



A Study Regarding Herbs Which Used To prevent Mankind against stings from Mosquitoes

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Abstract

Since ancient times, Humans have safeguarded themselves against host-seeking mosquitoes utilizing herbal plant-based repellents. The development of novel natural products may profit tremendously from the knowledge of traditional repellent plants acquired via ethnobotanical studies. Mosquitoes cause more damage to human life by transmitting illnesses such as malaria, West Nile virus, Dengue, Zika, Yellow fever, Chikungunya, and Rift Valley fever etc., Sustainable strategies are implemented to prevent these illnesses so that they do not affect the planet's health.

Key words Herbal Plant, Mosquito Repellent, Protection, Eco -Friendly.

I. INTRODUCTION

¹ Mosquito are the small midge like flies that constitute the family Culicidae. The word mosquito formed by (Mosco and diminutive -Ito) is Spanish for "little fly", There are over 3500 discovered mosquito species in the world there most significant of these are the Aedes, Anopheles and culex. ² Mosquitoes are among the most disturbing blood sucking insects afflicting human beings. The mosquito development process consists of four stages egg, larva, pupa, and mature. Eggs are laid on the water's surface, and when they hatch, they grow into movable larva that feed on aquatic algae and organic debris. various freshwater species, including dragonfly nymphs, various fish, and birds like ducks, feed on these larvae. Adult females of several species have mouthparts that are specialized for drilling into the skin of a host and feed on the blood of a variety of vertebrate hosts as well as some invertebrates, especially other arthropods. Certain organisms only laid eggs after absorbing blood. The major Mosquito borne diseases are Malaria, Filariasis, Yellow fever, Dengue, Hemorrhagic fever, Encephalitis, etc., ³According to WHO (World Health Organization) The majority of the death are due to Mosquito borne Disease Nearly 2.7 Million Death every year Mosquito have been reported as the deadliest animal across the world

II. ATTRACTION OF MOSQUITO

The mosquito gets drawn in by carbon di oxide, acids such as lactic acid, acidity in the urine, temperatures scents of cosmetics with fruit and flower odors, and people who have o +ve blood, staphylococcus spp bacteria, parasite infections, and dark clothing pieces. Mosquitoes are capable of identifying carbon dioxide from faraway locations and target humans. Carbon dioxide is emitted by humans and animals in their respiration, and mosquitoes detect it in the air. Once they recognize it, they hunt for and emphasize their next target. Female mosquitoes are the only ones that bite both humans and livestock. They required proteins from their blood for development of eggs and reproduce. Female and male mosquitoes feed on plant nectar for nourishment. carboxylic acids are one of the compounds that can attract mosquitoes. ⁴ Carbonic acids are major constituent of human sweat and volatiles generated by skin microbes. ⁵ Latic acid are major constituent of human sweat and produced by the body during exercise. ⁶ The skin microbiome can break down carbohydrates, fatty acid and peptides on the skin into volatiles that mosquito can differentiate. The study also found that staphylococcus SPP is four times as abundant in the highky attractive compared to poorly -attractive group

III . MOSQUITO AND THEIR DEADLIEST DISEASES TYPES

a. MALARIA

Malaria is a possibly fatal transmissible illness triggered by Plasmodium parasites. The parasites are transferred to humans by the bites of infected female Anopheles mosquitos. Plasmodium species that can infect humans includes Plasmodium falciparum and Plasmodium vivax. Here are some crucial points concerning malaria. Malaria circulates when an infected female Anopheles mosquito bites a human and injects the parasites that cause malaria into the bloodstream. The parasites then migrate to the organ known as the liver, where they mature and multiply. Malaria symptoms includes a high body temperature, a headaches discomfort in the muscles, and weariness. Other symptoms may include vomiting, nausea, and constipation. Malaria can result in organ failure, anemia, and other consequences in severe cases. Malaria occurs most frequently in tropical and subtropical spots such as Africa, Asia, the Middle East, Central and South America, and Oceania. Malaria risk for transmission varies by region and can be influenced by factors such as environmental conditions, height, and local species of mosquitoes. Preventative options include using insecticide-treated bed nets, insect repellents, and medication for malaria. Malaria-prone areas are frequently advised to take preventative drugs before, during, and after their trips. Mosquito is diagnosed and treated using laboratory tests that identify the presence of malaria parasites. Prompt and effective treatment is essential, as delayed treatment might result in serious complications

and death. Chloroquine, artemisinin-based combination treatments (ACTs), and other antimalarial medicines are employed for therapy, although the medication used depends on the individual species of Plasmodium and the region where the infection was acquired. Malaria has a huge impact on public health, especially in Sub-Saharan Africa. It affects millions of people worldwide and is a major source of illness and mortality, particularly among little children and pregnant women.

b. DENGUE

Dengue fever is an infection transmitted by mosquitoes and caused by the Flaviviridae virus. The virus is mostly transmitted to people by the bites of contaminated female mosquitoes, primarily the species of *Aedes aegypti*. Another mosquito species capable of spreading the virus is *Aedes albopictus*.

Symptoms of Dengue are fever indications can range from moderate to severe, and may include a sudden onset of high fever, persistent headaches, discomfort below eyes, joint and muscular pain, tiredness, nausea, vomiting, and a rash on the skin. Dengue fever may progress to hemorrhagic fever caused by dengue (DHF) or dengue shock syndrome (DSS) in severe cases, which are life-threatening diseases indicated by bleeds, organ damage, and shocks. Transmission The dengue virus is spread by *Aedes* mosquitos, specifically *Aedes aegypti*. Though these mosquitos are most active in the early hours of the day and late afternoon, they can bite at any time whether inside or in dark geographic areas. Regional Distribution Dengue fever is found in tropical and subtropical locations all over the world. It is an essential public health probability in nations with climates that are appropriate and *Aedes* mosquito populations. The disease known as dengue is common in Southeast Asia, the Pacific Islands, the Americas, and parts of Africa. Although there is no particular viral treatment for dengue fever, prevention is important. Prevent mosquito exposure by utilizing repellents for insects, protective clothes, and mosquito nets. Eliminating mosquito breeding regions, such as water that remains in containers, is also helpful. Vaccine As of January 2023, a dengue vaccine called Dengvaxia had been developed and licensed in various countries. However, its application is limited, and its efficiency varies depending on circumstances such as the individual's prior dengue exposure. Dengue fever is a serious worldwide health concern, with an estimated 390 million illnesses occurring each year. Dengue fever has been becoming increasingly prevalent in recent decades, making it an important concern for public health organizations and researchers.

c. ZIKA

Zika virus is a Flaviviridae group mosquito-borne viruses that is mostly circulate by *Aedes* mosquitos, mainly *Aedes aegypti* and *Aedes albopictus*. Here are some important facts concerning the Zika virus, The Zika virus is mostly spread to humans via the bites of infected *Aedes* mosquitos. It can also be passed from mom to offspring via childbirth or while pregnant, in addition to through sexual contact and blood transfusion. Symptoms The vast majority of Zika infections caused by the virus are asymptomatic, so indicates that those who are infected show no symptoms. When symptoms do appear, they are typically modest and include a high body temperature, rashes, joint pain, and ocular (red eyes). The symptoms frequently remain a few mornings to a week. Pregnancy and Birth challenges Infection with the Zika virus during pregnancy is particularly worrying since it has been associated to birth problems such as microcephaly, a disease that occurs when toddlers are born with unusually small heads and underdeveloped brains. Congenital Zika virus infection has also been linked to other delays in development and neurological consequences. Geographic Distribution the Zika virus was discovered in Africa, but it received international attention following epidemics in the South Pacific Islands and the Americas. It has been observed in numerous African, American, Asian, and Pacific countries. The presence of *Aedes* mosquitos affects the spread of Zika. Avoiding mosquito bites by using insect repellents, wearing protective clothes, and staying in screened or air-conditioned accommodations are all preventive strategies. Pregnant women are frequently advised to avoid travel to locations in which the Zika virus is widespread. Sexual Transmission the Zika virus can be transmitted sexually from an infected individual to their partners. Individuals who have travelled to Zika-infected areas ought to take actions to prevent sexual transmission, especially if pregnancy is a possibility. Vaccine and Treatment As of my most recent data update in July 2023, there was no specific Zika virus vaccine or antiviral treatment

d. YELLOW FEVER

Yellow fever is a fever with hemorrhaging viruses triggered by the yellow fever virus, which can be transmitted by mosquitoes, especially *Aedes aegypti* in cities and *Homologues* mosquitoes in the jungle and forested areas. Here are some important facts concerning yellow fever Symptoms Yellow fever symptoms include fever, headache, muscle aches, nausea, vomiting, and exhaustion, and can range from moderate to severe. The infection can proceed to jaundice (yellowing of the outermost layer of skin and eyes), bleeding, and organ damage in extreme cases.

Yellow fever is transmitted to humans by the bites of infected mosquitoes. Infected humans and monkeys have the virus in their blood, and mosquitoes contract it when they bite an infected individual or monkey. Infected the mosquitoes then spread the disease to additional humans through bite yellow fever is endemic in the tropical and subtropical regions of Africa and South America. Spreading can occur in regions where mosquito vectors are present. To limit the spread of the disease, some nations require confirmation of yellow fever vaccination for travelers arriving from affected areas. Yellow fever vaccination A highly effective and safe yellow fever vaccine is offered. immunization is an important preventive step, and many countries' international health standards may require confirmation of yellow fever immunization for entry. The vaccination gives permanent protection and is generally advised for people who live in or travel to yellow fever endemic areas. Yellow fever outbreaks and epidemics can occur on a huge scale, in particular in densely populated urban areas. Vaccination efforts, mosquito prevention efforts, and public health education are all used to control and prevent outbreaks. Yellow fever does not have a specific antiviral treatment. Affected persons receive supportive care, which includes treatment of indicators and consequences. Serious instances may necessitate hospitalization. Mosquito control techniques, such as insecticide use and efforts to eradicate breeding areas, are critical in avoiding the spread of yellow fever. This includes transmission cycles in both metropolitan and sylvatic (forest) ecosystems.

e. CHIKUNGUNYA

Chikungunya is a viral disease spread to people by infected Aedes mosquitos, especially Aedes aegypti and Aedes albopictus. The term "chikungunya" is derived from a Makonde phrase that means "to become twisted," which describes the hunched appearance of patients suffering from joint discomfort, which is a typical sign of the condition. Symptoms of chikungunya include an immediate peak in fever, severe joint pain, muscular discomfort, headache, nausea, fatigue, and rash. Joint discomfort is often incapacitating and can last for a period of time. Chikungunya is spread mostly via the bites of infected mosquitos. The Aedes mosquitos that spread chikungunya are additionally responsible for transmitting additional viruses such as dengue and Zika.

Chikungunya is present in Asia, Africa, the Indian subcontinent, and the Americas. Outbreaks occurred in several countries, and visitors to impacted areas are probably at risk of catching the virus. Chikungunya does not have a specific antiviral medication; thus, treatment focuses on symptom relief. Utilizing insect repellents, wearing long sleeves and pants, and utilizing mosquito nets are all ways to avoid mosquito bites. Eliminating mosquito breeding places, such as standing water, is also vital.

Chikungunya has the potential to have a severe impact on public health during epidemics. While the mortality rate is low, the morbidity (effect on health) can be considerable, especially because some people have prolonged joint discomfort.

Chronic circumstances Individuals may endure persistent joint pain for a lengthy period of time in some circumstances, which means that this chronic form of the disease may result in a lasting effect on quality of life.

f. RIFT VALLEY FEVER

Rift Valley Fever (RVF) is a viral disease that primarily affects animals, but it can also infect humans. The disease is caused by the Rift Valley Fever virus, a member of the Paleovirus genus in the Bunyaviridae family. RVF is typically transmitted through the bites of infected mosquitoes, primarily those belonging to the Aedes and Culex genera. Geographic Distribution Rift Valley Fever is primarily found in Africa, particularly in regions where livestock is raised. However, outbreaks have occurred outside Africa, and the potential for the virus to spread to new areas is a concern. Transmission The main process of transmission is through the bites of infected mosquitoes. The virus can also be transmitted through contact with blood, body fluids, or tissues of infected animals, particularly during slaughter or handling of sick animals. Reservoir Hosts RVF virus can infect a wide range of animals, including livestock such as cattle, sheep, and goats. Certain wild animals, including rodents and bats, may serve as reservoir hosts. Human Infection While humans can become infected with Rift Valley Fever, the majority of cases are associated with direct or indirect contact with infected animals or their tissues. In some cases, humans can be infected through mosquito bites. Human Symptoms Rift Valley Fever can cause a variety of symptoms in humans, which include mild flu-like illness to severe complications such as hemorrhagic fever, encephalitis, and ocular disease. The disease's severe forms can be fatal.

Livestock Impact RVF can have a significant effect on livestock, producing high rates of miscarriage in pregnant animals and high mortality rates in young animals. Outbreaks in livestock may give rise to economic losses in affected regions. Outbreaks in the Rift Valley Fever outbreaks frequently get correlated with periods of heavy rainfall and an increase in mosquito populations. The virus might get circulates into new regions through the movement of infected animals or vectors

III. HERBS

Herbs are plants that are appreciated for their culinary, medicinal, aromatic, and spiritual characteristics. Different civilizations have been using these plants for a variety of purposes through past. Herbs are distinguishable from other plants by their flavoring, scenting, or medicinal leaves, stems, or blossoms.

CULINARY HERBS:

Flavoring meals: Plenty of herbs are used to flavor meals. Herbs used in cooking include basil, thyme, rosemary, parsley, cilantro, mint, and oregano. Herbs can be used fresh or dried, and their flavors may vary depending on the form.

HEALING PROPERTIES OF THERAPEUTIC HERBS:

Certain herbs are recognized for their therapeutic properties and have been employed in traditional medicine systems all over the world. eg Echinacea for health support, chamomile for relaxation, and ginger for digestive difficulties are a few examples.

HERBS WITH A STRONG AROMA:

Many herbs contain essential oils, which contribute to their particular smells. Aromatic herbs such as lavender, sage, and thyme are used in aromatherapy, fragrances, and to create pleasing scents in the interior of homes.

HERBS ARE FREQUENTLY TIED WITH SYMBOLISM AND CULTURAL CUSTOMS

In some cultures, rosemary is associated with remembering, whereas basil is considered a symbol of love.

Herbs can be used in spiritual or religious ceremonies to purify, protect, or for other symbolic purposes.

HERB GARDENING:

Many herbs can be cultivated in small pots on windowsills or in home gardens. They are usually low-maintenance and may grow in a variety of conditions.

HERB GARDENS:

To have convenient access to a variety of fresh herbs, some individuals grow specialized herb gardens.

TEAS MADE FROM HERBS:

Herbal teas, which provide both flavour and potential health advantages, are made from some herbs. For digestion, try peppermint tea, chamomile tea, or echinacea tea.

SUSTAINABLE INSECT CONTROL:

Insect-Repelling Properties: Certain herbs, such as citronella, basil, and mint, are believed to repel insects and pests.

Companion Planting: particular plants are strategically planted in gardens in order to keep pests from attacking other crops.

IV. HERBS USED TO PREVENT MOSQUITO BITE

NEEM

The family Meliaceae includes neem (*Azadirachta indica*). The Meliaceae family, usually known as the mahogany family, includes many economically and environmentally important trees and shrubs. Some Meliaceae members are well-known for their valuable wood, attractive features, or medicinal properties.

The Meliaceae family is distinguished by alternating, pinnately complex leaves with a strong aromatic smell. The family is found throughout the world in tropical and subtropical environments.

Neem is a huge evergreen tree indigenous to the Indian subcontinent. It has been widely cultivated in tropical regions for its several purposes, including medicinal, insecticidal, and other applications.

The key component in neem that repels mosquitoes is Azadirachtin. Azadirachtin is a natural insect repellent found in neem seeds. It disrupts the feeding and growth patterns of insects, making it an effective natural deterrent. Additionally, neem oil, derived from neem seeds, contains other compounds such as limonoids and neem terpenoids that contribute to its insect-repelling properties.

Neem-based products, including neem oil and neem-based mosquito repellents, are commonly used as natural alternatives to synthetic insect repellents. Azadirachtin, in particular, is known for its ability to interfere with the life cycle of insects, acting as an insect growth regulator.

It's important to note that while neem-based products can be effective, their duration of protection may be shorter compared to some synthetic alternatives. Additionally, individual reactions to neem-based products may vary, so it's advisable to test a small area of the skin before widespread use. Using neem-based products can be a part of an integrated approach to mosquito control, along with other preventive measures.



FIG NO: 1 NEEM

TULSI

Tulsi, or holy basil (*Ocimum sanctum*), is known for its medicinal properties and has been traditionally used in various cultures for its health benefits. Some studies suggest that tulsi may have mosquito-repelling properties, likely attributed to its essential oils.

Tulsi contains several components in its essential oil that are believed to contribute to its mosquito-repelling properties. Some of the key components include:

Eugenol: This is a major component of tulsi essential oil and is known for its insecticidal properties. It has a pleasant aroma and is found in various aromatic plants. Eugenol is thought to be effective in repelling mosquitoes and other insects.

Camphor: Tulsi oil may contain camphor, which has a strong, aromatic odor. Camphor is known for its insect-repelling qualities and is often used in various insect repellent formulations.

Cineole (Eucalyptol): Cineole is another compound found in tulsi essential oil. It has a refreshing, camphor-like scent and is known for its insecticidal properties. Eucalyptus oil, which contains cineole, is also used in some mosquito repellents.

Linalool: Linalool is a terpene alcohol found in various plants, including tulsi. It has a floral scent and is known for its insect-repelling properties.

These components collectively contribute to the aromatic profile of tulsi essential oil and are believed to act as natural mosquito repellents. It's important to note that while tulsi may help in repelling mosquitoes to some extent, its effectiveness may vary, and it might not provide the same level of protection as commercial mosquito repellents. If you choose to use tulsi as a mosquito repellent, you can crush fresh leaves, use tulsi essential oil, or simply have potted tulsi plants in and around your living spaces.



Fig NO: 2 Tulsi

VETIVER

Vetiver is a type of grass that is commonly used for its aromatic roots, which have a distinct earthy and woody fragrance. While there is anecdotal evidence and traditional use suggesting that vetiver may have mosquito-repelling properties, scientific studies on its effectiveness are limited.

Vetiver essential oil, extracted from the roots of the vetiver grass, is sometimes used in aromatherapy and in the production of perfumes. The scent of vetiver is known to be pleasant to many people, and some believe it has insect-repelling qualities.

While there isn't an exhaustive body of scientific research specifically on vetiver's mosquito-repelling properties, some studies suggest that certain components found in vetiver essential oil may have repellent effects on mosquitoes. The primary components of vetiver essential oil include:

1. **Vetiverol:** This is a major component of vetiver oil and is responsible for its characteristic earthy and woody scent. Some studies suggest that vetiverol may have insect-repelling properties.
2. **Khusimol:** Another important compound found in vetiver oil, khusimol contributes to the unique fragrance of vetiver. While it is known for its aromatic qualities, there is limited research on its specific effects on mosquitoes.

It's important to note that the effectiveness of vetiver as a mosquito repellent may vary, and its use is often based on traditional knowledge and anecdotal evidence. If you're considering using vetiver for mosquito repellent purposes, you may want to:

- Dilute vetiver essential oil with a carrier oil and apply it to your skin.
- Use vetiver-scented products such as candles or sachets in your living space.

While natural remedies can be appealing, especially for those looking to avoid synthetic chemicals, it's essential to exercise caution and understand that the efficacy of natural products can vary from person to person and in different environments. Additionally, if you are in an area with a high risk of mosquito-borne diseases, it's advisable to use proven mosquito repellents containing ingredients like DEET or picaridin for more reliable protection.



Fig NO: 3 vetivers

GUAVA

Guava leaves are the leaves of the guava plant (*Psidium guajava*), which is a tropical fruit-bearing tree or shrub. The guava plant is native to Central America but is now cultivated in many tropical and subtropical regions around the world. The leaves of the guava plant have been used traditionally for various medicinal purposes.

Guava leaves contain various chemical compounds, and some of these compounds may have properties that could potentially act as natural insect repellents. One group of compounds often found in many plants and essential oils that exhibit insect-repelling properties is terpenoids. Terpenoids include compounds like limonene, eucalyptol, and others.

While the specific chemical components in guava leaves can vary, the essential oils extracted from the leaves may contain a mix of terpenoids and other aromatic compounds. These compounds are believed to contribute to the distinctive fragrance of guava leaves and may have potential insect-repelling properties.



Fig NO: 4 Guava Leaves

V. CONCLUSION

Mosquitoes are responsible for a number of diseases. Despite breakthroughs in mosquito control tactics and products, the mosquito continues to pose severe public health issues. A plant-based insect repellent should be safe for humans while providing personal protection. As a result, using these botanical derivatives instead of chemical pesticides to repel mosquitos could save money and lessen environmental impact. The obvious advantages of these plant extracts would give public health protection as well as an environmentally safer alternative. The availability of these types of plants in locations where manufacturing could be done simply and affordably to provide a feasible form of personal protection from disease vectors might have a global impact. There are numerous plant species in the world, and more research should be conducted. Other substances found in various plant species may be identified and employed in pest management as a safer alternative to synthetic chemicals, paving the path for the future usage of natural insect repellents. Plants created for repellents, on the other hand, must be long-lasting. They would ideally be fast-growing, naturally abundant, and simple to cultivate. The repellent should be obtained from replaceable plant components, such as the leaves, rather than those that, when removed, kill or damage the plant, such as the roots

or shoots. Because valuable plants might become scarce, abundance and survival after parts have been taken are critical for sustainability. owing to over-harvesting. Plant parts used must also be readily available or simple to harvest and store. Plant-based repellents have been utilised in traditional medicine for generations as a personal protection strategy against host-seeking mosquitoes. Knowledge on traditional repellent plants gathered via ethnobotanical studies is a great resource for the development of novel natural products.

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