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Formulation And Evaluation Of Poly Herbal Neem Mosquito Repellent Inscence Sticks

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Abstract

This study addresses environmental and health issues related to chemical mosquito repellents. It aims to develop a safe, chemical-free, affordable, and easily produced mosquito repellent using Azadirachta indica, a plant known for its potential as a natural insect repellent. The increasing demand for effective, non-toxic, environmentally friendly, and biodegradable mosquito repellents underscores the relevance of this research. Mosquito repellent incense stick is designed to produce smoke that keeps mosquitoes and other insects away using natural or chemical ingredients with an unpleasant scent for these pests. It burns slowly, releasing fragrant smoke that deters insects while also adding aroma to the environment.

Keyword : Mosquito repellent incense stick used to Azadirchta indica, cinnamon,camphor Rose , cow dung,and its uses .

Introduction

Mosquitoes are troubling blood-sucking insects that transmit diseases like Dengue, Malaria, and Yellow fever, affecting over 700 million people and causing more than one million deaths annually. Controlling mosquitoes is a significant public health issue. Many commercial mosquito repellents can be harmful to humans, prompting a study to develop effective plant- based alternatives. These repellents deter mosquitoes by masking human scent or using odors that mosquitoes typically avoid, as they are attracted to substances like carbon dioxide and lactic acid found in sweat.Mosquito repellent incense sticks are utilized for outdoor activities such as camping, gardening, and barbecuing, as well as indoors in mosquito-prone areas. They provide a natural, smoke-based option compared to chemical sprays or lotions, and are appreciated for their ease of use, long-lasting effects, and pleasant scents..

Over 700,000 people die each year from vector-borne diseases, which constitute over 17% of all infectious diseases, primarily caused by mosquitoes. These insects spread various illnesses, including Chikungunya, Dengue fever, Malaria, Lymphatic filariasis, Rift valley fever, Yellow

fever, and Zika. In 2017, India reported 157,220 dengue cases and 250 deaths due to mosquito-borne diseases, with Karnataka having the highest chikungunya cases at 31,644. The Culicidae family of mosquitoes includes over 300 species responsible for diseases such as malaria and dengue. While synthetic chemical larvicides are commonly used for mosquito control, they can be harmful to humans, animals, and plants, and resistance to these chemicals poses challenges. Researchers are now exploring natural compounds to inhibit mosquito larvae and act as repellents.

Mosquito Life cycle

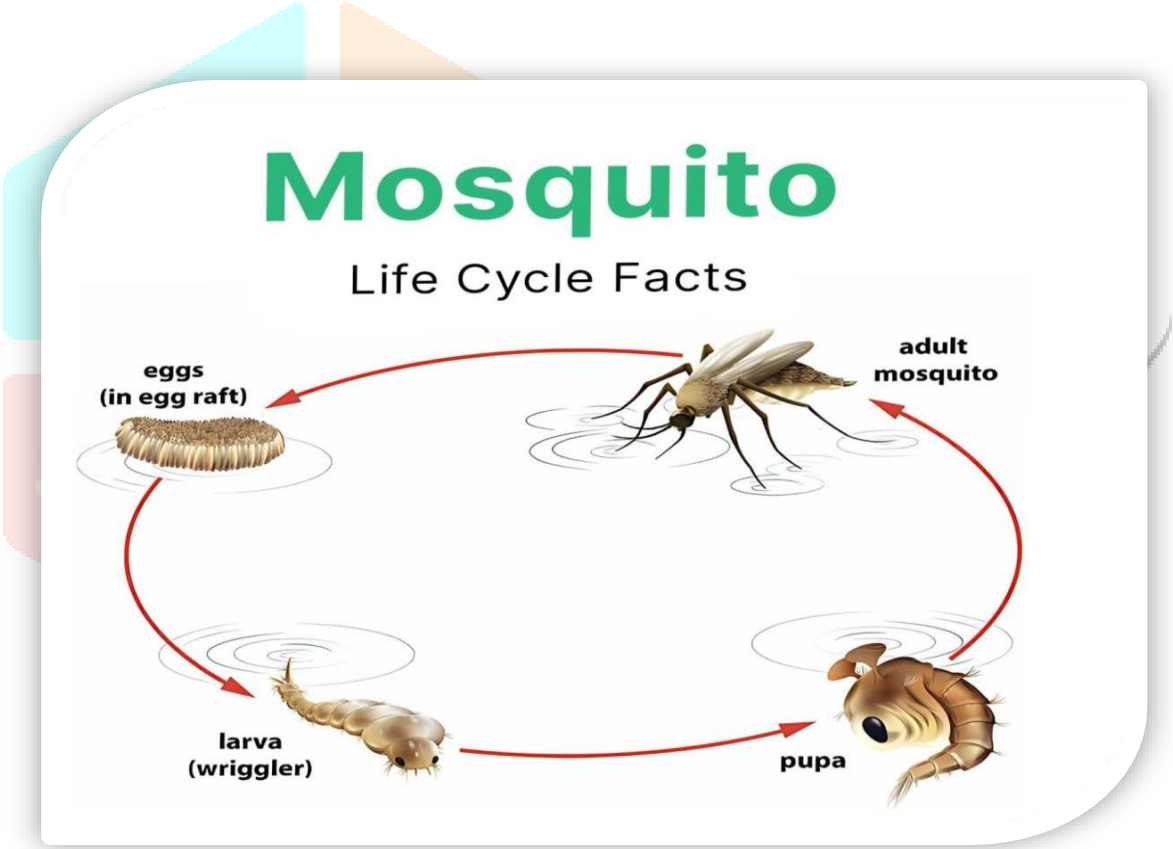
Mosquitoes go through four stages: egg, larva, pupa, and adult. Eggs:

Laid in water or moist areas near water.

Larvae: Live in water, feeding on organic matter. Pupae:

Non-feeding stage, developing into adults.

Adults: Emerges from the pupal stage and can fly, bite, and reproduce.



Mosquitoes typically live for 1 to 2 months on average, with females living longer than males, and some species can even live for several months, especially during colder periods when they enter a dormant state.

Male mosquitoes:

Generally live for about 6 to 10 days, primarily feeding on nectar and not biting humans.

Female mosquitoes:

Can live for a few weeks to several months, depending on factors like temperature, humidity, and species.

Anatomy of Mosquito

Mosquitoes are small insects with three main body parts: the head, thorax, and abdomen. The head contains sensors to locate hosts for feeding and has two eyes with lenses sensitive to movement. Their feathery antennae can detect human carbon dioxide from a distance of about 100 feet, while the maxillary palps near the antennae sense odors from human sweat. The proboscis, located between the antennae, is used to pierce skin and suck blood. The thorax, which continues from the head, has a pair of wings and six legs equipped with tiny claws for grip. The abdomen contains the stomach and lungs. Both male and female mosquitoes feed on plant juices, but only females bite humans for blood after mating, as they need proteins for egg maturation.

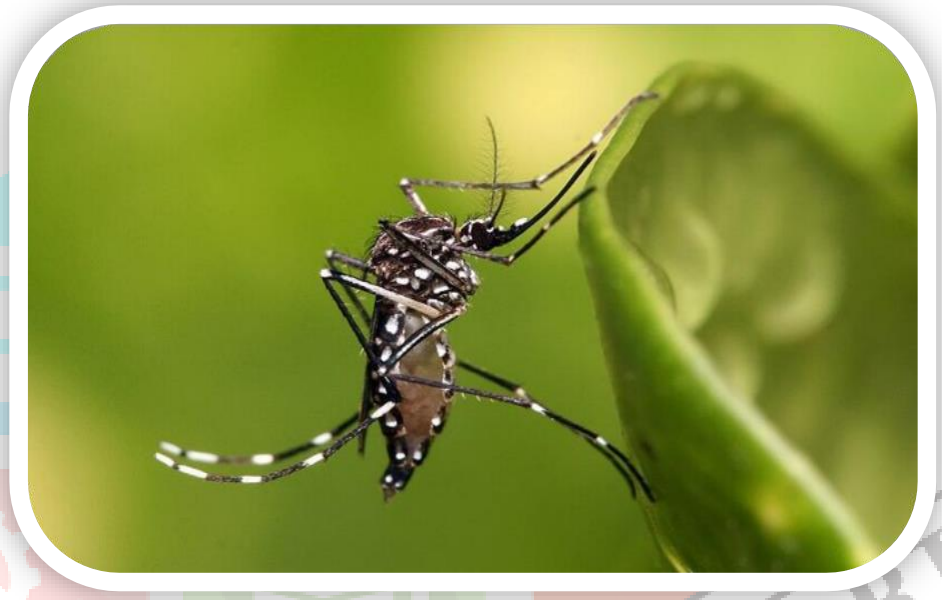


Fig . Mosquito

The term “mosquito” refers to a “little fly.” Mosquitoes have segmented bodies, three pairs of long, hair-like legs, one set of wings, and long mouthparts. To produce eggs, they require proteins and iron. The itching sensation after a bite is caused by their saliva. Mosquitoes are responsible for spreading several diseases to humans, including dengue, malaria, and yellow fever.

Kingdom : Animalia Phylum

: Arthropods Class: Insecta

Order : Diptera Family :

Culicidiae

Mosquito repellents can prevent bites, but many synthetic versions cause negative side effects like breathing issues and discomfort. To mitigate these impacts, herbal ingredients are being used in repellents. Effective herbs include camphor, benzoin, lemon balm, garlic powder, lavender, holy basil, and cinnamon oil. Neem, known for its medicinal benefits and properties such as antifungal and antibacterial effects, also provides protection against mosquito bites.

Incense

Incense is a fragrant biological material that produces aromatic smoke when burned. It can refer to either the substance itself or its scent. Incense is used in ceremonies, therapy, meditation, and for aesthetic reasons, and it can also serve as an insect repellent or deodorant. Typically made from aromatic plant components and essential oils, incense varies in form based on cultural influences and has evolved with technological advancements.

The global market for incense and incense sticks has grown significantly, with the USA, Brazil, China, and India being the leading exporters and consumers. Smudge blends typically consist of aromatic components combined with a flammable binder. Various materials, including fragrant woods, essential oils, plants, and resins, have been historically used for incense production.

1. **Neem**

Name of plant: -Azadirachta indica Synonym: -

Margosa

Vernacular Name: - Neem

Botanical name t: -Azadirachta indica

Synonym: - Margosa Vernacular

Name: - Neem

Botanical Name: - Azadirachta indica

Biological source: - Neem consists of the fresh or dried leaves and seed oil of Azadirachta indica

J. Juss (Melia Indica or M. Azadirachta Linn.). Family: -

Meliaceae.

Geographical source: - It is found in India, Pakistan, Sri Lanka, Malaya, Indonesia, Japan, Tropical region of Australia and Africa. In India, it is found in Uttar Pradesh, Maharashtra, Tamil Nadu, Rajasthan, and M.P.

Morphological Character: - Neem trees are attractive broad-leaved evergreens that can grow up To 30 m tall and 2.5 m in girth. Their spreading branches form rounded crowns as much as 20 m Across. They remain in leaf except during extreme drought, when the leaves may fall off.

Microscopical Character:- The transverse section showed outer dark reddish brown rhytidoma Consisting of 10 to 15 rows of outer most dark brown colored cells of cork, and a narrow band of stone cells lying underneath this followed by outer few rows of parenchyma and inner wide 20 to 25 rows of dark orange brown colored phloem tissue

Main use

Refreshing Aroma

Burning Neem dhoop can help Cleanse the Environment. Help

Reduce the Presence of Microbes in the Air

Aroma of Citronella is believed to have Stress-Reducing Properties

Antibacterial,

Antifungal, Antiviral,

Antidiabetics,

Mosquito repellent

Cinnamon bark

Synonyms : Cinnamon bark

Biological sources: It consists of dried inner bark of shoots tree of *cinnamomum zeyianicum* nees

Family: Lauraceae

Geographical source: Native from Shrilanka and India Jamaica and Brazil.

Uses Antioxidant Type 2

Diabetes

Infertility treatment Youthful skin

Treat viral infection Weight

Management Anto clotting

Brain health

Rose Water

◇ Kingdom:Plantae
◇ Clade:Tracheophytes
◇ Clade:Angiosperms
◇ Clade:Eudicots
◇ Clade:Rosids
◇ Order:Rosales
◇ Family:Rosaceae
◇ Subfamily:Rosoideae
◇ Tribe:Roseae
◇ Genus:Rosa L.
◇ Division: Tracheophyta
◇ Synonyms:
• Hulthemia Dumort
• .×Hulthemosa Juz. (Hulthemia × Ro
◇ Binomial name : Syzygium aromaticum

Use Antibacterial,

Antifungal, Antiseptic,

Antidepressants,

Anti- inflammatory.

Camphor Powder

Camphor is originally a white and oily resin of the tree Cinnamommum camphora. Its crystals are also widely available in the market. It has been used for generations as an effective repellent of mosquitoes and ants.

- **Kingdom:Plantae**
- Clade:Tracheophytes
- Clade:Angiosperms
- Clade:Magnoliids
- Order:
- Family:Lauraceae
- Genus:Camphora
- Species:C. Officinarum
- Binomial name: Camphora officinarum
- Synonym: Laurus camphora L.
- Persea camphora (L.) Spreng.
- Cinnamomum camphora (L.) J.Presl.
- Camphora officinalis Steud.
- Camphora camphora (L.) H. Karst.

Uses

Insect repellant, Bug repellant

Cow dung

Cow dung contains various beneficial microbes such as Saccharomyces, Lactobacillus, Bacillus, and Streptococcus, along with dietary components like cellulose, lignin, and essential minerals and vitamins. It is used for waste digestion in urban settings and hospitals and serves as a source for fibrous materials in paper production. Recent innovations include natural mosquito repellents and cow dung toothpaste, which promote oral health. The resource is both cost-effective and environmentally friendly, demonstrating anti-bacterial and anti-fungal properties. It has been found effective in treating skin conditions like psoriasis and eczema and can kill Mycobacterium TB and malarial parasites, as well as exhibit anti-fungal agent

Paraffin Wax

Paraffin wax can be used as a combustion aid to make mosquito repellent incense sticks easier to ignite and burn, often applied to the ignition part of the stick.

Formulation Table Experimental Work .

Sr. No	Name of Ingredients	Quantity Taken (gm).
1	Neem Powder	5 gm
2	Cinnamon Powder	2.25 gm
3	Camphor	4.3 gm
4		

M

.

.

. T

. Mix the neem powder , camphor ,cow dung and paraffin wax are properly mixing

. Added to a distilled water and to form a damp mass of ingredient

. Required tstick o 50 gm of powder premix 10 incense

. Rolling the dough by hand i tiny batches on underned bamboo stick Required

. Rose water was used to fragrance the dried incense stick

. Finally the product performed

Formulation and Evaluation

Physical appearance Colour :

Brownish colour **Smock Toxicity**

A smoke toxicity test was conducted in a chamber where 12 mosquitoes were exposed to smoke from burning incense sticks. The mosquitoes were observed for 30 minutes following their introduction to the chamber, and mortality data were recorded every 10 minutes.

Burning of Users

The test involved selecting mosquitoes in the evening and night while noting public feedback on mosquito repellent effectiveness. The incense sticks F1 and F2 were evaluated for side effects, including irritation, coughing, and tearing, which were .

Behaviour of the mosquito s when incense stick were burned

Behaviour of the mosquito	7 pm to 8 pm	8 pm to 9 pm	9 pm to 10 pm
Mosquito freely moving in the net	3	0	0
Number of mosquitos aligned on the net	14	10	2
Mosquito struglling for life	3	1	1
No movement and lying on floor	4	12	19

Result and Discussion

Sr. No	Colour	Odour	Mosquito Repellency	Allergy related issues
1	Brownish	Rose smell	Excellent	No issue
2	Brownish	Neem smell	Good	No issue
3	Brownish	Neem smell	Good	No issue

Conclusion

Herbal mosquito-repelling incense sticks are highly effective and safe, with no negative side effects. They produce a pleasant fragrance that surpasses that of commercial options. These sticks are economical, portable, and suitable for all age groups. The use of herbal ingredients is recommended, as they effectively repel mosquitoes while providing a nice scent. In contrast,
commercial mosquito repellents may cause various side effects such as eye discomfort, coughing, sneezing, and respiratory problems.

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