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E-PROCEEDING

EXTENDED ABSTRACT

UiTM *di hatiku*

اوسها تقوى موليا

E-PROCEEDING

EXTENDED ABSTRACT



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Welcome Message RECTOR, UITM KEDAH BRANCH

Assalamualaikum warahmatullahi wabarakatuh,

First and foremost, I would like to extend my deepest appreciation to the organising committee of i-SPIKE 2025 for their steadfast dedication and commitment in making this prestigious event a reality. My heartfelt congratulations to the committee for their tireless efforts in ensuring that i-SPIKE continues to grow as a meaningful and impactful platform for academics, researchers, students, and industry players worldwide.

The theme for this year, “Empowering Minds: Bridging Innovation, Knowledge and Education for a Sustainable Future,” is both timely and significant. It reflects our shared responsibility to not only embrace creativity and technological advancement, but also to ensure that innovation directly contributes to sustainable development, equitable education, and the well-being of future generations.

i-SPIKE 2025 provides a dynamic platform for showcasing innovations that address real-world challenges while opening new avenues for collaboration, engagement, and inclusivity. By bridging knowledge, innovation, and education, this symposium strengthens our collective capacity to design solutions that empower communities and inspire positive change.

I am truly impressed by the diversity and calibre of participants in this year’s event. The projects and ideas presented highlight the extraordinary creativity and determination of our innovators. I am confident that the insights and solutions shared here will pave the way for continuous advancement in teaching, learning, and innovation.

It is my sincere hope that you will find i-SPIKE 2025 an enriching experience, one that sparks new ideas, builds lasting collaborations, and strengthens our shared vision for a sustainable future. To all participants, I wish you every success, and to the winners, my warmest congratulations.

Once again, I thank the organising committee, partners, and contributors for their invaluable support. May i-SPIKE 2025 continue to inspire and empower minds for many years to come.

Professor Dr. Roshima Haji Said
Acting Rector
Universiti Teknologi MARA (UiTM) Kedah Branch

Welcome Message (i-SPIKE 2025 CHAIR)

It is my great pleasure to welcome you to the 4th International Exhibition & Symposium on Productivity, Innovation, Knowledge, and Education 2025 (i-SPIKE 2025). This year's theme, "Empowering Minds: Bridging Innovation, Knowledge, and Education for a Sustainable Future," reflects our collective commitment to advancing innovation and fostering meaningful collaboration across academia, industry, and communities.

i-SPIKE 2025 provides a platform for scholars, researchers, students, and practitioners from diverse fields to showcase their ideas, share knowledge, and inspire new solutions to global challenges. We extend our sincere appreciation to all participants and contributors whose efforts and dedication have made this symposium possible.

We hope that this e-proceedings serves not only as a record of the innovations presented but also as a valuable resource that continues to inspire long after the event.

Thank you.

Dr Junaida Ismail
Chair

4th International Exhibition & Symposium on Productivity, Innovation,
Knowledge, and Education 2025 (i-SPIKE 2025)

PREFACE

The 4th International Exhibition & Symposium on Productivity, Innovation, Knowledge, and Education (i-SPIKE 2025) marks yet another milestone in our ongoing commitment to fostering innovation, creativity, and collaboration across disciplines. Guided by this year's theme, "Empowering Minds: Bridging Innovation, Knowledge and Education for a Sustainable Future," the event provides a dynamic platform for students, educators, researchers, and professionals to share their ideas, showcase their innovations, and engage in meaningful knowledge exchange.

This year, we are pleased to report that i-SPIKE 2025 received approximately 50 initial submissions, with more than 35 projects successfully advancing to final presentation and exhibition. These projects reflect a rich diversity of innovation, ranging from educational technologies, digital applications, and gamified learning tools to sustainable materials, cultural heritage preservation, and community-focused solutions. Collectively, they embody the spirit of bridging innovation and education to address pressing societal and global challenges.

We sincerely thank all participants, reviewers, and committee members for their invaluable contributions in making i-SPIKE 2025 a success. It is our hope that this e-proceedings will not only serve as a record of the ideas and innovations presented, but also as an inspiration for future collaborations and advancements in the pursuit of sustainable knowledge and innovation.

Assoc. Prof. Dr. Azlyn Ahmad Zawawi
Editor-in-Chief, i-SPIKE 2025 Proceedings

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CATEGORY 1
S&T (ACADEMIC)

ROACHAWAY: A NATURAL COCKROACH REPELLENT AND INSECTICIDE FROM SEKENTUT LEAVES (*PAEDERIA FOETIDA*) EXTRACTS

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ABSTRACT

American cockroaches (*Periplaneta americana*) is a common pest in Malaysia and poses significant risks to humans through property damage and the transmission of the pathogenic organisms. The widespread use of synthetic repellent has contributed to chemical pollution and adverse health effects, prompting the search for safer, plant-based alternatives. In this study, extracts from Sekentut (*Paederia foetida*) leaves were evaluated for repellent and insecticidal effects against *P. Americana*. Dried leaves were soaked in ethanol, and the solvent was removed using a steam bath to obtain the extracts. The extracts were then diluted with distilled water to prepare concentrations of 10% (v/v), 25% (v/v), 50% (v/v), and 100% (v/v). Repellency was tested over a 30-minute exposure period, while lethal effects were assessed over 72 hours. Statistical analyses were conducted using one-way ANOVA and Probit analysis. The pure (100%) *P. foetida* extract demonstrated excellent repellency (100%) and strong insecticidal activity, with an LC99 value of 83%. These findings suggest that *P. foetida* leaf extract may serve as an effective natural repellent and insecticide against *P. Americana*, offering a potential eco-friendly alternative to synthetic chemical agents.

Keywords: Lethal effect, *Paederia foetida*, *Periplaneta americana*, Repellent

INTRODUCTION

Cockroaches are common pests frequently found in homes, offices, schools, warehouses, cafeterias, and other areas associated with food preparation or storage. The American cockroach (*Periplaneta americana*) exhibits negative phototaxis during the daytime, seeking refuge in water pipes, basins, and lavatories, where the environments that provide optimal conditions for its survival (Rejitha et al., 2014). According to Khan and Qamar (2015), extensive efforts have been made over the past two decades to identify plant-based alternatives that can replace conventional insecticides. Synthetic pesticides, although effective, are associated with several disadvantages, including environmental pollution and food contamination due to excessive chemical residues beyond the permissible limits, which can be harmful to humans (Pavela et al., 2016). *Paederia foetida*, commonly known as Sekentut, is a semi-woody, herbaceous, and evergreen climber that coils around supports or creeps along the ground (Walker et al., 2001).



Figure 1. *Paederia foetida* (Sekentut leaves)

Source: <http://animhosnan.blogspot.com/2015/04/daun-sekentut-khasiatnya.html>

Research has demonstrated that essential oils extracted from various parts of plants such as rhizomes, flowers, roots, fruit, and stems, contain volatile aromatic compounds with insecticidal and repellent properties against several hematophagous hexapods. Consequently, essential oils serve as the foundation for many commercial and environmentally friendly pest repellent formulations (Nerio, 2010). This study aims to evaluate the effectiveness of *P. foetida* (Sekentut) leaf extract against *P. americana*. The plant was selected due to previous findings indicating its strong repellent activity against mosquitoes, suggesting its potential as a natural alternative to synthetic cockroach repellents.

METHODOLOGY

Plant extraction

The Sekentut leaves (*P. foetida*) were taken from a village in Kuala Selangor, Selangor. The leaves of Sekentut were washed, cut into small pieces, and placed on the aluminum foil. The weight of the leaves was recorded before and after being put in the oven. The smaller pieces of leaves were dried in the oven for 24 hours at 60°C. The dried leaves were crushed into powder and extracted using ethanol for 3 days. The crude extract was obtained after concentrating the extract using a rotary evaporator at 40°C. The crude extract was kept until further use. The extract that was obtained has been undergoing three tests, which were the insect repellency, lethal activity, and chemical composition test using FTIR.

Repellent test

The repellent test was carried out by using the second container (choice box). Four different concentration, 10, 25, 50, and 100% (v/v) of Sekentut extraction, was used in this test. The cockroaches located at the treated and untreated zone were carefully observed and counted every for 10, 20 and 30 minutes of treatment. Each treatment with a different concentration was conducted in two replicates

Lethal test

For the lethal test, 40 adult cockroaches from the collection container were used. Four different concentrations: 10, 25, 50, and 100% (v/v) of Sekentut extraction were used. Each of the concentrations consists of 5 adults of cockroaches in the container. The cotton pad was dipped with 3 ml of plant extraction and placed in the container. The cockroaches located in the container were carefully observed and counted every 1, 6, 12, 24, 48, and 72 hours for 3 days of the treatments. The lethal activity was done in two replicates.

RESULTS AND DISCUSSION

FTIR analysis was done to determine functional groups present in the extract of *P. foetida*. The result for the FTIR spectrum of *P.foetida* leaves extract is shown in Table 1.

Table 1: Functional groups present in the extract of *P. foetida*.

Wavelength (c m ⁻¹)	Functional group
3383.41	Alcohol (C-OH)
2917.42, 1735.70	Aldehyde (C=O)
1645.81	Alkene (C=C)
1366.34	Nitro (NO ₂)
1217.20	Ether (R-O-R)
556.52 – 1046.00	Alkyl halide (C-X)

Excess Proportion Index

The Excess Proportion Index (EPI) value is used to determine the repellency or attractancy of a plant extract against the tested insect species. According to Mathew (2014), the repellency index (I) is interpreted as follows: a negative value indicates repellency, a positive value indicates attractancy, and a zero value reflects a neutral response. Table 2 presents the percentage repellency and I values of *P. americana* exposed to different concentrations of *P. foetida* extract over 10, 20, and 30 minutes. The highest repellency was observed at the 100% concentration of *P. foetida* extract, achieving 100% repellency at all exposure intervals (10, 20, and 30 minutes). At moderate concentrations (25% and 50%), the percentage repellency increased progressively from 10 to 20 minutes of exposure. However, at the lowest concentration (10%), a gradual decrease in repellency was observed between 20 and 30 minutes of exposure. Concentrations of 25%, 50%, and 100% demonstrated a consistent increase in repellent activity, indicating that *P. foetida* is highly effective against *P. americana*. The negative I values further confirm that fewer cockroaches were trapped in the treated zone compared to the untreated zone. Among all concentrations, *P. foetida* exhibited the lowest repellency at 10%, with I values of 0, -0.8, and -0.8 at 10, 20, and 30 minutes, respectively.

Table 2. The percentage repellency and I value of *P. americana* treated with different concentrations of the *P. foetida* leaves extract for 10, 20, and 30 minutes.

Plant	Concentration	Time duration					
		10 Minutes		20 Minutes		30 Minutes	
		I	PC	I	PC	I	PC
<i>Paederia foetida</i>	10	0	100%	-0.8	90%	-0.8	90%
	25	-0.6	80%	-1	100%	-1	100%
	50	-0.8	90%	-1	100%	-1	100%
	100	-1	100%	-1	100%	-1	100%
	Control	0	0%	0	0%	0	0%

*PC= percentage concentration *I= excess proportion index

Lethality effects

In this study Probit analysis was done to determine the best lethal concentration (LC), LC50, and LC99 of the extract (Nour, 2017). This shows that *P.foetida* was more powerful as an insecticide because the plant required an 83% concentration of extract in order to kill 99% of the total number of American cockroaches. However, 50% of the total number of American cockroaches was killed at a concentration of 29 % (Table 3).

Table 3: LC50 and LC99 of *P.foetida* leave extract

Plant	L C (%)	L C (%)
<i>Paederia foetida</i>	29	83

CONCLUSION

In this study, all concentrations of *Paederia foetida* leaf extract demonstrated repellency against *Periplaneta americana*. Based on the LC₉₉ value, it can be concluded that the insecticidal activity of *P. foetida* increased proportionally with concentration, as an 83% extract was required to achieve 99% mortality of the American cockroach population.

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The authors would like to express their sincere appreciation to Universiti Teknologi Mara (UiTM), Pahang Branch, Jengka Campus, for providing the facilities and support necessary to conduct this research.

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VIRTUAL REALITY IN INDUSTRIAL TRAINING: SUSTAINABLE CAMPUS-BASED LEARNING INNOVATION

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ABSTRACT

This project explores the use of Virtual Reality (VR) as a sustainable innovation in industrial training, aimed at enhancing campus-based learning at Universiti Teknologi MARA (UiTM) Jengka. The initiative focuses on creating immersive digital experiences that replicate professional environments, enabling students to engage with realistic training scenarios while reducing the financial and ecological costs of conventional training. Utilizing 360° photography, AI-generated narration, and the Lapentor platform, the project developed an interactive virtual tour featuring academic facilities, laboratories, and workplace-inspired settings. Through this process, students strengthened their skills in digital storytelling, multimedia integration, and project design, while deepening their understanding of industrial practices. Beyond technical competencies, the project demonstrates how digital transformation can advance sustainability by minimising physical resource use and expanding access to learning opportunities. The outcomes align with the United Nations Sustainable Development Goals (SDGs), particularly in fostering quality education, innovation, and sustainable practices. This VR-based model underscores UiTM's commitment to educational innovation, illustrating how technology can transform industrial training into an engaging, inclusive, and sustainable learning experience.

Keywords: Virtual Reality, Sustainable Education, Industrial Training, Immersive Learning, Digital Innovation

