E-PROCEEDINGS

INTERNATIONAL TINKER INNOVATION & ENTREPRENEURSHIP CHALLENGE (i-TIEC 2025)

"Fostering a Culture of Innovation and Entrepreneurial Excellence"

23 January 2025
PTDI, UiTM Cawangan Johor
Kampus Pasir Gudang

ORGANIZED BY:

Electrical Engineering Studies, College of Engineering
Universiti Teknologi MARA (UiTM) Cawangan Johor
Kampus Pasir Gudang
https://tiec-uitmpg.wixsite.com/tiec

e ISBN 978-967-0033-34-1

9 789670 033341

E-PROCEEDINGS
of International Tinker Innovation & Entrepreneurship Challenge (i-TIEC 2025)

"Fostering a Culture of Innovation and Entrepreneurial Excellence"

23rd JANUARY 2025
PTDI, UiTM Cawangan Johor, Kampus Pasir Gudang

Organized by

Electrical Engineering Studies, College of Engineering,

Universiti Teknologi MARA (UiTM) Cawangan Johor, Kampus Pasir Gudang.

https://tiec-uitmpg.wixsite.com/tiec

Editors

Aznilinda Zainuddin

Maisarah Noorezam

Copyright © 2025 Universiti Teknologi MARA Cawangan Johor, Kampus Pasir Gudang, Jalan Purnama, Bandar Seri Alam, 81750 Masai Johor.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, whether electronic, mechanical, or otherwise, without prior written consent from the Undergraduate Coordinator, Electrical Engineering Studies, College of Engineering, Universiti Teknologi MARA (UiTM) Cawangan Johor, Kampus Pasir Gudang.

e ISBN: 978-967-0033-34-1

The author and publisher assume no responsibility for errors or omissions in this e- proceeding book or for any outcomes related to the use of the information contained herein.

The extended abstracts featured in this e-proceeding book have not undergone peer review or verification by i-TIEC 2025. The authors bear full responsibility for the content of their abstracts, guaranteeing that they are original, unpublished, and not concurrently submitted elsewhere. The opinions presented in the abstracts reflect those of the authors and do not necessarily align with the views of the editor.

Published in Malaysia by
Universiti Teknologi MARA (UiTM) Cawangan Johor
Kampus Pasir Gudang, 81750 Masai

CONTENTS

PREFACE

It is with great pleasure that we present the e-proceedings of International Tinker Innovation & Entrepreneurship Challenge (i-TIEC 2025), which compiles the extended abstracts submitted to the International Tinker Innovation & Entrepreneurship Challenge (i-TIEC 2025), held on 23 January 2025 at **PTDI, Universiti Teknologi MARA (UiTM) Cawangan Johor, Kampus Pasir Gudang.** This publication serves as a valuable resource, showcasing the intellectual contributions on the invention and innovation among students, academics, researchers, and professionals.

The International Tinker Innovation & Entrepreneurship Challenge (i-TIEC 2025), organized under the theme "Fostering a Culture of Innovation and Entrepreneurial Excellence," is designed to inspire participants at various academic levels, from secondary students to higher education students and professionals. The competition emphasizes both innovation and entrepreneurship, encouraging the development of product prototypes that address real-world problems and have clear commercialization potential. By focusing on technological and social innovations, i-TIEC 2025 highlights the importance of turning creative ideas into viable, market-ready solutions that can benefit users and society. The extended abstracts in this e-proceedings book showcase the diverse perspectives and depth of research presented during the event, reflecting the strong entrepreneurial element at its core.

We extend our sincere gratitude to the contributors for their dedication in sharing their innovation and the organizing committee for their hard work in ensuring the success of the event and this publication. We also appreciate the support of our collaborators; Mass Rapid Transit Corporation Sdn. Bhd. (MRT Corp), Universitas Labuhanbatu, Indonesia (ULB), Universitas Riau Kepulauan, Indonesia (UNRIKA) and IEEE Young Professionals Malaysia, whose contributions have been instrumental in making this event and publication possible.

We hope that this e-proceedings book will serve as a valuable reference for researchers, educators, and practitioners, inspiring further studies and collaborations in both innovation and entrepreneurship. May the knowledge shared here continue to spark new ideas and market-ready solutions, advancing our collective expertise and fostering the growth of entrepreneurial ventures.

B-SS001 - B-SS144

B-SS106: INNOVATIVE ECO-ENZYME AND ORGANIC SOLUTIONS: TRANSFORMING WASTE INTO VALUE

Ravika Permata Hati[1], Catur Fatchu Ukhriyawati[2], Talitha Alifia Qanitah [1], and Theresia Ezeria Br Sinaga[1]
[1]Accounting Study, Universitas Riau Kepulauan, Batam, Indonesia
[2]Business Digital Study, Universitas Riau Kepulauan, Batam, Indonesia

Corresponding author: Ravika Permata Hati, ravika@fekon.unrika.ac.id

ABSTRACT

The increasing amount of organic waste, particularly from households, poses a serious issue in many major cities in Indonesia. Although often overlooked, organic waste holds significant potential to be processed into useful products such as eco-enzyme and organic fertilizer. This study aims to enhance community knowledge and skills in utilizing organic waste to produce multi-purpose eco-enzyme liquid and its derivatives, including handwashing soap and organic fertilizer. The method employed involves collaboration between a community service team and the Kota Hijau community of RW 21, Mangsang Village. Activities included planning, implementing the production of eco-enzyme and its derivative products, and evaluating the program's sustainability. Results demonstrated the successful transformation of organic waste into eco-friendly products with the support of partners and the local community, although resident participation was still limited. This program is expected to raise environmental awareness and provide practical solutions for organic waste management within the community while strengthening the relationship between the community service team and residents of RW 21.

Keywords: Innovative; Eco Enzyme; Organic Solution

1. Product Description

Eco-enzyme is a versatile organic liquid produced from the fermentation of organic waste, such as fruit peels and vegetable scraps, combined with molasses and water in a 1:3:10 ratio. This eco-friendly product addresses the growing issue of organic waste by transforming it into a practical and sustainable solution for daily use. The production process takes 90 days and requires minimal space, as recycled bottles can be used as fermentation containers, supporting the concept of reuse and environmental preservation.

Eco-enzyme has multiple applications. It serves as a natural cleaning agent for floors, dishes, and furniture, effectively removing stains, grease, and odors. It can also clean fruits and vegetables, removing pesticide residues, and is a natural pesticide and fertilizer for plants, enhancing soil health and repelling pests. Additionally, it supports the creation of derivative products, such as hand soap and organic fertilizer, further maximizing its value.

This innovative solution not only helps reduce waste but also empowers communities to adopt sustainable practices at home. The simple process makes it accessible to individuals and groups, encouraging environmental stewardship and fostering healthier, waste-conscious living. Eco-enzyme embodies the principle of turning waste into a resource for a cleaner, greener future.

2. Flowchart, Tables, and Pictures of Eco-Enzym Process

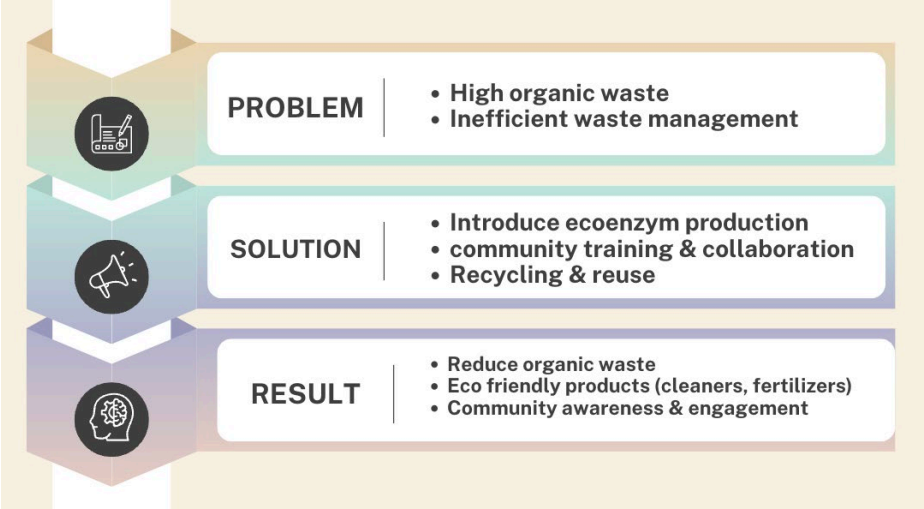


Figure 1. Flowchart Eco-Enzym Purposes

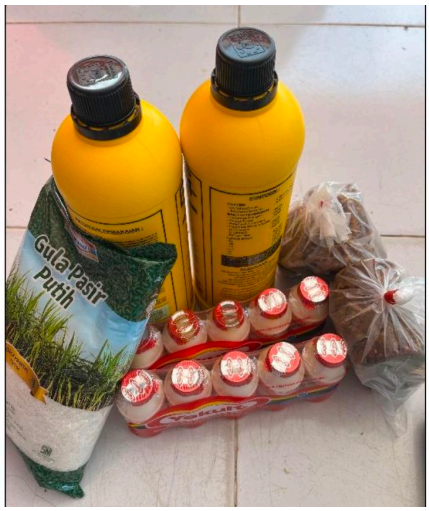


Figure 2. The Ingredients

Figure 3 Process the ecoenzym

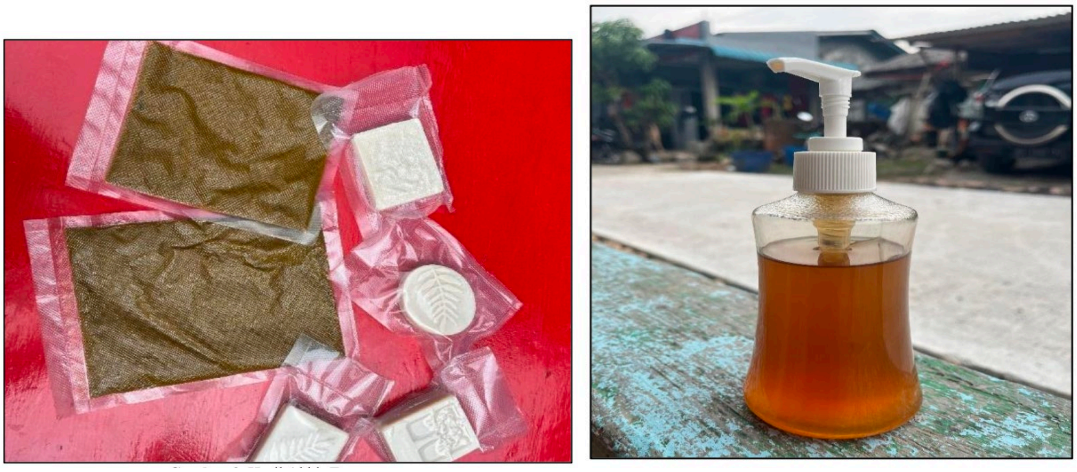


Figure 4 Products of Ecoenzym

Table 1 Detailing the materials and tools required for eco-enzyme production

Materials	Quantity	Purpose
Fruit peels (organic waste)	3.6 kg	Main ingredient for fermentation
Molasses or brown sugar	2 kg	Provides nutrients for the fermentation process
Water	20 liters	Acts as the base for the solution

Tools	Description	Purpose
Plastic bottles or containers	Recycled, sealable	Used as fermentation tanks
Measuring cups and spoons	Standard sizes	For precise measurement of ingredients
Stirring stick	Durable, non-reactive	To mix the ingredients evenly
Funnel	Optional	For easy transfer of liquids

Table 2 Outlining the procedures for eco-enzyme production

Step	Procedure
1	Prepare the materials: fruit peels, molasses or brown sugar, and water.
2	Mix water with molasses or brown sugar in a large container until dissolved.
3	Add the fruit peels to the mixture and ensure they are fully submerged.
4	Seal the container loosely to allow gases to escape during fermentation.
5	Store the container in a cool, dry place for 90 days.
6	Stir the mixture occasionally during the first 30 days to release gas.
7	After 90 days, filter the liquid to separate the eco-enzyme from solids.
8	Store the eco-enzyme in a clean, sealed bottle for use.

3. Novelty and uniqueness

The eco-enzyme project showcases significant novelty and uniqueness in addressing organic waste management. It introduces an innovative approach by transforming organic waste, such as fruit and vegetable scraps, into eco-enzyme—a versatile, multi-functional liquid. Unlike traditional composting, the production process is simple, requiring minimal space, basic materials like molasses and water, and everyday containers such as used bottles, making it accessible for households and communities, even in urban settings. The eco-enzyme's wide range of applications, including as a natural cleaning agent, pesticide remover, fertilizer, and pest repellent, reduces dependence on chemical-based products and promotes sustainable living. Furthermore, the project emphasizes the principles of reuse and recycling by utilizing waste materials and recycled containers, aligning with environmental conservation goals. Its community-centric implementation in RW 21 Kelurahan Mangsang demonstrates its potential to foster collective action and environmental stewardship. Additionally, the creation of derivative products, such as hand soap, liquid cleaners, and organic fertilizers, adds a unique layer of value, enhancing the

usability and marketability of eco-enzyme. This combination of simplicity, versatility, and environmental impact establishes the project as a practical, scalable, and innovative solution for addressing waste management challenges while promoting sustainable practices.

4. Benefit to mankind

The eco-enzyme project offers numerous benefits to mankind, addressing environmental, economic, and social challenges in a holistic manner. It contributes to environmental sustainability by reducing organic waste that would otherwise end up in landfills or be burned, which causes pollution and harmful emissions. By transforming waste into a versatile product, the project promotes cleaner ecosystems and healthier environments. Eco-enzyme also serves as a natural replacement for chemical-based cleaning agents, pesticides, and fertilizers, reducing exposure to harmful substances and minimizing their impact on human health and the environment. Its low-cost and simple production process ensures accessibility, allowing households and communities to save money on cleaning products and agricultural inputs. Furthermore, the project empowers individuals and communities with the knowledge and skills to manage waste sustainably, fostering long-term behavioral changes and a culture of environmental responsibility. As a natural fertilizer and pest repellent, eco-enzyme supports sustainable agriculture and home gardening by enhancing soil health and plant productivity without introducing harmful chemicals. Additionally, the project strengthens community bonds through collective efforts in waste management, promoting collaboration and shared environmental goals. Ultimately, the eco-enzyme project delivers widespread benefits, fostering a healthier, more sustainable, and empowered society.

5. Innovation and Entrepreneurial Impact

The eco-enzyme project promotes innovation by transforming organic waste into a versatile, eco-friendly product through a simple and accessible fermentation process. This creative approach redefines waste as a resource, encouraging sustainable practices that address pressing environmental challenges. By involving community members in workshops and hands-on training, the project fosters a culture of creativity, problem-solving, and resourcefulness.

In terms of entrepreneurship, the project empowers individuals and communities with the knowledge and skills to produce and market eco-enzyme and its derivative products, such as hand soaps, fertilizers, and pest repellents. These initiatives create new economic opportunities, particularly for small-scale businesses and social enterprises, while aligning with the growing demand for green and sustainable solutions. By demonstrating the economic potential of sustainability, the project inspires a mindset of innovation and entrepreneurial action, equipping participants to develop scalable, impactful initiatives that benefit both the environment and the local economy.

6. Potential commercialization

The eco-enzyme project offers significant potential for commercialization due to its multi-functional applications and growing demand for sustainable products. Eco-enzyme can be positioned as a cost-effective, eco-friendly alternative to chemical cleaning agents, pesticides, and fertilizers, appealing to environmentally conscious consumers and industries. Its versatility—ranging from household cleaning to agricultural use—creates diverse market opportunities.

Derivative products, such as hand soaps (liquid and bar), organic fertilizers, and pest repellents, add additional value and market segments. These products can be marketed to households, agricultural businesses, and eco-conscious organizations, capitalizing on the rising global trend toward green living and organic products.

The project's low production cost and reliance on readily available materials, such as organic waste and recycled containers, make it highly scalable and attractive for small-scale entrepreneurs. Partnerships with local communities, schools, and businesses can further enhance distribution and adoption. With appropriate branding, quality assurance, and marketing strategies, the eco-enzyme initiative has the potential to become a commercially viable enterprise while promoting environmental sustainability and social impact.

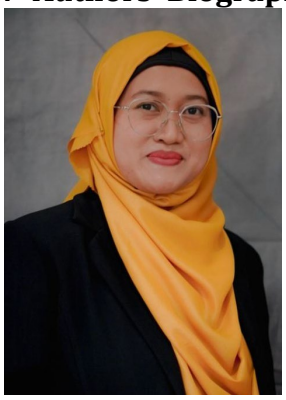
7. Acknowledgment

We express our deepest gratitude to all parties who contributed to the success of this eco-enzyme project. Special thanks go to the *Komunitas Kota Hijau* of RW 21, Kelurahan Mangsang, for their collaboration, active participation, and dedication throughout the process. Their support in providing materials, knowledge, and community engagement was invaluable.

We also extend our appreciation to the local community members and RT 05 officials, whose enthusiasm and involvement greatly contributed to the implementation and completion of the project. Their willingness to adopt eco-enzyme practices and assist in waste collection highlights their commitment to environmental preservation.

Finally, we acknowledge the guidance and support from academic mentors, institutions, and stakeholders who provided expertise, resources, and encouragement. This collaborative effort has not only advanced our understanding of sustainable waste management but also fostered stronger community ties and environmental awareness. We hope this project inspires ongoing efforts to protect our environment and promote sustainability.

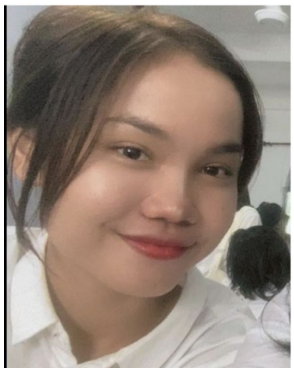
8. Authors' Biography



Ravika Permata Hati is a dedicated lecturer in the Accounting Study Program at Universitas Riau Kepulauan. With over 10 years of teaching experience, she has made significant contributions to education, research, and community service. Her passion for research and public service is reflected in her achievements, including securing multiple research grants at both university and national levels. Currently serving as the Head of the Accounting Study Program, Ravika is committed to fostering academic excellence and inspiring innovation within her department. Her expertise and leadership continue to drive impactful initiatives that benefit both academia and the community.

Dr. Catur Fatchu Ukhriyawati was born in Surabaya on May 10, 1984. She is a permanent lecturer in the Digital Business Study Program at the Faculty of Economics and Business, Universitas Riau Kepulauan. She completed her undergraduate studies in Management at FEB Universitas Negeri Surabaya, earned her Master's degree in Management from Universitas Dr. Soetomo Surabaya, and obtained her Doctorate in Economics from Universitas 17 Agustus 1945 Surabaya. Dr. Catur specializes in Management, with a focus on Financial Management, Investment Management, and Behavioral Finance. Her dedication to research in these areas has significantly enriched the academic community, while her teaching and mentorship inspire the next generation of professionals in the field of Digital Business and beyond.

Talitha Alifia Qanitah is a final-year student in the Accounting Study Program at Universitas Riau Kepulauan, currently in her 7th semester. With a keen interest in the field of accounting, Talitha has actively participated in various academic activities and research projects to enhance her knowledge and skills. Her dedication and hard work reflect her commitment to achieving academic excellence. As she approaches graduation, Talitha continues to focus on honing her expertise and preparing for a successful career in accounting and financial management.



Theresia Ezeria is a 5th-semester student in the Accounting Study Program at Universitas Riau Kepulauan. As a dedicated and motivated learner, she is developing her skills and knowledge in accounting principles and practices. Despite being in the early stages of her academic journey, Theresia is enthusiastic about exploring opportunities to contribute to research and community service activities. Her commitment to personal and professional growth underscores her aspiration to excel in the field of accounting and financial analysis in the future.