

FORMULATION AND EVALUATION OF MOSQUITO REPELLENT CREAM BY CITRONELLA OIL

Vasanthan.A^{*1}, Senthil Kumar. K.L^{*2}, Gokulan.P.D^{*3}, Vinoth.S^{*4}

^{*1}Associate Professor, Sri Vijay Vidyalaya College Of Pharmacy, Tamilnadu, India.

^{*2}Associate Professor, Sri Vijay Vidyalaya College Of Pharmacy, Tamilnadu, India.

^{*3,4}B.Pharm Students, Sri Vijay Vidyalaya College Of Pharmacy, Tamilnadu, India.

DOI : <https://www.doi.org/10.56726/IRJMETS53265>

ABSTRACT

Mosquitoes are one of the deadliest insects in the world which cause number of vector-borne diseases (e.g Dengue, malaria, Zika virus fever, yellow fever, Japanese encephalitis) in human being. Today's market is flooded chemical based mosquito repellent which were proved harmful & poisonous effects. The purpose of this study was to determine the herbal mosquito repellent activity of plant components like Eucalyptus globulus used to create safe and effective herbal mosquito repellent cream formulation. Ingredients used in the formulation were herbal based & ecofriendly. Since, it has no side effect. The formulated cream was evaluated that is non irritant and suitable for skin. Same formulations were evaluated for irritancy study, physical appearance, and stability etc. The present study demonstrates the potential for using essential oils from medicinal plants in mosquito repellent formulations.

Keywords: Citronella Oil, Double Boiler Method, Mosquito Repellent Activity, Cream Evaluation.

I. INTRODUCTION

Mosquito have been known to human for many decades and are little flies that transmit a variety of disease through their saliva. The majority of anopheles species are parasite carriers and cause disease and death. Several mosquito species from the genera Anopheles and Aedes serve as vectors for pathogens that cause diseases such as Dengue fever, Malaria, Yellow fever, Japanese Encephalitis and other infections. Malaria is the major cause of death. According to the WHO child dies from malaria every 30 seconds and 300 to 500 million cases of malaria occurred each year. Natural herbal mosquito repellents are non-toxic, effective, eco-friendly, biodegradable cheap and prepared. Some of essential oils include Citronella globulus found that an effective time of repellency strongly depended on the concentrations, experiment designs and mosquito species.

II. MOSQUITO REPELLENT

Insect repellent compounds have been employed to displace or kill insects since antiquity, when various plant oils, smokes, tars and other substances were used. There were only four main repellents accessible before citronella oil, which was sometimes used as a hair remedy for head lice, dimethyl phthalate, which was found in 1929, Indalone, which was patented in 1937 and Rutgers, which was marketed in 1939. The latter three components were combined into a military composition known as at the onset of World War II six parts dimethyl phthalate, two parts Indalone and two parts Rutgers. During the war, other military repellent formulas for use on garments were created, but they all failed to provide the protection that military soldiers stationed around the world required. Many of these plants are herbs and shrubs often considered as weeds. The use of herbs as mosquito or other insect repellents has been incorporated in many cultural rituals of these ethnic groups from time immemorial. Taking traditionally knowledge about certain plants has been selected processed and produced to prepare herbal mosquito repellent. The essential oil of the leaves of "CITRONELLA GLOBULUS".

Plant extracts or essential oils have been found to repel malaria vectors in numerous investigations all over the world. The goal of this systematic evaluation was to see if plant-based insect repellents were efficient against Anopheles mosquitoes. Some plants' essential oils and extracts could be used to create environmentally safe repellents against Anopheles species. Plant oils, which are reasonably safe, affordable, and widely available in many regions of the world.

III. MATERIALS AND METHODS

The selection of the herbal plant was based on their availability as raw materials scientific and literature evidence then used as a mosquito repellent. Citronella oil, Neem oil, Jasmin oil, bees wax, baking soda, rose oil were collected from the best scientific industries pvt.Ltd, Dharmapuri.

PLANT PROFILE

1. CITRONELLA OIL Taxonomical classification Genus : Citronella

Family: Myrtaceae Kingdom : Plantae

Order : Myrtales Phylum : Magnoliophyta Class : Magnoliopsida **Uses**

- It is used as a mosquito and insect repellent.
- Relieves stuffy nose.
- Clears respiratory complaints.
- It has anti-inflammatory properties that help to ease your joint and muscle pains.

EXCIPIENTS PROFILE

1. NEEM OIL

Taxonomical classification Genus : Azadirachta indica

Family : Areceaceae Kingdom : Plantae Order : Arecales

Phylum : Angiospermae Class : Liliopsida

Uses

- Protect Your Skin From UV Rays
- Increase Your Metabolism
- Improve Your Dental Health
- Relieve Skin Irritation and Eczema.

2. JASMIN OIL

Uses

- Moisturizing skin
- Wound healing
- Reducing skin itching
- Preventing or minimizing the appearance of scars.

3. BEES WAX Genus : Apis Family : Apidae

Uses

- Beeswax are used as thickeners, emulsifiers and as stiffening agents in cosmetics and moisturizing agent.
- Beeswax has been used since prehistory as the first plastic, as a lubricant and waterproofing agent.

4. BAKING SODA **Uses**

- It may help reduce bacteria that causes acne when applied topically
- Fight skin infection.

5. ROSE OIL **Uses**

- It is a natural humectant, meaning it helps to keep the skin hydrated
- It moisturizes the skin
- It helps exfoliate and brighten skin.

IV. FORMULATION

DOUBLE BOILER METHOD

- Melting the beeswax, Neem oil over low heat in china dish by double boiler. Heat the distilled water to almost boiling, remove from heat and stir in the baking soda in beaker.

MIXING

- Pour water phase slowly into oily phase while mixing with hand blender.
- Immediately turn white color emulsification.

ADD ACTIVE INGREDIENT

- Immediately place pan in an ice water bath in the sink.
- Add essential oil (CITRONELLA OIL) and rose oil for general mosquito repellent formulation.

FORMING THE CREAM

- Mix occasionally until evenly and completely cooled.

STORAGE

- Place into the jar labeled well and closed jar tightly.

INGREDIENTS OF THE PREPARED HERBAL MOSQUITO REPELLENT CREAM

S.NO	INGREDIENTS	QUANTITY
1.	Citronella oil	6ml
2.	Neem oil	10ml
3.	Jasmin oil	3ml
4.	Beeswax	6gm
5.	Baking soda	3gm
6.	Rose oil	3ml
7.	Distilled water	10ml

V. EVALUATION

1. IRRITANCY STUDY

The formulated cream shows no redness, edema, irritation and inflammation during studies. The formulated cream is safe to use.

2. PHYSICAL APPEARANCE

The cream observed by its

- Color - White
- Odour - Pleasant
- Texture - Smooth

3. DETERMINATION OF PH

The pH of the cream was found to be in range of 5.6 to 6.8 which is good for skin pH. The herbal formulation was shown pH nearer to skin required i.e pH 5.5.

4. HOMOGENITY

The appearance and touch of the cream were good.

5. SPREADABILITY

The spread ability test showed that the formulated cream has good spreadable property.

6. STABILITY TESTING

The formulated mosquito repellent cream was stable in normal condition temperature. The over heating causes melting the cream.

7. WASHABILITY

The cream applied on skin was easily removed by washing with tap water.

8. TEST FOR MICROBIAL GROWTH

There was no signs of microbial growth after 24 hrs of incubation at 37°C and it was comparable with the control.

9. DYE TEST

The disperse globules appears colorless in the red ground i.e. w/o type cream.

10. PHASE SEPARATION TEST

In this evaluation test oily and watery phase cannot be separated.

VI. CONCLUSION

To observe the prepared mosquito repellent cream were formulated and evaluated. From the present study, it can be concluded that the cream prepared from Citronella globulus are repel mosquitoes effectively. Citronella oil and other excipients are safe, effective and have good repelling property. It necessary that the cream should be formed slowly and capable to repel the mosquitoes from skin for a long period of time. Therefore it can be recommended a suitable mosquito repellent cream.

VII. REFERENCES

- [1] Malati R. Salunke, Sonu C. Bandal, Dinesh Choudhari, Tejaswini Gaikwad, Mahima Dubey, Review of Herbal mosquito repellent, IJSDR2203029, ISSN: 2455-2631, March 2022.
- [2] Ranasinghe, Nipuni & Arambewela, Lakshmi & Samarasinghe, S. (2016). DEVELOPMENT OF HERBAL MOSQUITO REPELLENT FORMULATION 10.13140/RG.2.2.17857.25443.
- [3] Prudêncio M. (2020). In Fairness to Mosquitoes. Trends in parasitology, 36(11), 876– 877. <https://doi.org/10.1016/j.pt.2020.08.003>
- [4] Sheethal Bhat, & Hariprasad Shetty. (2023). Formulation and evaluation of Herbal Mosquito Repellent in two forms used in folklore practise. Journal of Ayurveda and Integrated Medical Sciences, 8(3), 37 - 41. <https://doi.org/10.21760/jaims.8.3.6>
- [5] Archana B. Chavhan, Akshata A. Jain, and Swati G. Patil, "Formulation of Economically Affordable Herbal Mosquito Repellent Sticks," International Research Journal of Pharmacy and Medical Sciences (IRJPMS), Volume 5, Issue 6, pp. 5-7, 2022.
- [6] Chaudhari Datta Manjaba, JETIR2206A06 Journal of Emerging Technologies and Innovative Research (JETIR).
- [7] Jeong, W.Y., Kwon, M., Choi, H.E. et al. Recent advances in transdermal drug delivery systems review. Biomater Res 25, 24 (2021).
- [8] Shaikh Asif Ayub, Vol-9 Issue-1 2023, IJARIIE-ISSN(O)-2395.
- [9] Ma, D & Bhattacharjee, Apurba & Gupta, R & Karle, J. (1999). Predicting mosquito repellent potency of N,N-diethyl-m-toluamide (DEET) analogs from molecular electronic properties. The American journal of tropical medicine and hygiene. 60. 1-6. [10.4269/ajtmh.1999.60.1](https://doi.org/10.4269/ajtmh.1999.60.1).
- [10] Suryajeet H Pawar, Abhijit B Patil, Prasad D Namewar, e-ISSN 2320 -7876 www.ijfans.org Vol.11, Iss.11, 2022.
- [11] Daizy Batish., Research gate 256(12):2166-2174, 2008.
- [12] Bhupen Kalita., International Journal of Research Development Pharmacy Life Sciences 3(1) ,741-741,2013.