

Formulation and Devaluation of Mosquito Repellent Incense Stick

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ABSTRACT:-This study aimed to produce a safer, chemical-free, much less expensive, easily manufactured insect repellent because the usage of chemicals made expressly to repel mosquitoes now raises a variety of environmental and health problems. The mosquito is the most well-known disease vector as living organisms known as vectors are in charge of the transmission of infectious illnesses from people to animals or between humans. Finding out how well *Azadirachta indica*, a plant in the *Maliaceae* family that is used to manufacture a herbal mosquito repellent stick, works as a natural insect repellent was the aim of this study. The need for natural mosquito repellents that are safe, inexpensive, non-toxic, eco-friendly, and biodegradable is growing worldwide.

Objective: Try using a natural insect repellent instead of the dangerous chemicals found in conventional bug sprays. You may feel safe in the knowledge that, without using toxic pesticides, homemade insect repellents made with herbs and essential oils can successfully keep pests away of your house.

Purpose: Most of these repelling incense sticks are made of plant

Keyword: repellent for mosquitoes, incense stick

I. INTRODUCTION:

Vectorborne infections account for over 7 lakh deaths annually and account for over 17% of all infectious diseases. Mosquitoes are the most frequent carriers of illness. Numerous diseases, including as Chikungunya, Dengue fever, malaria, lymphatic filariasis, Rift valley fever, Yellow fever, and Zika, are transmitted by these insects. India had 1,57,220 dengue infections and 250 fatalities from illnesses spread by mosquitoes in 2017.

62,268 cases of chikungunya were reported nationwide, with Karnataka reporting the highest number of cases at 31,644 cases, according to the statistics. There are about 300 species of mosquitoes in the *Culicidae* family. A few diseases carried by mosquitoes are dengue fever, yellow

fever, and malaria .

To keep mosquitoes under control, most people on the planet still employ synthetic chemical larvicides. However, a number of these substances are toxic to humans, animals, and plants, and resistance to them can make management challenging. Researchers are now using natural substances to either hinder mosquito larvae or function as repellents for the same.

According to a recent WHO pesticide research, pyrethroids and organophosphates are the principal insecticides used against mosquitoes in the Americas. DEET (N, N diethyl-m-toluamide), a substance that is often employed, Permethrin is another artificial pyrethroid that is used in mosquito control programs to kill adult mosquitoes. Both sumithrin and resmethrin, Many plant extracts have a reputation for keeping insects away. Essential oils from plants are becoming more and more popular as a possible insect repellent. because of their repellent or insecticidal properties,

It belongs in the gens *Anopheles*, *Aedes*, and *Culex* are known to be vectors for most disease pathogens, including malaria, dengue fever, myiasis, yellow fever, encephalitis, etc. The female *Anopheles* mosquito carries a protozoan parasite that causes malaria.

The four distinct types of protozoa that cause malaria are *Plasmodium falciparum*, *Plasmodium vivax*, *Plasmodium ovale*, and *Plasmodium malariae*. It was the primary cause of early mortality and was responsible for almost 500,000 deaths, according to a 2012 WHO report. According to the American Association of Mosquito Control, the number of fatalities had increased to 100,000 as of 2018. The symptoms include a high fever and chills.

The management of mosquito-borne diseases, which pose a serious danger to human health due to their rapid rate of reproduction and establishment of chemical resistance, has grown increasingly difficult. In order to control mosquito populations, synthetic insecticides and repellents are frequently utilized.

They work by either killing adult mosquitoes, preventing them from biting humans, or removing mosquito eggs from vector breeding sites. Nevertheless, the adverse impacts on populations that were not intended targets and the development of resistance prompted scientists to hunt for alternative, simple, and durable mosquito control methods.



The mosquito's name translates to "little fly," and it has a segmented body with three pairs of long, hair-like legs, one set of wings, and long mouth parts. Iron and proteins are also required for the mosquito to develop eggs.

Mosquitoes carry and transmit a wide range of illnesses to people, such as dengue, malaria, yellow fever, and others.

Kingdom: Animalia
Phylum: Arthropoda
Class: Insecta
Order: Diptera
Family: Culicidae .

By using repellents, you can prevent mosquito bites. The proliferation of synthetic insect repellents on the market is causing an increase in adverse effects, including coughing, discomfort, and breathing problems.

Herbal components are used to make mosquito repellents, which helps to reduce the harmful effects of the marketed product. Among the plants that repel mosquitoes are camphor, benzoin, lemon balm, garlic powder, lavender, holy basil, and cinnamon oil. Among the many health benefits of neem are its antifungal, antibacterial, antiviral, and anti-diabetic qualities. Neem also provides protection from mosquito bites .

Mosquito repellent:

Mosquito repellent is often known as "bug spray". Applying repellents to the skin's surface helps shield the body from mosquito bites. You can avoid mosquitoes by wearing light-colored clothing and using a fan with increased ventilation. Adult mosquitoes are managed with hand and van-mounted foggers .

Many plant oils, smokes, tars, and other compounds have been used as insect repellents and insect killers since ancient times. Only four repellents worked well before World War II: neem oil, which was discovered in 1931 and Rutgers 612 was introduced in 1939; citronella oil, which was occasionally used as a hair treatment for head lice; dimethyl phthalate, which was discovered in 1929; and indalone, which was patented in 1937.

Types of Mosquito repellent:

The mosquito repellents are divided into many groups. They can be classified as chemical or herbal repellents, depending on the source. Moreover, based on how they behave, they may be grouped. Insecticides classified as repellents work by discouraging insects and other pests from developing a poisonous or lethal reaction. Included in insecticides are compounds known to induce disturbances upon contact, such as neurotoxins. They lose consciousness when their brain systems come into touch with mosquito and insect neural systems .

Plant based repellent:

Because of their greater structural variation, natural products have proven to be a richer supply of molecules for the development of therapeutic treatments than synthetic compounds. Natural products, which have long been important sources of bioactive molecules, will continue to play a significant role in the development of novel medications. Since ancient times, people have protected themselves against various Anopheles species by applying plant-based repellents to oneself. Traditional plant knowledge is helpful for creating new all-natural repellents rather than ones that rely on chemicals. Numerous studies conducted worldwide have revealed that plant extracts or essential oils has the capacity to deter malaria vectors. This extensive study set out to determine the effectiveness of plant-based insect repellents against Anopheles mosquitoes. secure for the surroundings,

Classification of Mosquito repellent:

1. Physical method of Mosquito repellent:

The physical techniques used to repel mosquitoes help to avoid mosquito bites. Emptying the stagnant water into buckets, rain gutters, plastic covers, old tires, and other containers is one practical method of keeping mosquitoes away. It is really alluring. Regular water changes are necessary to prevent mosquitoes from finding the ideal spot to lay their eggs in bird baths, fountains, pools, rain barrels, etc. once a week or more. Additionally, you ought to dress in long sleeves, particularly in the morning and evening. To further keep mosquitoes out of the house, the screens on the doors and windows need to be repaired. Coils, mosquito nets, and other commercially available repellents fall under this category

2. Mechanical methods of Mosquito repellent:

It was well known that mosquitoes were drawn to yellow light rather than white, and that this difference might be used to make a mechanical insect repellent. Mechanical mosquito repellents include the Electric Mosquito Zapper, Mosquito Magnets, and other methods. a Power The Mosquito Zapper uses UV light to catch mosquitoes, and when the insects come into contact with a lethal electric charge, it kills them.

3. Chemical method of Mosquito repellent:

By offering the best personal insect-seeking protection, chemical repellents help prevent and limit insect-borne illness outbreaks such as measles, Lyme disease, dengue fever, bubonic plague, West Nile fever, etc.

4. Natural method of Mosquito repellent:

Natural Mosquito Repellents: The prevention of vector-borne illnesses in persons and communities has been greatly aided by the use of natural chemicals that have been demonstrated to possess insecticidal or repellent qualities. People and mosquitoes have coexisted in close proximity since the dawn of human civilization. To protect ourselves against mosquito bites and illnesses carried by vectors, people have made use of natural resources. Since ancient times, these all-natural insect repellents have been developed and marketed, and they have helped advance personal safety methods.

5. Synthetic method of Mosquito repellent:

synthetic mosquito repellents Plant-based repellents have been around for a while, but they

still have certain disadvantages. Because they have undergone extensive testing, plant-based insect repellents have been shown to have a lesser environmental effect than synthetic repellents. Conversely, it appears that these natural repellents' efficacy wears off more swiftly and for a shorter duration. These products need to be used often and only provide temporary protection. Some drawbacks include strong odor, skin discomfort, and possible health risks. They weren't routinely tested for toxicity, either. Most importantly, the cost of these repellents is sometimes exorbitant.

Incense:

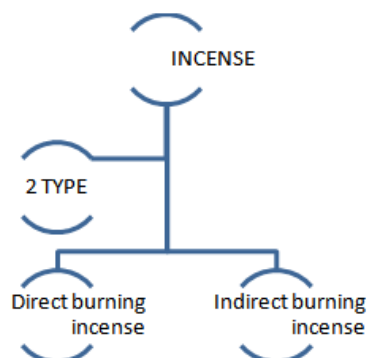
Incense is an aromatic organic substance that releases fragrant smoke when burned. The word can be used to describe the material or the aroma. Incense has several uses, including ceremonial, medicinal, aesthetic, and meditative. It may also be used as a simple deodorant and insect repellent. Incense is made of aromatic plant parts that are often combined with essential oils. Depending on the underlying culture, incense may take on several forms, and these forms have changed over time as a result of developments in technology and rising consumption.

In recent years, the worldwide market for incense and incense sticks has grown. The leading exporters and consumers of incense and incense sticks, respectively, are the USA, Brazil, China, and India. Typically, the smudge is made using fragrant substances, a combustible binder combined with material. There are several resources accessible, which, either together or alone, have been used for incense from the beginning of time. Woods that smell good is one type of substance. Plants, essential oils, and resins



Classification of incense sticks on the basis of burning:

Depending on its size and shape, the burning incense might be categorized into two main groups. There are two methods to burn incense: directly and indirectly.



1. Indirect incense burning sticks:

"Non-flammable incense" is a mixture of aromatic materials, such as resins. They execute, not include combustible substances that need different fuels to burn. These fragrances come in a variety of varieties. Length of time the material's surface burns. Because they have a larger surface area than heavier or coarser fragrances, which have smaller surface areas, the more delicate scent components tend to burn more quickly.

2. Direct incense burning sticks: Direct burning incense is sometimes referred to as "combustible incense" since it is ignited immediately by fire. In the absence of an external heat source or flame, the incense burner's

Shining embers will keep smoldering. For direct burning, incense is either compressed, crushed into a building, ejected, or coated in a supporting material. This kind of fragrance is made using an odorless adhesive and an aromatic finely powdered (or liquid) fragrance ingredient on a moldable substrate.

Advantages:

1. It is chemical free as compared to synthetic repellents.
2. Prevent causation of diseases like malaria, dengue, fever etc.
3. Do not cause any skin irritation.
4. Easily available.
5. Cost effective.

6. Pleasant.
7. Environmental-friendly.
8. Repel other bugs.
9. Peace of mind.
10. No allergic reaction.

DRUG PROFILE

1. Neem powder:

Scientific Name: *Azadirachta indica*

Family: Meliaceae

Chemical constituents: -

- a. Azadirachtin: Exhibits antimicrobial properties, helping to repel mosquitoes.
- b. Nimbin: Offers anti-inflammatory and antifungal effects.

2. Rose water:

Scientific Name: *Rosa damascena*

Family: Rosaceae

Chemical constituents: -

Phenylethanol: provide the characteristic fragrance of rose

geraniol: another effective mosquito repellent found in rose oil

3. Camphor powder:

Scientific Name: *cinnamomumcamphora*

Family: Lauraceae

Chemical constituents: -

Terpenes: are the largest among Plants Secondary Metabolites and have been increasingly studied for their potential as insecticidal control agents

Alcohol: Geraniol is a type of alcohol used as a fragrance or flavor. It's from plant oils like citronella, lemongrass, and rose. As an ingredient in mosquito repellent, it's known to be effective for 2 to 4 hours, depending on the

4. Clove powder:

Scientific Name: *Syzygiummaticum*

Family: Myrtaceae

Chemical constituents: -

Eugenol: pesticidal Uses: While Eugenol is most often used as a mosquito repellent,

β-Caryophyllene: β-caryophyllene oxide and vetiver oil), with proven mosquito-repellent properties, were combined to enhance repellent efficacy.

5. Cow dung powder:

Chemical constituents: -

Nitrogen: Mosquitoes become sluggish in the cold at far warmer temps than -195C (-320F) and

probably will be killed instantly upon contact with liquid nitrogen

Carbon: Activated charcoal obtained from agro-waste coconut shells can be used as an alternative filler in industrially manufactured mosquito stick,

6.starch

Scientific Name: Polymeric carbohydrate

Family : Gramineae

Chemical constituents: -

Amylose: bamboo sticks with Citronella, Lemongrass, eugenol, binding agent

Formulation table:-

Serial no.	Name of ingredients	Quantity taken (gm)
1.	Neem	30gm
2.	Rose water	10ml
3	Camphor	4.5gm
4.	Clove	4.5gm
5.	Cow dung	45gm
6.	Honey	5ml
7.	Water	As per q.s.

Method:

- In a mixer, all of the dried herbs were ground into a fine powder before being sieved (mesh no. 80).
- If the powder is not very fine, there will be issues with binding and burning.
- 20 incense sticks required a total of 100g of powder premix
- Tables 1 provide of the amount of material taken.
- The fine powder was diluted with water gradually until it had the consistency of dough.
- It should be well combined and not too watery to avoid difficulties while producing sticks.
- Rolling the dough by hand in tiny batches on unadorned bamboo sticks required dividing the dough into parts .
- in the shade.. Large-scale production can use a machine to complete this.For 24 hours, the sticks

were dried

9.Rose water was used to fragrance the dried incense sticks.

10.Finally, sticks were stored after being packed in an appropriate material, preferably plastic

Evaluation parameter:

1.Appearance :

Colour:Brownishcolour

Odour:

2.Smock toxicity test: A test of smoke toxicity was carried out in a chamber . next grownup In the 30minutes following their discharge into the chamber, mosquitoes were exposed to the smoke from burning incense sticks. Every 10minutes, the mortality data were recorded.There were 12 mosquitoes employed in all.



Figure:dead mosquito

3.feed back from 20 volunteers:

The feedback of mosquito repellent incense sticks were taken from 20 volunteers.

Parameters	Excellent	Good	Average	Poor					
1.Product elegance	12	8	-----	-----					
2.Mosquito repellancy	15	5	-----	-----					
3.Odor of incense stick	12	8	-----	-----					
4.Allergy	-----	-----	-----	-----					
5.Product satisfaction rating of 1 to 5 score	3	-----	-----	-----					

(Average)									
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Result and Discussion:

Sr no.	Colour	Odour	Mosquito Repellancy	Allergy related issue					
1.	Brownish	Rose smell	Excellent	No issue					
2.	Brownish	Rose smell	Good	No issue					
3.	Brownish	Rose smell	Good	No issue					

II. CONCLUSION:

The incense sticks made of herbs are quite effective at keeping mosquitoes away and do not have any unfavorable side effects. The stick compositions provide a more pleasant scent than the commercial product. The incense sticks were inexpensive, practical, and risk-free to use. Because it's portable, people of all ages may use it with ease. Because herbals emit a pleasant aroma and deter mosquitoes, it is highly recommended to utilize them in the construction of mosquito-repelling incense sticks. The commercially available treatment includes a number of negative effects, such as respiratory problems, coughing, sneezing, and eye pain.

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