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A Review of clove oil gel Preparation for the treatment of Scabies

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Abstract

The skin, the body's largest organ, performs essential functions such as protecting against environmental hazards, regulating temperature, and enabling sensory perception. In topical drug delivery, the primary obstacle is the stratum corneum, which drugs must traverse to reach deeper skin layers or enter systemic circulation. Drugs with low solubility or short half-lives are particularly well-suited for transdermal delivery, taking advantage of the skin's permeability. Natural oils, derived from plant sources like leaves, fruits, flowers, seeds, bark, and roots, have gained attention for their ability to enhance drug penetration. These oils offer benefits due to their biocompatibility, penetration-enhancing properties, and capacity to integrate within the skin. Unlike synthetic chemical enhancers, which may carry toxicity risks, natural oils and their bioactive components—such as lipids, flavonoids, and terpenes—are generally safer and provide additional therapeutic effects, including anti-inflammatory activity.Transdermal delivery using natural oils also overcomes limitations associated with oral administration, such as gastrointestinal degradation and the need for taste masking or protective coatings. This highlights the potential of natural oils as a safer, multifunctional approach to drug delivery. Continued research into the extraction, characterization, and application of these oils could pave the way for innovative therapeutic strategies, offering effective alternatives to conventional oral medications and expanding the possibilities for treating a wide range of diseases

Keywords: *Natural products for scabies Sarcoptes scabiei, acaricidal agents, dosage forms for scabies , Synthetic products for scabies*

Introduction

Clove

In response to these concerns, research efforts are increasingly focused on innovative strategies to combat bacterial infections beyond conventional antibiotics. Approaches such as bacteriophage therapy, antimicrobial peptides, probiotics, and the use of plant-derived compounds offer promising avenues for reducing reliance on traditional drugs. Additionally, improved stewardship practices, enhanced surveillance of resistance patterns, and the integration of novel technologies in drug discovery are essential to slow the spread of resistance. Together, these measures can help safeguard public health, ensure food safety, and support sustainable agricultural systems while addressing the urgent need for effective antimicrobial solutions. [1]

Beyond their physicochemical diversity, essential oils are widely recognized for their broad spectrum of biological activities, which are largely attributed to the synergistic interactions among their constituent compounds. These bioactive components, including terpenes, terpenoids, phenolics, and aldehydes, contribute to antimicrobial, antioxidant, anti-inflammatory, and preservative properties. As a result, essential oils have gained increasing attention in pharmaceutical, food, cosmetic, and agricultural applications, particularly as natural alternatives to synthetic additives and antimicrobial agents. [2-3]

This growing interest in essential oils is driven by consumer demand for safer, more sustainable, and naturally derived products, as well as concerns over the adverse effects associated with synthetic chemicals. Their multifunctional properties make EOs particularly attractive for incorporation into food systems, pharmaceuticals, and complementary medicine. However, challenges such as variability in chemical composition, stability, potential toxicity at high concentrations, and regulatory considerations must be carefully addressed to ensure their effective and safe application [4-5]

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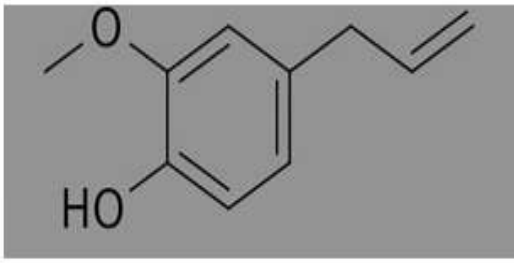
Clove



Structure of Eugenol

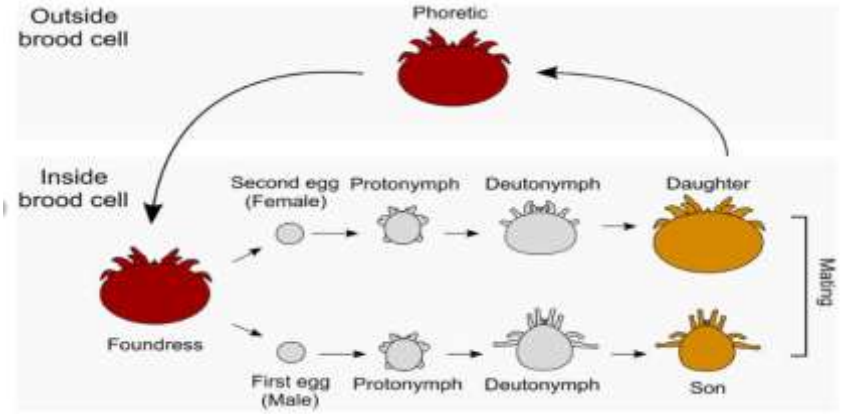
Their broad industrial adoption is supported by ongoing research aimed at optimizing extraction methods, improving formulation stability, and enhancing efficacy through encapsulation and controlled-release technologies. Such advancements not only expand the functional potential of essential oils but also facilitate their integration into modern industrial processes, reinforcing their role as versatile, value-added natural resources. [6-7-8]

Scabies

Identified Sarcoptes scabiei as the causative agent of scabies, establishing the disease as a parasitic infestation rather than a humoral disorder This discovery marked a significant milestone in dermatology and parasitology, providing the foundation for understanding the transmission, clinical manifestations, and subsequent development of targeted therapeutic approaches for scabies. linked symptoms to the mite, describing its parasitic nature, disease progression, treatments, and possible transmission routes. Today, scabies affects individuals across all races and social strata, with notable occurrences in settings requiring prolonged care such as hospitals, residential homes, schools, and nurseries. This disease is recognized as a global public health concern, with a significant burden in developing and endemic regions worldwide. [9-10-11]

Mite Biology and Life Cycle

The scabies mite is an obligate parasite that quickly burrows into the epidermis of human skin, typically within 30 minutes of initial contact. Once burrowed, adult mites progress through the stratum corneum at a rate of 0.5 to 5.0 mm per day, leaving feces along their path and laying eggs. These eggs hatch into larvae within 2 to 3 days, which then emerge from the burrow to mature on the skin surface. Within 10 to 11 days, female larvae develop into egg-laying adults with a lifespan of approximately 5 weeks. Adult mites, distinguishable by their eight legs, move rapidly on warm skin surfaces, capable of crawling up to 2.5 cm per minute. Off the host, scabies mites can survive for 24 to 36 hours under room conditions and up to 19 days in cooler, more humid environments. Their ability to infest a new host diminishes with time away from a human host, although adult mites can detect potential hosts using odor and thermotaxis mechanisms. [12-13]



Materials and Methods

Chemical

Ingredients:

- Clove essential oil
- Carbopol 940
- Optional: Preservative (if the gel base does not already contain one)

Equipment:

- Glass or stainless steel mixing bowl
- Stirring rod or spoon
- Measuring spoons
- Clean containers for storage

Procedure

1. **Prepare the gel base:**
   - Use aloe vera gel as the base for this preparation. Aloe vera is soothing and can help calm irritated skin, which is beneficial for scabies treatment.
2. **Dilute clove essential oil:**
   - Clove oil is potent and should always be diluted before application to avoid skin irritation or adverse reactions. Mix clove essential oil with the gel base. A safe starting point is about 10 drops of clove oil per ounce of gel base. You can adjust the concentration based on the individual's tolerance and severity of symptoms.
3. **Optional: Add Vitamin E oil:**

- Vitamin E oil not only acts as a natural preservative but also provides additional nourishment for the skin. Add a few drops (around 5 drops per ounce of gel) and mix well.

4. **Mix thoroughly:**

- Proper mixing helps maintain consistent potency and texture across the formulation. Mix the formulation thoroughly to achieve uniform distribution of the clove oil throughout the gel base.

5. **Store the gel:**

- Once prepared, the clove oil gel should be placed into a clean, well-sealed container and properly labeled. The container should be kept in a cool, dark location to help maintain the gel's stability, fragrance, and therapeutic efficacy over time.

Quality Analysis

Therapeutic Effect

Clove oil, obtained from the buds of Eugenia caryophyllata of the Myrtaceae family, is a complex blend of compounds, with eugenol, eugenyl acetate, and β-caryophyllene as its major constituents. It also contains minor components such as 2-heptanone, ethyl hexanoate, humulenol, α-humulene, calacorene, and calamenene. Studies using nanoemulsion formulations of clove oil have shown its promising potential in promoting wound healing in female albino Wistar rats. In addition to its wound-healing effects, clove oil possesses a wide range of biological activities, including antibacterial, antifungal, antitumor, antiviral, and antioxidant properties. [14-15]

Clove oil has been studied as an anesthetic for different fish species, demonstrating safety and showing no signs of immune suppression in anesthetized fish. Additionally, it is well known for its antifungal and analgesic properties, which support its traditional use as a dental remedy for toothache relief. These characteristics underscore clove oil's versatility and its potential applications in both therapeutic and veterinary settings. [16-17]

Clove oil is commercially available in products such as "Analgesico Dental," reflecting its long-established role and effectiveness in relieving toothache pain. Its enduring use in dental care highlights both its therapeutic value and consumer trust.

The wide array of bioactive compounds present in clove oil continues to position it as an important ingredient in the development of pharmaceuticals and natural health products, offering diverse applications across medical and wellness industries. [18-19]

Application:

Prior to using the clove oil gel, wash the affected area with a mild cleanser and gently pat it dry. Apply a thin layer of the gel directly onto the skin, concentrating on areas showing symptoms of scabies, including itching, redness, and rash. Massage the gel lightly until it is fully absorbed.

The gel should be used two to three times daily, or as advised by a healthcare professional, to ensure optimal relief and effectiveness. [18-19]

Precautions:

Before using the clove oil gel extensively, conduct a patch test to ensure there is no allergic reaction or skin sensitivity. Do not apply the gel to broken or inflamed skin, as this may worsen irritation. If any adverse effects occur, such as increased redness, swelling, or itching, discontinue use immediately and consult a healthcare professional if necessary. [20]

Additional Considerations:

Consultation: It is recommended to seek advice from a healthcare professional, particularly when managing scabies. They can offer guidance on appropriate treatment options and help ensure the condition is properly managed.

Complementary Measures: In addition to topical treatment, wash all bedding, clothing, and towels in hot water to reduce the risk of reinfestation. If scabies is confirmed, family members and close contacts may also require treatment to prevent further spread. [21]

Formulating a clove oil gel for scabies treatment harnesses the antimicrobial activity of clove oil along with the calming and moisturizing properties of aloe vera gel, which may help alleviate the discomfort caused by this parasitic skin condition.

To ensure both safety and effectiveness, it is essential to adhere to the recommended dilution ratios and follow proper application guidelines during use. [22]

Discussion: Clove oil gel is applied topically to harness the therapeutic benefits of clove oil presents a promising avenue for scabies treatment, particularly in regions where conventional treatments are less effective or accessible. However, further research is needed to standardize formulations, determine optimal concentrations, and assess long-term efficacy and safety.

Conclusion: In conclusion, the reviewed studies indicate that clove oil gel preparations offer a potentially effective and well-tolerated treatment option for scabies. Continued investigation and clinical trials are warranted to fully establish its role in scabies management and to address remaining questions regarding its optimal use.

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Conflicts of interest
The authors declare that there are no conflicts of interest regarding the publication of this paper.

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