POLITEKNIK MELAKA

DIPLOMA IN INTERNATIONAL BUSINESS

“ALLIUMGUARD (ORGANIC INSECT CONTROL LIQUID)”

NURUL ATHIRAH BINTI MOHD FARID

(11DPI22F2004)

MUHAMMAD HAZIRUL NAIM BIN NORAZLI

(11DPI22F2023)

NUR FIRDAUS BIN NORISHAM

(11DPI22F2012)

COMMERCE DEPARTMENT

SESSION II 2024/2025

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THIS REPORT PROPOSAL IS SUBMITTED TO THE COMMERCE DEPARTMENT AS A PART OF THE AWARD OF FOR A DILPMA INTERNATIONAL BUSINESS

COMMERCE DEPARTMENT

SESSION II 2024/2025

COMFIRMATION OF THE PROJECT

The project report of titled “Alliumguard (Organic Insect Control Liquid)” has been submitted, reviewed and verified as a fulfills the condition sand requirements of the project writing in stipulated.

Check by :

Supervisor name : MADAM NAZIRA BINTI MD LATIB

Supervisor signature :

Date :

Verified by :

Project Coordinatar name: MADAM TUTY BINTI KAMIS

Signature Coordinator:

Date:

“We acknowledge this work is our own work except the except we have already explained to our source”

1. Signature:

   Name: NURUL ATHIRAH BINTI MOHD FARID

   Registration Number: 11DPI22F2004

   Date:

2. Signature:

   Name: MUHAMMAD HAZIRUL NAIM BIN NORAZLI

   Registration Number: 11DPI22F2023

   Date:

3. Signature:

   Name: NUR FIRDAUS BIN NORISHAM

   Registration Number: 11DPI22F2012

   Date:

ACKNOWLEDGEMENTS

We express our praise and gratitude to Allah, the Lord of the universe, for granting us the intelligence and strength to undertake this project. Through His blessings, we successfully completed our improvements. Without His will, this achievement would not have been possible. We are thankful for the opportunity to enhance this Alliumguard (Organic Insect Control Liquid) project.

This journey has been challenging for us as final-semester Diploma in International Business students. Achieving the desired outcomes required significant patience and effort. Without adequate guidance, we might not have reached the completion of this improvement project.

We extend our heartfelt thanks to our supervisor, Madam Nazira Binti Md Latib, for her unwavering support and guidance, which played a crucial role in our success. We are also deeply appreciative of Encik Afiq from Afiq Burger station for providing us with valuable insights regarding our Alliumguard (Organic Insect Control Liquid) improvements.

Finally, we would like to thank the staff and students of Politeknik Melaka, as well as the forwarding company, for taking the time to participate in our questionnaires.

EXECUTIVE SUMMARY

AlliumGuard was developed as a sustainable, food-safe pest control alternative using recycled onion waste from Afiq Burger Station. This project was initiated to address the persistent pest problems faced by the station while creating a scalable solution that could benefit the broader food and beverage industry. The main objectives were to produce a non-chemical insecticide AlliumGuard for controlling pest insects at Afiq Burger Station and to evaluate its effectiveness in doing so.

This innovative solution not only replaced chemical insecticides but also offered a cost-effective method to reduce operational expenses and improve food hygiene. The project focused on optimizing AlliumGuard's formulation to meet food safety standards and ensure effective pest control performance. By utilizing food waste in the product's creation, the initiative also contributed to environmental sustainability and waste reduction.

In addition to addressing Afiq Burger Station's immediate needs, market research highlighted the potential for AlliumGuard's application in other small food businesses. Strategies for production and distribution were established to ensure a steady and affordable supply. Ultimately, the project allowed Afiq Burger Station to reduce its reliance on synthetic pesticides while maintaining food quality, and it positioned AlliumGuard as a replicable, environmentally friendly model for sustainable pest control across the food industry.

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INTRODUCTION

1.0 INTRODUCTION TO PROJECT

This project focuses on the development of AlliumGuard, an organic pest control solution derived from recycled onion waste. According to research by ***Benítez V.; Mollá, E.; Martín-Cabrejas, M.A.; Aguilera, Y.; López-Andréu, F.J.; Cools, K.; Terry, L.A.; Esteban, R.M (2011)***. the outer layer of brown onions contains high antioxidant activity and various valuable chemical compounds, making it the most suitable onion waste for repurposing. Based on these findings, the idea was formed to transform onion peels specifically those discarded at Afiq Burger Station into a natural, food-safe insect repellent.

The initiative was launched in response to persistent pest issues at Afiq Burger Station, located in Kuang, Sungai Buloh, a food stall specializing in burgers. Insect infestations had been disrupting food preparation, raising hygiene concerns, and increasing operational costs due to the regular use of chemical insecticides. By turning waste into a solution, the project aimed to address these challenges through a more sustainable, cost-effective method.

This innovative approach not only reduced the stall's reliance on chemical pesticides but also maintained food hygiene and safety standards. By utilizing waste materials already generated from daily operations, the project effectively lowered expenses while promoting environmentally friendly pest control. AlliumGuard stands as a practical example of how small food businesses can adopt green solutions to improve sustainability, reduce costs, and ensure safe food handling practices.

2.0 LITERATURE REVIEW

The pursuit of sustainable and eco-friendly agricultural practices had led to increased interest in botanical pesticides. Among these, Allium species, particularly onion (Allium cepa), had garnered attention due to their natural pesticidal properties. Studies demonstrated the insecticidal and antimicrobial activities of onion extracts, attributing these effects to bioactive compounds such as sulfur-containing compounds, flavonoids, and phenolic acids.

Winarni, Siti, Cahyani, Khoirun Nada Okta Aulia, Nissa, Cintya, Adhy, Suryo, Purnami, Chusnul Tri, Mawarni, Annisa, & Dharminto. (2023). investigated the use of shallot (Allium ascalonicum) peel extract as a natural pesticide against armyworms (Spodoptera litura). The study showed that higher extract concentrations significantly increased larval mortality, indicating strong insecticidal potential. This supported the viability of onion-based pesticides like AlliumGuard in managing pest populations effectively.

The mechanism of action of Allium-derived pesticides was primarily linked to organosulfur compounds, such as allicin. These compounds interfered with pest metabolism by reacting with thiol-containing enzymes, ultimately causing cellular disruption and death. Additionally, the strong odor of onion acted as a repellent, contributing to its efficacy in integrated pest management (IPM) systems.

Assatarakul and Himasuttidach (2017) demonstrated that ethanolic onion extracts possessed potent antibacterial activity against Bacillus cereus, Staphylococcus aureus, and Escherichia coli O157:H7. This suggested additional protective benefits in reducing disease-causing pathogens on crops.

Compared to synthetic chemical pesticides, Allium-based formulations such as AlliumGuard were considered environmentally friendly, as they degraded quickly without leaving toxic residues. They also presented lower ecological risks to pollinators and beneficial insects, while offering potential to slow pesticide resistance development in pest species.

However, challenges existed in maintaining the stability and shelf-life of onion-based products. The active compounds were prone to degradation when exposed to light and temperature. AlliumGuard addressed these issues through proprietary stabilization methods, which improved both efficacy and user practicality in field conditions.

Overall, the reviewed literature underscored the promise of onion-based pesticides as viable tools for organic and sustainable pest control. AlliumGuard built upon these scientific insights to deliver a product that aligned with modern agricultural and environmental standards.

3.0 BUSINESS ISSUES

Afiq Burger Station had been facing significant challenges due to pest insects that interfered with food production and affected overall food quality. The presence of these pests created hygiene concerns, leading to potential health risks for customers and decreased customer trust in the food stall. The insects contaminated raw ingredients, cooking areas, and prepared food, resulting in a decline in the overall quality and taste of the burgers served. Additionally, pest infestations led to food spoilage, causing financial losses due to wasted ingredients and increased expenses to maintain cleanliness and hygiene standards.

To combat this issue, Afiq Burger Station had been relying on chemical insecticides, which not only increased operational costs but also introduced potential health risks due to chemical exposure. The continuous purchase of these synthetic insecticides placed a financial burden on the business, making it an unsustainable solution in the long run. Furthermore, excessive use of chemical-based pesticides could have led to regulatory compliance issues and negatively impacted the stall's reputation among health-conscious consumers.

This problem not only affected daily operations but also influenced customer satisfaction and business profitability, making it essential for Afiq Burger Station to adopt a more effective and environmentally friendly pest control solution, such as AlliumGuard. This was the reason our group came up with the idea to create AlliumGuard, providing a sustainable, cost-effective alternative to chemical pesticides addressing both the financial and hygiene concerns faced by Afiq Burger Station.

4.0 BUSINESS OBJECTIVES

1. To produce non-chemical insecticides Alliumguard to control pest insects at Afiq Burger Station.

2. To identify the effectiveness of Alliumguard to control pest insects at Afiq Burger Station.

5.0 JUSTIFICATION OF BUSINESS PROJECT SELECTION

Afiq Burger Station faced persistent pest issues that affected food quality and increased operational costs due to frequent purchases of chemical insecticides. Traditional pest control methods were costly, unsustainable, and posed potential health risks. To address this, AlliumGuard provided a safer and more cost-effective alternative that helped reduce dependency on synthetic pesticides while maintaining hygiene and food safety standards.

This project was justified by its ability to tackle multiple challenges simultaneously. It supported Afiq Burger Station in lowering expenses, minimizing food contamination risks, and enhancing customer confidence. Additionally, by repurposing onion waste, AlliumGuard contributed to sustainability and waste reduction, making it an innovative and environmentally friendly solution.

By investing in this solution, Afiq Burger Station improved food quality, reduced costs, and established itself as a business committed to hygiene and sustainability. Afiq Burger Station's challenges with pest infestations highlighted the need for an effective and sustainable pest control solution. The increasing adoption of sustainable food production further emphasized the demand for non-toxic pest control methods. Food manufacturers, beverage companies, and small food businesses like Afiq Burger Station were looking for alternatives that aligned with health and safety regulations while maintaining product quality. AlliumGuard offered a highly effective, onion-based solution that supported sustainable agriculture and food safety.

By investing in AlliumGuard, businesses reduced their dependency on chemical pesticides, improved their marketability, and complied with global food safety standards. Furthermore, the project promoted environmental responsibility by reducing food waste through the recycling of onion by-products.

6.0 BUSINESS SCOPE

This project aimed to solve the pest issues faced by Afiq Burger Station while benefiting the broader food and beverage industry. AlliumGuard was developed as a cost-effective and sustainable pest control solution to help small food businesses struggling with insect infestations that impacted food quality and operational expenses. By utilizing onion waste from Afiq Burger Station, AlliumGuard provided a natural and affordable alternative to chemical insecticides, reducing reliance on costly synthetic pesticides.

The project focused on refining AlliumGuard's formulation to effectively address pest challenges at Afiq Burger Station while ensuring compliance with food safety regulations. Market research was conducted to assess its effectiveness and identify other small food businesses that could benefit from its use. Additionally, production and distribution strategies were established to maintain a steady and affordable supply of AlliumGuard, ensuring accessibility for Afiq Burger Station and similar businesses.

By implementing these strategies, the project not only benefited Afiq Burger Station but also served as a model for other food establishments seeking a safe, sustainable, and cost-effective alternative to chemical insecticides. This initiative enhanced food quality, reduced operational costs, and promoted environmentally friendly business practices in the food and beverage industry. By developing AlliumGuard as a cost-effective and sustainable pest control solution, the project helped small food businesses struggling with insect infestations that impacted food quality and operational costs.