

Preparation and Evaluation of Mosquito Repellent Gel

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Abstract— A mosquito repellent is a substance applied to skin, apparel, or other shells to help mosquitoes from wharf or smelling on them.

The current study is concentrated on creating and testing a polyherbal mosquito repellent gel that uses excerpts from Lemongrass, Rosemary, and Shankpushpi. A phytochemical test showed the presence of important active composites. Alkaloids were set up in Lemongrass and Rosemary, while terpenoids, flavonoids, tannins, and phytosterols were detected in all three excerpts, suggesting they may have remedial and nonentity- repelling rates.

I. INTRODUCTION

Mosquito- borne conditions are a big concern for public health encyclopedically, especially in tropical and tropical areas.

Conditions like malaria, dengue, chikungunya, and Zika contagion spread through mosquitoes, which makes controlling these conditions a major challenge. Although chemical- grounded repellents are generally used, there are worries about long- term health pitfalls, skin vexation, and environmental goods from using synthetic composites. Because of this, there's a growing interest in natural druthers that are both effective and safe for everyday use.

Herbal excerpts are known for their wide range of bioactive composites that offer antimicrobial, anti-inflammatory, and nonentity- repelling goods.

In this study, Lemongrass, Rosemary, and Shankpushpi were named because of their traditional and scientific support for these parcels. Lemongrass is known for containing citronellal and geraniol, which are natural mosquito repellents. Rosemary has essential canvases and terpenoids that help repel insects and reduce oxidative stress. Shankpushpi, while substantially used for cognitive benefits, also contains useful secondary metabolites.

The phytochemical analysis of the excerpts verified the presence of composites similar as alkaloids, flavonoids, tannins, terpenoids, and phytosterols.

These substances are believed to be responsible for the gel's natural exertion, including its capability to repel mosquitoes. Combining multiple herbal excerpts may lead to a synergistic effect, enhancing the overall effectiveness of the product. The gel was made using Carbopol 934, glycerine, triethanolamine, and distilled water to insure it's stable, easy to apply, and safe for the skin.

The thing of this exploration is to produce and assess a polyherbal gel with repellent parcels, with a focus on both its physical characteristics and how well it works.

Several factors similar as appearance, pH position, spreadability, density, and washability were tested to determine the product's quality. The effectiveness of the gel in repelling mosquitoes was also estimated to insure it works as intended. This approach fits with the rising demand for natural and environmentally friendly options in particular care and nonentity protection products.

Aim: Formulation and Evaluation of Mosquito Repellent

II. OBJECTIVES

To provide protection against mosquitoes that transmit diseases such as malaria, dengue, chikungunya, and yellow fever.

To address the issues related to neurotoxicity caused by chemical-based synthetic mosquito repellents.

To minimize the side effects like itching, dizziness, and skin rashes that are often associated with synthetic repellents.

To utilize citronella and eugenol, which are found in lemongrass and clove essential oils respectively, to mask the host's attractants such as carbon dioxide,

lactic acid, body odor, and body temperature, which mosquitoes rely on to locate their hosts.

To create a mosquito repellent gel using essential oils from herbs like lemongrass, neem, clove, basil, and camphor, which have proven mosquito repellent properties.

To formulate effective and not toxic mosquito repellents using herbal ingredients.

Advantages

It is convenient and easy to apply

It is safe and Natural.

Mosquito repellent cream is easy to use.

It is Aromatic.

Relieves itch and irritation.

Preventing mosquito bites.

Reducing the risk of diseases.

Protection from bites.

III. METHODOLOGY

Collection of Herbs :-

Extraction of Oils from Herbs

Collect the essential parts of herbs such as leaves, buds, and bark.

Use coconut oil as the base solvent.

Heat the coconut oil on a water bath at a constant temperature, approximately 75 degrees Celsius.

Carefully add the fresh essential parts of the herb into the coconut oil while it is on the water bath.

Boil the mixture at a constant temperature until the leaves turn brown in color.

The leaves or any other part of the selected herbs contain active compounds such as eugenol, limonene, citronella, and linalool.

Due to the boiling process, these active compounds dissolve into the base solvent oil, resulting in a characteristic aroma.

Use a funnel to strain the oil and a spoon to extract the remaining oil from the leaves.

Discard the leftover parts of the leaves.

Transfer the extracted oil to a suitable container.

Preparation Of Herbal Extract

Solvent Extraction (Maceration)

This is the most common method for creating tinctures or liquid extracts using alcohol (ethanol) or

water. Ethanol is often preferred as it extracts both polar and non-polar bioactives effectively.

Preparation: * Wash and shade-dry the leaves of Tulsi, Neem, and Lemongrass for about 4 days to preserve active ingredients. Grind the dried cloves into a coarse powder.

Process: * Place the powdered herbs in a glass jar.

Cover with a solvent (e.g., 70–90% ethanol or a glycerin-water mix).

Cold Extraction: Let it sit for 4–12 weeks in a cool, dark place, shaking daily.

Hot Extraction (Infusion): Heat the mixture gently (40–50°C) for 30–60 minutes for a faster result, then filter.

Camphor Integration: Camphor is highly soluble in alcohol. It should be powdered and added directly to the final filtered extract.

Steam or Hydrodistillation :-This method is best for obtaining essential oils and hydrosols (herbal waters), particularly from Lemongrass and Clove.

Process: * Place the fresh or dried plant material in a distillation still.

Hydrodistillation: Submerge the herbs in water and bring to a boil; the steam carries the volatile oils through a condenser where they are collected.

o Steam Distillation: Pass steam through the herbs (not submerged) to vaporize the oils. This typically yields a broader spectrum of compounds.

Preparation Of Sample

weigh accurate all ingredients . take a 1ml of neem oil in beaker then add lemongrass oil of 3 ml in which. then add clove powder 1.5 mg in which sample. then add basil leaves extraction 2 ml in which sample . they add camphor leaves extract oil 1 ml in which sample . then add carbopol as a gelling agent take a required quantity . then this sample heat on 75 degree temperature and stir it slowly for 5 minutes .then after this sample transfer in suitable container

Evaluation And Results

Organoleptic characteristics :- The prepared gel formulation was evaluated for various parameters like colour, odor, texture, and any possible phase

separation by visual observation. Pressing a small quantity of the cream on the finger and thumb gives an idea about its texture and homogeneous nature.

Colour evaluation :- Colour evaluation has been tested by visible examination by using a black and white background and any change has been observed for change in colour. Odour evaluation :- Odour of the ointment has been tested with the three volunteers for more accurate observation.

Texture evaluation :- The prepared gel was found to be Smooth and no greediness is observed.

pH determination :-The pH of various formulations was measured using a digital pH meter. A 0.5g sample of each cream was dissolved in 50ml of distilled water, allowed to sit for 2 hours, and then tested.

Washability :-Washability was assessed by applying a small amount of gel to the hand and then rinsing with tap water.

Irritancy test:- The irritancy test involved applying the gel to a marked area on the dorsal surface of the left hand. The area was monitored for signs of irritancy, redness (erythema), and swelling (edema) at regular intervals over 24 hours.

Spreadability :-The spreadability of the herbal gel was measured by timing how long it took for two glass slides, with the cream in between, to separate under a 30g weight. The slides were scraped clean of excess cream, and the time taken for the upper slide to slip off was recorded. Spreadability was calculated using the formula: Spreadability = (weight × length) / time .

Viscosity :-Viscosity was measured using a Brookfield Viscometer with a helipath stand. A 10g sample was allowed to acclimate for 5 minutes before measuring the dial reading using a T-D spindle at various speeds (10-100 rpm). Measurements were taken in triplicate at room temperature, and viscosity values in centipoises were calculated by multiplying the dial readings with the corresponding coefficients from the viscometer catalogue

IV. CONCLUSION

The study concludes that herbal mosquito repellent gel can serve as an effective and economical substitute for synthetic mosquito repellents. The formulation demonstrated good stability, favorable physical properties, and significant mosquito

repellent potential. The study highlights the pharmaceutical importance of herbal formulations in modern healthcare applications. Natural products continue to attract attention due to their therapeutic effectiveness and reduced adverse effects. This project demonstrates the practical application of herbal ingredients in topical dosage forms. The study concludes that herbal mosquito repellent gel can serve as an effective and economical substitute for synthetic mosquito repellents. The formulation demonstrated good stability, favorable physical properties, and significant mosquito repellent potential. The study highlights the pharmaceutical importance of herbal formulations in modern healthcare applications. Natural products continue to attract attention due to their therapeutic effectiveness and reduced adverse effects.

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