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Preface

The Scientific Project Colloquium offers a platform for publishing Diploma Science final year projects (FYP). The objective is to effectively distribute research findings throughout all scientific disciplines. The primary objective of including final year projects into the course curriculum is to encourage students to put their theoretical knowledge into practical applications.

We would like to express our gratitude to our primary establishment, the Faculty of Applied Sciences and Universiti Teknologi MARA, Perak Branch, for their invaluable assistance.

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ASSESSING THE EFFECTIVENESS OF CLOVE, STAR ANISE, AND CURRY LEAVES AS NATURAL REPELLENTS AGAINST DIPTERAN INSECTS

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Abstract: The use of commercialized fly repellent containing DEET (N, N-diethyl-meta-toluamide) which is present in many repellent formulations can affect humans' health and the air quality. The significance of this research is to provide natural repellent, which is affordable, easy-access and less toxic to human health. Furthermore, curry leaves, cloves, and star anise are edible herbs that are nontoxic, safe for kids, and they do not contain any chemicals that could be damaging to skin. The objective of this project is to examine the effectiveness of these three natural spices and herbs (*Illicium verum, Murraya koenigii and Syzygium aromaticum*), and thus to provide the repellents that are environment friendly. The extractions of curry leaves, cloves, and star anise were used in this study. The extraction of clove is the most effective in repelling the Diptera rather than curry leaves and star anise because of special components called eugenol and carbazole alkaloids that have antioxidant, and insecticidal properties that are used against flies. The suitability also considers aspects like safety, convenience of preparation, and any negative reactions or side effects. It can be concluded that the natural plant resources can be used in reducing the number of flies and repel Diptera in a way that are affordable, less toxicity, environment friendly, and providing a safer and greener alternative to chemical repellents. The findings will be useful in determining the best natural repellent technique for everyday use.

Keywords: *clove, curry leaves, Diptera, repellent, star anise*

INTRODUCTION

A common insect of the Muscidae family (order Diptera) is the housefly (*Musca domestica*). Houseflies make up around 90% of all flies found in human habitations. Houseflies are still an issue anywhere rubbish and decomposing organic waste are allowed to gather. Therefore, it is known that house flies, or Diptera, are carriers of diseases that are easily spread to humans.

Numerous diseases, like germs and viruses, are known to be carried by these *Musca domestica* and are easily dispersed across surfaces and food. Usually, commercialized fly repellent is toxic and costly. Amazingly, nature has its own ways of dealing with flies. Since many natural materials contain chemicals that flies find repulsive or even poisonous, they are effective fly repellents. For example, the strong fragrances of several natural plants, such as curry leaves, cloves, and star anise, might repel flies or affect their nervous system systems (Jason, 2024).

The safe and efficient method of keeping these bothersome insects away from your home is to use natural fly repellents. In addition to being useful for cooking, natural herbs also work well as organic fly inhibitions (Flykiller, 2023). Indirectly, this innovation is changing the use of chemicals into natural products that can guarantee a better environment, health and safety. Moreover, curry leaves, cloves, and star anise are edible herbs that are nontoxic and safe for kids to accidentally ingest, they do not contain any chemicals that could be damaging to skin. The objectives of the study are to test the potential of using star anise, curry leaves and cloves as natural repellent, to compare the effectiveness of star anise, curry leaves and cloves to repel flies and to provide the extraction of natural herbs as natural repellent.

METHODOLOGY

Star anise, curry leaves and cloves are examples of natural products that can repel flies. Natural products are efficient in repelling flies without the use of harsh chemicals. Plant-based repellents are effective against many species of flies, including house flies, stable flies, and Anopheles mosquitoes.

The research is worth doing because it can show that natural plant sources can be used in reducing the number and repel Diptera in a way that are affordable, less toxic to human health. This research is also to avoid food poisoning problems and be environment friendly as it will help to reduce toxicity in the air and not be harmful to the children if they are accidentally taken or exposed. Thus, herbs are the best solution that can help people to get rid of flies naturally.

Procedures to provide the extractions started when the star anise, curry leaves and cloves were weighed about 30 grams. Star anise, curry leaves and cloves have been dried in the oven about 40°C for 3 hours until the color of the three herbs becomes brown. The star anise, curry leaves and cloves were then grinded until it became powdered. The star anise has been put in a beaker labeled 'A' and filled in the 500mL beaker with distilled water until 300mL. The beaker has been heated by using a Bunsen burner until it goes down ⅓ of total water. The sample has been cooled for a few minutes at room temperature. Then, the star anise has been filtered using a funnel and filter paper to get the liquid extraction from the mixture of star anise with distilled water. After that, beaker 'A' has been poured until all sediments are retained in a conical flask into the bottle. The bottle was labeled as 'A'. Those steps were repeated for curry leaves and cloves. Curry leaves were labeled as 'B' and cloves as 'C'. According to Aguele et.al (2023), it shows that this methodology is safe and environment friendly because it didn't use any chemical product to repel flies. Other than that, it is an easy, not costly and affordable alternative to repel flies.

Figure 1: Product of Clove Extraction

RESULTS

The research had been conducted to reduce the fly disturbance in Beta Cafe, University Teknologi MARA (UiTM) Perak branch, Tapah campus. The research shows that natural plant sources can be used in reducing the number and repel Diptera.

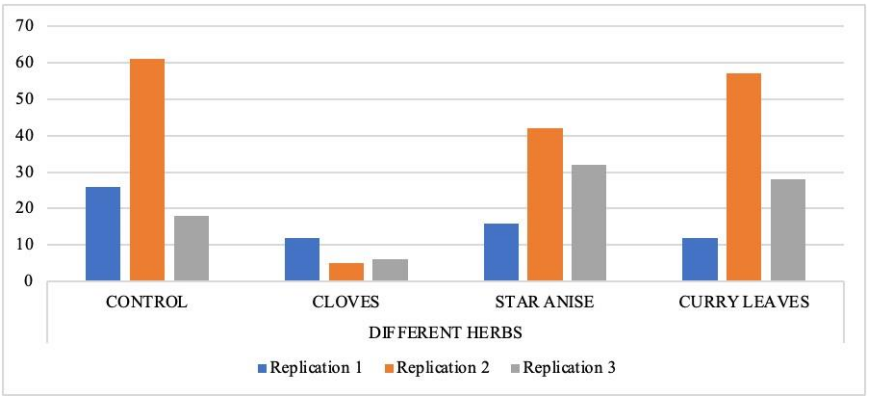

Figure 2: Number of Flies Trapped by Using Different Herbs Extractions

The result indicates that cloves have the highest repellent effect against flies, as there were the fewest number of insects captured on the fly trap. The extraction of clove is the most effective in repelling the Diptera rather than curry leaves and star anise because of special components called eugenol, and carbazole alkaloids that have antioxidant, and insecticidal properties that are used against flies. Cloves contain an essential oil called eugenol, which has antiseptic, antibacterial, and antioxidants (Tavvabi-Kashani et. al, 2024).

The outcome demonstrates that fewer flies were caught on fly traps containing cloves than on fly traps with curry leaves and star anise. This demonstrates that cloves, as opposed to curry leaves and star anise, have potent repelling qualities. Cloves are the most effective plant to use as a fly repellent because their aroma can cover the largest possible area and keep flies away. Essential oils found in natural herbs serve as nature's insect deterrent.
There are some factors that lead to these results. One of the factors is the chemical compound present in the herbs

used that gave the repellence towards flies. But, among the three all of them the least inefficient was curry leaves. For curry leaves, the main chemical component is the leaves of *M. koenigii*, which have been identified as having distinct flavour and aroma. It is believed that the folks in the rural areas of Malaysia use curry leaves as traditional home remedies for flies' prevention possibly due to the presence of chemical components in the curry leaf that have the similar characteristic to the repellent's active compound.

Natural herbs can also be used to repel flies instead of DEET or other commercial insect repellent. And it is for a very good reason, as they may contain harmful chemicals that can trigger allergies, skin reactions or severe respiratory conditions that can guarantee a better environment, health and safety. Thus, this can provide natural insect repellent which is cheaper than commercialized ones.

CONCLUSION

Cloves, star anise and curry leaves have potential to repel flies. The cloves are the most effective one as fly repellent followed by star anise and curry leaves. It can be concluded that the natural plant resources can be used in reducing the number of flies and repel Diptera in a way that are affordable, less toxicity, environment friendly, and providing a safer and greener alternative to chemical repellents. The findings will be useful in determining the best natural repellent technique for everyday use.

COMPLIANCE OF ETHICAL STANDARDS

Not applicable.

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SITI BASRIYAH SHAIK BAHARUDIN
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