a worldwide problem that made up the second highest cause of death in cancer especially in developing country. *Pleurotus ostreatus* has potential as cancer therapy. This study aims to investigate the effect of cetuximab combined with *Pleurotus ostreatus* extract nanoparticles on the HT-29 cell line.
Methods: *Pleurotus ostreatus* was extracted by maceration. This extract was then formulated into nanoparticle. The extract was treated with cetuximab on HT-29 cells *in vitro.* EGFR and TIMP-1 expressions were analysed by *immunofluorescence.*
Results: There was a decrease both of EGFR and TIMP-1 expressions in treated cells compared to the control group. The group with the highest dose of therapy combinations gave the highest reduction in both EGFR and TIMP-1 expression compared to the control group and other treated groups. The *Pleurotus ostreatus* extract is able to decrease EGFR and TIMP-1 expressions.
Conclusion: The combination of cetuximab and *Pleurotus ostreatus* nanoparticle reduce EGFR and TIMP-1 expressions in HT-29 cells.

Keywords: Anticancer; colon cancer; *Pleurotus ostreatus*; EGFR; TIMP-1

P-079

Exploration of Four Bali Medicinal Plants Showing from an Anti-inflammatory to Aphrodisiac

I Gede Putu Wirawan
Faculty of Agriculture, Udayana University, Jl. P.B. Sudirman, Denpasar, Bali, Indonesia
*Corresponding author: igpwirawan@unud.ac.id

Abstract
Medicinal plants have been used in Bali since old times as mentioned in many ancient manuscripts namely Lontar Usada, Lontar Taru Premana, and others. Among many medicinal plants mentioned in the lontar, we have studied four plants those were red algae Bulung Sangu, Purnajiwa, Kemangi (Basil), and Jeruju (*Acanthus montanus).* These plants were first analysed using DNA Barcode to determine whether these plants were unique to Bali, analyzed using Gas Chromatography-Mass Spectrophotometry (GC-MS) to determine the bio-active compounds, and then functional analysis of the ethanol extracts. The results showed that red algae bulung sangu contains an anti-inflammatory, rich antioxidants especially astaxanthin, and anti-cholesterol compound. Purnajiwa showing a strong aphrodisiac compound, vincadifformine and has been confirmed increased mount and mate as well as increased testosterone level of mice that used in the experiments. Kemangi with four species showed some different bio-active compounds and mainly were citral, eugenol and methyl-eugenol. The last plant Jeruju contains vanillic acid and phytol which both were aromatic and aphrodisiac as well. The results showed that the four medicinal plants studied were unique in Bali and showed biomedical evidence.

Keywords: Medicinal plants; DNA Barcode; GC-MS; anti-inflammatory; aphrodisiac

P-080

Transcriptional Responses of Porcine Intestinal Organoids Exposed to Acetate and Butyrate

Nuning Winaris[a,b]*, Bart van der Hee[a], Ellen Kranenbarg[a], Jerry M. Wells[a]
[a]Host-Microbe Interactomics Group, Department of Animal Science, Wageningen University & Research, Wageningen, Netherlands
[b]Master Program in Biomedical Sciences, Faculty of Medicine, Universitas Brawijaya, Malang, Indonesia
*Corresponding author: nuning_winaris@ub.ac.id

Abstract
Short-chain fatty acids (SCFA), such as butyrate, acetate, and propionate, have been reported to reduce the risk of gastrointestinal disorders. A previous study reported that incubation of ileum organoids with bacterial culture supernatant of *Akkermansia muciniphila* and *Faecalibacterium prausnitzii* (which contained different SCFA), as well as individual SCFA affected the expression of metabolic cellular growth and cell survival pathways. However, these results are difficult to interpret because of the mixture of SCFA and other metabolites present in the bacterial culture supernatants. Furthermore, the combined concentration of SCFAs used was high and possible toxicity was not assessed. In this study we aimed to investigate the effects of non-toxic concentrations of acetate and butyrate on gene expression in 3D organoid cultures in order to gain more insight into their transcriptional effects on epithelial functions. Porcine 3D ileal organoids were exposed to non-toxic concentration of butyrate and acetate for 5 hours or buffer control and RNA was purified for RNA sequencing. Differentially expressed genes and pathways were identified using various bioinformatics software. Butyrate treatment induced the largest set of differentially expressed genes (DEG) compared to acetate. The top canonical pathways activated by acetate treatment mostly related to cellular processes-related pathways, whereas butyrate evoked many cell-cycle related pathways. Moreover, butyrate was predicted to reduce cell proliferation through inhibition of histone deacetylase 3 (HDAC3). In contrast, the effect of acetate on histone 3 acetylation is still unclear. These results reveal that acetate and butyrate regulate different intestinal epithelial functions.

Keywords: Porcine ileal organoids; transcriptomic; epithelial function

P-081

Local Corn Cultivar from Kisar Island Maluku: Its Potential and Development for Future Functional Food

Hermalina Sinay*, Ritha Lusian Karuwal
Biology Education Program, Faculty of Teacher Training and Educational Sciences, University of Pattimura
*Corresponding author: elinasinay08@gmail.com

Abstract
Corn (*Zea mays* L.) is one of the most important food crops in almost all places in the world, after wheat and rice. In several areas in Indonesia, people also use corn as a staple food. In Maluku there is one area, namely Kisar Island, which is an area in Southwest Maluku Regency whose people also consume corn as a staple food. Seven local corn cultivars have been found in this area which have been characterized by their structure including leaf anatomy, proline content, yield components, and expression of drought resistance genes. While the characterization of proximate composition, phenolic and flavonoid content and antioxidant activity was also carried out. The results of the characterization showed that local corn cultivars from Kisar Island had a high range of adaptation to drought which could be seen through several indicators such as high proline content which was correlated with yield and yield components, as well as very high drought tolerance gene expression that even exceeded normal range. The results of the proximate analysis also showed a high protein content, as well as the results of the phenolics and flavonoids content, while the results of the antioxidant activity showed a very strong free radical inhibitory activity even exceeding that of quercetin. Therefore it can be concluded that local corn cultivars from Kisar Island have the potential to be developed as functional food to support food security and self-sufficiency in the future.

Keywords: local corn cultivar; Kisar island; potential and development; functional food

P-082

Harnessing the Power of Gut-Brain Axis: Probiotic Supplementation Ameliorates Neurological Symptoms in Cerebral Malaria

Aulia Rahmi Pawestri[a,b], Tita Rachma Ayuningtyas[c], Nuning Winaris[a,b], Shahdevi Nandar Kurniawan[d], Teguh Wahju Sardjono[a,b], Loeki Enggar Fitri[a,b]*
[a]Department of Parasitology, Faculty of Medicine, Universitas Brawijaya, Malang, Indonesia
[b]AIDS, Toxoplasma, Opportunistic Disease and Malaria Research Group, Faculty of Medicine, Universitas Brawijaya, Malang, Indonesia
[c]Master Program in Biomedical Science, Faculty of Medicine, Universitas Brawijaya, Malang, Indonesia
[d]Department of Neurology, Faculty of Medicine, Universitas Brawijaya, Malang, Indonesia
*Corresponding author: lukief@ub.ac.id

Abstract

Background: Malaria remains an unresolved global threat with spiking incidence and mortality rates, with cerebral malaria being the leading cause of death. The complex pathogenesis of cerebral malaria involves host immune and parasite interactions. Lately, with the concept of the gut-brain axis, the gut microbiota was identified to protect against systemic pathogen invasion through the activation of immune signalling pathways. Here, we aimed to explore the effect of probiotic supplementation toward clinical outcomes of cerebral malaria *in vivo*. **Methods:** C57BL/6 mice were given oral probiotic supplementation with either *Lactobacillus casei*, *Bifidobacterium longum*, or the combination of both five days before to seven days after *Plasmodium berghei* infection. Clinical manifestations were recorded using the SmithKline, Harwell, Imperial College, Royal Hospital, Phenotype Assessment (SHIRPA) score. The data was analysed using One-way ANOVA. **Results:** The were significant differences of motor behaviour ($p = 0.001$), muscle tone ($p = 0.0001$), reflex and sensory ($p = 0.025$), and neuropsychiatric state ($p = 0.015$) between the control group and that receiving combination of *L. casei* and *B. longum*. **Conclusion:** Probiotic supplementation showed promising effects in improving the neurological manifestations during cerebral malaria. Further studies are required to elucidate the immunological pathways involved and the best formulations. In the future, it is propitious that the mortalities by cerebral malaria could be mitigated by harnessing the gut-brain axis using the power of probiotics.

Keywords: Probiotics; gut microbiota; cerebral malaria; dysbiosis; immune regulation

P-083

Protective Effect of Combination Gel Transfersome *Centella asiatica* Extract and Nanoemulsion of Rosemary Essential Oil against UVB-Induced Skin Aging in BALB/C Mice

Husnul Khotimah[a], Dina Dewi Lestari Ismail[b], Dhelya Widasmara[c], Wibi Riawan[d], Ekowati Retnaningtyas[e], Raditya Weka Nugraheni[f], Oktavia Eka Puspita[g], Oktavia Rahayu Adianingsih[g], Mardiyah[h], Andri Setiawan[h]
[a]Department of Pharmacology, Faculty of Medicine, Universitas Brawijaya, Malang 65145, Indonesia
[b]Department of Nursing, Faculty of Medicine, Universitas Brawijaya, Malang 65145, Indonesia
[c]Department of Dermatovenereology, Saiful Anwar Hospital Malang, Faculty of Medicine, Universitas Brawijaya, Malang 65145, Indonesia
[d]Department of Biochemistry and Biomolecular, Faculty of Medicine, Universitas Brawijaya, Malang 65145, Indonesia
[e]Malang State Health Polytechnic, Ministry of Health, Indonesia, Malang 65119, Indonesia
[f]Department of Pharmacy, Muhammadiyah University of Malang, Malang 65145, Indonesia
[g]Department of Pharmacy, Faculty of Medicine, Universitas Brawijaya, Malang 65145, Indonesia
[h]Master Program of Biomedical Sciences, Faculty of Medicine, Universitas Brawijaya, Malang 65145, Indonesia
*Corresponding author: husnul_farmako.fk@ub.ac.id

Abstract

Background: Ultraviolet B (UVB) irradiation induces physiological and morphological skin aging, resulting in skin dryness, wrinkle formation, and loss of elasticity. This study analyzed nanoencapsulation of combination transfersome *Centella asiatica* (CA) and nanoemulsion *rosemary essential oil* (REO) with a lipid-based nanocarrier to synergize for the prevention of UVB radiation ability of both compounds, along with ameliorative and anti-aging effects.
Methods: To ensure the quality, lipid-based nanocarrier of transfersome and nanoemulsion were characterized for size, polydispersity index, zeta potential. Well-established in vivo studies were used to determine the biological effects of combination gel transfersome CA, and nanoemulsion REO were applied topically upon UVB-irradiation of BALB/c hairless mice.
Results: The results showed lipid-based nanocarrier had an particle size range of 43,97 ± 5,6 nm, polydispersity index range of 0,64 ± 0,01, zeta potential range of -10,91 ± 1,99 mV. In vivo study revealed that topical application of combination gel transfersome CA and nanoemulsion REO significantly ameliorated wrinkle formation, epidermal hyperplasia, and degradation of collagen fibers caused by UVB irradiation. Further, combination gel transfersome CA and nanoemulsion REO suppressed lipid peroxidation by decreasing the expression of *malondialdehyde* (MDA) and collagen destruction by inhibiting *matrix metalloproteinase-9* (MMP-9) expression. Moreover, combination gel transfersome CA and nanoemulsion REO upregulated type I collagen through activation of the *transforming growth factor-β* (TGF-β) /Smad pathway, thereby recovering the density of collagen reduced by UVB.
Conclusions: Overall, these data indicate that topical application of combination gel transfersome CA and nanoemulsion REO could synergistically act and potentially prevents oxidative stress and collagen degradation in the skin from UVB-induced photoaging.

Keywords: Transfersome; nanoemulsion; *Centella asiatica*; Rosemary; skin aging; UVB

P-085

Structural and Microbiology Analysis of Entrapped IS258 in Na-Alginate Matrix Upon Repetitive Batch Bio-Ethanol Fermentation

Indah S. Naibaho, I M. Mahaputra Wijaya*, I Wayan Arnata, I. B. Wayan Gunam
Department of Agro-Industrial Technology, Udayana University, Bali-Indonesia 80361
*Corresponding author: mahaputrawijaya@unud.ac.id

Abstract
Cell immobilization is aimed to fix and limit the movement of working cells which are held in specific matrix and used as functional catalyst. Cell immobilization has advantages which are more efficient and cost effective in comparison with free yeast culture in the ethanol fermentation process. Yeast isolate named IS258 is superior isolate previously obtained from the Balinese Arrack industry which functions as bioethanol fermentation agent. IS258 yeast cells was entrapped in sodium-alginate matrix for cell immobilization. The IS258 Na-alginate matrix was then used for repetitive-batches ethanol fermentations of coconut sap analog. This study aimed to analyze the structure of initial conditions and running conditions on the IS258 alginate matrix. As the alginate matrix was used for bioethanol fermentation, the result indicates that the matrix structure underwent expansion due to increasing population of IS258 yeast inside the matrix, resulting the reduction of the strength of the alginate matrix structure, thus causing the matrix to breaks apart. The condition of the IS258 alginate matrix will be discussed based on the Scanning Electron Microscope (SEM) results.

Keywords: Immobilization; matrix; IS258; ethanol; fermentation

P-087

Effect of Media Type and pH on the Growth of Isolate R5I4 in the Early Stage of Fermentation

I Made Febriana[a], Ida Bagus Wayan Gunam[a,b,*], Anak Agung Made Dewi Anggreni[a,b], I Gede Arya Sujana[a,b]
[a]Department of Agroindustrial Technology, Faculty of Agricultural Technology, Udayana University, Bukit Jimbaran, Badung Bali 80361, Indonesia
[b]Laboratory of Bioindustry, Faculty of Agricultural Technology, Udayana University, Denpasar, Bali 80232, Indonesia
*Corresponding author: ibwgunam@unud.ac.id,

Abstract
Media is a material that can be used as a place for the growth of microorganisms such as bacteria, yeasts and molds. Some types of microbes can live well on very simple media, which only contain inorganic salts plus organic carbon sources such as sugar. However, there are also microbes that require a very complex medium that not only contains carbon and nitrogen sources but also needs the addition of blood or other complex ingredients. Therefore, this research aims to determine the best type of media as the growth of isolate R5I4 and its optimal pH. The types of media used are: nutrient broth, starch broth and yeast peptone glucose and the pH used is pH 6, 7, and 8. The best treatment in this study was the M2P1 treatment which uses starch broth media at pH 6 which was able to produce an OD value of 1.925 ± 0.11 at a wavelength of 660 nm and a total microbial value of 8.76 x 10^6 CFU/mL. It also produced amylase enzyme activity of 2.720 ± 0.036 IU/mL with total reduction sugar produced of 2.20 ± 0.036 IU/mL and final total soluble solids of 6.5 ± 0.14 %Brix.

Keywords: Isolate R5I4; nutrient broth; pH; starch broth; yeast peptone glucose

P-090

The Effect of Hexane Extract of *Caulerpa racemosa* on HT-29 Cell Line by Suppressing PI3K/AKT Pathway

H.K. Permatasari[a]*, N. Amalia[b], H.W. Sulistomo[c]
[a]Department of Biochemistry and Biomolecular, Faculty of Medicine, Brawijaya University, Malang, Indonesia
[b]Biomedical Science Master Program, Faculty of Medicine, Brawijaya University, Malang, Indonesia
[c]Department of Pharmacology, Faculty of Medicine, Brawijaya University, Malang, Indonesia
*Corresponding author: happykp@ub.ac.id,

Abstract
Background : Colon cancer is a malignancy of the gastrointestinal system, the most common malignancy and the second most common cause of death. One of the challenges in the treatment of colon cancer is therapy resistance due to inappropriately targeted therapy and the several adverse side effects in patients. Tumorigenesis of colon cancer involved oncologic pathway such as PI3K/AKT as the common pathway on colon cancer. Therefore, an alternative colon cancer treatments is needed that comes from biological resources. One of them is utilizing sea grapes abundant in Indonesian waters. **Objectives:** This study aims to determine the effect of hexane extract from sea grapes (*Caulerpa racemosa*) on the colon cancer HT-29 cell line based on PI3K/AKT pathway. **Methods:** The study was conducted in vitro using the hexane extract of *Caulerpa racemosa* at concentrations of (0, 400, 800, and 1.200) µg/mL on the HT-29 cell line based on the level expression of p-akt. **Result:** The research results found that the hexane extract of *Caulerpa racemosa* decreased the expression level of p-akt (Kruskal wallis, p=0,027). The hexane extract of *Caulerpa racemosa* had a strong negative correlation (Spearman, p=0,000 and r=-0,907) to level expression of p-akt, indicating that decreasing of p-akt level occurred with increasing doses. **Conclusion:** *Caulerpa racemosa* hexane extract can inhibit PI3K/AKT pathway based on decreased the expression level of p-akt.

Keywords: *Caulerpa racemosa*; HT-29; colon cancer; PI3K/AKT; p-akt

P-091

Effect of Fluctuations in Temperature on the Life Cycle of the Forensically Important Calliphoridae fly *Chrysomya rufifacies* (Macquart 1843) (Diptera)

Bansode S.A.[a]*, More V.R.[b]
[a]Dept. of Zoology, Kelkar Education Trust's V.G.Vaze College of Arts, Science and Commerce, Mithagar Road, Mulund (East) Mumbai - 400 081
[b]Department of Zoology, Government College of Arts and Science, Aurangabad-431004 (Maharashtra), India
*Corresponding author: vitthal67@gmail.com

Abstract
In the field of forensic entomology, *Chrysomya rufifacies* has emerged as an important species for the assessment of the postmortem interval (PMI) in criminal investigations. Understanding the geographically specific developmental patterns of *C. rufifacies* in response to temperature and seasonal changes is crucial to improving the precision of PMI forecasts. In this work, we examined the growth rates of *C. rufifacies* at several temperatures (20°C, 25°C, 30°C, 35°C, and 40°C) in order to gather precise developmental data for PMI calculations in a particular region. Our research indicates that temperature significantly affects the growth of *C. rufufcaies*. We also investigated how seasonal variations affect the growth and development of *C. rufifacies*. The length of developmental phases and morphological features varied seasonally, with winter showing longer durations and colder temperatures and summer showing shorter durations and hotter temperatures. The importance of temperature in affecting an insect's life cycle was highlighted by the discovery that higher temperatures are a direct cause of faster development. Our work highlights the need to gather data on regionally unique developmental trends for accurate PMI calculations in forensic entomology investigations. Understanding the interactions between temperature, seasonal fluctuations, and morphological characteristics is crucial for creating baseline data for PMI estimates. The accuracy of PMI estimates will ultimately increase thanks to the use of this information, and forensic entomologists will have even more power to contribute to criminal investigations.

Keywords: Forensic entomology; stages of decomposition; Calliphoridae; forensic investigation; *Chrysomya rufifacies.*

P-095

Microbial Degradation Potential of Microplastic using Cutinase-like Microplastic Degrading Enzyme from *Cryptococcus* sp.

Oladipo O.O., Olaleye A.C., Oyewusi, H.A.*
Department of Science Technology, School of Science and Computer Studies, Federal Polytechnic Ado Ekiti, Nigeria
*Corresponding author: haoyewusi@utm.my

Abstract
The study revolves around a remarkable biodegradable plastic-degrading enzyme known as Wr CfCLE, sourced from *Cryptococcus* sp. This specific enzyme exhibits the ability to degrade various biodegradable plastics (BPs), including polybutylene succinate (PBS), polybutylene succinate-co-adipate (PBSA), poly ε-caprolactone (PCL), and polylactic acid (PLA). However, the rise in BP consumption has led to environmental challenges, as these materials often fail to degrade completely within a desirable timeframe. This investigation dives deep into the physicochemical properties of Wr CfCLE, encompassing secondary structure prediction and 3D homology modelling of protein sequences. The sequence's characteristics, including amino acid count, molecular weight, theoretical pI values, molecular formula, and total atom count, are meticulously scrutinized. Notably, the sequence consists of 239 amino acids with a molecular weight of 24,303.04 Da, holding an acidic nature with a pI value of 6.39. Further, the composition includes 33.47% alpha helices and 49.37% random coils, while alanine and glycine constitute 14.2% and 12.1% respectively. In summary, the study underscores the structural attributes of Wr CfCLE, spotlighting its potential as a bioremediation agent addressing environmental challenges posed by biodegradable plastics.

Keywords: Structural analysis; cutinase; biodegradable; plastic; degrading enzyme; *Cryptococcus* sp.

P-096

Analysis of Decolorization Potential of Dye from a Bacterium Isolated from the Hypersaline Lake

Habeebat Adekilekun Oyewusi[a,b*], Kolajo Adedamola Akinyede[a], Roswanira Abdul Wahab[c,d], Evi Susanti[e], Syariffah Nuratiqah Syed Yaacob[b], Fahrul Huyop[b]
[a]Department of Science Technology, Biochemistry unit, The Federal Polytechnic P.M.B 5351, Ado Ekiti, Ekiti State, Nigeria.
[b]Department of Biosciences, Faculty of Science, Universiti Teknologi Malaysia, 81310 UTM Johor, Malaysia.
[c]Department of Chemistry, Faculty of Science, Universiti Teknologi Malaysia, 81310 UTM Johor, Malaysia.
[d]Enzyme Technology and Green Synthesis Research Group, Department of Chemistry, Faculty of Science, Universiti Teknologi Malaysia, 81310 UTM Johor, Malaysia.
[e]Department of Biotechnology, Faculty of Mathematics and Natural Sciences, Universitas Negeri Malang, 65145, Indonesia
*Corresponding author: haoyewusi@utm.my

Abstract
The research investigated the decolorization potential of a dye by utilizing *Bacillus megaterium* H2 azoreductase (AzrBmH2), extracted from a bacterium in a hypersaline lake. The ability of AzrBmH2 to degrade four synthetic dyes, namely reactive blue 4, Remazol brilliant red, thymol blue, and methyl red, was monitored spectrophotometrically. Subsequent in-silico analysis using GROMACS was conducted. The findings revealed that *Bacillus megaterium* H2 effectively degraded all four synthetic dyes, achieving up to 60% degradation across various tested concentrations. Genomic analysis identified five distinct azoreductase genes, which were then modelled into three templates: AzrBmH21, AzrBmH22/3, and AzrBmH24/5. Binding energies of AzrBmH2-substrate complexes ranged from −10.6 to −6.9 kcal/mol, forming 4 to 6 hydrogen bonds with predicted catalytic binding residues (His10, Glu 14, Ser 58, Met 99, Val 107, His 183, Asn184, and Gln 191). Among these, AzrBmH21-substrates exhibited the lowest binding energy with all dyes (−10.6 to −7.9). Molecular dynamic simulations indicated enhanced stability of AzrBmH21-substrate complexes. In conclusion, this study underscores the effective decolorization capacity of *Bacillus megaterium* H2, and its potential for large-scale dye remediation applications. The findings shed light on the bacterium's promising role in addressing dye pollution concerns.

Keywords: azodyes; *Bacillus megaterium* sp.; In silico study of azodye; Lake Tuz

P-097

Synergistic Effect of Medicinal Plants on Liver Damage

Tooba Lateef*, Sidra Sajjad, and Shamim A Qureshi
Department of Biochemistry, University of Karachi, Karachi-75270, Pakistan
*Corresponding author: t.lateef12@gmail.com

Abstract
Liver diseases are one of the major problems worldwide. In recent years focus on effective hepatoprotective medicinal plant has been increased. It has been reported that the principles of synergy and combining herbs improves efficacy and decreases harmful effect. Therefore, in the present investigation, seeds and fruits extracts of plants in different combinations including 1. *C. anthelminticum*, *Vitis vinifera* (raisins) and *W. coagulans* (CRW), 2. *C. anthelminticum*, *A. fatua* and *V. vinifera* (raisins) (CAR) and 3. *C. anthelminticum* and *V. vinifera* (raisins) (CV) were studied against carbon tetrachloride (CCl_4) induced hepatotoxicity in animal model. Female Wister rats were distributed into 6 groups normal (1 mL distilled water), hepatotoxic control (3 mL/kg CCl_4), positive control (100 mg/kg silymarin), Test A (800 mg/kg CRW), Test B (800 mg/kg CAR) and Test C (800 mg/kg CV), administered with their respective doses for 5 consecutive days. CCl_4 (3 mL in equal proportion with olive oil) was administered intraperitoneally on third and fifth day of animal trial after administration of test doses in all groups expect group I. After 24 hours of last dosage of CCl4, rats were decapitated, and their serum was collected. CRW, CAR and CV in dose of 800 mg/kg each in their respective test groups significantly ameliorate the biochemical parameters by observing reduction in alanine and aspartate transaminases, alkaline phosphates, gamma glutamyl transpeptidase, total bilirubin both direct & indirect and uric acid whereas elevation in total protein & albumin levels when compared with CCl_4 hepatotoxic control group. Therefore, the present investigation concludes that different combinations of extracts of *A. fatuva, C. anthelmenticum*, raisins and *W. coagulans* are strong liver regenerative and hepatoprotective herbal agents which bring all liver confined parameters back to normal when compared with carbon tetrachloride induced hepatotoxicity.

Keywords: Hepatoprotective; liver diseases; synergistic; CCl_4; medicinal plants

P-098

Determination of Heavy Metals in Some Selected Herbal Medicinal Preparations Marketed in Kano State, Nigeria

Zigau Z.*[a], Huyop F.[b], Aliyu B.S[c], Yakasai, M.A.[d], Sanusi, H.[e]
[a]Department of Biological Science, Faculty of Science, Bauchi State University Gadau, Nigeria
[b]Department of Biosciences, Faculty of Science, Universiti Teknologi Malaysia, Malaysia
[c]Department of Plant Biology, Faculty of Life Science, Bayero University Kano, Nigeria.
[d]Department of Biology, Aliko Dangote University of Science and technology, Nigeria
[e]Department of Plant science and biotechnology, Federal University Dutsinma, Nigeria
*Corresponding author: zainabauwalzigau87@gmail.com

Abstract
Herbs are extensively consumed in Nigeria, for their medicinal properties and availability. Due to the increasing rate of pollution in the environment, heavy metal contamination has been reported in herbal medicines globally. However, there is little information on heavy metal contamination of herbal medicines in Kano State, Nigeria. This study aimed at determining the concentration of heavy metals residues in some selected traditional medicinal herbs consumed in Kano State, Nigeria. This is to assess their relative safety and potential health risks to local inhabitants based on the world health organization standard limit. A total of ten (10) powdered samples of medicinal preparations labeled A to J were purchased from the local markets in Kano metropolis and were analyzed for the presence of lead, chromium, cadmium and mercury contents. Plant samples were digested according to the method described by Street *et al.,* 2008, and heavy metal concentration was determined using Atomic Absorption Spectrometry (AAS). Metals found to be present varied in different concentrations in the herbal samples. The presence of heavy metal ranges as follows: 0.6-6.5mg/kg for chromium, 3.10-22.10mg/kg for lead, 0.08-0.60mg/kg for cadmium and 0.09-0.30mg/kg for mercury. However, the content of mercury was not detected in some samples.
The findings of the study suggest that most of these samples were contaminated with high amount of lead chromium and cadmium, thus these herbs contain unsafe levels of heavy metals that exceeded the World Health Organization (WHO) permissible limits, and in some of the samples the levels of Mercury found present did not exceed the permissible limit by W.H.O.

Keywords: Traditional medicine; heavy metals; permissible limits and contamination

P-099

Identification of Bacterial Strain Isolated from Antarctica Able to Degrade Dalapon

Suleyman Faruk Kirkinci[a], Hasan Murat Aksoy[a], Sevgi Marakli[b], Yilmaz Kaya[a]*
[a]Department of Agricultural Biotechnology, Faculty of Agriculture, Ondokuz Mayis University, Turkey
[b]Department of Molecular Biology and Genetics, Faculty of Science and Letter, Yildiz Technical University, Turkey
*Corresponding author: yilmaz.kaya@omu.edu.tr

Abstract
This study focuses on psychrophilic microorganisms found in extreme environments, such as Antarctica, and their potential contributions to environmental and industrial biotechnology. Specifically, a newly discovered psychrophilic bacterial strain TaeBurcu001 was isolated from Galindez Island, Antarctica. This strain was capable of thriving at lower temperatures, with an optimal growth temperature of 5 °C. Interestingly, TaeBurcu001 exhibited the ability to utilize the herbicide Dalapon (2,2-dichloropropionic acid, 2,2-DCP) as its sole carbon source, which is a unique adaptation to its extreme habitat. Phylogenetic analysis based on the 16S rRNA gene sequence revealed that TaeBurcu001 was closely related to members of the genus Psychrobacter, sharing 99% similarity. Comparisons of phenotypic and biochemical characteristics between TaeBurcu001 and other known Psychrobacter species showed significant similarities. Additionally, a colorimetric assay detected the release of chloride ions, with a maximum value recorded at 0.27 mmol/L in the presence of 30 mM of 2,2-DCP. This research sheds light on the previously unreported ability of psychrophilic bacteria to utilize halogenated compounds as carbon sources, providing valuable insights into their unique metabolic capabilities. The findings suggest potential applications of these microorganisms in environmental processes and the remediation of contaminated ecosystems. This study serves as a steppingstone for further investigations into harnessing the potential of extreme microorganisms for practical applications.

Keywords: Dalapon; dehalogenase; pollutant degradation; psychrophilic; Antarctic

P-062

Design, Development, and Usability Evaluation of MSU-TCTO Abalone Hatchery Water Temperature Monitoring System (WaTeMS)

Charisa F. Llema[a]*, Abdul-Aziz J. Tiblana[a], Al-ameen P. Abdurahima[a], Joseph V. Andas[a]
[a]Mindanao State University – Tawi-Tawi College of Technology and Oceanography, Bongao, Tawi-Tawi 7500, Philippines
*Corresponding author: charisa.llema@g.msuiit.edu.ph

Abstract
This study presents the design, development, and evaluation of the MSU-TCTO Abalone Hatchery Water Temperature Monitoring System (WaTeMS), a hardware and software system aimed at enhancing abalone production, especially in Hatcheries. Utilizing microcontrollers and sensors, WaTeMS continuously monitors water temperature in real-time, enabling hatchery managers to remotely access data on their desktop/laptop or cellphone and make informed decisions. The system employs temperature sensors, and microcontrollers to facilitate remote monitoring and data analysis. With optimal water temperature being crucial for abalone growth and survival, this cost-effective and user-friendly solution offers potential applications in other aquaculture settings. Further, the system garnered 78.33333, equivalent to a ‘Good’ adjective rating based on the System Usability Scale rate that makes the system usable. Finally, the research is recommended to expand WaTeMS' functionality, incorporating additional environmental parameters for a comprehensive monitoring system.

P-100

Understanding Composting and Microbial Behavior in Algerian Urban Areas

Fatma Zohra Derias
Laboratory for Sustainable Industrial Development and Engineering Safety, Institute of Industrial and Maintenance, University of Benahmed Mohamed, Oran 2, Algeria
*Corresponding author: manarderias7@gmail.com

Abstract
The purpose of the paper is to monitor the behavior of five different types of waste (household waste, coffee waste, green waste, humus and waste smaller than 8 mm) during composting to see the impact of the nature of the substrate on the quality of mature compost and the process. The study focuses on monitoring the evolution of microflora and determining physicochemical parameters and characteristics. The results show that there is a correlation between the parameters of each substrate and that if the process conditions are respected (moisture level and N/C ratio), household waste, coffee waste, green waste, and very small waste can give the best quality compost. The study also found that there is no concentration of pathogenic microorganisms such as *Shigella* and *Salmonella* in composting. The results suggest that composting can be used as an effective method for reducing waste in Algeria and promoting industrialization by valorizing waste.

Keywords: Solid waste; Algeria; composting; solid waste treatment

P-101

Characterization of the Genetic Diversity of Citrus Species of Nepal using Simple Sequence Repeat (SSR) Markers

Nabin Narayan Munankarmi[af]*, Neesha Rana[b], Bal Krishna Joshi[e], Tribikram Bhattarai[a], Sujan Chaudhary[c], Bikash Baral[d], Sangita Shrestha[b]
[a]Central Department of Biotechnology, Tribhuvan University (TU), GPO Box 44613, Kirtipur, Kathmandu, Nepal
[b]Molecular Biotechnology Unit, Faculty of Science, Nepal Academy of Science and Technology (NAST), GPO Box 3323, Khumaltar, Lalitpur, Nepal
[c]Department of Botany, Amrit Campus, Tribhuvan University (T.U), Kathmandu, Nepal
[d]Department of Biochemistry, University of Turku, FIN-20014 Turku, Finland
[e]National Gene bank, Nepal Agriculture Research Council (NARC), Nepal
[f]Department of Research and Development, Biotechnology Society of Nepal (BSN), 44600, Nepal
*Corresponding author: nabin2045@gmail.com

Abstract
Nepal has very low Citrus fruit production compared to other countries, which is due to lack of elite varieties and cultivars having desirable traits. Therefore, breeding of elite cultivars is crucial to address ever increasing market demand of citrus fruits in Nepal. Genetic diversity characterization of Citrus germplasm at molecular level is important and crucial step for their utilization in breeding and conservation. In the present investigation, we aimed to utilize 12 SSR markers to characterize genetic diversity of forty-five Citrus accessions of Citrus collected from National Citrus Research Program (NCRP), Dhankuta and Kathmandu valley. A total of 60 putative alleles were amplified at 12 SSR loci with an average of five alleles per locus. PIC value ranged from 0.497 with primer TAA 27 to 0.802 with primer TAA 41 with an average value of 0.662. Probability of identity (PI) ranged from 0.075 to 0.383 with an average value of 0.143. Observed Heterozygosity (Ho) ranged from 0.460 to 0.794 and Expected Heterozygosity (He) ranged from 0.460 to 0.794. Shannon's Information Index (I) ranged from 0.677 to 1.678. Principal co-ordinate analysis (PCO) revealed the first principal co-ordinate axis accounting 20.35% and second axis accounting 11.43% of the total variation. UPGMA clustering using Jaccard's similarity coefficient grouped 45 accessions into four clusters. The information generated from this investigation will be useful for National Agriculture Genetic Resources Center (Gene bank) of Nepal and other relevant Citrus researchers and breeders for their conservation, Molecular Breeding-based Research & Development and their sustainable future utilization.

Keywords: Citrus; SSR; Genetic diversity; Nepal

P-102

Green Honey from Banggi Island: A Comprehensive Study on its Physical and Chemical Properties

Nanthini Rajindran and Fahrul Huyop
Department of Biosciences, Faculty of Science, Universiti Teknologi Malaysia, 81310 UTM Johor Bahru, Malaysia
*Corresponding author: fahrul@utm.my

Abstract
The exclusive green honey from Banggi Island in Sabah commands a premium price due to its uniqueness. Yet, its limited availability makes it susceptible to adulteration, posing health risks. With no established standard to reduce sugar in green honey, our study aimed to analyze its properties. Results showed its physicochemical profile is comparable to other honey types. The green hue is from chlorophyll and island flowers. The acidity is low (28−33 Meq/100 g), HMF content minimal, and phenolic content noteworthy (16-19 mg GAE /100 g). Its reducing sugar content (~37.9 %) is lower than processed honey due to moisture removal. Protein content is high (1-2 gm/kg), especially trans-4-hydroxyproline, a source of healing agents. Trace metals (arsenic, lead, nickel, cadmium, copper, and cobalt) are within safe limits. Our findings support its safe consumption and quality certification for local and export markets.

Keywords: Green honey; Banggi Island; physico chemical

P-064

Anticancer Robustness of Gold-Silver-Cinnamon Nanohybrids

Ali Aqeel Salim, Sib Krishna Ghoshal and Hazri Bakhtiar
Laser Center & Physics Department, Faculty of Science, Universiti Teknologi Malaysia, 81310 UTM Johor Bahru, Johor, Malaysia
*Corresponding author: asali@utm.my

Abstract

We present a demonstration of the anticancer potency against HCT-116 colorectal cancer cells and the cytotoxicity of novel highly fluorescent, surface-functionalized gold-silver-cinnamon nanohybrids (Au-Ag-Cin-NHs) synthesized using the pulsed laser ablation in liquid (PLAL) method. Furthermore, we propose the first anticancer mechanism of these nanohybrids against malignant cell membranes. The preparation of these nanohybrids involved immersing separate solid targets of gold (Au), silver (Ag), and cinnamon bark in deionized water (used as the liquid medium), followed by ablation using a Q-switched Nd:YAG pulse laser under optimal conditions (pulse duration of 10 ns, repetition rate of 10 Hz, and wavelength of 1064 nm). This resulted in the synthesis of colloidal Au-Ag-Cin-NHs with tailored physicochemical characteristics, showcasing excellent spherical morphologies, structures, and fluorescence, all desirable for therapeutic drug formulation. Comprehensive characterizations of these nanohybrids revealed their strong potential for use in therapeutic applications. Notably, these proposed nanohybrids exhibited significant anticancer efficacy (with a high IC50 of 20 µg/ml) during in vitro testing against both HCT-116 colorectal adenocarcinoma and CCD-18co normal colon cell lines. This remarkable anticancer and cytotoxicity performance can be attributed to the synergistic interaction between inorganic components (Au/Ag) and the organic component (Cin) in the nanomaterials. The presence of bioactive agents such as cinnamaldehyde and polyphenols within cinnamon nanoparticles contributes to their favorable nanobiomedical effects. Simultaneously, the localized surface plasmon resonance of small Au/Ag components induces strong fluorescence, which proves to be effective in targeting and eliminating cancer cells. We assert that our systematic study serves as a foundation for the production of high-performance Au-Ag-Cin-NHs. These nanohybrids, with their sustainable and cost-effective nature, can be tailored to possess advantageous properties for a wide array of nanomedicinal applications.

Keywords: Au-Ag-Cin-NHs; PLAL; fluorescence; MTT assay; anticancer

ACKNOWLEDGEMENT

ORGANIZING COMMITTEE

Udayana University, INDONESIA
Universiti Teknologi Malaysia, MALAYSIA
Centre for Sustainable Nanomaterials (CSNano), Ibnu Sina Insitute for Scientific and Industrial Research, UTM
International Islamic University Malaysia, MALAYSIA
Ondokuz Mayis University, TURKEY

SPONSORS

NS Field Sdn Bhd
Youbaby Million Sdn Bhd

SPEAKERS AND PARTICIPANTS

All keynote, plenary and invited speakers
All presenters and participants

All organizing and scientific committee