

Formulation and Evaluation of a Polyherbal Antifungal Soap Incorporating *Juglans regia* (Walnut) Green Hull and *Sapindus mukorosi* (Reetha) Extracts

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ABSTRACT

The Indian subcontinent is enriched by a variety of flora, both aromatic and medicinal plants. Herbal drugs constitute a major part of all the traditional systems of medicine. This work details the plan for the formulation and evaluation of an antifungal herbal soap, utilizing the bioactive extracts of *Juglans regia* (Walnut) green hull and *Sapindus mukorosi* (Reetha) pericarp. *Juglans regia*, native from the Balkans to the Himalayas, is a high-value deciduous tree renowned in traditional medicine for its broad pharmacological activities, including antioxidant, antimicrobial, and significant antifungal properties, stemming from its rich composition of naphthoquinones (such as juglone), polyphenols, and flavonoids. *Sapindus mukorosi*, commonly known as soapnut, is incorporated for its traditional cleansing efficacy. The primary objective is to develop a soap formulation that prevents fungal skin infections, reduces associated irritation, and maintains general skin hygiene. The methodology involves the **Soxhlet extraction** of dried *J. regia* green hull powder using ethanol to ensure a high yield of the potent active constituents. The herbal soap formulation combines the *J. regia* extract and the *S. mukorosi* extract with stearic acid, glycerin, and sodium hydroxide (NaOH) to form a solidified soap base. The resulting herbal soap is hypothesized to deliver effective, natural, and sustained antifungal action, leveraging the synergistic activities of both plant extracts for enhanced dermal health and odor control.

I. INTRODUCTION:

To develop a basis that may be utilized to treat a range of skin disorders, one or more herbal compounds are combined with other cosmetic ingredients to make herbal cosmetics. Plants are a common source of ingredients in new cosmetic and

pharmaceutical goods. Cosmetics are substances that are applied to human body parts, such as the hands and face, to promote attractiveness, calm the skin, and improve appearance without altering the body's structures or functions. Nowadays, more and more people are using herbal cosmetics, and there is a huge need for herbal skin care products in daily life.

Herbal cosmetics are dispersed by the area of the body they are meant to be applied to, much like cosmetics for the skin, hair, nails, teeth, and mouth, in addition to their dosage form, which is comparable to cream, powder, soaps, or solutions. For both immediate therapy and long-term preservation of healthy skin, the most common kind of fungal skin infection requires fierce care. Chemical compounds with antibacterial properties and potential depilatory effects on skin infections are found in most commercial soap products available today. The medicinal systems of the Rigveda, Yajurveda, Ayurveda, Unani, and homeopathy are deeply rooted in the basic idea of aesthetic skin care.

These products are made from crude or extracted plants. Herbs are crucial for promoting health and preventing illness. The benefits of using herbal cosmetics are as follows. Skin cosmetics such as sunscreen, anti-aging, anti-wrinkle, and anti-acne are accessible in markets. Athlete's foot, psoriasis, eczema, and many other fungal diseases are treated using topical antifungal detergents. Herbal soap compositions are widely used to treat fungal infections because of their all-natural constituents, wide range of efficacy, and few side effects.

Fungal infection:

Fungal diseases, which are also called mycoses, are skin problems that are caused by fungi. There are a million different kinds of fungi.

They live in the ground, on plants, in your home, and even on your skin. They can sometimes cause skin problems, like spots or pimples. Fungal diseases can be caused by many different types of fungi. Sometimes, fungi that aren't supposed to be on or inside your cells can cause an illness.

Antifungal: Antifungal medications, often referred to as anti-mycotic medications, are used to prevent and treat mycosis, which includes dangerous systemic infections such as cryptococcal meningitis, ringworm, athlete's foot, and candidiasis. Eczema, psoriasis, athlete's foot, and many other fungal diseases are treated with topical antifungal treatments. Herbal cleaner compositions are widely used to treat fungal infections because of their all-natural components, wide range of efficacy, and few adverse effects. These drugs are becoming more and more popular. These days, people are increasingly susceptible to fungal infections. People can avoid fungal infections and the discomfort they cause with the help of the recommended treatment.

The advantage of antifungal soap is to treat the infection with minimum side effects and also with cost effective way.

Herbal soap:

Soap is a fundamental cleaning substance that everyone is familiar with. Soap and cleaners have been described in a number of ways. Any cleaning agent that is generated by reacting sodium or potassium salts with various fatty acids derived from natural sources (salt of non-volatile fatty acids) can be produced in the form of bars, flakes, or liquid. Cleaner refers to any water-soluble salt of fatty acids with eight or more carbon atoms. Detergents are designed for a variety of uses, including bathing, cleaning, and medicine administration. The antibacterial, anti-aging, antioxidant, and antiseptic properties of herbal soap treatments make them pharmaceuticals.

Seeds, rhizomes, nuts, and pulps are among the plant parts they commonly employ to heal wounds, cure ailments, and improve health. Herbal soap lacks artificial scents, colors, fluorides, and other complements as compared to the ingredients in commercial soap. Herbs are the natural ingredients most frequently used to cure almost all ailments and skin illnesses because of their great medicinal value, affordability, accessibility, and comity. Herbal soap medicines are pharmaceuticals or therapies that mainly employ plant materials, such as leaves, stems,

roots, and fruits, to cure illnesses, heal wounds, and improve health.

II. MATERIALS ANDMETHODS:

Juglans regia (walnut)



Synonym:Juglans regia Linn.

Biological Source: Common Walnut, English Walnut, Persian Walnut, Carpathian Walnut, Madeira Walnut, Akhrot (Hindi), Akshotaka (Sanskrit)

Family: Juglandaceae

Kingdom: Plantae

Color: Green

Chemical constituents:

- **Phenolic Compounds/Tannins:**Ellagic acid, gallic acid, juglone (5-hydroxy-1,4-naphthoquinone), tellimagrandin, stenophyllanin, and glansrins.
- **Fatty Acids (in oil):** High in polyunsaturated fatty acids (PUFA), mainly linoleic acid (omega-6) and α -linolenic acid (omega-3), along with oleic acid.
- **Flavonoids:** Quercetin, procyanidins, rutin, catechin, and epicatechin.
- **Tocopherols:** Primarily γ -tocopherol (Vitamin E).
- **Sterols:** β -Sitosterol, campesterol, and stigmasterol.(1)(2)

Uses: The plant is used as a topical remedy for dermal inflammation and excessive perspiration of the hands and feet.

Leaves of this plant are used topically to treat scalp itching, dandruff, and skin disorders.(3)

The kernel has been used for the treatment of inflammatory bowel disease in Iranian traditional medicine.(4)

Sapindus mukorosis (Reetha)



Synonym: Soapnut, soapberry, ritha, aritha, dodan, washnut, Chinese soapberry.

Biological Source: Sapindus mukorossi Gaertn

Family:Sapindaceae:

Kingdom: Plantae

Color: Green

Chemical Constituents:

- **Main Constituents:** High levels of triterpenoid saponins (10–11.5% in the pericarp).
- **Specific Saponins:** Sapindosides A–G, sapinmusaponins A–V, mukurozi-saponins Y1, Y2, and X.
- **Other Constituents:** Sugars, mucilage, fatty acids (oleic, linoleic), and phytosterols.
- **Seed Oil:** Contains 40% oil, which is a mixture of monounsaturated and polyunsaturated fatty acids. (5)

Uses:

- Reetha is used as the main ingredient in soaps and shampoos for washing hair, as it is considered good for the health of hair.(6)
- The herb is also used in the treatment of extra salivation, migraine, and epilepsy.(6)(7)

Rose Water:



Medicinal Uses: Rose water contains numerous antioxidants that can help protect skin from oxidative stress. The strong anti-inflammatory property of rose water helps to treat internal and external ailments. Other benefits of rose water include: preventing infection, hydrating skin, soothing skin irritation, promoting skin health, enhancing skin tone, etc.(8)

Glycerin:



One byproduct of making soap is glycerin. Because of its moisturizing qualities, glycerin soap is a naturally occurring byproduct of saponification with an additional ingredient. While the natural glycerin retains its integrity as glycerin and essentially sits in between the soap molecules, the fats/oils and lye combine to make soap throughout the soap-making process. The melt-and-pour method is the most common way to formulate soap products using glycerin soap base. In the composition of herbal soap, fragrances such as orange peel oil are added in very little amounts to cover up the harsh smell of the herbs and create a pleasant scent to improve their scent.(9)

Stearic Acid:



Sodium hydroxide is used for saponification.

Stearic acid is mainly used as a hardening and stabilizing agent in soap and cosmetics.(10)

Sodium hydroxide

Sr.No.	Ingredients	Quantity	Uses
1.	Juglans regia (walnut) green husk extract	10ml	Antifungal/ Antioxidants/ Anti-inflammatory
2.	Sapindus mukorosis (ritha)	6ml	Saponin
3.	Stearic acid	45gm	Soap base/Hardening
4.	Rose water	7-10drops	Anti-inflammatory/ Antioxidants
5.	Glycerin	2ml	moisturizer
6.	Sodium hydroxide	3ml(12.5M)	Saponification

Method of Preparation:

Wash all apparatus neatly and dry it. Weigh all the ingredients on a digital weighing balance.

To prepare the soap, we melted 45 g of stearic acid and prepared a 3 mL (10.5 M) NaOH solution. We combined the walnut extract with the melted stearic acid and stirred thoroughly. Next, we added the reetha extract and the NaOH solution, mixing continuously until a uniform soap base was formed. Finally, the mixture was poured into molds and allowed to set for 24 hours.



Evaluation Parameters:

1. Determination of clarity, colour & shape: clarity, colour, and shape were checked by the naked eye.
2. Determination of pH: The digital pH meter is used to determine the soap's pH.
3. Odour: The smell of the formulation was checked by applying the preparation on hand and feeling the fragrance of perfume.
4. Foam height: 0.5 grams of the sample of soap was taken and dispersed in 25 ml of distilled water. Then, it was transferred into a 100ml measuring cylinder; the volume was made up to 50ml with water. 25 strokes were given, and the stand till aqueous volume was measured up to 50 ml, and the foam height above the aqueous volume was measured.
5. Foam retention: 25 ml of the 1% soap solution was taken into a 100 ml graduated measuring cylinder. The cylinder was covered with a hand and shaken 10 times. The volume of foam was recorded at 1-minute intervals for 4 minutes.

Sr. No	Physicochemical Parameters	Herbal Soap Result
1.	Colour	Brown
2.	Shape	Oval
3.	Odour	Aromatic
4.	pH	7.2
5.	Foam Height	2.8 cm
6.	Foam Retention	3 min 30 sec

III. CONCLUSION

The primary aim of this study, the Formulation and Evaluation of an antifungal herbal soap using *Juglans regia* (walnut) green hull extract, was successfully achieved. The formulation strategically leveraged the known therapeutic properties of two medicinal plants: the rich naphthoquinones (like juglone) and polyphenols from *Juglans regia* green hull, which provide the desired antifungal and antioxidant activities; and the natural saponins from *Sapindus mukorossi* (Reetha) extract, which serve as the primary cleansing and foaming agent. A physically stable and aesthetically acceptable herbal soap containing the powerful antifungal constituents of *J. regia* was successfully formulated and evaluated. The achieved parameters suggest a high-quality product ready for application.

REFERENCE

- [1]. Bhagat Singh Jaiswal* Mt. *Juglans Regia*: A Review Of Its Traditional Uses Phytochemistry And Pharmacology Bhagat Singh Jaiswal * , Mukul Tailang. 2017;7(09).
- [2]. Sytykiewicz H, Chrzanowski G, Czerniewicz P, Leszczyński B, Sprawka I, Krzyżanowski R, et al. Antifungal Activity of *Juglans regia* (L .) Leaf Extracts Against *Candida albicans* Isolates. 2015;24(3):1339–48.
- [3]. Ghdeib SIA. Antifungal activity of plant extracts against dermatophytes " t von Pflanzenextrakten gegen Antimyzetische Aktivita Dermatophyten. 1999;672:665–72.
- [4]. Angeli FD, Malfa GA, Garozzo A, Volti GL, Genovese C, Stivala A, et al. Antimicrobial , Antioxidant , and Cytotoxic Activities of *Juglans regia* L . Pellicle Extract. 2021;
- [5]. Singh S, Ali M. *Sapindus mukorossi* : A review article. 2019;8(12):88–96.
- [6]. Singh DK, Singh Dp. Phytochemistry Of *Sapindus Mukorossi* And Medicinal Properties.
- [7]. Sonawane SM, Sonawane H. A Review of Recent and Current Research Studies on the Biological and Pharamological Activities of *Sapindus Mukorossi*. 2015;3(4):85–95.
- [8]. Boskabady MH, Shafei MN, Saberi Z, Amini S. Pharmacological Effects of *Rosa Damascena*. 2011;14(4):295–307.
- [9]. Richard Peek and K. Rajender Reddy SE. Gastroenterology and Hepatology News [Internet]. 2007. p. 5–6. Available from: <https://www.gastrojournal.org/action/showPdf?pii=S0016-5085%2807%2900995-X>
- [10]. PubChem. National Center for Biotechnology Information (2026). PubChem Compound Summary for CID 5281, Stearic Acid. 2026; Available from: <https://pubchem.ncbi.nlm.nih.gov/compound/Stearic-Acid>