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Design of Solar Energy Driven Mosquito killing System Using UV Light

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ABSTRACT-- Mosquitoes are a major public health problem since they are known to spread illnesses like the Zika virus, dengue fever, and malaria. In this study, we suggest a solar-powered mosquito killing device that attracts and kills insects using ultraviolet (UV) light. The system consists of a racket with a mesh area and a solar-powered UV light source. Mosquitoes are drawn to the racket by the UV light, and when they come into touch with the mesh area, they are shocked. Without batteries or electricity, the solar panel serves as a sustainable source of energy. The suggested method is user-friendly and practical for both indoor and outdoor use. The results indicate that the UV light and racket device might be an effective substitute for chemical insecticides and other types of mosquito control.

KEYWORDS –Mosquito Control, Solar Power, Ultraviolet Light (UV), Cost-Effective, Eco-Friendly.

I. INTRODUCTION

Humans are at great risk for mosquito-borne illnesses such as chikungunya, dengue fever, Zika virus, and malaria. These diseases disproportionately affect populations in underdeveloped nations, where mosquito populations are abundant and conventional mosquito control measures, including insecticides and fumigation, are ineffective and frequently have detrimental effects on the environment. Communities are at a higher risk of catching diseases carried by mosquitoes since these approaches can be expensive and difficult to maintain in low-income areas.

The World Health Organization (WHO) estimates that more than 500 million people worldwide contract mosquito-borne diseases each year, resulting in over one million fatalities. Chemical insecticides are used in conventional mosquito control techniques, however these substances have a number of negative impacts on the environment and human health. Therefore, alternative eco-friendly and economical mosquito control strategies must be developed. This study describes the creation of a mosquito-killing gadget that electrocutes mosquitoes on touch and uses UV radiation. The device is made to draw mosquitoes to the UV light, where they are killed naturally without the need of dangerous chemicals. Experiments were conducted to determine the device's performance, and the findings show that it is capable of killing a sizable number of mosquitoes. The device is simple to operate and might help in regions with a lot of mosquitoes in controlling diseases spread by them.

In this paper, we have developed a mosquito killing device that uses UV light to attract the mosquito and kill them when they come into contact with the racket. Solar panels are used to provide a power source for the project. The system's solar power supply is built to be dependable, long-lasting, and able to resist a variety of weather situations. This method is more environmentally friendly and sustainable due to the usage of solar panels. Experiments were used to test the device's efficacy, and the findings revealed that it was capable of killing a sizable number of mosquitoes. In locations with dense populations of mosquitoes, the gadget may help reduce the spread of diseases transmitted by mosquitoes.

II. LITERATURE REVIEW

In the world, mosquito-borne illnesses continue to represent a serious danger to public health, particularly in low-income nations where conventional mosquito control measures are ineffective. The interest in creating novel mosquito control strategies that are more economical and environmentally friendly than conventional approaches has grown in recent years. The solar-powered mosquito killing racket is one such remedy that draws and kills insects using ultraviolet (UV) light. In this review of the research, we will look at the effectiveness of solar-powered insect killing devices in lowering mosquito populations, their potential to lower the prevalence of illnesses spread by mosquitoes, and their effects on the environment.

[1]. Adjuik M, Gyapong J, Owusu-Dabo E (2014)The solar-powered racks for killing mosquitoes have been tested in numerous trials to determine how well it work to reduce mosquito populations. In a Ghanaian study, solar-powered mosquito killing rackets were discovered to be more efficient than conventional mosquito control techniques, such as insecticide-treated bed nets, at reducing mosquito populations in houses.This study says that the households using solar-powered mosquito killing rackets had much lower mosquito concentrations. The use of solar-powered mosquito swatters was discovered by the researchers to be linked to a decline in the incidence of malaria in youngsters.

[2]. Rajan R, Sunish IP, Rajendran R (2011)By using solar-powered mosquito rackets to control mosquito populations in outdoor locations was the subject of another Indian study. This study says that, the quantity of mosquitoes collected in trap collections significantly decreased when solar-powered mosquito killing rackets were used. In the study area, the researchers also saw a decline in the number of mosquito bites and diseases spread by them.

[3]. Diabaté A, Tripet F (2015)The effectiveness of solar-powered mosquito swatting devices in lowering the prevalence of dengue disease was assessed in a study carried out in Kenya. According to the study, the number of dengue fever cases in the study area significantly decreased when solar-powered mosquito rackets were used. The usage of solar-powered mosquito killing devices was also discovered by the researchers to be more affordable than conventional mosquito control techniques like fumigation.

[4]. Liu J, Wang M, and Yang J (2012)Chinese researchers assessed the effects of producing and discarding solar panels on the environment. According to this study, the production of solar panels generates a sizable quantity of waste and pollution, particularly when it comes to the usage of potentially dangerous materials like lead and cadmium. The researchers also discovered that the disposal of solar panels might be harmful to the environment and to people's health, particularly in light of the leaking of hazardous materials from landfills.

The solar-powered mosquito-killing lamp is more sustainable than traditional mosquito control methods. The use of solar panels to power the system reduces reliance on fossil fuels, making it a cleaner and more sustainable alternative. Additionally, advancements in solar panel technology have led to the development of more eco-friendly and sustainable solar panels, further it will reduce the environmental impact of this technology.

III. PROBLEM DEFINITION

Mosquitoes are a common and detrimental issue that affects both human health and the economy. Numerous harmful infections, including the Zika virus, dengue fever, and malaria, are carried and spread by these small insects. Mosquito bites can also be a pain since they cause itchiness, edoema, and other uncomfortable side effects. Pesticides and other conventional ways of managing mosquito populations can be costly and environmentally damaging. Alternative and long-lasting solutions are thus desperately needed.

The use of solar-powered equipment that uses UV light to attract and kill mosquitoes is a potential method of mosquito management. These tools come in a variety of shapes, including rackets for killing mosquitoes and traps that imitate human breath with carbon dioxide.The mosquitoes are attract to the UV light and subsequently destroyed by a built-in fan or electric grid. These gadgets are cheaper and more cost-effective than conventional insecticides because to the solar panels that power them.

IV. OBJECTIVES

The purpose of this paper is to examine the efficacy of a solar-powered mosquito-killing apparatus that attracts mosquitoes using UV light. The tool has a built-in fan and racket for killing and trapping mosquitoes, which work effectively. Our objective is to evaluate this device's potential as a practical and cost-effective replacement for conventional mosquito control techniques. We intend to thoroughly assess the effectiveness of our device in various contexts, such as high-mosquito-density locations and low-income neighbourhoods. The paper will also emphasise current constraints and difficulties that need to be resolved to make this device more widely available and efficient, as well as the environmental advantages of using solar power for mosquito eradication.

V. METHODOLOGY

A UV lamp attracts mosquitoes to the system, a mosquito-killing racket kills them, and a fan collects the dead mosquitoes so they may be disposed of properly. Mosquitoes are killed when they come into touch with the system's

mosquito-killing equipment after being drawn to it by the UV light. The deceased mosquitoes are then captured by the fan and disposed of, avoiding the spread of disease. This method successfully lowers mosquito populations and the threat of diseases spread by them.

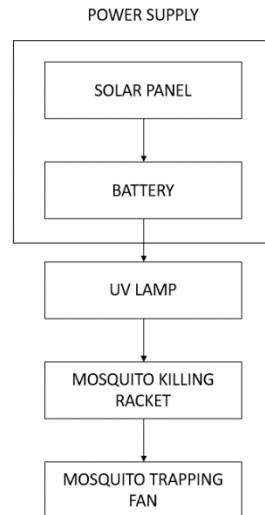


Fig 1. Block Diagram of Mosquito Killing Lamp

At night, we kept the project going. The mosquito control system was then activated and left running until the morning. During the night, the device used UV light to attract the insects and a mosquito-killing racket to kill them. The fan is used to suck dead mosquitoes.

VI. FUNCTIONAL PARTITIONING

The Solar panel, UV light attraction, the mosquito-killing racket, and the mosquito-trapping fan are the four primary parts of the mosquito control system.

1. Solar Panel

The solar panel, which absorbs sunlight and transforms it into electrical energy to power the system, is a crucial part. The power management module then controls and regulates the flow of electricity to the various components of the system, managing this energy.

The system's effectiveness and efficiency are ensured by the power management module, which is made up of a battery and a charge controller. To ensure that the battery is charged properly, the charge controller is in charge of controlling the flow of electricity from the solar panel to the battery. The mosquito attraction and killing module can operate as intended since the battery provides a reliable supply of power.



Fig 2. Solar Panel

2. UV Light

In order to attract mosquitoes, UV light is used. Mosquitoes are drawn to the UV light when it is nearby and fly in that direction. This part of the system is essential because it attracts mosquitoes to the device and makes sure they are within reach of the fan and racket that kill insects.



Fig 3. UV Light

3. Mosquito-Killing Racket

The racket used to kill mosquitoes is what prevents them from being enticed to the UV light. The electrical charge on the racket kills mosquitoes instantaneously when they come in touch with it. This element is made to be secure for people and animals while removing the intended pests successfully.

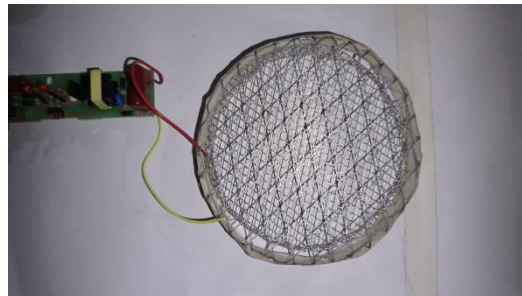


Fig 4. Mosquito Killing Racket

4. Mosquito-Trapping Fan

The purpose of the fan is to attract and hold the mosquitoes inside the trap. The mosquitoes, which are killed by the racket, drop into a tray at the bottom of the gadget. The dead mosquitoes are then attracted by the fan to the tray, where they are collected and later it will be thrown away.



Fig 5. Mosquito Trapping Fan

VII. ADVANTAGES

- This is a chemical-free treatment that is beneficial to the environment. Thus, it is protected against harm to people, animals, and the environment.
- The system uses solar energy as its source of electricity, making it an affordable method of mosquito control. Solar energy reduces the need for electricity, which is sometimes expensive, especially in isolated or rural places.
- The system is small and portable, making it simple to transfer and set up as necessary in different places.
- This method kills mosquitoes quite well. The mosquitoes are drawn to the UV light, racket kills them instantly.

VIII. APPLICATION

- This can be used to control the mosquito population and reduce mosquito-borne diseases.

- This can be used to prevent mosquito bites in outdoor recreation locations like parks, campgrounds, and sports fields.
- This can be used in agricultural settings to protect crops.
- This can be used to replace chemical pesticides and other mosquito control techniques with a sustainable and environmentally friendly alternative.

IX. CONCLUSION

Mosquitoes have been a serious danger to public health and welfare, and their negative effects on the economy cannot be understated. Particularly in rural locations with limited access to electricity, using solar-powered equipment offers a sustainable and efficient method of controlling mosquito populations. Further testing in real-world situations can help to increase the system's efficiency. The proposed mosquito control system uses UV light to attract mosquitoes and rackets to kill them. The fan will suck up the mosquitoes. Incorporating solar panels and power management modules improves the system's cost and sustainability, making it a desirable choice for areas where mosquito-borne illnesses are a problem.

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