SIIDEx Program Book

5th Sarawak **Invention, Innovation & Design Expo 2026** (SIIDEx 2026)

SIIDEx2026

14 September 2026 | The Waterfront Hotel,Kuching Sarawak

Creating, Innovating and Realising Ideas for a Sustainable Future

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Foreword
Rector of UiTM Sarawak

It is with great pride and institutional satisfaction that I commemorate the successful organization of the 5th Sarawak Invention, Innovation & Design Expo (SIIDEx) 2026 by Universiti Teknologi MARA (UiTM) Sarawak Branch. This landmark achievement exemplifies our steadfast commitment to advancing Malaysia's human capital development. Furthermore, it directly reinforces the strategic vision of the Malaysian Higher Education Blueprint 2026–2035, which emphasizes the cultivation of humanity-centric, purpose-driven leaders dedicated to nation-building.

Far beyond a conventional competitive showcase, SIIDEx 2026 serves as a premier platform for participants across the nation to present groundbreaking creative and technological innovations. The expo facilitates crucial scholarly discourse, cross- disciplinary exchange, and strategic networking. Robust academic networking remains vital to higher education, as it connects emerging scholars and researchers with mentors, experts, and industry leaders, thereby opening avenues for collaborative research, career advancement, and practical real-world impact.

In alignment with UiTM's overarching aspiration to sustain academic rigor, institutional progressiveness, and stakeholder value, SIIDEx actively fosters an ecosystem centered on creativity, innovation, and knowledge commercialization among researchers, educators, students, and industry practitioners. The exposition offers a rigorous forum where inventive prototypes and solutions are publicly presented and evaluated. By earning university-sanctioned accolades, participants secure prestigious recognition while leveraging the platform to bridge the gap between academic research and industry execution.

In closing, I extend my deepest appreciation to the steering committee, whose unwavering dedication, resilience, and operational excellence guaranteed the success of SIIDEx 2026. My sincere gratitude also goes to our esteemed sponsors and strategic partners for their vital support. I am confident that the transformative ideas and innovations that emerged from SIIDEx 2026 will yield enduring benefits for the UiTM community and contribute meaningfully to national socio-economic advancement.

Sincerely,

Professor Dr. Firdaus Abdullah
Rector
UiTM Sarawak Branch

Foreword

Chairman of SIIDEx 2026

Thank you to Almighty Allah. The 5th Sarawak Invention, Innovation & Design Expo (SIIDEx) 2026 was successfully organised by UiTM Sarawak. As the host of SIIDEx 2026, we are proud of UiTM Sarawak Branch in organising this expo.

The expo provides a platform for all academia, industry players and students to exhibit their products, designs, and ideas. The innovative and inventive products displayed can be recognised and made known to the public. The public can benefit from these products and build multiple networks among academia, industry players, and the community.

Moreover, the innovative products displayed at SIIDEx 2026 offer participants the opportunity to win lucrative awards and medals. It allows product winners to be recognised by peers and communities. Through this expo, the winning products can be identified and pave the way for them to participate in bigger events such as the Malaysian Invention and Exhibition Expo (MIIX).

Finally, I would like to take this opportunity to thank all the sponsors, the SIIDEx 2026 committees, the juries, and the participants for making SIIDEx 2026 a success. We hope SIIDEx 2026 can benefit academia, industry, and the community. Thank you.

Professor Ir. Dr. Juferi Idris
Chairman
SIIDEx 2026

About SIIDEx 2026

5th Sarawak Invention, Innovation & Design Expo 2026 (SIIDEx 2026)

14 September 2026 The Waterfront Hotel,Kuching Sarawak

Creating, Innovating and Realising Ideas for a Sustainable Future

BACKGROUND

Sarawak Invention, Innovation & Design Exposition (SIIDEx) 2026 is the fifth SIIDEx to be organised by Universiti Teknologi MARA (UiTM) Sarawak Branch. This SIIDEx 2026 is jointly organised with UiTM Penang Branch. SIIDEx 2026 will take place on **14 September 2026** at the **Waterfront Hotel, Kuching, Sarawak, Malaysia.**

It is a major innovation competition established to foster a culture of creativity, innovation, and commercialisation of knowledge among researchers, educators, students, and industry practitioners. Through SIIDEx, an exhibition of innovative and inventive products can be displayed to the public and contested.

The product exhibition competition offers participants the opportunity to win an award recognised by the university and to use the platform to communicate with industry and academic participants.

COMPETITION CATEGORIES

CATEGORY A
Teaching and Learning Innovation

CATEGORY B
Innovation

CATEGORY C
Invented Products

CATEGORY D
Design

Logo

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Creating, Innovating and Realising Ideas for a Sustainable Future

Theme

"Creating, Innovating and Realising Ideas for a Sustainable Future"

Programme Objectives

- To provide an **international platform** for researchers, academics, students, and **industry innovators** to showcase their inventions, innovations, and designs.
- To promote a culture of **creativity, innovation,** and excellence in research and product development.
- To encourage the development of **innovative digital solutions** capable of addressing real-world challenges in the areas of sustainability, healthcare, infrastructure, and community well-being.
- To strengthen **strategic collaboration** among academia, industry, government, and other stakeholders.
- To enhance the **recognition** and **commercialisation** potential of research outcomes and innovative products.
- To strengthen the position of UiTM Sarawak Branch as a **leading institution in innovation development** at the national and international levels.
- The implementation of SiIDEx 2026 is expected to enhance the **visibility, impact, and collaboration** of research, in line with the aspiration of UiTM Sarawak to become a **regional hub of innovation excellence.**

Tentative

14 September 2026 (Mon)

7.00 AM - 8.00 AM

Participant Exhibition Setup & Registration
Exhibition Rooms: Tubau 1, 2 & 3, Kerangas & Kabu Rooms
Registration Counter: Nipah Room (Level 4, Waterfront Hotel)

8.30 AM - 4.00 PM

Exhibition & Judging (All Categories)
Tubau 1, 2 & 3, Kerangas & Kabu Rooms
(Level 4, Waterfront Hotel)

11.30 AM - 1.00 PM

Break

4.00 PM

End of Judging

4.30 PM

End of Programme

15 September 2026 (Tues)

10.00 AM - 12.00 PM

Opening Ceremony of SIIDEX 2026 and SeAIM 2026 Conference
Ranyai Ballroom, Level 4, Waterfront Hotel

3.30 PM

Closing of SIIDEX 2026 & Award Ceremony
Announcement of SIIDEX 2026 Results
Ranyai Ballroom, Level 4, Waterfront Hotel

Note: The programme is subject to change without prior notice.

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EXTENDED ABSTRACTS

Teaching and Learning Category

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and formalise commercialization pathways; system sales, installation, training and licensing supporting broader adoption across Malaysia and the ASEAN blue economy.

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SILVER SHIELD: NANOSILVER PET SPRAY

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ABSTRACT

Pet skin infections and hygiene issues are commonly managed with chemical-based antiseptics that can irritate sensitive skin and contribute to antimicrobial resistance. This study presents Silver Shield, a nanosilver pet spray formulated using green-synthesised silver nanoparticles (AgNPs) biosynthesised from *Piper nigrum* (black pepper) leaf extract, repurposing agricultural waste as a natural reducing and stabilising agent. The AgNPs were incorporated at 50 ppm with aloe vera gel, chamomile hydrosol, and glycerin to provide antimicrobial, soothing, and moisturising properties. Antimicrobial screening via agar disc diffusion showed the formulated spray produced larger zones of inhibition than two commercial benchmark products (Brand X and Brand Y) across five test microorganisms: *Pseudomonas aeruginosa* (17.33 mm vs 16.27 mm and 15.67 mm), *Escherichia coli* (11.90 mm vs 10.67 mm and 10.30 mm), *Bacillus cereus* (15.10 mm vs 14.87 mm and 14.33 mm), *Staphylococcus aureus* (13.70 mm vs 12.67 mm and 11.97 mm), and *Candida albicans* (13.37 mm vs 12.43 mm and 12.03 mm). A seven-day in vivo trial on a working hunting dog with pyoderma-affected elbow wounds showed visible improvement, with reduced swelling, elimination of odour, and fur regrowth after twice-daily application. These findings indicate that *Piper nigrum* leaf-derived AgNPs offer a sustainable, cost-effective, and efficacious alternative to conventional chemical antiseptics for pet hygiene. The product has since received a Gold Medal at INTEX2025 and is currently at Technology Readiness Level 7, with intellectual property protection (LY2025Q02986), positioning it for near-term commercialisation in the growing natural pet care market.

Keywords: *Green Synthesis, Silver Nanoparticles, Piper Nigrum, Antimicrobial, Pet Hygiene Spray*

1. INTRODUCTION

Pets are increasingly regarded as companions and working partners across both urban and rural communities in Malaysia, yet skin infections, wounds, and hygiene-related conditions remain common and costly to manage. Conventional treatments rely heavily on chemically synthesised antiseptics, which are often harsh on sensitive skin, may leave irritating residues, and contribute to the growing concern of antimicrobial resistance. Furthermore, most nanosilver pet sprays available in the Malaysian market are imported, chemically synthesised, and priced beyond the reach of many rural pet owners who depend on working dogs but have limited access to veterinary care. There is a clear gap for a locally produced, plant-based, and affordable alternative. This study addresses that gap through the green synthesis of silver nanoparticles using *Piper nigrum* leaf extract, an underutilised agricultural by-product of Sarawak's pepper industry, formulated into an antimicrobial pet hygiene spray.

2. METHODOLOGY

2.1 Biosynthesis of Silver Nanoparticles

Pruned *Piper nigrum* leaves were collected, cleaned, and shade-dried. An aqueous extract was prepared using 5 g of dried leaves in 300 mL deionized water (1:60 ratio), heated at 80°C for 1 hour, then filtered. The filtered extract was added dropwise into a silver nitrate solution under continuous stirring at 100°C, with the reaction vessel shielded from light. Nanoparticle formation was confirmed by a colour change to intense golden yellow, indicating optimal particle size via surface plasmon resonance.

2.2 Formulation of Nanosilver Pet Spray

The biosynthesised AgNP solution was standardised to 50 ppm and combined with aloe vera gel, chamomile hydrosol, and glycerin as skin-soothing and moisturising agents. The final formulation was transferred into a light-protective HDPE spray bottle to prevent photodegradation of the nanoparticles.

2.3 Antimicrobial Evaluation

Antimicrobial activity was assessed via agar disc diffusion against two Gram-negative bacteria (*P. aeruginosa, E. coli*), two Gram-positive bacteria (*B. cereus, S. aureus*), and one fungal species (*C. albicans*), and benchmarked against a leading commercial nanosilver pet spray (Brand X and Brand Y).

2.4 In Vivo Trial

The formulated spray was applied twice daily for seven days to a working hunting dog presenting with pyoderma-affected elbow wounds, with visual monitoring of swelling, odour, and fur regrowth.

3. FINDINGS

Figure 1 summarises the zone of inhibition (mm) of Silver Shield against commercial benchmarks (Brand X and Brand Y).

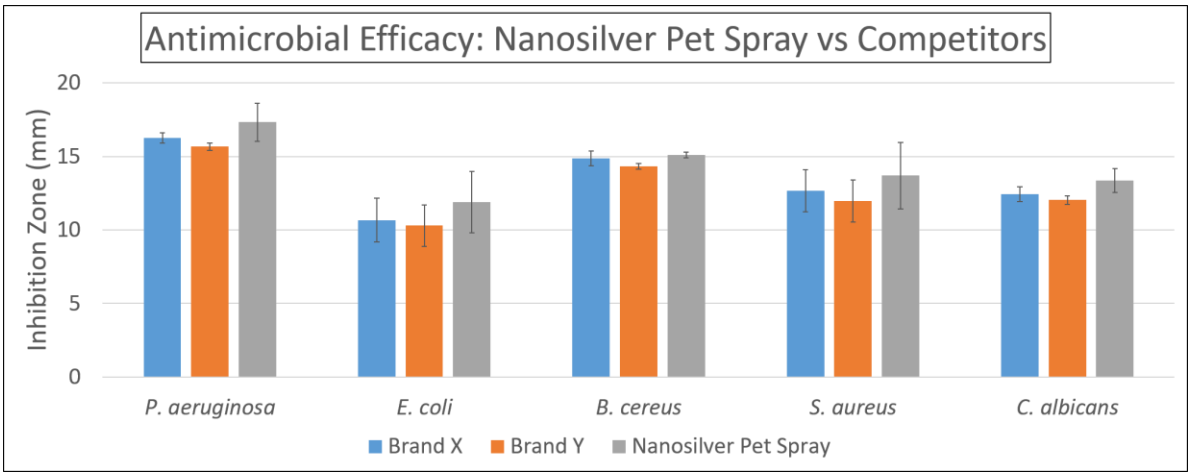

Figure 1 Comparative antimicrobial efficacy (zone of inhibition) of Silver Shield versus Brand X and Brand Y nanosilver pet sprays against five test microorganisms.

Silver Shield produced consistently larger inhibition zones than both commercial benchmark across all five test organisms, with the largest margins observed against *S. aureus* and *E. coli*. Figure 2 shows the seven-day in vivo trial outcome. On Day 1, the affected elbow area showed visible swelling, irritation, and fur loss. By Day 7, following twice-daily application, the area showed fur regrowth and no detectable odour, consistent with the antimicrobial and wound-soothing action observed in vitro.

Figure 2 Seven-day in vivo trial of Silver Shield on a pyoderma-affected elbow wound (Day 1 vs Day 7).

4. CONCLUSION

Silver Shield demonstrates that agricultural waste from Sarawak's black pepper industry can be repurposed into a high-performance, plant-based antimicrobial agent for pet hygiene applications. Combining measurable in vitro antimicrobial superiority over two commercial benchmarks with real-world in vivo evidence of wound healing, the product offers a locally made, affordable, and eco-friendly alternative to imported chemical antiseptics. With TRL 7 status, IP protection secured, and recognition at INTEX2025, Silver Shield is positioned for near-term commercialisation, with planned next steps including formal toxicology and shelf-life validation ahead of full market launch.

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