

An Engineer's Solution to Housefly Menace in a Premise

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**UNIVERSITI TEKNIKAL MALAYSIA MELAKA**  
**FAKULTI KEJURUTERAAN ELEKTRONIK DAN KEJURUTERAAN KOMPUTER**

**BORANG PENGESAHAN STATUS LAPORAN**  
**PROJEK SARJANA MUDA II**

**Tajuk Projek** : AN ENGINEER'S SOLUTION TO HOUSEFLY  
 MENACE IN A PREMISE

**Sesi Pengajian** : 

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## **ABSTRACT**

This research project is undertaken to provide a solution to the housefly premise. The premise is constantly invaded by houseflies. As everyone is well aware that houseflies are carriers of disease like cholera, diarrhea, etc and their presence poses a threat to the health of the humans. This main focus of this project is to carry researches and make comprehensive study on the effectiveness of microwave housefly repellents as claimed by the manufacturers. Once such electronic devices are proven to be effective and cannot be disputed, the respective authorities can gazette a law requiring all premises with housefly problem to install these devices.

## **ABSTRAK**

Projek kajian ini dilakukan untuk memberikan penyelesaian terhadap premis lalat. Seperti semua orang menyedari bahawa lalat adalah pembawa penyakit seperti ‘cholera’, ‘diarrhea’, dan kehadiran mereka menimbulkan ancaman bagi kesihatan manusia. Fokus utama dari projek ini adalah untuk melakukan kajian dan membuat kajian menyeluruh mengenai keberkesanan peranti lalat seperti dituntut oleh pengeluar. Apabila peranti elektronik tersebut terbukti berkesan dan tidak boleh dipertikaikan, justeru pihak peranti ini membolehkan semua tempat dengan masalah lalat untuk memasang peranti tersebut bagi mengatasi masalah ini.

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## **CHAPTER 1**

### **INTRODUCTION**

This consists of the introduction about the project, the background, project objective, problems statement, and the scope of work.

## 1.1 Research Background

This research project is undertaken to provide a solution to the housefly premise. The premise is constantly invaded by houseflies. As everyone is well aware that houseflies are carriers of disease like cholera, diarrhea, etc and their presence poses a threat to the health of the humans. This main focus of this project is to carry researches and make comprehensive study on the effectiveness of microwave housefly repeller as claimed by the manufacturers. Once such electronic devices are proven to be effective and cannot be disputed, the respective authorities can gazette a law requiring all premises with housefly problem to install these devices.

Obviously, the microwave housefly repeller, if effective it will destroy the larvae before becoming houseflies. Once this technique is proven to be effective and cannot be disputed, recommendations will be made to the respective bodies to install the system to overcome the housefly menace in the area. The present invention relates to the field of housefly extermination, and more particularly to a novel exterminating device employing microwave energy which is generated and distributed over an area intended to be freed of housefly.

This project is basically about to solve the housefly menace in premise. The main objective is to kill the base or larvae of the fly before it become the fly. The extermination device is disclosed here in having an RF radiation generator providing microwave and high frequency waves that generated waves is characterized as being effective to cause insect internal molecular friction to generate deadly heat. The benefit of this project is to enhance the past fly exterminator. This project also covered about ultrasonic methods to prevent this fly problem.

## **1.2 Research Objective**

The primary objective to provide a housefly exterminating means which includes the generation of microwave energy that is detrimental to pests but is not detrimental to structures, such as walls, floors or the like.

## **1.3 Problem Statement**

Most of the time, the premise are invaded by thousands of houseflies. During peak seasons, the sheer abundant of houseflies crawling on the table and feeding on uncooked and cooked food is a turnoff. A housefly, each time landing on the food will either regurgitate on the food to soften it or drop its feaces on the food. Coupled by the body parts and legs with the germs and dirt on them, food that has been come in contact with a housefly is highly contaminated. Thus an effort to contain the threat by these insects will bring benefit to the society at large.

This project should improve the conventional practice to effect the extermination of bugs and pest by employing a variety of aerosol or other pressurized systems for distributing a wet mist in a limited area in order to spread a chemical substance for contacting specific insects or bugs. Such devices are normally called "foggers" and employ a pressurized canister with a manually released valve for discharging a wet toxic chemical vapor into the surrounding air. In application where this project is the generation of microwave energy that is detrimental to pests but is not detrimental to structures, such as walls, floors or the like.

## **1.4 Scope of Works**

There are several areas that being identified or considered that need to be work out to produce the microwave radiation insect exterminator.



There are:

a) Power Supply

The power supply must support the all equipment in this project. Such as Klystron power supply. Klystrons are used as amplifiers at microwave and radio frequencies to produce both low-power reference signals for super heterodyne radar receivers and to produce high-power carrier waves for communications and the driving force for modern particle accelerators. The input power source may be a battery of approximately 24 volts or, if desired line voltage of 115 to 220 volts may be used. [1]

b) Safety Interlock

A device or arrangement, which means the functioning of one part is controlled by the functioning of another, as for safety.

c) Antenna

An antenna (or aerial) is a transducer designed to transmit or receive electromagnetic waves.

d) Indicator

An electronic indicator means for a scaling the actual displacement of the spindle by a user-adjustable scale factor representing the ratio of the actual displacement of a spindle to the value displayed.

e) Transformer

A transformer is a device that transfers electrical energy from one circuit to another through inductively coupled conductors; the transformer's coils.

f) Magnetron

A magnetron is a tube that utilizes electrical and magnetic currents in order to create an intense heat output.

## **1.5 Project Methodology**

There are 4 phases involved in order to achieve the objective of the project.

There are:

- a) Project Planning
- b) Literature Review and related theory
- c) Hardware Construction
- d) Finishing

The main focused of this project is to provide an exterminating device which generates microwave energy in order to eliminate housefly, such as termites, wood-boring beetles or the like, that extend into inaccessible areas of a structure.

## **1.6 Difficulties and problems**

The cost of the project because all microwave equipments is too expensive and encountered the problem of the past insect extermination.

## **CHAPTER 2**

### **LITERATURE REVIEW**

This chapter will discuss precisely about the project, including the factors that should be considered before start the project and other related circuits that needs fully attention for this research.

## 2.1 Fly

Each female fly can lay approximately 500 eggs in several batches of about 75 to 150 [2]. The eggs are white and are about 1.2 mm in length. Within a day, larvae (maggots) hatch from the eggs; they live and feed in (usually dead and decaying) organic material, such as garbage or faeces. They are pale-whitish, 3–9 mm long, thinner at the mouth end, and have no legs. They live at least one week. At the end of their third instar, the maggots crawl to a dry cool place and transform into pupae, colored reddish or brown and about 8 mm long. The adult flies then emerge from the pupae. This whole cycle is known as complete metamorphosis. The adults live from two weeks to a month in the wild, or longer in benign laboratory conditions. After having emerged from the pupae, the flies cease to grow; small flies are not young flies, but are indeed the result of getting insufficient food during the larval stage. [3]

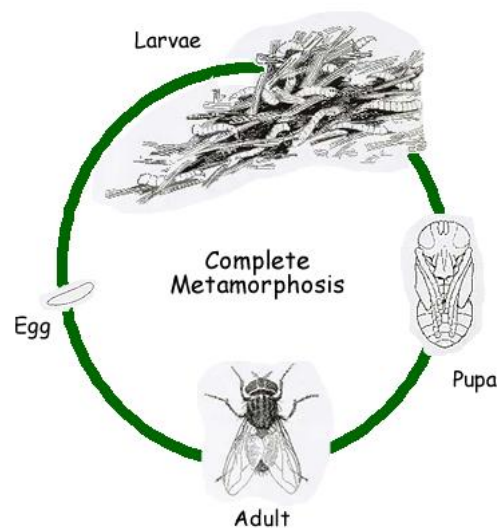


Figure 2.1: Fly Life Cycle

The flies depend on warm temperatures; generally, the warmer the temperature the faster the flies will develop. In winter, most of them survive in the larval or the pupa stage in some protected warm location. [4]

Housefly is a vector of disease, mechanical transmission of organisms on its hairs, mouthparts, vomitus and feces:

- Parasitic diseases: Cysts of protozoa e.g. *Entamoeba histolytica*, *Giardia lamblia* and eggs of helminths e.g.: *Ascaris lumbricoides*, *Trichuros trichura*, *Haemenolypes nana*, *Enterobius vermicularis*.
- Bacterial diseases: Typhoid, cholera, dysentery, pyogenic cocci...etc. House flies have been demonstrated to be vectors of *Campylobacter* and *E. coli* O157:H7 using PCR. House flies can be monitored for bacterial pathogens using filter paper spot cards and PCR [5]
- Viruses: Enteroviruses: Poliomyelitis, infective hepatitis (A & E)

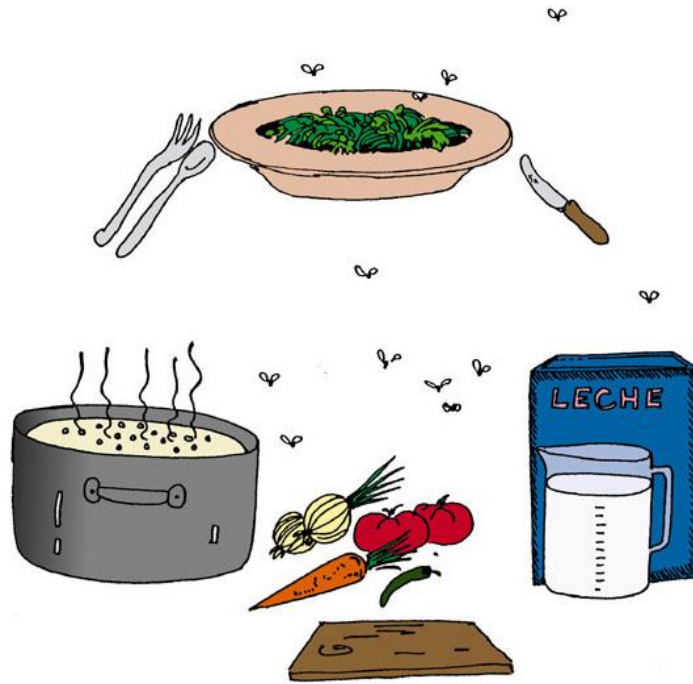


Figure 2.2: Flies on food (flies will leave parasite eggs wherever they fly and are particularly).

## 2.2 Existing Fly Repeller

In the past, it has been the conventional practice to effect the extermination of bugs and insects by employing a variety of or other pressurized systems for distributing a wet mist in a limited area in order to spread a chemical substance for contacting specific insects or bugs. Such devices are normally called "foggers" and employ a pressurized canister with a manually released valve for discharging a wet toxic chemical vapor into the surrounding air.

Difficulties and problems have been encountered when using such prior chemical dispensing devices which stem from the fact that the discharge is a wet mist which is heavy and has a tendency to drop upon surrounding floor areas so that only a relatively small area is serviced by the chemical. Also, wet mists generally leave a residue on furniture, sinks, wall surfaces or any utensils or other items upon which the wet mist comes into contact.

Another problem resides in the fact that the chemicals used are highly toxic in such systems and great care must be taken to remove any food, utensils or other articles upon which the wet mist may come into contact so that the chemical is not inadvertently ingested by humans or animals.

Still a further problem with such toxic chemicals resides in the fact that pests, such as termites, wood-boring beetles, etc. extend into inaccessible areas of a wall or floor structure as well as in spaces between the floors and certain ceiling areas. Current methods involve either employment of the wet mist or gas fumigation systems of the entire structure or physically opening the infested area so that it can be treated with a toxic chemical. Both of these methods require considerable inconvenience to the occupant as well as the release of toxic chemicals into the surrounding environment.

## **2.3 Electronic Pest Controlling**

Basically, there are two types of these electronic pest controls from which you can choose from. First, ultrasonic devices emit sound waves that have short wavelengths and high frequencies, usually greater than 20,000 Hz. These, of course, cannot be heard by humans but can be heard by animals like insects and rodents.

The ultrasonic sound waves scare away pests, which gradually eliminates them from the general vicinity of the pest control device. You must remember, however, that solid areas like walls will block ultrasonic sounds. Thus, these types of devices must be placed near the pests' entrance and exit points as well as its tunnels.

Second, electromagnetic devices alter the building's electromagnetic field. With the altered vibrations, pests sensitive to it will stay away from the area. However, the electrical wiring itself is left undamaged and the household pets are usually not affected by the altered electromagnetic fields. [6]

Of course, there are always the ultraviolet ray devices to complement the abovementioned types of electronic pest control. These devices combine UV rays with pheromone baits to trap mosquitoes and flies, after which they either land in sticky pads or are electrocuted.

### **2.3.1 Benefits of the Devices**

Electronic pest control devices are favored for their minimum environmental impact. Since you are not spraying harmful chemicals into the atmosphere, particularly into your home, you are protecting both the environment and the health of your family members. After all, these chemicals can cause health complications like asthma. [7]

## 2.4 Ultrasonic Sound

Ultrasound is cyclic sound pressure with a frequency greater than the upper limit of human hearing. Although this limit varies from person to person, it is approximately 20 kilohertz (20,000 hertz) in healthy, young adults and thus, 20 kHz serves as a useful lower limit in describing ultrasound. [8]

The production of ultrasound is used in many different fields, typically to penetrate a medium and measure the reflection signature or supply focused energy. The reflection signature can reveal details about the inner structure of the medium, a property also used by animals such as bats for hunting.

The ultrasonic radiation gets rid of rodents, insects and many other pests. Ultrasonic pest controlling system doesn't kill rodents and insects but it just drives them out. It is non toxic chemicals or messy traps, it is safe and clean for human and environments. These high intensity ultrasonic sound waves (20~65 kHz) are out the range of hearing of human are most household pets, but pests. These nerve-crushing sounds effects the rodents and insects directly penetrate their brain and nervous systems causing them severe pain and discomfort, and make them uneasy and act abnormal such as to become more frantic jumping, stampeding and fighting each other, which result in the voluntary repulsion against ultrasonic waves areas and pest are impossible to stay at such radiated areas. [9]

## 2.5 Ultrasonic Repeller

Nowadays, many fly or bug repeller use sound devices. The term "ultrasonic" applied to sound refers to anything above the frequencies of audible sound, and nominally includes anything over 20,000 Hz. Frequencies used for medical diagnostic ultrasound scans extend to 10 MHz and beyond.

Sounds in the range 20-100 kHz are commonly used for communication and navigation by bats, dolphins, and some other species. Much higher frequencies, in the range 1-20 MHz, are used for medical ultrasound. Such sounds are produced by