





Malaysian Journal of BIOENGINEERING AND TECHNOLOGY

elSSN: 3036-017X



EDITOR-IN-CHIEF

Muhammad Azwadi Sulaiman

MANAGING EDITOR

Mahani Yussof

EDITORIAL OFFICE
Noor Azling Ibrahim

EDITORS

Mohd Hazim Mohamad Amini
Wee Seng Kew
Wong Yie Ching
Nurul Akmar Che Zaudin
Ahmad Zul Izzi Fauzi
Julie Juliewatty Mohamed
Shinichi Tashiro

Published by: UMK Press

In Collaboration:
Faculty of Bioengineering and Technology
Universiti Malaysia Kelantan

Available online at http://journal.umk.edu.my/index.php/mjbet

Copyright UMK Press, 2024

All rights reserved. No part of this publication may be reproduced, stored in production transmitted in any form, whether electronic, mechanical, photocopying, recording or otherwise, without having permission from the UMK Press.

Book's title: Malaysian Journal of Bioengineering and Technology (MJBET)

eISSN no.: 3036-017X

Published by:

UMK Press

Universiti Malaysia Kelantan

Office of Library and Knowledge Management

16300 Bachok

Kelantan

(Member of Malaysian Scholarly Publishing Council (MAPIM))

(Member of Malaysian Book Publishers Association (MABOPA)

Membership Number: 201903)

In Collaboration:

Faculty of Bioengineering and Technology

Universiti Malaysia Kelantan

Jeli Campus

17600 Jeli

Kelantan

Preface

As the editor-in-chief, I am delighted to present the second issue of the Malaysian Journal of Bioengineering and Technology (MJBT), a new journal from Universiti Malaysia Kelantan. This journal aims to provide a platform for researchers, academics, and practitioners to share their knowledge and innovations in bioengineering and related technology.

The December 2024 issue of the Malaysian Journal of Bioengineering and Technology (MJBeT) features research on various topics, including the mechanical and thermal properties of cellulose nanocrystal/graphene nanoplatelet biocomposites, performance of polymer inclusion membranes for gold extraction, advancements in wire arc additive manufacturing, antibacterial studies on graphene oxide alginate, biohydrogen production techniques, and enzymatic pretreatment of lignocellulosic biomass for bioenergy conversion. The issue also covers the effects of silver complexes on antibacterial properties and the synthesis of CaCu₃Ti₄O₁₂ using microwave processing techniques.

I want to express my sincere gratitude to all the authors, reviewers, editorial board members, and staff who have contributed to the successful launch of this journal. I would also like to thank Universiti Malaysia Kelantan for its support and endorsement of this journal. Finally, I hope that the readers will find this journal useful and informative and that they will cite and take advantage of the publications in this journal.

Muhammad Azwadi Sulaiman Editor-in-Chief Malaysian Journal of Bioengineering and Technology

Editorial Board

Editor-in-Chief

Associate Professor Dr. Muhammad Azwadi Sulaiman, Universiti Malaysia Kelantan, Malaysia

Managing Editor

Associate Professor Dr. Mahani Yussof, Universiti Malaysia Kelantan, Malaysia

Editorial Office

Associate Professor Dr. Noor Azlina Ibrahim, Universiti Malaysia Kelantan, Malaysia

Editors

Professor Ir. Ts. Dr. Julie Juliewatty Mohamed, Universiti Malaysia Kelantan, Malaysia Associate Professor Dr. Mohd. Hazim Mohamad Amini, Universiti Malaysia Kelantan, Malaysia

Associate Professor Dr. Wee Seng Kew, Universiti Malaysia Kelantan, Malaysia Associate Professor Dr. Wong Yie Ching, Universiti Malaysia Kelantan, Malaysia

Dr. Ahmad Zul Izzi Bin Fauzi, Malaysia

Dr. Nurul Akmar Binti Che Zaudin, Malaysia

Dr. Shinichi Tashiro, Osaka University, Japan

Acknowledgement for Reviewers

MJBET would like to acknowledge our peer reviewers listed below for their contributions. Their time and expertise help us tremendously to improve the scientific quality of submitted manuscripts.

Reviewers for

Vol. 2, 2024

Zubaidah Aimi Abdul Hamid Mohd Ezwan Selamat Mahani Yusoff Teo Pao Ter Mohamad Bashree Abu Bakar Muhammad Azwadi Sulaiman Lum Wei Chen Andi Hermawan Wani Sofia Udin Hidayani Jaafar Sitti Fatimah Mhd. Ramle Tan Lian See
Wong Yee Ching
Asanah Binti Radhi
Siti Roshayu Binti Hassan
Ahmad Zul Izzi Fauzi
Arlina Ali
Nor Izaida Ibrahim
Mohd Hazim Mohamad Amini
Ainihayati Abdul Rahim
Noor Azlina Ibrahim

Table of Contents

Mechanical and Thermal Properties of Cellulose Nanocrystal/Graphene Nanoplatelet Reinforced Polylactide Acid Biocomposites Nur Izzati Mustafa, Mohd Bashree Abu Bakar, Nur Izzati Mazli, Mohamad Najmi Masri, Andi Hermawan	94-99
Mechanical Properties of Annealed Soda Lime Silica Glass with Various Potassium Salt by Ion Exchange Nur Hidayah Yaakob, Norfadhilah Ibrahim, Julie Juliewatty Mohamed, Muhammad Azwadi Sulaiman	100-106
Study on the Performance of Polymer Inclusion Membrane for Gold Extraction Nor Zafirah Nor'Azmi, Noor Fazliani Shoparwe, Abdul Hafidz Yusoff	107-112
From Light to Heavy: Addressing Gaps in Rare Earth Element Extraction at the Lynas Advanced Materials Plant Norazihan Zulkifli, Noor Fazliani Shoparwe, Abdul Hafidz Yusof, Ahmad Zuhairi Abdullah, Mohammad Norazmi Ahmad	113-120
Advances in Membrane Technology for Gold Extraction: A Comprehensive Review Lim Cee Kee, Noor Fazliani Shoparwe	121-129
Advancements and Challenges in Wire Arc Additive Manufacturing – A Review Camilla Kong, Azfi Zaidi Mohammad Sofi, Sarizam Mamat	130-136
Effect of Silver Complex on Graphene Oxide Alginate (GOAlgAg) for Antibacterial Studies Hanisah Izati Adli, An'amt Mohamed Noor, Nor Hakimin Abdullah, Arlina Ali, Norfadhilah Ibrahim	137-142
Advances in Biohydrogen Production: Techniques, Challenges, and Future Prospects Ahmad Zul Izzi Fauzi, Muhammad Iqbal Ahmad, Kar Keng Lim, Amar Hisham Jaaffar, Azfi Zaidi Mohammad Sofi @ Aziz, Nor Hakimin Abdullah, Sarizam Mamat	143-153
Effect of Polyvinyl Alcohol (PVA), Cellulose Nanocrystals (CNC), and ε-Polylysine (ε-PL) Biocomposites for Fresh Chillies Coating Application Nur Aiman Mohamad Senusi, Nor Hakimin Abdullah	154-160
A Review of Enzymatic Pretreatment of Lignocellulosic Biomass for Bioenergy Conversion Ahmad Zul Izzi Fauzi, Muhammad Iqbal Ahmad, Kar Keng Lim, Amar Hisham Jaaffar, Azfi Zaidi Mohammad Sofi @ Aziz, Nor Hakimin Abdullah, Sarizam Mamat	161-169
A Review on Microwave Processing Technique in the Synthesis of CaCu ₃ Ti ₄ O ₁₂ Fathin Asila Mohd Pabli, Syifa' Muhammad Sharifuddin, Muhammad Azwadi Sulaiman	170- 179