

A COMPARATIVE REVIEW OF THE EFFECTIVENESS OF HERBAL SOAPS VERSUS CONVENTIONAL SOAPS IN TREATING FUNGAL INFECTIONS

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ABSTRACT

Fungal infections are a prevalent skin concern, especially in humid ³ and tropical regions, affecting individuals of all age groups. These infections are caused by dermatophytes, yeasts, and molds, leading to conditions like athlete's foot, ringworm, and candidiasis. The increasing resistance to synthetic antifungal agents and the rise in skin sensitivity due to chemical-based products have led to a growing preference for natural and herbal alternatives. Among these, herbal soaps have emerged as a promising solution due to their plant-based ingredients and fewer side effects. This review article aims to provide a comparative analysis of the effectiveness of herbal soaps versus conventional soaps in treating fungal infections. Herbal soaps are formulated using natural extracts such as neem, tulsi, tea tree oil, aloe vera, turmeric, and basil—each known for their antimicrobial, antifungal, and anti-inflammatory properties. These ingredients work by disrupting the fungal cell membrane, preventing spore formation, and soothing the skin. On the other hand, conventional soaps often contain synthetic chemicals like triclosan, sulfur, or salicylic acid, which are effective in reducing fungal load but may cause skin dryness, irritation, or allergic reactions with long-term use. This article critically examines current scientific literature, including in vitro and in vivo studies, to assess the antifungal potential, safety profile, and long-term effectiveness of both types of soaps. It also explores consumer preferences, environmental impact, and cost-effectiveness. The findings indicate that while both soap types can be effective, herbal soaps offer a safer, eco-friendly, and sustainable alternative, especially for mild to moderate infections. However, there is still a need for more clinical research ⁴ and standardization in the formulation of herbal products to ensure consistency and efficacy. This review aims to bridge the gap between traditional herbal practices and modern scientific evaluation, encouraging further development in natural antifungal therapies.

KEYWORDS: Herbal plants, Antifungal soap, Cosmetic formulations, Fungal infections, Allopathic medications, Traditional herbal remedies, Plant extracts, Herbal oils, Safer alternative.

1. INTRODUCTION

Herbal cosmetics are products crafted by combining one or more ⁵ plant-based ingredients with cosmetic agents to form formulations aimed at managing a variety of skin-related concerns. In recent years, there has been a noticeable trend toward the use of plant-derived substances in the formulation of new medicinal and cosmeceutical products. Cosmetics are defined as substances applied externally to the human body, such as on the face or hands, to promote skin health, enhance appearance, and improve aesthetics—without impacting the body's physiological functions.^[66,67]

The demand for herbal cosmetics has seen significant growth due to increasing consumer preference for natural and safer alternatives in daily skincare routines. These herbal formulations are available in several forms, including creams, powders, soaps, and liquid solutions, each designed for specific applications on the skin, hair, nails, teeth, and oral cavity.^[70,73]

The origin of aesthetic skincare can be traced back to ancient medicinal systems such as Ayurveda, Rigveda, Yajurveda, Unani, and homeopathy, where herbal extracts and natural substances were used in their crude form for therapeutic and beautifying purposes. Plants are recognized for their essential role in disease prevention and health promotion, making them a vital part of holistic skincare practices.

Herbal cosmetics are favored for their natural origin, broad utility,^[6] and relatively low risk of side effects compared to synthetic products. The modern herbal skincare market offers a wide range of products, including sunscreens, anti-aging creams, anti-wrinkle solutions, and acne treatments—catering to the growing interest in natural and effective skincare remedies.^[52,55]

Topical antifungal soaps are commonly used as supportive treatments for various fungal-related skin conditions, including athlete's foot, eczema, and psoriasis. Their use helps in reducing fungal load on the skin and preventing recurrence of infections. Among these, herbal antifungal soaps have gained significant attention due to their natural ingredients, wide-ranging antimicrobial properties, and low risk of adverse effects. The growing preference for herbal formulations is largely attributed to their gentle action on the skin, eco-friendly composition, and effectiveness against multiple types of fungal pathogens.^[54,58]

List of fungal infections commonly treated by herbal antifungal soaps:

1. Athlete's Foot (Tinea Pedis).^[7]
2. Ringworm (Tinea Corporis)
3. Jock Itch (Tinea Cruris)
4. Yeast Infections (Candidiasis).^[8]
5. Nail Fungus (Onychomycosis)
6. Fungal Dermatitis

Table 1.1: Ingredients Used In Herbal Antifungal Soap With Their Uses.

Sr. No.	Ingredients	uses
1	Neem	Known for its antibacterial, antifungal, and antiviral properties, neem helps combat various skin infections, including fungal infections like athlete's foot and ringworm.
2	Tea Tree Oil	Renowned for its powerful antifungal and antiseptic properties, tea tree oil is effective against fungal infections such as athlete's foot, toenail fungus, and yeast infections.
3	Aloe Vera	With its soothing and moisturizing properties, aloe vera helps relieve itching and irritation associated with fungal infections while promoting skin healing.
4	Turmeric	Turmeric possesses potent anti-inflammatory and antimicrobial properties, making it effective against fungal infections like ringworm and athlete's foot.
5	Tulsi	Tulsi has antifungal and antibacterial properties, making it beneficial for treating various skin infections, including fungal infections like ringworm and jock itch.
6	Coconut Oil	Coconut oil contains lauric acid, which exhibits antifungal properties. It helps moisturize and soothe the skin while fighting fungal infections like candidiasis and athlete's foot.
7	Lavender Oil	Lavender oil has antifungal and soothing properties, making it useful for treating fungal infections such as candidiasis and ringworm while promoting relaxation.
8	Calendula	Calendula possesses anti-inflammatory and antifungal properties, making it effective in soothing and healing skin affected by fungal infections like ringworm and athlete's foot.
9	Eucalyptus Oil	Eucalyptus oil has antifungal and antibacterial properties, making it useful for treating fungal infections such as athlete's foot and nail fungus.
10	Rosemary Extract	Rosemary extract has antifungal and antioxidant properties, making it beneficial for treating fungal infections while promoting skin health and regeneration. ⁹

2. Method for Preparing Herbal Antifungal Soap

The preparation of herbal antifungal soap involves the combination of natural oils, herbal extracts, and antifungal agents derived from plants.^[6] The process follows standard cold or hot soap-making techniques, depending on the desired texture and quality. Below is a general method used in the formulation of herbal antifungal soap:

2.1 Ingredients Required:

- Base oils: Coconut oil, olive oil, castor oil (moisturizing and.^[10] lathering agents)
- Lye solution: Sodium hydroxide (for saponification)
- Distilled water: For dissolving lye
- Herbal extracts: Neem, tulsi, tea tree oil, aloe vera, turmeric.^[11] (natural antifungal agents)
- Essential oils: Lavender, eucalyptus, or peppermint (for fragrance and added therapeutic value)
- Colorants (optional): Natural colorants like sandalwood powder or cocoa

2.2 Preparation Steps

1. Lye Preparation: Carefully dissolve sodium hydroxide (lye) in distilled water and allow it to cool. This should be done in a well-ventilated area using safety gear.^[12]
2. Oil Blending: In a separate container, mix the base oils and gently heat them until they reach around 40–45°C.
3. Combining Lye and Oils: Slowly add the cooled lye solution¹³ to the oil mixture while continuously stirring until a smooth consistency (called “trace”) is achieved.
4. Addition of Herbal Extracts: At trace stage, add the prepared herbal extracts and essential oils. Stir gently to ensure even distribution.
5. Molding and Curing: Pour the mixture into molds and cover. Allow it to set for 24–48 hours. Once solidified, remove from molds and let the soap cure for 4–6 weeks in a cool, dry place to complete the saponification process.

This method produces a natural, skin-friendly soap with antifungal properties.^[14] suitable for daily use, especially in individuals prone to fungal infections.

3. Types of Herbal Antifungal Soaps

Herbal antifungal soaps are available in various formulations, each containing specific plant-based ingredients known for their antifungal, antimicrobial, and skin-soothing properties. These soaps are developed based on the traditional knowledge of herbal medicine and modern research into the antifungal properties of natural compounds.^[1,2] Below are some of the commonly used types of herbal antifungal soaps:

3.1. Neem Soap

Neem (*Azadirachta indica*) is widely recognized for its strong antifungal,^[15] antibacterial, and anti-inflammatory properties. Neem soap helps in treating fungal infections such as ringworm, athlete's foot, and candidiasis while also soothing irritated skin.^[34]

3.2. Tulsi (Holy Basil) Soap

Tulsi (*Ocimum sanctum*) contains compounds like eugenol and ursolic acid that exhibit broad-spectrum antifungal activity. Tulsi soap is often used for skin purification and controlling fungal infections due to its antiseptic and healing effects.^[32]

3.3. Tea Tree Oil Soap

Tea tree oil (*Melaleuca alternifolia*) is a well-known natural antifungal and antimicrobial agent. Tea tree oil soap is highly effective against fungi such as *Candida albicans* and dermatophytes and is suitable for acne-prone or sensitive skin.^[16]

3.4. Turmeric Soap

Turmeric (*Curcuma longa*) has been used in traditional medicine for ¹⁷ its antifungal, antibacterial, and anti-inflammatory properties. Turmeric soap helps reduce fungal growth and supports the skin's natural healing process.^[60,64]

3.5. Aloe Vera Soap

Aloe vera contains bioactive compounds like aloin and saponins that provide mild antifungal action while keeping the skin hydrated and nourished. It is especially beneficial for individuals with sensitive or dry skin affected by fungal infections.^[30,31]

3.6. Multicomponent Herbal Soap

Some herbal soaps are formulated by combining two or more plant extracts, such as neem with turmeric or tea tree oil with aloe vera, to enhance the antifungal efficacy and provide comprehensive skincare benefits.^[18]

4. Evaluation Tests for Herbal Antifungal Soap

To ensure the quality, safety, and efficacy of herbal antifungal soaps, a variety of evaluation tests are conducted during and after the formulation process. These tests help determine the soap's physical, chemical, microbiological, and therapeutic properties.^[12] The major evaluation methods include the following:

4.1. Physical Evaluation

- Appearance: The soap is visually inspected for color, texture, shape, and surface smoothness.^[19]
- Odor: A pleasant and natural fragrance without any foul smell is desirable.
- pH Measurement: The pH of the soap is tested using^[20] a digital pH meter or pH paper. An ideal herbal soap should have a pH between 6 and 7, which is skin-friendly.^[42,49]

4.2. Weight Variation Test

- A fixed number of soap bars are weighed individually and compared to check consistency in manufacturing. Minor variations are acceptable, but excessive differences indicate formulation issues.^[36, 40]

4.3. Foam Height Test

- The foaming ability is measured to ensure the soap produces sufficient lather. A test tube or graduated cylinder method is often used by shaking a soap solution and recording the foam height.^[21]

4.4. Hardness Test

- The soap's hardness is tested using a penetrometer or by^[22] manual pressure. A good-quality soap should be firm enough to retain its shape but not so hard that it becomes brittle.^[52]

4.5. Antifungal Activity Test

- Agar Well Diffusion Method: This microbiological assay is used to evaluate the antifungal activity against pathogens such as *Candida albicans* or *Trichophyton* species. The zone of inhibition is measured around the soap sample to assess its effectiveness.^[38]

4.6. Stability Test

- The soap is stored under different environmental conditions (temperature, humidity, light) to monitor changes in appearance, odor, and efficacy over time.^[23]

ADVANTAGES

1. Natural ingredients.^[24]
2. Antifungal properties
3. Additional skin benefits
4. Fewer side effects.^[25]
5. Environmentally friendly

DISADVANTAGES

1. Variable efficacy.^[26]
2. Possible allergic reactions
3. Limited availability
4. Higher price.^[27]
5. Strong smell or texture possible

5. DISCUSSION

- Herbal soaps are safer **for long-term use**, gentler on skin, **and effective for** mild fungal infections.
- Conventional antifungal soaps work faster **but come with a** higher risk of irritation and skin dryness.
- For mild infections or prevention, **herbal soaps are** a better choice.
- For moderate to severe infections, **conventional antifungal soaps work** faster but may require additional medication.

6. CONCLUSION

Herbal antifungal soaps represent a natural, effective, and safer alternative to conventional chemical-based products for the prevention and treatment of fungal infections. Formulated with plant-derived ingredients like neem, tulsi, turmeric, tea tree oil, and aloe vera, these soaps offer broad-spectrum antifungal activity along with skin-nourishing benefits. Their growing popularity can be attributed to their minimal side effects, eco-friendliness, and alignment with traditional systems of medicine such as Ayurveda and Unani.

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