

Foreword

Welcome to the fourth issue of 2026 of the *Pertanika Journal of Science and Technology* (PJST)!

PJST is an open-access journal for studies in Science and Technology published by Universiti Putra Malaysia Press. It is independently owned and managed by the university for the benefit of the world-wide science community.

This issue contains 27 articles: one short communication article; four review articles; and the rest are regular articles. The authors of these articles come from different countries namely Bangladesh, India, Indonesia, Japan, Malaysia, and Saudi Arabia.

The issue also features the article titled *“Data-Driven Fault Detection and Diagnosis of a Nuclear Reactor Cooling System Using Graph Neural Networks”*, which presents an intelligent approach to improving the monitoring and reliability of complex cooling systems. The research develops a Graph Neural Network-based Fault Detection and Diagnosis framework for the TRIGA PUSPATI Reactor cooling system using data generated from a scaled-down laboratory control rig that replicates the operational relationships of the reactor cooling process. By representing sensors and system components as interconnected nodes and edges, the GNN can capture relationships among temperature, pressure, and flow measurements that may not be adequately represented by conventional neural-network approaches. The proposed model was evaluated against an Artificial Neural Network under identical experimental conditions and demonstrated superior performance, achieving 98.12% accuracy, 99.15% precision, 99.26% recall, and a 98.20% F1-score, together with a substantially lower mean squared error. The system was further validated through offline and real-time experiments involving representative fault scenarios, where it successfully detected and localised faults while providing graphical indications of the affected components. By combining graph-based artificial intelligence with real-time sensor monitoring, this study contributes to the development of more responsive and data-driven fault diagnosis systems and demonstrates the potential of intelligent monitoring technologies to enhance predictive maintenance, operational reliability, and safety in complex industrial cooling environments. Full details of this study are available on page 2053.

The article entitled *“Characterisation of Bamboo Fibre Reinforced Polyurethane Foam Composites with Varying Fibre Sizes”* investigates the potential of bamboo fibre as a sustainable reinforcement for polyurethane foam composites and examines how fibre size influences their thermal, mechanical, and physical performance. The study fabricates composites using bamboo fibres in four size ranges, from below 150 μm to 425-600 μm ,

and evaluates their thermal degradation behaviour, flexural and compressive properties, water absorption, thickness swelling, and moisture content. The findings demonstrate that fibre size plays an important role in determining composite performance. Among the bamboo fibre-reinforced formulations, BFP3, containing fibres within the 300–425 μm range, exhibited the highest flexural and compressive strengths at 0.192 MPa and 0.232 MPa, respectively, while also showing favourable thermal stability. In contrast, composites containing smaller fibres recorded lower water absorption, thickness swelling, and moisture content, highlighting the balance required between mechanical performance and dimensional stability. By demonstrating the potential of bamboo fibre as an environmentally friendly reinforcement material, this work contributes to the advancement of natural fibre composites for applications such as thermal insulation, acoustic products, and building components, while supporting efforts to reduce dependence on synthetic reinforcement materials. Further details of this study can be found on page 2385.

Another noteworthy contribution is the article entitled “Valorisation of Food Waste and Leftovers into Functional Bio-Compost: Optimisation of Maturation Period and Growth Performance of *Ipomoea Aquatica*”, which addresses the growing challenge of food waste management through the production of functional bio-compost. The study applies the Bokashi composting method to food waste and leftover food and evaluates maturation periods of 30, 40, and 50 days based on physical and chemical properties as well as the growth performance of water spinach (*Ipomoea aquatica*). The results demonstrate that longer maturation periods generally improve compost quality through reduced bulk density, increased moisture content and water-holding capacity, improved nitrogen availability, and more favourable carbon-to-nitrogen ratios. Among the treatments, leftover food compost matured for 50 days, designated LF-50, produced the most favourable overall characteristics, including the lowest C ratio, the highest nitrogen and potassium concentrations, and the strongest water spinach growth performance. The LF-50 treatment achieved a crop growth rate of 12.85 g/m²/day and produced the highest number and size of leaves among the bio-compost treatments, approaching the performance obtained using commercial organic fertiliser. By transforming commonly discarded organic materials into a useful soil amendment, the study provides a practical approach to reducing landfill disposal while supporting nutrient recovery, household composting, and more sustainable agricultural practices. Further details of this study can be found on page 2421.

We anticipate that you will find the evidence presented in this issue to be intriguing, thought-provoking and useful in reaching new milestones in your own research. Please recommend the journal to your colleagues and students to make this endeavour meaningful.

All the papers published in this edition underwent Pertanika’s stringent peer-review process involving a minimum of two reviewers comprising internal as well as external

referees. This was to ensure that the quality of the papers justified the high ranking of the journal, which is renowned as a heavily-cited journal not only by authors and researchers in Malaysia but by those in other countries around the world as well.

We would also like to express our gratitude to all the contributors, namely the authors, reviewers and Editorial Board Members of PJST, who have made this issue possible.

PJST is currently accepting manuscripts for upcoming issues based on original qualitative or quantitative research that opens new areas of inquiry and investigation.

Editor-in-Chief

Mohamed Thariq Hameed Sultan