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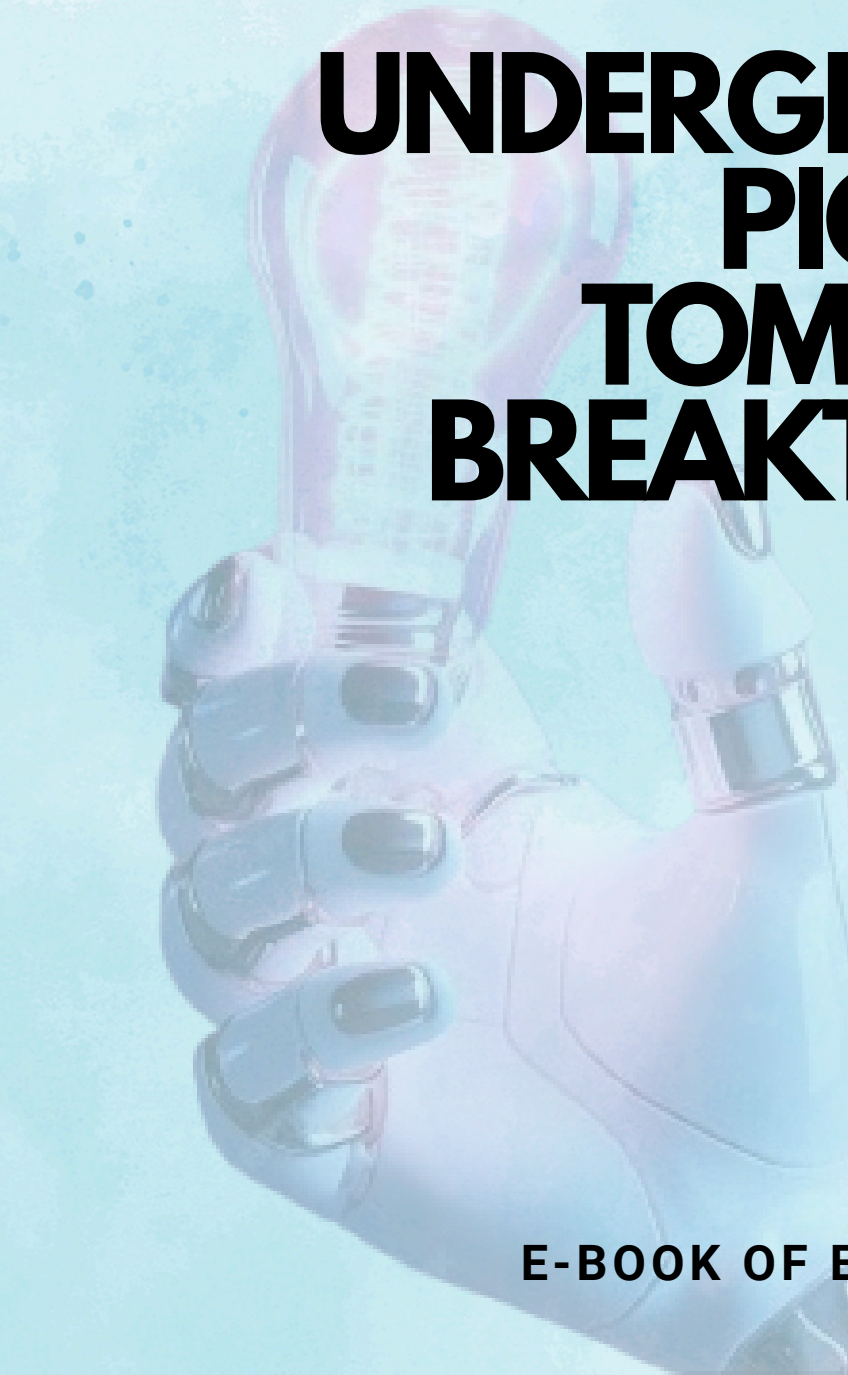

E-BOOK OF EXTENDED ABSTRACTS

SOLAR STICKY INSECT TRAP

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ABSTRACT

The Solar Sticky Insect Trap is an eco-friendly, solar-powered pest control device designed to attract and trap flying insects, such as fruit flies and moths, without the use of harmful chemicals. It operates by utilising solar energy to power an ultraviolet light that attracts insects, while a sticky surface ensures they are captured. The trap was invented to provide a cost-effective and sustainable alternative to chemical pesticides, reducing environmental impact and improving farming practices. Its key features include low maintenance, chemical-free operation, affordability, and ease of use, making it ideal for smallholder farmers, organic farms, and residential gardeners. The device helps improve agricultural productivity by controlling pest populations, leading to healthier crops and increased yields. Environmentally, it supports biodiversity by minimising pesticide use and reducing pollution. Socio-economically, it offers an affordable solution for farmers, particularly in developing regions, reducing their dependency on expensive pesticides and labour. The Solar Sticky Insect Trap has strong commercialisation potential in both local and international markets, especially as demand for sustainable pest management solutions rises. Its application across the agricultural, residential, and commercial sectors positions it as a viable product for a wide range of consumers seeking environmentally friendly and efficient pest control methods.

Keywords: Solar Sticky Insect Trap, Solar Panel, Chemical Free, Pest Management, Eco-friendly

INTRODUCTION

Global crop productivity is significantly impacted by pest problems affecting fruit crops. Traditional pest management is based on chemical pesticides, and although they can be effective in the short term, they have significant health, environmental and sustainability implications. Overuse and misuse of pesticides are the causes of soil and water contamination, loss of biodiversity, pests' resistance to these chemicals, as well as risks to the health of farmers and consumers. In Malaysia, which depends on fruit (crop) farming as an important sector of the agricultural economy, farmers, especially smallholders, are still facing difficulties in managing pest control adequately as well as in line with both pest management and sustainable production.

Consistent with international requests for sustainable farming, there is an urgent need for alternative pest control strategies. Environmentally friendly appliances that reduce reliance on chemicals without being prohibitive in cost and availability for farmers are required to guarantee food safety, protect the environment, and conform to international market requests for safe food. It was in this context that the Solar Sticky Insect Trap emerged as a novel, low-cost, and eco-friendly pest control measure specifically for agricultural and residential purposes.

OBJECTIVES

The main objective of this project is to design and develop a solar-powered sticky insect trap that:

i. Reduces dependence on chemical pesticides through an eco-friendly, chemical-free pest control method.
ii. Provides farmers, especially smallholders and organic producers, with a cost-effective, low-maintenance device for managing pest populations.

iii. Enhances agricultural productivity and crop quality by effectively controlling flying insect pests such as fruit flies and moths.
iv. Contributes to long-term sustainability by aligning with key United Nations Sustainable Development Goals (SDGs), particularly in food security, health, and environmental conservation.

PRODUCT DESCRIPTION

The Solar Sticky Insect Trap is an eco-friendly solution to pest control- It's a quality product that incorporates cutting-edge technology. The device consists of:

- A solar panel that harvests energy all day, then uses it to power the unit at night.
- There's an ultraviolet (UV) LED light that kicks in after dark, catching any flying insects such as fruit flies and moths.
- A sticky surface under the light that captures & immobilises insects.
- Tripod stand and tray design, convenient installation and stable in orchard, plantation or garden.

This is an easy-care system that doesn't take much space or time to use – all one must do is clean the surface now and then and put on new sticky traps. Being compact, the implement can be used across a wide variety of farmlands and since it is chemical-free, all the useful organisms and the health of the soil are maintained. Powered by solar energy, the trap requires no electrical network and can be used even in farming regions distant from built-up areas. It is affordable and easy to use, and is suitable for a variety of end users, from smallholders to organic farms and home gardeners.

The Solar Sticky Insect Trap consists of a tripod stand, a tray, an LED light, a solar panel, and a sticky insect trap. The solar panel charges during the day and powers an ultraviolet light at night, attracting harmful insects that are most active during this time. It can be placed in fruit farms, particularly during the fruit season, to attract and trap insects. Figure 1 shows the prototype of the Solar Sticky Insect Trap.

Figure 1: The prototype of the Solar Sticky Insect Trap

NOVELTY AND UNIQUENESS

The Solar Sticky Insect Trap is unique and novel due to several key features:

1. Solar-Powered Operation: It uses renewable solar energy to power the device, eliminating the need for electricity and reducing environmental impact.
2. Chemical-Free Pest Control: Unlike traditional pest control methods, it does not rely on harmful pesticides, promoting a healthier environment for both farmers and consumers.

3. Sticky Trap Technology: The combination of ultraviolet light and a sticky surface effectively attracts and traps insects, ensuring a non-toxic, efficient solution for pest management.
4. Low Maintenance: Designed for minimal upkeep, requiring only occasional cleaning and trap replacement, making it easy for farmers to use without frequent intervention.
5. Cost-Effective: The product is affordable, making it accessible for small-scale farmers, while reducing reliance on expensive chemical treatments and labour.
6. Ease of Use: Simple to install and operate, it allows farmers to independently manage pest control without the need for external assistance.
7. Eco-Friendly and Sustainable: By reducing pesticide usage, it supports sustainable farming practices and contributes to environmental conservation.

BENEFIT TO MANKIND AND SUSTAINABILITY

The Solar Sticky Insect Trap offers significant benefits to mankind by improving health and safety, reducing harmful chemical exposure, and enhancing agricultural productivity through cost-effective pest control. Its solar-powered, chemical-free operation not only provides an affordable solution for small-scale farmers but also supports environmental protection by reducing pesticide use, preserving biodiversity, and promoting sustainable farming practices. The trap helps increase crop yields, contributing to food security and supporting farmers' livelihoods. In terms of sustainability, it aligns with several United Nations Sustainable Development Goals (SDGs), including SDG 2 (Zero Hunger) by improving food supply, SDG 3 (Good Health and Well-being) by reducing pesticide-related health risks, SDG 12 (Responsible Consumption and Production) through sustainable practices, SDG 13 (Climate Action) by reducing fossil fuel reliance, and SDG 15 (Life on Land) by protecting ecosystems and reducing environmental impact. Overall, the product supports environmental, economic, and social well-being, while promoting long-term sustainability in agriculture.

POTENTIAL COMMERCIALISATION

The Solar Sticky Insect Trap offers significant commercialisation potential across multiple markets, including the agricultural sector, residential market, and commercial pest control. It provides an eco-friendly, chemical-free solution for farmers, particularly in fruit farming, helping reduce the reliance on harmful pesticides while improving crop health and yields. Its solar-powered operation makes it affordable and low-maintenance, appealing to smallholder farmers, organic farms, and home gardeners. The trap can also be marketed to commercial pest control companies managing large spaces like hotels and restaurants, supporting sustainable pest management. With the growing global demand for organic farming and sustainable agriculture, the product holds strong export potential.

CONCLUSION

The Solar Sticky Insect Trap demonstrates how renewable energy and simple design can be combined to create an effective, affordable, and eco-friendly pest management tool. By reducing reliance on chemical pesticides, it not only enhances crop productivity and food safety but also supports biodiversity and sustainable farming practices. With its low cost, ease of use, and alignment with global sustainability goals, the device holds strong potential for widespread adoption in both local and international agricultural sectors.

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