ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 10| Issue: 11| November 2024|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2024: 8.402|| ISI Value

# FORMULATION OF POLYHERBAL ESSENSE STICK TO REPEL INSECTS

**Ishwari N. Takle[1]*, Avinash G. Wagh[2], Ashwini Shelke[3], Dr. Swati. Rawat [4], Dr. Sunil S. Jaybhaye[5]**

*[1]Students of Institute of Pharmacy Badnapur*
*[2]Department of Pharmaceutics, Faculty of Institute of Pharmacy Badnapur*
*[3]Department of Communication Skills, Faculty of Institute of Pharmacy Badnapur*
*[4]Principal Institute of Pharmacy Badnapur*
*[5]Department of Quality Assurance, Faculty of Institute of Pharmacy Badnapur*

## ABSTRACT

*Currently the use of synthetic mosquito repellent chemicals has several issues related to environment and human health. This project was formulated and developed to have safer mosquitorepellent free from carcinogenic chemicals and are significantly cheaper and simple to develop. Dried powdered herbs like clove, cow dung, camphor, guggul, neem leaves were used to make mosquito repellent formulation. The powdered blend were mixed with binders and additives like charcoal powder. The solid formulation was rolled in the form of incense sticks.The incense stickswhen ignited releases vapours with a pleasant fragrance and herbs which repels the mosquitoes. The incense sticks was tested for its potency by burning near the for feedback and were deemed to be very effective in controlling the mosquitos. mosquito net cage with sufficient mosquitoes. The sticks also distributed to random peoples*

**KEYWORDS:** *Neem Leaves , Clove , Charcoal , Guar Gum , Camphor , Guggul ,Saw Dust , Lemon Extract*

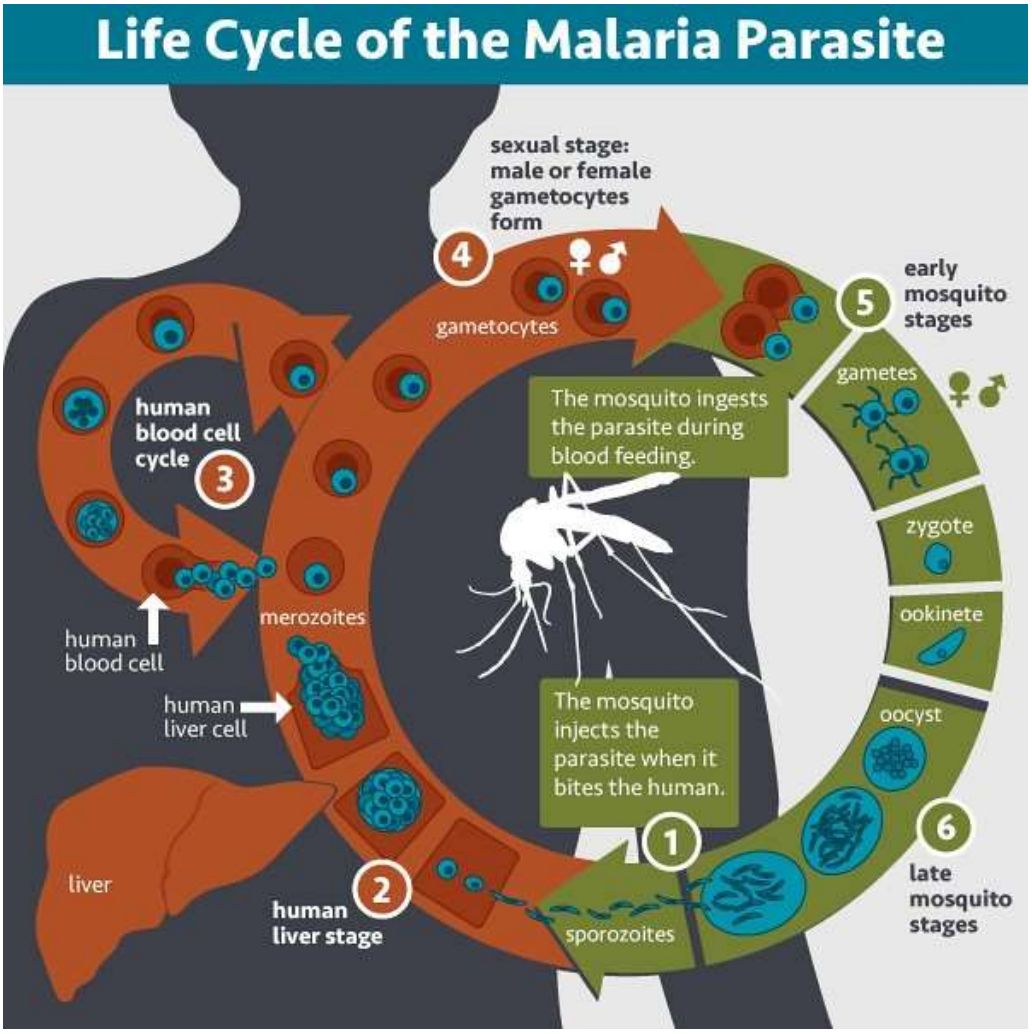
## INTRODUCTION

- Mosquitoes are most irritating and blood sucking insect disturbing human beings.Some of the mosquito species which belongs to genera Anopheles,Aedes and Culex are known to be vectors for the most of the disease pathogens like Malaria,Dengue,Fever etc.In Malaria the female Anopheles mosquito carries the malarial parasite.
- The four different species of protozoa causes Malaria namely Plasmodium falciparum, Plasmodium vivax, Plasmodium ovale and Plasmodium malariae.
- It is the leading cause of premature mortality and caused more than half a million deaths according to the and the death rate has increased to one million as of 2018, according to the American Association of Mosquito control.
- Symptoms are high fever and chills.
- Dengue fever is an acute mosquito transmitted disease which is characterized by fever, headache, joint and muscle pains, skin rash, nausea followed by vomiting. The causative organism of Dengue Fever is arbovirus and is spread by genus Aedes mosquitoes.
- Some of the infections in Dengue are Haemorrhagic Fever, Shock Syndrome which can threat the patient's life by increased vascular permeability which leads shock. Over the pasttwenty years, there has been global increase in the frequency of Dengue Fever incidence.
    - Several factors which are responsible for the resurgence of dengue epidemic are:

i. Uncontrolled population growth
ii. Urbanization
iii. Improper waste management
iv. Improper water supply
v. Increased mosquitoes
vi. Improper mosquito control

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 10| Issue: 11| November 2024|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2024: 8.402|| ISI Value

**MALARIA CYCLE**

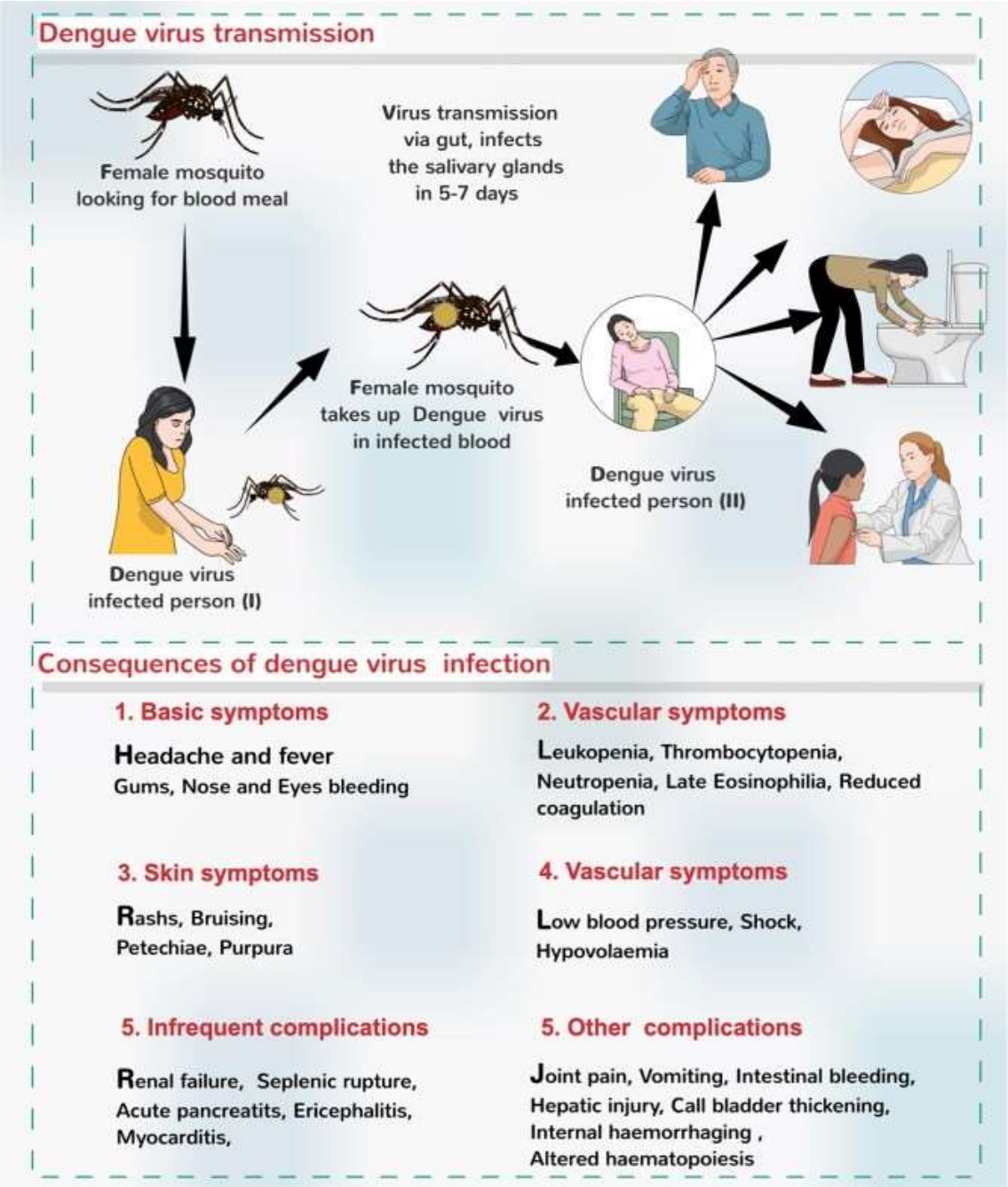



**[Fig No.1]**

- This diagram outlines the key stages of the dengue cycle involving both humans and Aedes mosquitoes. Keep in mind that the dengue virus has four serotypes, and recovery from one serotype provides immunity only to that specific serotype, increasing the risk of severe disease upon infection with a different serotype.

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 10| Issue: 11| November 2024|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2024: 8.402|| ISI Value

## DENGUE CYCLE



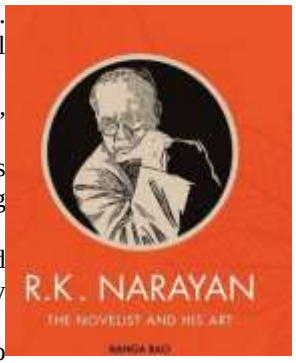

**[Fig no.2]**

- Dengue is transmitted through the bite of infected Aedes mosquitoes, primarily Aedesaegypti.
- Preventing mosquito breeding by eliminating stagnant water, using mosquitorepellentsand wearing protective clothing can help reduce the spread of dengue.

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 10| Issue: 11| November 2024|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2024: 8.402|| ISI Value

## HISTORY

- Ancient civilizations used various natural substances to repel mosquitoes. In ancient Egypt,people burned various plants like myrrh and frankincense to deter mosquitoes. In India, neem leaves and oil were utilized for their insect-repelling properties. In ancient China, citronella was burned as a mosquito deterrent.
- Native American tribes in North America used plants like sage and sweetgrass for their mosquito-repelling properties. Additionally, some Native American tribes used smudge sticks made from herbs like sage, cedar, and sweetgrass, which were burned to create smokethat acted as a natural insect repellent.
- These ancient methods laid the foundation for the development of modern mosquitorepellents. Today, we've refined and synthesized these natural ingredients into various commercial repellents.
- A simple man with lofty ideals, a visionary in the truest sense of the word, Sri N. Ranga Rao, displayed exceptionalentrepreneurial traits, since an early age.
- He had his share of troubles and hurdles in his formative years, but used them to hone his business and life skills. Before long, he dreamed of founding an incense stick manufacturing company, and envisaged it as a leading company in the country.
- The prolific businessman gave wings to his dream with thelaunch of Mysore Products and General Trading Company in 1948. His vision stemmed from the conviction that "Quality backed by services will pay.
- Within months of its inception, the business grew satisfactorily. It was time for brand Cycleto be born. Committed to quality, Cycle had a series of firsts in the incense manufacturing history. Cycle was the first company to obtain design copyrights to make an exciting rangeof incense sticks, cones.
- In order to create exquisite fragrances in the perfumery industry, the company set up its ownin-house fragrance creation workshop.
- Despite the heights of success that the Company went on to reach, Sri Ranga Rao remainedgrounded. He stayed devoted to the wellbeing of those around him, and committed to doingthe right thing.




## INDIAN HISTORY

In India, the use of natural substances for mosquito repellent dates back thousands of years.Here are some key points in the history of mosquito repellents in India:

- **Neem :** Neem (Azadirachta indica) has been a central ingredient in traditional Indian medicine for centuries. It is known for its insecticidal and repellent properties. Neem leaveswere often used in various forms to ward off mosquitoes. Additionally, neem oil was appliedto the skin as a natural repellent.
- **Tulsi (Holy Basil) :** Holy basil (Ocimum sanctum) is another plant with insect-repelling properties. In India, it's considered sacred and is commonly grown around homes. Burning dried tulsi leaves was a method used to create a natural mosquito-repelling smoke.
- **Camphor (Kapoor) :** Camphor (Cinnamomum camphora) has a strong aroma that repels mosquitoes. It's commonly used in households, especially during religious ceremonies. Kapoor, as it's known in Hindi, is often burnt to create a mosquito-free environment.
- **Cow Dung :** In rural areas, burning cow dung cakes was a traditional method to keepmosquitoes away. The smoke produced was believed to act as a natural repellent.
- **Sandalwood:** Sandalwood (Santalum album) has a fragrance that is known to repel insects. In India, sandalwood paste was often applied to the skin, and its aromatic qualities helped deter mosquitoes.
- **Clove :** Clove oil (Eugenia caryophyllata) has mosquito-repelling properties and wassometimes used in various formulations to create natural insect repellents.
- **Turmeric :** Turmeric (Curcuma longa) has been used in Indian households for various purposes, including as an insect repellent. It was often mixed with other substances to createeffective natural repellents.

These traditional methods were based on the knowledge of local flora and their properties. Over time, some of these natural ingredients have been incorporated into modern mosquito repellent formulations. While synthetic repellents are widely used today, these traditional remedies still hold cultural significance in many parts of India.

## MOSQUITO REPELLENT

A mosquito repellent is a substance or product designed to deter or prevent mosquitoes from landing on or biting humans or animals. It typically works by emitting a scent or creating a barrierthat mosquitoes find unappealing, thereby discouraging them from approaching. Mosquito repellents come in various forms, including sprays, lotions, creams, candles, coils, and electronic devices, and they may contain natural or synthetic ingredients that have been proven to repel mosquitoes. These products are commonly used to reduce the risk of mosquito-borne diseases and provide protection against irritating mosquito bites.

Mosquito repellents are substances that prevent mosquitoes from being in an environment. There are various types of synthetic mosquito repellents used in the market; these are manufactured on a large scale by industries. They are widely used and are very popular.

However, there are various drawbacks to these mosquito repellents. The ingredients used in themare harmful for the humans as well as the environment.

Harmful ingredients in synthetic herbal repellents Synthetic herbal repellents have a number of harmful ingredients, which are harmful to the health of human beings when inhaled or ingested, and are harmful to the environment either during the

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 10| Issue: 11| November 2024|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2024: 8.402|| ISI Value

process of manufacture or during the use of these mosquito repellents in the average Indian household.

Aerosols- Many mosquito repellents are in the form of aerosols that release their content in the airwhen the coil of the machine of the repellent is heated. Aerosols can be toxic to the cardiovascularsystem and can have several nervous system side effects such as tremors and convulsions. In addition, aerosols with a pleasant fragrance can contain several harmful chemicals like xylene andformaldehyde that are carcinogens. Aerosols are also known to harm the environment

**Organic Mosquito Repellent**

An organic mosquito repellent is a type of insect repellent made from natural and non-synthetic ingredients. It is formulated using substances derived from plants, herbs, or other organic sourcesand typically does not contain synthetic chemicals or artificial additives. Organic mosquitorepellents work by harnessing the natural repellent properties of these botanical ingredients to determosquitoes from approaching and biting. They are often considered environmentally-friendly andmay be preferred by individuals seeking alternative options to conventional repellents that containsynthetic compounds. It's important to note that while organic repellents are generally consideredsafer for the environment, their effectiveness may vary depending on the specific formulation andconcentration of active ingredients.

**HERBAL DRUGS**

Herbal drugs in pharmacy refer to medications derived from plants or plant extracts, used for theirtherapeutic properties. These drugs often contain one or more active ingredients obtained from herbs and have been used traditionally for medicinal purposes. They can be available in various forms such as capsules, tablets, extracts, teas, or tinctures, and are utilized to treat various health conditions.

| DRUGS | ORIGIN | USES |
|---|---|---|
| CLOVE | Clove comes from the dried flowerbuds of the clove tree (Syzygiumaromaticum) | Clove oil is known for its mosquito-repelling properties, and it is sometimes used in natural mosquito repellents. The high concentration of eugenol, a compound found in clove oil, is believed to be responsible for its insect-repelling effects |
| NEEM | Neem is obtained from the neem tree (Azadirachta indica). Different parts of the neem tree, such as its leaves, seeds, and bark, are used to extract various beneficialcompounds. | Neem is known for its ability to repel mosquitoes and other insects. It is used in various forms, such as neem oil or neem-based formulations, to create natural and eco-friendlymosquito repellents. |
| CAMPHOR | Camphor is derived from the woodof camphor trees, primarily the Cinnamomum camphora species. | Camphor is sometimes used as an ingredient inmosquito repellents dueto its strong and distinctodor, which mosquitoesfind repulsive. |
| GUGGUL | Guggul, also known as Commiphora wightii or Indian bdellium, originates from the resin produced by the Mukul myrrh tree. | It's believed to have anti-inflammatory properties and is used to treat conditions like arthritis and lipid disorders |
| COW DUNG | Cow dung, as a natural substance, comes from the excrement of cows. | To create smoke, and itis believed that the smoke may help repel mosquitoes to some extent. |
| CHARCOAL | Charcoal is derived from the incomplete burning of wood, peat, coconut shells, or other organic materials | In the context of mosquito control, the burning of charcoal or specific types of wood might produce smoke, which can deter mosquitoes due to the smoke's impact on their sensory receptors |
| SAWDUST | Sawdust powder is a byproduct of cutting, grinding, or sanding wood. It originates from the process of machining or processing wood, resulting in small particles or powder composed of wood fibers and dust. | Certain aromatic woods or herbs, when mixed with sawdust, can act as natural mosquito repellents |
| LEMON | Lemon peel extract is obtained from the outer layer or zest of lemons, the citrus fruit. Lemons (Citrus limon) | Lemon peel extract is another natural ingredient that can be used in mosquito repellents. It contains citronella oil, which has known insect-repelling properties |
| GUAR GUM | Guar gum is derived from guar beans, which come from the guar plant (Cyamopsis tetragonoloba). This plant is primarily grown in India and Pakistan | Guar gum's versatile properties make it valuable in a range of applications, contributing to its widespread use in various industrial sectors. |

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 10| Issue: 11| November 2024|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2024: 8.402|| ISI Value





**FLAVOURING AGENT**

**Camphor** : Use its incense to give a boost to morale and cleanse the energies of your livingor working place.

**Neem** : Is conventionally using for air hygiene.

**Clove** : Antioxidant

**Guggul** : Performing spiritual rituals, prayer, meditation, spa and aromatherapy

**INGREDIENT USE**

**Cow dung** : Cow dung removes mental stress and provides peace to the mind

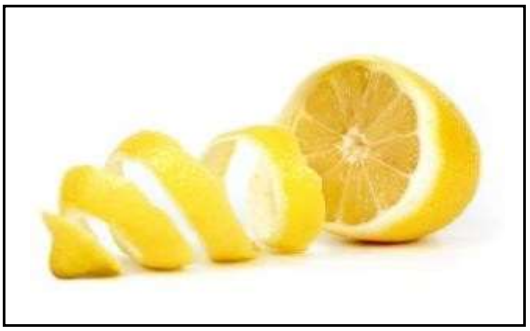
**Saw dust powder** : It does not affect the smell that you have added to your incense sticksuse asburning agent

**Neem** : Use as burning agent **Charcoal** : Use as burning agent

**Guar gum** : Use as a binding agent

**Lemon peel extract** : Use as a binding agent











## PRINCIPLE

Organic mosquito repellents operate on similar principles to conventional repellents, but they exclusively use natural, non-synthetic ingredients derived from plants, herbs, or other organic sources. Here are the key principles behind organic mosquito repellents:

1. **Natural Active Ingredients :** Organic repellents use naturally occurring substances such as essential oils, plant extracts, and botanicals. These ingredients often possess inherent insect- repelling properties.
2. **Aromatic Deterrence :** Many organic repellents work by emitting scents that mosquitoes find unappealing or confusing. These natural scents mask or disrupt the chemical signals that attract mosquitoes to potential hosts.
3. **Biochemical Disruption :** Certain organic compounds can interfere with the mosquito's sensory receptors or neurological functions, making it harder for them to locate and bite a host.
4. **Camouflage and Barrier Formation :** Organic repellents can create a protective barrier on the skin, making it more challenging for mosquitoes to land and feed. This barrier can be in the formof a lotion, cream, or oil.
5. **Plant-Based Repellent Properties :** Many plants produce compounds that naturally repel insects to protect

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 10| Issue: 11| November 2024|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2024: 8.402|| ISI Value

themselves from herbivores. Organic repellents leverage these plant defenses todeter mosquitoes.

6. **Non-Synthetic Formulations :** Organic repellents are formulated without synthetic chemicals, artificial fragrances, or additives. This makes them a preferred choice for individuals seeking natural and eco-friendly alternatives.
7. **Environmentally-Friendly :** Organic repellents are often considered safer for the environment,as they do not introduce synthetic chemicals into ecosystems.
8. **Potential Variability in Effectiveness :** The effectiveness of organic repellents may vary depending on factors such as the specific natural ingredients used, their concentration, and individual factors like skin type and activity level.

It's important to note that while organic repellents are generally considered safer and more environmentally-friendly, their effectiveness can vary. It's recommended to choose products withproven natural repellent properties and consider factors like concentration and formulation for optimal results.

## METHODOLOGY

All the dried herbs were finely powdered in a mixer and.The powder should be very fine orelse there will be problems in the binding and burning. Total 100 grams of powder premix taken to prepare 20 incense sticks.

Water was gradually added to the fine powder until it attains dough like consistency. It should bewell mixed and not too watery dough otherwise it creates problem in making sticks.

The dough was divided in portions and was rolled by hand in small quantities on plain bamboosticks.

The sticks were dried for 24 hours under shade. Tray dryer can also be used to dry the sticks faster.

## ADVANTAGES

**Natural Ingredients :** These products often contain natural ingredients, which can be less harmfulto the environment and human health compared to synthetic repellents.

**Potentially Effective :** Some herbal ingredients, like neem, or lemon are known for theirmosquito-repelling properties.

**Pleasant Fragrance :** Many polyherbal repellents have a pleasant fragrance, making them more appealing than chemical-based repellents.

**Environmentally Friendly :** Using natural ingredients can be more eco-friendly, as it may havea lower impact on the environment.

**Suitable for Sensitive Skin :** These products may be gentler on sensitive skin compared to some chemical-based repellents.

## EVALUATION TEST

1. **Field Testing :** Conduct field tests in areas with mosquito activity. Compare the performance of the Polyherbal stick with a control group (without repellent) to assess its ability to repel mosquitoes.
2. **Duration of Protection :** Measure how long the repellent remains effective. Note the duration between application and the onset of mosquito bites.
3. **User Feedback :** Collect feedback from individuals using the Polyherbal essence stick. Ask about their experience, including any instances of mosquito bites and overall satisfaction with theproduct.
4. **Safety Assessment :** Evaluate the product for any adverse effects on the skin. Ensure that the concentration of herbal extracts is safe and does not cause irritation or other side effects.\
5. **Comparative Analysis :** Compare the Polyherbal stick with existing commercial repellents containing proven ingredients. Assess its efficacy in repelling mosquitoes compared to establishedproducts.
6. **Repellent Spectrum :** Determine the range of mosquitoes the essence stick is effective against.Some repellents may target specific species, so understanding the spectrum of protection is crucial.
7. **Long-Term Studies :** Consider conducting long-term studies to assess the product's effectiveness over extended periods and potential habituation effects.
8. **Environmental Impact :** Assess the environmental impact of the Polyherbal essence stick, ensuring that its production and use are sustainable and eco-friendly.
9. Remember to conduct tests under various conditions to gather comprehensive data on thePolyherbal mosquito repellent essence stick's performance and safety

## CONCLUSION

- Those we can finally estimate that aroma, odour of essence stick can have healthcare effect on human body
- A through literature survey was carried out before the development of mosquito repellent incense sticks. Plants have mosquito repellent activity like neem, camphor and lemongrass oil was selected, powdered and made the incense sticks by adding binders. The incense sticks are subjected for evaluation by using mosquito net cage method and the results were very satisfactory in repelling the mosquitos.
- The feedbacks of the product were also satisfactory when given to 20 people and the product satisfaction rating score given was 4 out of 5. The product also tested for any allergysymptoms when used and there is no such allergic symptoms like discomfort, sneezing, wheezing were reported. Overall the product is safe to use and have significant mosquito repellent activity.

## RESULT

- Pollyherbal essence stick was found to be effective in manner of effect odour and activity

## REFERENCES

1. *Makhaik M., Naik SN., Tewary DK. Evaluation of anti-mosquito properties of essential oils. J Sci Ind Res 2005; 64: 129-133.*
2. *Mohomed AA., Tarek IAAM., Zarrag IAA. Larvicidal and*

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 10| Issue: 11| November 2024|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2024: 8.402|| ISI Value

*repellent effect of some Tribulus terrestris L., (Zygophyllaceae) extracts against the dengue fever mosquito, Aedes aegypti (Diptera: Culicidae). J Saudi Soc 2012; 20: 13-16.*

3. *Karunamoorthi K, Ilango K. Larvicidal activity of Cymbopogon citratus (DC) Stapf. and Croton macrostachyus Del. Against Anopheles arabiensis Patton (Diptera: Culicidae), the principal malaria vector. Eur Rev Med Pharmacol Sci. 2010;14 (1):57– 62.*
4. *Chaiyakunapruk N., Kongkaew C., Sakunrag I., Tawatsin. Effectiveness of citronella preparations in preventing mosquito bites: systematic review of controlled laboratory experimental studies. Tropical Med Int Health 2011; 16: 802- 810.*
5. *Gupta A., Oswal RJ., Patel EK. A Review On: Mosquito RepellentMethods Int J Pharm Chem Biol Sci 2012; 2: 310-317.*
6. *Pandey DM., Rani N., Vidyarthi AS., Wany A. Study of Citronellaleaf based herbal mosquito repellents using natural binders. CurrRes Microb Biotechnol 2013; 1: 98-103.*
7. *Scott RR., Tawatsin A., Techadamrongsin Y., Thavara U., WrattenSD. Behavioral responses of Aedes aegypti, Aedes albopictus, Culex quinquefasciatus, and Anopheles minimus against various synthetic and natural repellent compounds. J Vector Ecology 2001;26: 76-82.*
8. *Snodgrass, R. (1959). The anatomical life of the mosquito.Washington: The Smithsonian Institution.*
9. *Klowden MJ. Blood, sex, and the mosquito. Bioscience. 1995 May1;45(5):326-31.*
10. *Gubler DJ. Resurgent vector-borne diseases as a global health problem. Emerging infectious diseases. 1998 Jul;4(3):442.*
11. *Pradhan SS., Patel RK. Preparation of low cost Herbal Mosquito Repellent from Begunia Leaf, Rourkela National Institute of Technology 2014; 1-25.*
12. *Fornadel CM, Norris LC, Glass GE, Norris DE. Analysis of Anopheles arabiensis blood feeding behavior in southern Zambia during the two years after introduction of insecticide-treated bed nets. Am J Trop Med Hyg. 2010;83(4):848–853.*
13. *Karunamoorthi K, Husen E. Knowledge and self-reported practice of the local inhabitants on traditional insect repellent plants in Western Hararghe Zone, Ethiopia. J Ethnopharmacol. 2012;141(1):212–219.*
14. *E.J. Mavundza, R. Maharaj, J.F. Finnie, G. Kabera, J. Van Staden*
15. *An ethnobotanical survey of mosquito repellent plants in Mkhanyakude district, KwaZulu-Natal province, South Africa J Ethnopharmocol, 137 (2011), pp. 1516- 1520*
16. *S. Phasomkusolsil, M. Soonwera Insect repellent activity of medicinal plant oils against Aedes aegypti (Linn.), Anophelesminimus (Theobald) and Culex quinquefasciatus Say based on protection time and biting rate Southeast Asian J Trop Med Public Health, 41 (2010), pp. 831- 840*
17. *A.K. Mishra, N. Singh, V.P. Sharma Use of neem oil as mosquito repellent in tribal villages of Mandla district, Madhya Pradesh Indian J Malariol, 32 (1995), pp. 99- 103*
18. *N.G. Das, D.R. Nath, I. Baruah, P.K. Talukdar, S.C. Das Field evaluation of herbal mosquito repellents J Commun Dis, 31 (2000), pp. 241-245*
19. *Y. Young-Cheol, L. Eun-Hae, L. Hoi-Seon, L. Dong-Kyu, A. Young-Joon Repellency of aromatic medicinal plant extracts and a steam distillate to Aedes aegypti J Am Mosq Control Assoc, 20 (2004), pp. 146-149*
20. *N.G. Das, Sunil Dhiman, P.K. Talukdar Synergistic mosquito- repellent activity of Curcuma longa, Pogostemon heyneanus and Zanthoxylum limonella essential oils J of Infection and Pub Health Vol 8, Issue 4, July–August 2015, pp 323-328*