

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



UTM
UNIVERSITI TEKNOLOGI MALAYSIA



الجامعة الإسلامية العالمية ماليزيا
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA
UNIVERSITI AL-ISLAMIA MALAYSIA
Center of Knowledge and Islam



EDITED BY

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



Fourth Edition 2023

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Programme and Abstract Book

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Editor:

NIK AHMAD NIZAM NIK MALEK

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

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**Four Points by Sheraton, Ungasan – Bali
Indonesia**



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Organized by

Udayana University, INDONESIA
Universiti Teknologi Malaysia, MALAYSIA

In collaboration with

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



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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



Bismillahirrahmanirrahim,

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 Mayıs University, Samsun, Türkiye

ORGANIZING COMMITTEE

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**Programme/Public Relation/Souvenirs
Venue/Accommodation**

Dr. I Dewa Ayu Anom Yuarini
Cokorda Anom Bayu Sadyasmara
Desak Kartika
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Field Trip

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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 Presentaition 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 Faedah 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 Aedrianees 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 Haziya Amin 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

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Plenary	In-situ Formation of Silica Nanoparticles Decorated with Well-Defined Chains of Linear and Non-Linear Structures Nikos Hadjichristidis, <i>King Abdullah University of Science and Technology, Saudi Arabia</i>	3
Plenary	An Orchestra of Cellular Senescence, Inflammaging, Aging and Age-Related Disease: Mechanism and Therapy Fatchiyah F., <i>Brawijaya University, Indonesia</i>	4
Plenary	DNA-Recombinant Based Vaccine Technology: The Promises and Pitfalls I Gusti Ngurah Kade Mahardika, <i>Udayana University, Indonesia</i>	5

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

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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

ACKNOWLEDGEMENT

ORGANIZING COMMITTEE

Udayana University, INDONESIA
Universiti Teknologi Malaysia, MALAYSIA
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