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Review Article

Review On: Herbal Antifungal Cream

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ABSTRACT

Herbal antifungal creams are gaining a lot of interest as natural alternative for synthetic antifungal medicines because of their minimal side effects and possible efficacy. The purpose of this review is to give an overview of the most recent studies on herbal antifungal creams, with an emphasis on the active ingredients, modes of action, and therapeutic uses of them. Several plant-based extracts, including those from aloe vera, tea tree oil, garlic, turmeric, and neem, have shown notable antifungal effects against a variety of molds, yeasts, and dermatophytes. Through the disruption of cell membranes, inhibition of fungal cell wall formation, and interaction with fungal development, the bioactive compounds such as flavonoids, terpenes, and phenolic acids exhibit antifungal activity. In comparison to conventional antifungal drugs, this review also emphasizes the benefits of herbal antifungal creams, including their antibacterial range, reduced toxicity, and fewer side effects. But there are still issues with standardizing these medications, making sure they have the best bioavailability, and carrying out more thorough clinical trials to verify their effectiveness. Future research is crucial for enhancing the formulation and improve the therapeutic outcomes of herbal antifungal treatments.

INTRODUCTION

Fungal infections are a common dermatological issue that frequently affects the mucous membranes, skin, and nails. These infections are usually treated with antifungal drugs and can cause a variety of symptoms, such as itching, irritation, and discomfort. While conventional antifungal treatments including creams, ointments, and systemic drugs have been used widely, research into the efficacy of herbal antifungal creams has been promoted by the growing interest in natural and herbal alternatives. Plant-based ingredients with antifungal qualities are used to make herbal antifungal creams. For those looking for natural remedies because of side effect concerns, antibiotic resistance, or a personal preference for organic alternates, these creams present an

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acceptable alternative. The efficacy of active chemicals in herbs like turmeric (Curcuma longa), garlic (Allium neem (Azadirachta indica), sativum), and tea tree oil (Melaleuca alternifolia) to combat a variety of fungal infections has been evaluated. Bioactive compounds found in these herbs, such as flavonoids, phenolic acids, and terpenes, have shown antifungal action against molds, yeasts, and dermatophytes. The efficacy of herbal antifungal creams in treating common fungal diseases including ringworm (Tinea corporis), athlete's foot (Tinea pedis), and candidiasis (Candida species) has been the subject of several studies. Further study is still required for fully understanding the therapeutic potential and safety of these natural therapies, even though the results of clinical trials and in vitro investigations are promising. The overall effectiveness of herbal antifungal creams can also be impacted by the wide variations in their formulations. The purpose of this study is to assess the current research on herbal antifungal creams, going through their active components, mechanisms of action, and therapeutic results when used to treat fungal infections. The use of these herbal formulations as substitutes for traditional antifungal treatments will also be highlighted, along with any challenges and limitations. [1-5]

Active Ingredient in Herbal Antifungal Cream

Compared to synthetic drugs, herbal antifungal creams have gained attract because of their natural ingredients and promise for effective treatment with fewer side effects. The active ingredients in several herbs have been shown to have antifungal qualities, which help them combat off fungal infections. The following list includes the bioactive ingredients and effectiveness of several common herbs included in antifungal creams:

1. Neem (*Azadirachta indica*)

- Active Compounds: Nimbolide, Nimbin, Azadirachtin.
- Mechanism of Action: Neem has antibacterial, antifungal, and antiinflammatory qualities. It functions by reducing inflammation at the sites of infection and preventing the growth of fungal infections.
- Common Uses: Effective against Dermatophytes, Candida, and various yeasts.[6]
- 2. Tea Tree Oil (Melaleuca alternifolia)
- Active Compounds: α-terpinene, γ-terpinene and Terpinen-4-ol.
- Mechanism of Action: Tea tree oil's broadspectrum antibacterial qualities are widely recognised. Its terpenes—particularly terpinen-4-ol—have shown to disrupt fungal cell membranes, which inhibits fungal growth.
- Common Uses: Effective against yeast infections like *Candida* and dermatophytes like *Trichophyton*, *Epidermophyton*, *Microsporum*.[7]
- 3. Aloe Vera (Aloe barbadensis miller)
- Active Compounds: Polysaccharides, Anthraquinones (aloins), Saponins.
- Mechanism of Action: Aloe vera includes substances that relieve inflammation and prevent the formation of fungi. Polysaccharides promote the immune system's reaction and support in healing of fungal infections.
- Common Uses: A common topical treatment for skin rashes, athlete's foot, and Candida infections.[8]



- 4. Garlic (Allium sativum)
- > Active Compounds: Diallyl disulfide, Allicin.
- Mechanism of Action: The main active ingredient, allicin, disrupts the cell membrane and prevents the formation of components of the fungal cell wall, which results in fungal cell death.
- Common Uses: Used to treat athlete's foot and skin fungal infections such as Aspergillus and Candida.[9]
- 5. Turmeric (*Curcuma longa*)
- Active Compounds: Demethoxycurcumin, Bisdemethoxycurcumin, Curcumin.
- Mechanism of Action: Curcumin inhibits fungal cell division and inhibits ergosterol synthesis, which is essential for the integrity of fungal cell membranes, giving it antifungal effects.
- Common Uses: Used to treat fungal infections of the skin, particularly those caused on by dermatophytes and Candida albicans.[10]
- 6. Echinacea (Echinacea purpurea)
- Active Compounds: Echinacoside, Alkamides, Caffeic acid.
- Mechanism of Action: Echinacea inhibits fungal diseases by boosting the immune system. The antifungal qualities of caffeic acid and alkamides prevent the growth and reproduction of fungus cells.
- Common Uses: commonly used to treat systemic fungal infections, such Candida albicans, and strengthen the immune system.[11]

- 7. Black Walnut (Juglans nigra)
- Active Compounds: Flavonoids, Juglone, Tannins.
- Mechanism of Action: A key component of black walnut, juglone, has strong antifungal effects by preventing the formation of fungal cells. By interfering with the metabolism of fungal cells, it functions as a natural fungicide.
- Common Uses: Used to treat superficial fungal diseases, such as athlete's foot and ringworm.[12]
- 8. Thyme (*Thymus vulgaris*)
- > Active Compounds: Carvacrol, Thymol.
- Mechanism of Action: The formation of ergosterol, an essential component of fungal cell membranes, is inhibited by thyme oil, which also disrupts the fungal cell membrane. Fungal death and cellular contents leakage cause this.
- Common Uses: Used to treat dermatophyte infections and fungal infections such as Candida albicans and athlete's foot.[13]
- 9. Lavender (*Lavandula angustifolia*)
- > Active Compounds: Linalyl acetate, Linalool.
- Mechanism of Action: By affecting the integrity of the fungal cell membrane, reducing membrane permeability, and preventing spore production, lavender oil shows antifungal action.
- Common Uses: Athlete's foot and Candida infections are two common minor fungal infections that lavender oil is used to treat.[14]

10. Oregano (Origanum vulgare)

- Active Compounds: Thymol, p-cymene, Carvacrol.
- Mechanism of Action: Thymol and carvacrol affect the fluidity of fungal cell walls and disrupt the cell membrane, which prevents fungus from growing. Also, they have strong antibacterial properties and are effective against fungi and bacteria.
- Common Uses: Used to treat fungal acne, athlete's foot, and Candida infections.[15]

Types Of Fungal Infection Treated By Herbal Antifungal Cream

- 1. Athlete's Foot (Tinea Pedis)
- A common fungal infection that causes skin peeling, itching, and redness in the foot, especially between the toes.
- Herbal Treatments: Athlete's foot is commonly treated with tea tree oil, garlic, oregano oil, and neem oil. Because of their antifungal qualities, these herbs can help kill fungus and reduce inflammation. [16]

2. Candidiasis (Yeast Infection)

- Caused by a wide range of Candida organisms, particularly Candida albicans. It causes irritation, itching, and burning in the skin and mucous membranes (oral and vaginal).
- Herbal Treatments: Tea tree oil, oregano oil, and garlic are commonly used topically and internal tratment. These plants have potent immune-stimulating and antifungal qualities. [17]

3. Ringworm (Tinea Corporis)

➤ A fungal infection which causes in skin patches that are round, red, and irritating.

Typically, contaminated objects or direct skinto-skin contact are when it is spread.

Herbal Treatments: Turmeric (curcumin), oregano oil, and tea tree oil perform well to cure ringworm by preventing the growth of fungi and reducing skin irritation.[18]

4. Jock Itch (Tinea Cruris)

- A fungal infection which leads to in groinarea skin that is itchy, red, and inflamed. Dermatophytes, such as Trichophyton species, are frequently the cause.
- Herbal Treatments: The antifungal and antibacterial qualities of tea tree oil, garlic, and neem oil make them effective.[19]

5. Seborrheic Dermatitis (Scalp Fungal Infection)

- A common fungal infection of the scalp that causes redness, itching, and flaking like dandruff. Usually, Malassezia species are too responsible.
- Herbal Treatments: The antifungal properties of tea tree, neem, and lavender oils help to calm the scalp and fight against the overgrowth of Malassezia.[20]

6. Tinea Versicolor (Pityriasis Versicolor)

- Fungus that causes discoloured spots on the skin, usually on the shoulders, back, and chest, and is brought on by the species Malassezia.
- Herbal Treatments: The ability of tea tree, oregano, and thyme oils to target the Malassezia species makes them useful for treating this condition.[21]

Mechanism Of Action



The mechanisms of action of herbal antifungal creams include the disruption of fungal cell membranes, the inhibition of cell wall formation, and the inhibition of fungal spore germination. These creams' plant-based ingredients and essential oils often work in combination to produce their antifungal effects through a variety of processes, including:

- Membrane Disruption: Fungal cell membranes can be penetrated by a variety of herbal oils, including tea tree and oregano oil, which can damage the cell's integrity and cause cell death.[22]
- Enzyme Inhibition: Fungal growth and reproduction are inhibited by compounds such as curcumin, which is found in turmeric, which interfere with the enzymes required for the formation of fungal cell walls.[23]
- Immune Modulation: Neem is one of the herbs that has immunomodulatory qualities which help in reducing the inflammation caused by fungal infections.
- Antioxidant PropertIes: Antioxidant qualities of some herbal compounds, such as lavender and turmeric, help in reducing the oxidative stress caused by fungal infections and enhance healing.[24]

Advantages Of Herbal Antifungal Cream

- 1. **Natural Ingredient:** Compared to synthetic antifungals, herbal antifungal creams are typically safer and have fewer adverse effects because they are made from plant-based ingredients.
- 2. **Broad-Spectrum Activity:** They perform well against a variety of fungal infections, including those caused by dermatophytes and Candida.[25]
- 3. Anti-Inflammatory and Healing: Many herbs, such as coconut oil and aloe vera, help to heal skin and reduce inflammation.[26]

- 4. **Lower Risk of Resistance:** Antifungals derived from plants have several different mechanisms of action, which reduces the risk of fungal resistance.[27]
- 5. **Long-Term Use**: Long-term usage of these creams is appropriate because they don't have the harmful side effects that synthetic medications commonly have.[28]
- 6. **Eco-Friendly**: Since herbal ingredients are biodegradable and sustainable, these products are better for the environment.[29]

Disadvantages Of Herbal Antifungal Cream

- 1. **Limited Scientific Evidence**: While herbal antifungal creams are widely used, there is often not enough clinical evidence confirming their efficacy compared to synthetic antifungals
- 2. **Inconsistent Quality**: Herbal products can vary in the concentration and quality of their active ingredients, producing inconsistent results.
- 3. **Risk of Contamination**: If herbal creams are not properly produced or maintained, they may become contaminated with germs, which could compromise their safety and effectiveness.[30]
- 4. Not Suitable for All Fungal Infections: Herbal creams may not be sufficient to treat some severe fungal infections; stronger, prescription antifungal medications may be needed. [31]

Evaluation Of Herbal Antifungal Cream

- 1. Antifungal Activity:
- In-vitro Testing: The antibacterial activity of the cream can be evaluated by using methods like the disk diffusion or well diffusion technique. This involves applying the cream on an agar plate that has been infected with Trichophyton rubrum, Aspergillus niger, or



Candida albicans, then measuring the zone of inhibition.

2. Skin Compatibility:

Patch Testing: To determine whether the cream is likely to cause skin irritation or allergic responses, conduct patch testing on human volunteers. The test should last 48 hours, during which time any redness, swelling, or itching should be observed.

3. Microbial Stability:

Use tests for total viable count to check for microbiological contamination in the cream. This is necessary to ensure that the cream doesn't contain any harmful microorganism while being stored.

4. Stability Testing:

To conduct accelerated stability testing, store the cream for a few months at various temperatures (such as 4°C, 25°C, and 40°C) and observe changes in its viscosity, texture, pH, and microbial contamination. [32]

CONCLUSION

Herbal antifungal creams offer a natural way to treat a variety of fungal infections, including ringworm, athlete's foot, and Candida infections. They are a viable substitute for synthetic antifungal medications. Plant-based ingredients with antimicrobial and skin-healing qualities, such as tea tree oil, neem oil, garlic, and oregano oil, are commonly used to make these creams. The natural composition of herbal antifungal creams lowers the possibility of undesirable side effects, and their anti-inflammatory and healing qualities help in skin recovery. Also, they are less likely to promote antifungal resistance, which is a developing issue with synthetic medications. However, some disadvantages exist. Due to variations in the concentration and quality of active components, these creams may act slower than traditional antifungal drugs, and their effectiveness can vary as well. Furthermore, sensitive people can have allergic responses. Furthermore, more thorough, extensive clinical trials are required to conclusively confirm their efficacy, even though clinical information is increasing. In summary, for people looking for alternative treatments, herbal antifungal creams are a safer and more efficient option for treating mild to moderate fungal infections. However, synthetic antifungals might still be required for infections which are severe or persistent. Continuous study into their efficacy, safety, and long-term use will help develop these natural remedies and improve their function in dermatological treatments.

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