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
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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-ST131: INNOVATIVE LOW-COST FOGGING FOR DENGUE MOSQUITO ERADICATION AND CLEAN LIVING SPACE

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ABSTRACT

Dengue fever, caused by the Aedes aegypti mosquito, remains a significant public health challenge in tropical regions. Traditional fogging methods for mosquito eradication often require substantial resources, making them less accessible to low-income communities. This study introduces an innovative, low-cost fogging technology designed to effectively target dengue-carrying mosquitoes while promoting sustainable, clean-living spaces. The proposed system utilizes readily available materials and environmentally friendly substances to create a cost-effective and efficient fogging mechanism. Field trials demonstrate the technology's efficacy in reducing mosquito populations and improving hygiene conditions in targeted areas. By integrating community involvement and simple operational guidelines, this approach bridges the gap between resource limitations and the need for effective vector control. The findings highlight the potential for widespread adoption, particularly in underserved regions, contributing to both public health improvement and enhanced living standards.

Keywords: Mosquito eradication, community, fogging, dengue fever

1. Product Description

Fogging is one of the methods used to eradicate the Aedes aegypti mosquito, a major factor in the spread of the Dengue virus that causes Dengue Hemorrhagic Fever (DHF). This method involves spraying insecticides in the form of fog to kill adult mosquitoes in neighborhoods that are considered high-risk for the spread of DHF. Fogging is usually done when there is an increase in dengue cases in an area or during an outbreak, with the aim of suppressing the population of adult mosquitoes that spread the virus.

This simple fogging is the result of innovation in the form of simplifying the concept of fogging in general. To make the tool itself is quite easy, the materials needed include: Copper pipe, plastic hose, manual water pump, canned gas, gas torch, and ziptie. The process of making the tool starts with rolling the copper cable into a coil so that it can be heated effectively, then assembling where the copper coil is connected to the hose which is then connected to the outlet of the water pump. After that, the torch is inserted into the coil so that it can be inserted. If so, the tool is complete and ready to use.

2. Diagram and Photo Flowchart of Simple Fogging Implementation Method

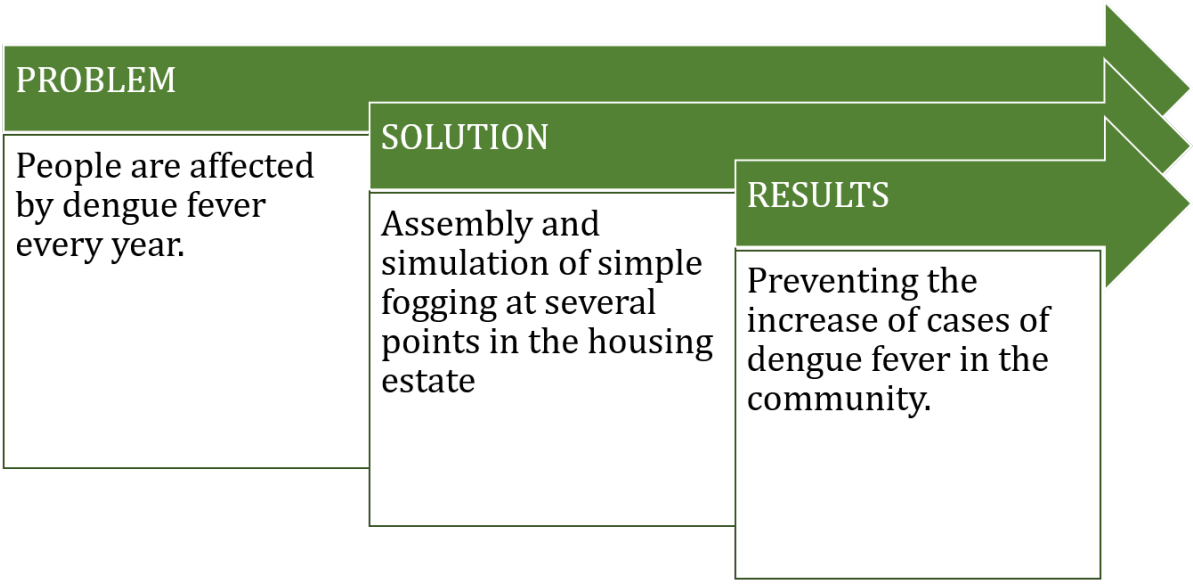


Figure 1. Manufacturing method of a simple fogging device

Table 1. Materials and tools for making simple fogging

Materials	Tools
• Portable gas • Gas torch/flame gun • Stainless cover • Clamps • Copper coil/winding • Lighter • Hose • Spray tube • Bracket	• Screwdriver • Bolts • Pliers • Scissors

Procedure for making a simple fogging device

1) Attach the bracket to the spray tube and portable gas.
2) Attach the gas torch to the portable gas.
3) If you have paired the gas torch to portable gas, then insert the gas torch that has been installed into the copper pipe that has been formed spiral.
4) Dissolve the fogging liquid WFA and Smash Insecticide into the spray tube.
5) Attach the hose to the sprayer tube and connect it to the coil.

Figure 2. Procedure for making a simple fogging device

Procedure for using a simple fogging device

1) Turn on the lighter starting from a low flame, wait until the coil is lit and hot.
2) Pump the sprayer then press the sprayer button until the smoke comes out.
3) To press the sprayer button, give a pause, don't keep pressing it, press it 3 - 4 times then pause and so on so that the smoking results are thicker.

Figure 3. Procedure for using a simple fogging device

Figure 4. Simple fogging device (low-cost fogging)

3. Novelty and uniqueness

This simple fogging is a novel innovation in the form of simplification of fogging found in general. The procurement of this simple fogging is a result of the large number of aedes aegypty mosquitoes spreading around the community. Due to limitations in the use of fogging equipment from the local government office, as a result many people, especially children, are affected by dengue fever. Therefore, this simple fogging is present as a functional adequacy in eradicating the spread of the aedes agypty mosquito.

This simple fogging is made using materials and tools that can be found around the community. The way of making and using it is quite simple so that all people can use it to be applied in their environment. With this simple fogging, people no longer need to worry about the limited supply of fogging tools. So that people can always maintain the health and cleanliness of the surrounding environment.

4. Benefit to mankind

This simple fogging comes as a solution and answer to the limited supply of fogging equipment from the local community government office. The spread and proliferation of the aedes aegypty mosquito that continues to increase every year makes the community affected. If this continues without a solution, there will be more victims. The fogging method is the most effective initial method to prevent the spread of the aedes agypty mosquito. With this simple fogging, the community can protect their surroundings from the spread of dengue fever mosquitoes. So that the surrounding environment is much cleaner and healthier to live

in. This simple fogging is a real result of innovation that benefits the community in all its limitations.

5. Innovation and Entrepreneurial Impact

Simple fogging, which is an innovation in the form of simplification of existing fogging tools, creates new entrepreneurship that has an impact on selling value. This simple fogging also contributes to the local community in preventing the spread of the aedes agypty mosquito. Because the materials and tools used are easy to find, and the way to make and use them is quite simple, the potential for simple fogging will continue to grow in the future, and will increase the simple community industry which continues to grow in interest every year. In the end, simple fogging becomes the community's main key in preventing the spread of dengue fever mosquitoes whose value will continue to increase.

6. Potential commercialization

The potential for commercialization of simple fogging is promising, especially in areas with high dengue fever cases. Some factors that support this potential are High demand. As dengue cases increase in various regions, the demand for fogging services also increases. Also, people are increasingly aware of the importance of preventing infectious diseases, so investing in simple fogging equipment can be an attractive option. Training and education in the form of offering training for communities to make and use simple fogging tools can increase added value and create new business opportunities. Overall, simple fogging not only serves as a pest control tool but also has great potential to be developed into a commercial venture that benefits public health.

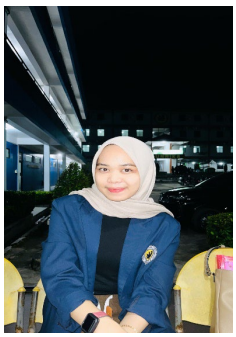
7. Acknowledgment

The process of making simple fogging equipment and fogging activities was carried out in Tanjung Riau Village, Sekupang Subdistrict, Batam City. This activity is a community service, so the activities carried out must have a positive impact on the community. This simple fogging is proven to work well, of course, in collaboration with the community so that the expected results can be achieved. With the success of the manufacture and program of this simple fogging activity, it was finally well received by the village management and the local community.

Figure 5. Handover of simple fogging to the community

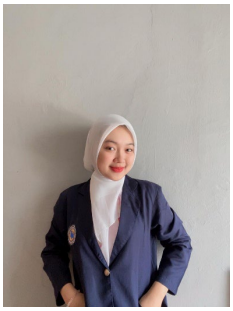
8. Authors' Biography

Afdhol Aulia Putra is a 3rd-semester student at the University of Riau Kepulauan, Batam, Indonesia, majoring in Mechanical Engineering. As a Mechanical Engineering student, Afdhol often studies practical aspects of machinery. He has a strong interest in machines due to his passion for 2-stroke automotive engines. In his spare time, Afdhol frequently applies his knowledge in the Mechanical Engineering laboratory at the University of Riau Kepulauan, working with tools such as lathes and other machinery for scientific experiments.



Meli Wulandari is a 5th-semester student at the University of Riau Kepulauan, Batam, Indonesia, majoring in Government Studies. An active and dedicated student, Meli participates in various internal campus organizations. She has been a member of the Social and Political Science Student Association (HIMIP) and currently serves as the Treasurer of the Social and Political Science Executive Student Board (BEM). Additionally, she is part of the Media Organization for Social and Political Sciences and was appointed as a Campus Ambassador for the University of Riau Kepulauan for the 2024-2025 period. Meli is also actively involved in campus activities, frequently taking roles as a committee member in various student events organized by the university.

Damar Yudasmara is a 5th semester architecture student at Riau Islands University, Batam, Indonesia. As an architecture student, he always participates in activities related to architecture, starting with joining the architecture student association, to participating in architectural competitions at the national level. In addition to participating in architecture activities, of course, he participates in other activities outside of that. For example, he was chosen as the campus' favorite ambassador and was trusted as the team leader of community service activities.



Dini Mariani is a third semester student at the University of the Riau Islands, Batam, Indonesia, majoring in Biology Education. As a Biology Education student, Dini often studies theoretical and practical aspects of biology. She has a strong interest in biology because of his love for the world of flora and fauna. In his spare time, Dini often applies his knowledge in the biology laboratory at the University of the Riau Islands, carrying out simple experiments and research such as microscopic observations and cultivating plants to support his scientific understanding.