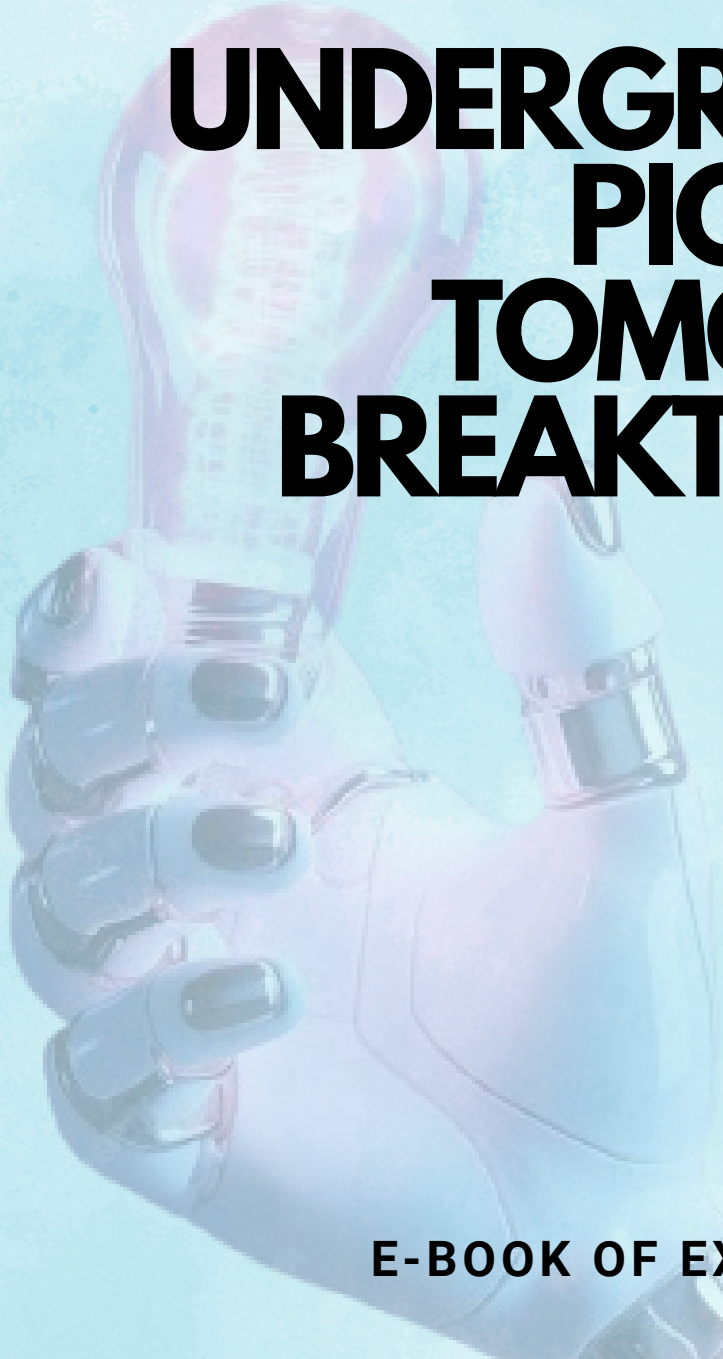


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E-BOOK OF EXTENDED ABSTRACTS

PawPurify: A NATURAL CLAY-BASED DETOX INNOVATION FOR ENHANCING PET HYGIENE AND PREVENTING ZOO NOTIC RISKS

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ABSTRACT

Pet ownership has been steadily increasing in Malaysia, resulting in greater demand for pet care products that are safe, effective, and environmentally responsible. However, conventional products often expose both pets and humans to harmful chemicals, parasites, and zoonotic diseases. At the same time, organic waste such as tea waste is frequently discarded, contributing to soil and water pollution. Addressing these issues, this project, PAWPURIFY focuses on the development of an innovative and sustainable pet care solution. The main objective of this project is to formulate, produce, and promote a natural clay detox powder for pets using eco-friendly and biodegradable ingredients, including tea waste, turmeric, neem leaves, activated charcoal, and chamomile. This product is designed to improve pet and human health by preventing skin irritation, parasites, and zoonotic infections, while remaining safe, non-toxic, and affordable for all groups of pet owners. The detox clay works as a natural protective powder with strong absorbent and detoxifying properties. It helps to maintain pet hygiene by reducing odours, minimizing irritation, and preventing disease transmission. In addition, the product contributes to sustainability by upcycling tea waste and other natural resources into value-added products, supporting responsible consumption and production practices. The novelty of this innovation lies in its unique combination of natural ingredients, dual function as both detox and preventive care, and eco-friendly approach compared to chemical-based alternatives. With its affordability, safety, and sustainability, the project not only enhances pet well-being but also supports the global effort towards zero-waste and green innovation.

Keywords: *Eco-friendly, Detox Powder, Zoonotic Prevention, Waste Upcycling, Sustainable Innovation*

INTRODUCTION

Responsible pet ownership has increasingly become an important global issue, particularly as pet populations continue to grow in both developed and developing nations. Pets contribute to emotional well-being and companionship; however, poor hygiene practices can expose both animals and their owners to significant health risks, including zoonotic diseases. The World Health Organization (WHO, 2020) has emphasized that zoonotic pathogens, such as *Toxoplasma gondii*, *Salmonella* spp., and *Leptospira* spp., can be transmitted from animals to humans through contaminated environments, poor sanitation, or direct contact. According to Day (2011), maintaining proper hygiene in pets is critical not only to animal health but also to public health.

Conventional pet hygiene products, such as chemical-based disinfectants and shampoos, have limitations. Many contain synthetic compounds that may cause skin irritation, allergic reactions, or long-term ecological harm (Martínez-Merino et al., 2020). In contrast, natural products have gained traction in veterinary and pet care industries due to their eco-friendly and non-toxic properties (Ali et al., 2021). Natural clays, particularly bentonite and kaolin, have been historically used for detoxification, antibacterial effects, and toxin adsorption (Carretero & Pozo, 2009). However, the integration of clay-based detoxification into mainstream pet hygiene remains underexplored.

This study introduces PawPurify, a clay-based natural detox solution specifically designed to enhance pet hygiene while minimising zoonotic risks. The innovation bridges the gap between effective antimicrobial action and pet safety, providing a sustainable alternative to synthetic products.

OBJECTIVES

The objectives of this innovation are as follows:

- i. To develop PawPurify, a natural detox formulation derived from clay, tailored for pet hygiene.
- ii. To assess the potential of natural clay in reducing bacterial contamination associated with pets.
- iii. To evaluate the role of PawPurify in preventing zoonotic disease transmission while ensuring safety for animals.
- iv. To contribute to sustainable and eco-friendly solutions aligned with global health and environmental goals.

METHODOLOGY AND DEVELOPMENT

The development of PawPurify followed a systematic approach:

1. Selection of Natural Clay – Clay samples with proven adsorption and antibacterial properties were identified. Bentonite and kaolin were prioritized for their safety and non-toxicity in topical applications. Studies by Christidis et al. (2011) highlighted clays' capacity to bind microbial toxins and inhibit bacterial proliferation.
2. Formulation – The clay was processed into a fine powder, detoxified through natural purification techniques, and blended with supportive agents that maintain texture, usability, and effectiveness. The formulation was designed to be hypoallergenic, safe for contact with animal skin, and free of harmful chemicals.
3. Antibacterial Evaluation – Laboratory-scale antibacterial testing was conducted based on methodologies adapted from Ali et al. (2021). The clay formulation demonstrated promising antibacterial activity against common pathogens found in pet environments, including *E. coli* and *Staphylococcus aureus*.
4. Pet-Safety Assessment – Preliminary safety assessments were performed to ensure that the product caused no irritation or adverse reactions when applied to pets. This stage focused on non-invasive application and close monitoring of animal comfort.

INNOVATION AND SIGNIFICANCE

PawPurify introduces several innovative contributions:

- Clay-Based Detox Mechanism – Unlike traditional pet cleansers that rely on synthetic chemicals, PawPurify leverages the adsorption and antibacterial properties of natural clay to neutralise toxins and microbial threats.
- Zoonotic Disease Prevention – By reducing bacterial load and maintaining cleaner pets, PawPurify minimizes the likelihood of zoonotic transmission. This aligns with the One Health framework, which emphasises the interconnectedness of human, animal, and environmental health (Destoumieux-Garzón et al., 2018).
- Pet-Safe and Eco-Friendly – Free of synthetic irritants and toxic residues, the product ensures animal safety and environmental sustainability. Unlike chemical detergents, clays degrade naturally without ecological harm.
- Versatile Application – The product may be utilised across multiple settings, including household pet care, animal shelters, and veterinary practices, making it highly adaptable to various contexts.

RESULTS AND DISCUSSION

The survey on PawPurify, a natural clay-based detox product for pets, was designed to examine consumer perceptions and behavioral intentions towards adopting an eco-friendly innovation. The data was structured around five constructs: Attitude (AT), Subjective Norm (SN), Perceived Behavioral Control (PBC), Environmental Awareness (EA), and Behavioral Intention (INT). Preliminary descriptive results revealed consistently moderate-to-high ratings across all constructs, suggesting a generally positive response towards the product.

Attitude (AT) Towards PawPurify

Attitude is a central determinant of behavioral intention in the Theory of Planned Behavior (Ajzen, 1991). Respondents indicated favorable views of PawPurify, expressing that using the product is both a good idea and beneficial for the environment. This positive perception aligns with previous studies on green consumer behavior, which found that environmentally friendly attributes strongly influence attitudes towards product adoption (Joshi & Rahman, 2015). The data suggests that PawPurify is perceived not only as a functional hygiene product but also as a socially responsible innovation. Such positive attitudes are crucial in shaping long-term behavioral changes in pet care practices.

Influence of Subjective Norms (SN)

The role of subjective norms, which reflect perceived social pressure from important others, emerged as another important factor. Respondents acknowledged that family members and peers would encourage them to purchase and use PawPurify. Prior studies have shown that social influence significantly drives adoption of sustainable products, particularly in collectivist cultures where group opinions hold strong weight (Yadav & Pathak, 2017). The findings imply that marketing strategies for PawPurify should emphasize community endorsement, peer support, and testimonials, thereby reinforcing positive normative pressures that promote adoption.

Perceived Behavioral Control (PBC)

Perceived behavioral control relates to the individual's confidence in their ability to perform a behavior. The data shows that respondents generally agreed they could easily use and purchase PawPurify, indicating minimal barriers to adoption. This is consistent with the work of Paul et al. (2016), who found that consumers are more likely to adopt green innovations when they perceive the products to be accessible, affordable, and convenient. Importantly, a strong sense of PBC increases both intention and actual usage. For PawPurify, this suggests that availability in local markets and affordable pricing will further enhance consumer confidence and uptake.

Environmental Awareness (EA)

A particularly strong construct observed in the dataset was environmental awareness. Respondents expressed heightened awareness of environmental protection, individual responsibility, and willingness to reduce consumption for sustainability. This finding is critical, as prior research emphasizes that environmental consciousness strongly predicts green product adoption (Biswas & Roy, 2015). By positioning PawPurify as an eco-friendly solution that contributes to reducing environmental pollution, the product resonates well with environmentally conscious consumers. The synergy between ecological concern and pet welfare creates a dual value proposition: protecting animals while also safeguarding the planet.

Behavioral Intention (INT)

The construct of intention directly reflects the likelihood of future adoption. Responses indicated strong willingness to purchase and use PawPurify, with many participants expressing plans to choose the product over conventional alternatives. According to the Theory of Planned Behavior, intention is the most immediate predictor of actual behavior (Ajzen, 1991). The data suggests that positive attitudes, supportive social influence, high perceived control, and environmental awareness collectively translate into strong behavioral intentions. This is consistent with prior findings where green attitudes and awareness significantly influenced purchase intentions in the eco-friendly product sector (Nguyen et al., 2017).

Integration and Implications

Overall, the results demonstrate that PawPurify holds substantial potential in the market for sustainable pet hygiene solutions. Attitudes towards the product are favorable, subjective norms reinforce positive

decision-making, and perceived control eliminates adoption barriers. Importantly, environmental awareness not only enhances the intention to adopt but also differentiates PawPurify as an innovation aligned with broader sustainability goals.

From a practical perspective, the findings underscore several key implications:

1. Marketing Strategy – Campaigns should highlight PawPurify’s eco-friendly benefits and zoonosis prevention function while leveraging endorsements from veterinarians, pet communities, and eco-conscious influencers to strengthen subjective norms.
2. Product Positioning – Positioning PawPurify as both a pet wellness and environmental protection product will maximize its appeal.
3. Accessibility – Ensuring affordability and availability will maintain strong perceived behavioral control among consumers.
4. Policy Alignment – The product aligns with SDG 3 (Good Health and Well-being) and SDG 12 (Responsible Consumption and Production), creating opportunities for institutional endorsement and potential government or NGO collaborations.

The analysis reveals that PawPurify is well-positioned to be adopted by consumers due to the positive interplay of attitudes, subjective norms, behavioral control, and environmental awareness. The strong behavioral intention identified in this study signals readiness for market entry and provides a foundation for future empirical validation. With continued product development and strategic marketing, PawPurify could serve as both an innovative pet-care solution and a meaningful contribution to sustainable living.

CONCLUSION

The development of PawPurify demonstrates the feasibility of a clay-based detox solution in advancing pet hygiene while addressing zoonotic disease risks. This innovation contributes to Sustainable Development Goal (SDG) 3 (Good Health and Well-being) by promoting healthier interactions between pets and humans, and SDG 12 (Responsible Consumption and Production) through its reliance on natural and sustainable materials.

Future studies should expand antibacterial evaluations to include viral and fungal pathogens, conduct longitudinal safety trials in larger pet populations, and perform market feasibility assessments. Such research would strengthen the scientific basis for broader commercialisation and adoption in the pet care industry. Ultimately, PawPurify represents a novel step toward integrating traditional natural resources into modern solutions for responsible pet ownership and public health.

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