WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.453
Volume 14, Issue 6, 218-233. Review Article ISSN 2277–7105

A LITERATURE REVIEW ON EVALUATION OF ANTIBACTERIAL POLYHERBAL SOAP

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Article Received on
23 Jan. 2025,

Revised on 13 Feb. 2025,
Accepted on 05 March 2025

DOI: 10.20959/wjpr20256-35787

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1. ABSTRACT

The formulation and evaluation of an antibacterial polyherbal soap was conducted to develop a product with natural antimicrobial properties that could serve as an alternative to synthetic antibacterial agents. Various medicinal plants, known for their antimicrobial activities, such as Azadirachta indica (Neem), Tulsi (Holy Basil), Aloe vera, and Tea Tree oil, were selected for their synergistic effects. The soap was formulated using a blend of these herbs in combination with natural oils and surfactants to ensure skin compatibility and effective cleansing. The results indicate that the polyherbal soap possesses strong antibacterial properties while being gentle on the skin, offering a natural and effective alternative for personal hygiene. Further studies on long-term use and dermatological testing are recommended to confirm its safety and efficacy.

2. INTRODUCTION

2.1 Genaral

Skin from in factious micro organisms and their spreading the skin hygiene Plays an important role to avoid the contagious diseases. This poly herbal soap help reduce healthcare-associated transmission of contagious Disease more effectively. Plants having the Medicinal properties are being used as a traditional medicine from time immemorial.

The various extract from the stem, roots and leaves, of various medicinal plants have been employed as a natural remedy in curing various ailments and diseases. Even many of the plant- based products have been replaced use of synthetic chemicals, the efficacy and safety of ayurvedic Product scould not find their match. The skin is the most exposed area of the body to the sun, pollutants, and viruses while yet providing some protection.

Eczema, warts, acne, rashes, psoriasis, allergies, and other skin conditions are the most frequent. 1, 2 Skin disorders are one of the most serious public health issues because they affect both people and communities. Pain, suffering, impairment of normal functioning, and a lower quality of life are all consequences, As a result of the increased use of dangerous synthetic chemicals in skin care products, the prevalence of certain skin illnesses is on the rise. Hand hygiene is important in preventing contagious diseases by protecting the skin from in fectious microorganisms and their spread. Many chemical antisepties are now accessible as alcohol-based sanitizers, Chlorohexidine preparations, and other forms. This poly herbal soapor solution helps to prevent healthcare associated infectious disease transmission more efficiently, although it has certain drawbacks or side effects 19 Plants that have ther apeutic characteristics have been employed astraditional medicine since the dawn of mankind. Medicinal plant extracts from the leaves, stems, and roots have been used as a natural cure for a variety of maladies and disorders. Despite the fact that many plant-based medicines have been supplanted by synthetic chemicals, ayurvedic goods' safety and usefulness have not been proven In comparison to chemical goods, herbal treatments have the benefit of being in expensive, readily available, and having less adverse effects.

Herbal soap preparation is a medicineit contain antibacterial, anti-ageingantioxidant, anti-septic properties which mainly uses of part of plant like seeds, rhizomes, nuts and pulps to treatment for an injury or disease orto achieve health. Herbal soap do not contain the artificial colours, flavours, fluorides etc., when compared to the content of commercial soap. Herbs are the natural products mostly found in the treatment of almost all diseases and skin problems owing to their high medicinal value, cost effectiveness, availability and compatibility.

Fig. 2.1.

2.2 Skin

Skin is very important for all health care professionals to have basic information about the structure and function of human skin. Skin is also called cutaneous membrane. In adults the skin has a surface are aranging from1.2to 2.2m2. Skin has two types, hair – bearings kin that covers much of the body and hairless skin as that of palms of hands and soles of feet Skin is the most exposed part of the body to the sunlight, environmental pollution and also used to some protection against the pathogen. The skin or cutaneous membrane covers the external surface of the body. It is the largest organ of the body in surface area and weight.

The function of the skin is body temperature regulation, are servoir for blood, protection from the external environment, cutaneous sensations, excretion and absorption.

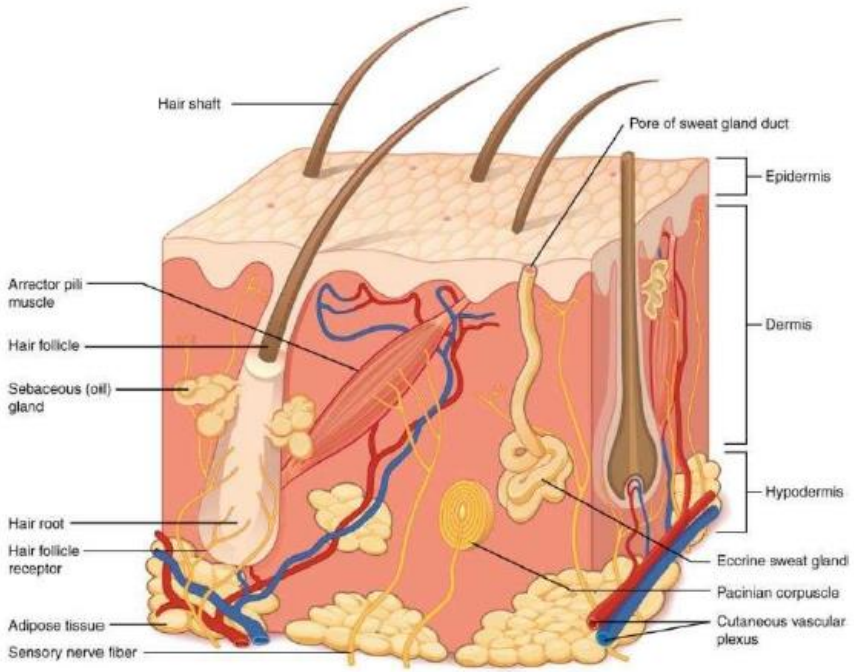

Fig. 2.2.

Fig.2.3

Fig.2.4

2.3 Soap

Soap is a salt of fatty acid used in a variety of cleansing and lubricating products. Soaps are surfactant usually used for washing and bathing and other types of housekeeping remove dirt including dust microorganism,strains bad smells from the body Soaps are used to Commercial soap usually are made up of toxic mercury aluminium, barium, bisphenol, plastics and other chemicals, which are absorbed into the body via internal organs from vaporization of the chemicals as well as skin absorption with negative side effects.

2.4 Herbal Soap

Herbal soap preparation is a medicine it contain anti bacterial, anti-ageinganti-oxidant, anti-septic properties which mainly uses of part of plant like seeds, rhizomes, nuts and pulps to treatment for an injury or disease or to achieve health Herbal soap do not contain the artificial colours, flavours, fluorides etc., when compared to the content of commercial soap Herbs are the natural products mostly found in the treatment of almost all diseases and skin problems owing to their high medicinal value, cost effectiveness, availability and compatibility Azadirachta indica is one the best trees in India, which known for its medicinal properties. In fruits and seeds are the source of neem oil. It is used to treat most few common problems that the people face The Aloe vera has been known and used for centuries for its health, beauty, medicinal and skin care properties.

2.5 Role of Antibacterial Polyherbal Soap

Antibacterial poly herbal soaps are formulated using a combination of multiple herbal ingredients, each chosen for its antibacterial, antifungal, and soothing properties. These soaps aim to provide an effective means of cleansing while offering the benefits of natural ingredients. The role of antibacterial poly herbal soaps includes:

1. **Antibacterial Action:** They help to eliminate or reduce harmful bacteria on the skin, preventing infections and promoting overall skin health. Herbs like neem, tea tree, and turmeric are commonly used for their strong antibacterial properties.
2. **Skin Protection:** The natural ingredients in these soaps often contain antioxidants and vitamins that can help protect the skin from damage caused by free radicals, pollution, and environmental stressors.
3. Soothing and Healing: Many herbal ingredients have anti-inflammatory properties that can soothe irritated skin and promote healing of minor cuts, rashes, or acne.

4. **Gentle on Skin:** Unlike some synthetic antibacterial soaps, poly herbal soaps are generally milder, offering skin hydration and nourishment while still maintaining cleanliness.
5. **Prevention of Skin Conditions:** Regular use may help prevent conditions like acne, eczema, or fungal infections by keeping the skin free from excess bacteria and moisture buildup.

Overall, antibacterial poly herbal soaps provide a natural, gentle yet effective way to cleanse and protect the skin, promoting both hygiene and skin health.

2.6 Benefits of Antibacterial Polyherbal Soap

1. Effective Bacteria Control: The primary benefit is their ability to kill or inhibit the growth of harmful bacteria on the skin. Ingredients like neem, tulsi, and tea tree oil are known for their powerful antibacterial properties, reducing the risk of skin infections and promoting cleanliness.

2. Natural Skin Care: Poly herbal soaps use plant-based ingredients that are typically gentler on the skin compared to harsh synthetic chemicals found in regular antibacterial soaps. They nourish the skin, prevent dryness, and maintain a healthy moisture balance, making them suitable for sensitive skin.

3. Prevention of Skin Disorders: Regular use helps to prevent and manage common skin conditions such as acne, eczema, fungal infections, and body odor. Herbs like turmeric, aloe vera, and neem are known for their anti-inflammatory and antimicrobial properties, which help keep the skin free from infections and rashes.

4. Soothing and Healing: Many herbal ingredients, such as aloe vera and chamomile, have soothing and healing properties, helping to reduce irritation, redness, and inflammation. They can accelerate the healing of minor cuts, bruises, or skin abrasions.

5. Antioxidant Protection: Several herbal ingredients are rich in antioxidants (e.g., turmeric and neem), which help protect the skin from damage caused by free radicals, environmental pollutants, and UV exposure. This can delay signs of aging, such as wrinkles and fine lines.

6. Balanced pH: Poly herbal soaps tend to maintain the skin's natural pH balance, which is essential for protecting the skin's protective barrier. This helps prevent over-drying or excessive oiliness, keeping the skin in optimal condition.

7. Mild and Non-Toxic: Being made from natural herbal ingredients, poly herbal soaps are usually free from harsh chemicals, sulfates, parabens, and artificial fragrances, making them safe for daily use and ideal for people with sensitive skin or allergies.

8. Pleasant Fragrance: Many herbal soaps have a natural, refreshing fragrance derived from the herbs used in the formulation, such as lavender, sandalwood, or lemongrass, offering a pleasant, aromatherapeutic experience without artificial perfumes.

9. Environmentally Friendly: Most poly herbal soaps are eco-friendly, made from biodegradable ingredients that don't harm the environment. They are often free from synthetic chemicals that can pollute water sources.

10. Nourishment and Hydration: Many herbal ingredients in these soaps, such as honey and glycerin, have moisturizing properties that help keep the skin hydrated, preventing dryness and leaving it soft and smooth.

2.7 Application in Antibacterial Polyherbal Soap

An antibacterial poly herbal soap combines multiple herbal ingredients known for their antibacterial properties to create a product that helps cleanse the skin while providing protection against harmful bacteria. These herbal soaps typically aim to offer a natural alternative to conventional antibacterial soaps, avoiding synthetic chemicals while still maintaining effectiveness.

Antibacterial Action: The combination of herbs like Neem, Tulsi (Holy Basil), Tea Tree Oil, Eucalyptus, and Aloe Vera can effectively inhibit the growth of bacteria, preventing infections, acne, and other skin conditions caused by bacterial presence.

Gentle on Skin: Herbal ingredients are often less irritating than synthetic chemicals, making the soap suitable for sensitive skin. It can be used by people with conditions like eczema, psoriasis, or acne.

Moisturizing: Many herbal soaps include moisturizing agents like Aloe Vera or Glycerin, which help keep the skin hydrated while cleansing. This prevents the skin from becoming dry, a common issue with traditional antibacterial soaps.

Natural Skin Care: Poly herbal soap can help balance oil production, reduce inflammation, and offer healing properties for minor cuts, wounds, or rashes due to the soothing nature of many herbs.

Prevention of Body Odor: Some herbs, such as Tea Tree Oil and Neem, are known for their ability to neutralize body odors and keep the skin smelling fresh.

OBJECTIVES

The objective of an antibacterial poly herbal soap is to combine the natural antimicrobial properties of various herbs and plant-based ingredients to cleanse and protect the skin from bacteria, while offering a more gentle, non-synthetic alternative to traditional antibacterial soaps. These soaps typically aim to:

1. **Eliminate Harmful Bacteria:** The antibacterial properties of herbs like neem, tea tree, turmeric, and aloe vera help reduce bacterial growth on the skin, preventing infections, acne, and other skin-related issues.
2. **Promote Skin Health:** Many poly herbal soaps include additional ingredients that soothe, moisturize, and nourish the skin, improving overall skin tone and texture.
3. **Minimize Skin Irritation:** Being made from natural ingredients, poly herbal soaps tend to be less harsh than conventional antibacterial soaps, making them suitable for sensitive skin types.
4. **Eco-friendly and Sustainable:** These soaps often prioritize biodegradable, plant-based ingredients and avoid chemicals or synthetic additives, making them a more environmentally conscious choice.
5. **Support Preventive Care:** By incorporating multiple herbs known for their therapeutic properties, poly herbal soaps may support a holistic approach to skin care, aiding in the prevention of various skin conditions.

4. Method of preparation

1. 1. Melt and Pour Method.
2. 2. Cold Process Method.
3. 3. Hot Process Method.
4. 4. Rebatching Method.

Hot Process Method

Preparation of Antibactrial Poly herbal Soap

INGREDIENTS	QUANTITY	USES
Sodium hydroxide	450g	Hardening
Neem leaves	150g	Antibacterial
Tulsileaves	150g	Anti-Viral
Turmeric Powder	75g	Antibacterial

Ginger powder	75g	Antibacterial
Aloe vera gel	75g	Anti-agin
Tea tree oil	45g	Antiseptic
Lavender oil	45g	Antimicrobial
Olive oil	1.5g	Moisturizing
Coconut oil	1.25g	Antifungal
Palm oil	1g	Cleansingagent
Castor oil	500g	Moisturizing
Shea butter	250g	Moisturizing
Distilled water	1500g	Dilution

Procedure

I) Weigh the lye and distilled water separately. Slowly add the lye to the water in a wellventilated area, while stirring carefully. Continue stirring until the lye dissolves copletely.

II) Weigh the oils and combine the mina separate mixing bowl. Stirthe oil blend until it reaches a uniform temperature (around 100°F to 110°F).

III) Monitor the temperatures of both the lye solution and oil blend. Once they reach a temperaturedifferenceof10°Fto15°F(e.g. lye solution at 110°Fandoilblendat 100°F), you're ready for the next step.

IV) Slowly pour the lye solution into the oil blend, while using an immersion lender. Blend until you reach trace(the soap mixture should have a consistency similar to thin pudding).

V) Add the herbal blend and mix well. I fusing essential oils, add them no wand mix thoroughly.

VI) Pour the soap mixture into a he at-resistant mixing bowl or ad dedicated soap-making pot. Place the bowl/pot over low-medium heat and maintain a temperature of 160°F to 180°F.Stir the soap mixture every 10-15 minutes, scraping the sides and bottom of the bowl/pot. Continue cooking until the soap mixture reaches a temperature of 220°F to 230°F (this may take about 30-45 minutes).

VII) Use a can dither mo meter to check the temperature. Performa" zaptest": carefully touch the soap mixture with your tongue. If it feels smooth and doesn't sting, it's done.

VIII) Pour the soap mixture in to your prepared mold (e.g., silicone, plastic, ormetal). Tap the mold gently to remove any air bubbles.

IX) Cover the mold with a to we lor blank etto keep it warm. Let the soap set for 24-48hours.

X) After 24-48hours,carefully remove the soap from the mold. Place the soap on a wire rack or tray, allowing air to circulate around it. Letthesoapcure for 4-6weeks, turning it occasionally to ensure even drying.

4.1 Evaluation Test for Polyherbal Soap

1. Microbial Efficacy Testing

Evaluate the antibacterial activity of the soap against common pathogens.

2. Skin Sensitivity and Irritation Test

Ensure the soap does not cause skin irritation or allergic reactions.

3. Physicochemical Testing

To confirm that the soap's chemical composition aligns with standard specifications and is safe for use.

4. Stability Testing

Soap's shelf life and performance under different environmental conditions.

5. Foaming and Lathering Characteristics

To evaluate the soap's ability to produce foam and cleanse effectively.

6. Consumer Sensory Evaluation

Assess the user experience and acceptability of the soap.

7. Toxicity Testing

Confirm the soap is free from harmful substances that could cause long-term health risks.

8. Cost-Effectiveness and Performance Evaluation

Evaluate whether the soap provides good value for the cost.

METHODOLOGY

Collection and Authentication of Plant: In the present study, I have selected the plant Azadirachta indica (Neem), Ocimum tenuiflorum (Tulsi) The Azadirachta Indica (Neem)& Ocimumtenuiflorum(Tulsi)leaves were collected from the chatrpati sambhajinagar city.

Preparation of Herbarium: After that we have prepared her barium of Azadirachta indica. For the herbarium the plant specimens are properly dried, pressed & mounted on sheets.

Preparation of Powder: The flower spetals were dried under shade for about 2weeks and then made into powdered form using mortar and pestle then sieved.

Extraction: The Azadirachta indica, Ocimum tenuiflorum, was extracted with water by decoction process 10gmofabovestatedpowder was taken in conical flask and extracted with water for 5hours with occasional agitation.

Preparation of Base Glycerine Soap

SR.NO	INGREDIENTS	Quantity	USES
1	Distilled Water	49.7g	Solvent
2	Sodium Hydroxide	15.7g	PH Adjustment
3	Palm Oil	34.0g	Fragrance
4	Cocount Oil	35.3g	Moisturizer
5	Castrol Oil	34.0g	Nourishing
6	Glycerine	19.6g	Skin soothing
7	Ethyl Alcohol	38.0g	Preservative
8	Sugar	23.6g	Moisturizer

Formulation table of Glycerine Soap

I) The lye solution was produced by blending sodium hydroxide(15.7gm) with distilled water (32.7 gm) in a non metallic pan and heating it below 500 C until it became transparent, then cooling it.

II) The addition of lye solution was done, which was produced by boiling palm oil, coconut oil, and castor oil.

III) Place the cover on the slow cooker and simmer or many hours (about Hours) until the soup mixture becomes translucent.

IV) Pour the alcohol and glycerine in to it. Allow the soap to simmer for about 30minutes, covered and sealed.

V) The already prepared sugar solution at lowtempisafter30min, in which the sugar entirely dissolved in the water.

VI) Then I gently poured glycerine soap in to the soap moulds.

VII) The mixture in soap moulds was allowed to cool to and get solidified in refrigerator.

Fig. 2.5: Base glycerine soap.

Procedure of Poly Herbal Soap Formulation

I) The small piece soft the prepared basic glycerine soap were put into apan and meltedona water bath at a temperature below 60°C.

II) Neem, Tulsi,turmeric extract was added after that all of the components such as honey, aloe vera, ethanol, stearic acid was combined together.

III) The liquids Was poured in to the mold, which was then allowed to harden at room temperature and evaluated the various parameters of soap.

Fig 2.6

Fig 2.7

5. LITERATURE OF REVIEW

Francisco Jose Gonzalez-Minero et al., (2020)- Rosemary is a plant native to the Mediterranean region that has been distributed throughout the world. It is a member of the Labiatae family, which includes manygenera that are frequently used in cosmetics because of their high level so anti oxidant compounds, including Salvia, Lavandula, and Thymus. Weassess the uses ofrosemary in cosmetics while taking into consideration its preservation properties, the products it is employed in, its toxicological safety, as well as its current uses or potential future roles in topical preparations, in accordance with most recent and continuing studies.

Ashlesha Ghanwat et al.,(2020): Azadirachta indica, Ocimum tenuiflorum, Sapindus mukorussi, and powdered Acacia concinna leaf and bark extracts were utilised to create a herbal cleaning soap and hand sanitizer. Ayurvedic cosmetics are often known as natural cosmetics since the natural components of the herbs have no negative effects on the body.[9]

Patil J. Netal., (2023): In their article entitled "Formulation and Evaluation of Camphoraloe soap" stated that numerous chemical toxins micro organism present in the atmosphere may

cause chemical infection and damage to skin cosmetic alone are not sufficient to take care of the skin and body.[16]

Govind A, etal., (2021): In their article entitled“ Formulation and Evaluation of herbal soap by using natural ingredients by using simple matched” stated that the plant used in soap preparation is able to soft the skin epidermis enhanced greater penetrationre move acne as well as promote healing and resolution in quickly in time.[11]

Saudagar R.B., Sisodiya M H et al., (2018): in their article entitled “Review on herbal cosmetics” stated that the herbal cosmetics are the most important part of the today’ smodern life as they are used for the beautification purpose.[15]

Telange-PatilP. Vetal, (2022): “Bacterial skin infection are most common among people, taking significant attention for treatment and also to maintain healthy skin some herbal factory excerpt have antibacterial exertion”[20]

R. Margret Chandiraetal, (2022): “Herbal cleaner has been used traditionally for treating several epidermal dysfunctions, similar as eczema, psoriasis, and acne and helps to boost vulnerable response in towel of affected skin area.”[18]

Patel Anu et al, (2022): “Herbal cleaner was prepared using coconut oil painting, castor oil painting, neem oil painting, lavender oil painting, rose oil painting, and NaOH(lye)and different excerpts were included into introductory saponification response.”[12]

Bothe Sauravet al(2022): “Ayurvedic cosmetics are also known as the herbal cosmetics the natural content in the sauces doesn't have any side effect on the mortal body most herbal supplement are grounded on several botanical constituents with long histories of traditional or familial drug operation. Among the multitudinous botanical constituents available in the request moment”[13]

Prasad, S. (2018): Throughout history, various culture shavere lied on herbal remedies for hygiene and medicinal purposes. Traditional knowledge and practices have longer cognized the antibacterial propertie so fcertain herbs, such as neem, tea tree, and lavender. The use of herbal formulations in soap-making dates back centuries, with ancient civilizations harnessing the antibacterial properties of plants to promote cleanliness and wellness.[14]

Slam, M., Ahmad, M. S., & Mahmood, M. A. (2019): Antibacterial poly herbal soap typically contains a blend of herbs known for their antimicrobial properties, such as neem, turmeric, and aloe vera. These herbs are often combined with natural oils like coconutoilor olive oil to create anourishing and moisturizing soap base. Additionaling redients may include essential oils for fragrance and other botanical extracts for enhanced antibacterial efficacy.[17]

Shinde, S., & Tatiya, A. (2020): The formulation of poly herbal soap plays a crucial role in determining its efficacy and stability. Optimization strategies may involve adjusting the concentrations of herbal extracts, selecting appropriate base oils, and incorporating synergistic ingredients to enhance antibacterial activity. Standardization of production processes and quality control measures are essential to ensure consistency and reproducibility in soap formulations.[19]

Lall, N., & Kishore, N. (2021): Despite the growing interest in poly herbal soap, several research gapsrema into be addressed. Future studies should focus one lucidating the mechanisms of action of herbal compounds, optimizing soap formulations for enhanced efficacy and stability, and conducting clinical trialsto evaluate long-term safety and effectiveness.

Collaborative efforts between academia, industry, and regulatory agencies are needed to advance the field of herbal soap research and promote the development of in novative and sustainable skin care solutions.[22]

6. CONCLUSION

Neem has been Extensively used in Ayurveda, Unani and Homoeopathic medicine and has be come admiration of modern medicine. Neeme laborate savast biologically active compounds that are structurally complex and Chemically diverse. Poly herbal soap were prepared by using cold process technique. The prepared formulation showing good physical characteristic.

The poly-herbal antibacterial soap formulation is a viable product with effective antibacterial action and skin compatibility. Its natural composition offers an attractive alternative to synthetic antibacterial soaps, with the added benefit of being less harsh on the skin. Further clinical trials and consumer studies can help validate its effectiveness and safety on a larger scale, and optimize its commercial potential.

The prepared polyherbal soap formulation when tested for different test gave good results. It does not give any irritancy to skin it was determined by using these soap hence it is proved that soap does not give any irritancy to skin.

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