E-BOOK OF EXTENDED ABSTRACT

THE 14TH INTERNATIONAL INVENTION, INNOVATION & DESIGN COMPETITION 2025

14TH INDES 2025

ENVIRONMENTAL • SOCIAL • GOVERNANCE

UNIVERSITI TEKNOLOGI MARA

RIICAN
Research Innovation Industry Community & Alumni Network

E-BOOK OF EXTENDED ABSTRACT

THE 14th INTERNATIONAL
INVENTION, INNOVATION &
DESIGN COMPETITION 2025

Organized by:

Office of Research, Industry,
Community & Alumni Network
UiTM Perak Branch

Perpustakaan Negara Malaysia Cataloguing in Publication Data

No e- ISBN: 978-967-2776-52-9

Cover Design: Dr. Mohd Khairulnizam Ramlie

Typesetting : Georgia

EDITORIAL BOARD

PUREFEAST ANTi-FEED: SUSTAINABLE CERAMIC FEEDER WITH BUILT-IN ANT-PROOF SYSTEM & ERGONOMIC LIFT DESIGN

[1]Mohd Khairi Baharom[1], Siti Ermi Syahira Abdul Jamil[2], Mohd Shahrol Hanafi Mohd Raffie[3], Gladys Tagie[4], Rozarina Johari[5]

Universiti Teknologi Mara Cawangan Perak
32610 Seri Iskandar, Perak, Malaysia

mohdk135@uitm.edu.my[1], sitiermi@uitm.edu.my [2], hanafi208@uitm.edu.my[3], gladystagie@uitm.edu.my[4], rozar720@uitm.edu.my [5]

ABSTRACT

Ant infestations in pet feeding areas pose persistent hygiene and health risks, often made worse by the limitations of conventional solutions that rely on chemical repellents or single-use plastic feeders. These approaches are typically short-lived, environmentally unsustainable, and aesthetically incompatible with modern living spaces. Addressing these issues, *PureFeast ANTi-FEED* introduces a sustainable, ceramic-based pet feeder with a built-in, chemical-free ant barrier. The design comprises two detachable trays (one for food and one for water) facilitating easy maintenance. Central to the design is a water moat system that effectively prevents insect intrusion without the use of toxic agents. Fabricated from high-fired glazed ceramic, the feeder offers hygienic, durable, and visually appealing qualities suited for contemporary domestic environments. Its elevated ergonomic form supports healthier feeding postures for pets while enhancing user convenience. The modular, eco-conscious approach contributes to reducing plastic dependency in the pet care industry. By merging ecological design, material innovation, and user-centered functionality, this product demonstrates potential for sustainable impact and commercial viability in the premium pet care market.

Keyword: Ceramic, sustainable design, pet feeder, ecological product, ant prevention

1. INTRODUCTION

Ant infestations in pet feeding areas are a common and persistent domestic challenge that threaten food hygiene and pose health risks to companion animals. Contaminated feeding zones have been directly linked to bacterial and parasitic transmission, particularly in indoor environments where pets have prolonged exposure to infested areas (Lefebvre & Waltner-Toews, 2020). While many pet owners resort to chemical repellents, such methods often fail due to insecticide resistance and raise concerns about toxicity and long-term ecological damage (Kassiri & Zangeneh, 2018).

Moreover, the widespread use of plastic-based feeders contributes significantly to environmental pollution. These products are not only short-lived and visually obtrusive, but also exacerbate plastic waste, a growing concern in sustainable product design (Sung et al., 2021). These issues are particularly pronounced in urban households, where consumers increasingly demand pet care solutions that balance functionality, cleanliness, and sustainability.

In response, the PureFeast ANTi-FEED presents a design-led solution that integrates a durable, ceramic-based feeder system with an effective, chemical-free ant barrier. The design comprises two detachable trays (a food tray and a water tray) with a built-in water moat that acts as a natural defense against insect intrusion. Additionally, the elevated ergonomic form supports a healthier feeding posture for pets while offering ease of use for owners.

Aesthetically, the minimalist design language aligns with contemporary interior preferences, providing both functional and visual harmony in domestic settings. By eliminating disposable materials and offering a hygienic alternative, this project contributes meaningfully to sustainable pet product innovation. This article outlines the design process, user feedback, and the market viability of this sustainable solution.

2. METHODOLOGY

This study adopted a studio-based design research approach within a design thinking framework, enabling iterative exploration through practice and user-centered inquiry (Candy & Edmonds, 2018; Cross, 2011). The process began with identifying hygiene and pest-control issues in conventional plastic feeders, followed by ideation through sketches and form studies that prioritized ant prevention, sustainability, and ergonomic use. High-fired glazed ceramic was selected for its hygienic, durable, and eco-friendly properties. Its non-porous surface offers advantages in cleaning and longevity, as supported by ceramic material research (Hamer & Hamer, 2015; Petkova et al., 2020).

Prototypes were developed featuring a modular design: a detachable food and water tray with an integrated water moat as a chemical-free ant barrier. These were tested under controlled conditions to evaluate ant resistance, ease of cleaning, and functional usability.

User testing, including direct observation and informal interviews with pet owners, informed iterative refinement. The elevated feeding platform design was influenced by studies indicating improved posture and comfort in older pets (Franklin & White, 2012). Findings were continuously incorporated to optimize the product's performance, usability, and environmental value.

3. FINDINGS

The evaluation of *PureFeast ANTi-FEED* (figure 1) demonstrated notable strengths in environmental performance, functional design, and user satisfaction. Testing confirmed that the built-in water moat functioned effectively as a natural barrier, preventing ant intrusion without the need for chemical intervention. The use of high-fired glazed ceramic was particularly advantageous, offering superior resistance to staining, odor retention, and surface degradation—features validated through repeated cleaning cycles and user trials.

Ergonomic assessments, especially among households with aging pets, indicated improved feeding postures and reduced neck strain, aligning with established principles of animal comfort and welfare (Franklin & White, 2012). The modular configuration, consisting of detachable food and water trays, received positive feedback for ease of cleaning, handling, and reassembly. Participants also expressed willingness to pay a premium, citing the feeder's sustainable materials, visual integration into modern interiors, and practicality.

Collectively, these findings affirm that *PureFeast ANTi-FEED* fulfills its objective of integrating ecological responsibility with functional pet care, reinforcing its potential as a high-value design solution in the growing market for sustainable pet products.

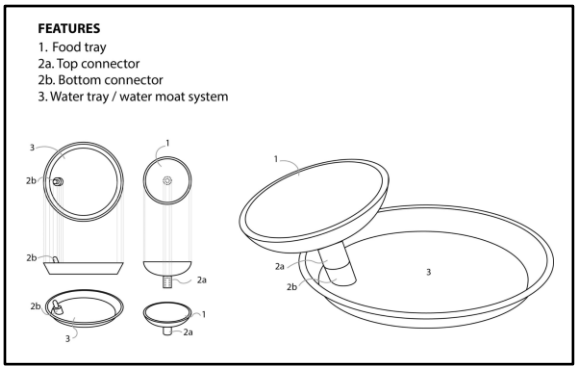


Figure 1 PureFeast ANTi-FEED

4. CONCLUSION

The *PureFeast ANTi-FEED* project illustrates how practice-based design can address real-world domestic issues through sustainable, user-centered innovation. By combining high-performance ceramic materials with an effective chemical-free ant barrier, the product offers a hygienic and ecologically responsible alternative to conventional plastic feeders. Its elevated form not only improves feeding ergonomics but also enhances usability for pet owners. The findings, drawn from user testing and functional evaluation, underscore the product's market readiness and alignment with consumer demands for sustainability, aesthetics, and practical utility. Positioned at the intersection of design, ecology, and user behavior, *PureFeast ANTi-FEED* contributes meaningfully to the discourse on sustainable consumer product design. Future developments may explore scaling the production process, expanding product variations, and integrating lifecycle analysis to further validate its ecological impact.

REFERENCES

Candy, L., & Edmonds, E. (2018). Practice-based research in the creative arts: Foundations and futures from the front line. *Leonardo, 51*(1), 63–69. https://doi.org/10.1162/LEON_a_01471

Franklin, R. J., & White, J. E. (2012). Ergonomic interventions in companion animal product design: A case study on elevated feeders. *Applied Animal Behaviour Science, 137*(3–4), 191–198. https://doi.org/10.1016/j.applanim.2011.11.005

Hamer, F., & Hamer, J. (2015). *The Potter's Dictionary of Materials and Techniques* (5th ed.). Bloomsbury Publishing.

Kassiri, H., & Zangeneh, A. (2018). Insecticide resistance and chemical control failure in ant management: A review. *Environmental Health Engineering and Management Journal, 5*(3), 135–141. https://doi.org/10.15171/EHEM.2018.18

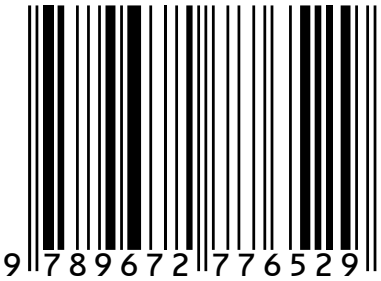
Lefebvre, S. L., & Waltner-Toews, D. (2020). Food safety hazards in pet foods: A review of recent outbreaks and their implications. *Preventive Veterinary Medicine, 182*, 105098. https://doi.org/10.1016/j.prevetmed.2020.105098

Petkova, B., Baji, Z., & Dimitrova, A. (2020). Sustainable ceramics: Material properties, production, and lifecycle considerations. *Materials Today: Proceedings, 33*, 527–532. https://doi.org/10.1016/j.matpr.2020.04.604

Sung, H., Jeon, H., & Lee, S. (2021). Sustainable alternatives to plastic materials in product design: A review of lifecycle and disposal challenges. *Sustainability, 13*(4), 1952. https://doi.org/10.3390/su13041952

E-Book of Extended Abstract THE 14th INTERNATIONAL INVENTION, INNOVATION & DESIGN COMPETITION 2025

e ISBN 978-967-2776-52-9



Unit Penerbitan UiTM Perak
.

(online)