

A Review on Formulation and Evaluation of Herbal Soap for Antimicrobial Activity

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Abstract: *The objective of our research is to create an herbal hygienic soap through a cold process method, incorporating an antimicrobial agent. The soap was formulated using coconut oil, castor oil, neem oil, lavender oil, rose oil, and NaOH (lye), along with various extracts integrated into the primary saponification process. We prepared the herbal formulation and conducted evaluations to analyze its pH, moisture content, foaming index, foam retention time, saponification, total fatty matter (TFM), and antimicrobial properties by comparing different concentrations of the soap solution to a standard. The herbal soap demonstrated promising antimicrobial effectiveness when compared to antibiotics. Additionally, the oils included are beneficial for treating various skin infections and are suitable for everyday use.*

Keywords: Poly herbal soap, Evaluation, saponification value, antimicrobial potential

I. INTRODUCTION

The word cosmetic was derived from the Greek word “kosm tikos” meaning having the power, arrange, skill in decorating¹. The origin of cosmetics forms a continuous narrative throughout the history of man as they developed. The man in prehistoric times 3000BC used colors for decoration to attract the animals that he wished to hunt and also the man survived attack from the enemy by coloring his skin and adorned his body for protection to provoke fear in an enemy (whether man or animal). The cosmetics, according to the Drugs and Cosmetics Act is defined as articles intended to be rubbed, poured, sprinkled or sprayed on, introduced into or otherwise applied to the human body or any part there of for cleansing, beautifying, promoting attractiveness or altering the appearance.

The cosmetic does not come under the preview of drug license. The herbal cosmetics are the preparations containing phytochemical from a variety of botanical sources, which influences the functions of skin and provide nutrients necessary for the healthy skin or hair. The natural herbs and their products when used for their aromatic value in cosmetic preparation are termed as herbal cosmetics. The Drug and Cosmetics Act specify that herbs and essential oils used in cosmetics must not claim to penetrate beyond the surface layers of the skin nor should have any therapeutic effect. Herbal soap preparation is a medicine or drugs it contain Antibacterial and antifungal agents which mainly uses of part of plants such as like leaves, stem, roots and fruits to treatment for a injury or disease or to achieve good health.

This preparation possess antimicrobial property are administered topically and available to apply in various forms like creams, lotion gel, soap, solvent extract or ointment. The variety of creams and soap properties have been used to treat various skin disorders. Mostly skin infection are caused by fungi, staphylococcus aureus and streptococcus species. Ethnomedicinally, juice and extract from leaves of the plants are topically applied as antimicrobial and anti-inflammatory agents in treatment of skin disease including eczemas, ringworm and pruritus⁸.

The succulent gel form is used to disorders of psoriasis. Crude preparation of soapy plant are able to soften the skin epidermis enhance greater penetration and cleaning acne and also promote healing and resolution in quickly in time. In this review article herbal soap containing neem, tulsi, shikakai and reetha as natural plant ingredients and this content gives or shows antibacterial antifungal and anti-inflammatory activity. In this soap, neem is main compound, and shows medicinal properties. Neem leaf and its extract exhibit immunomodulatory anti-inflammatory, anti-ulcer anti-malarial, antifungal antibacterial antioxidant anticarcinogenic property. Tulsi has got the greatest medicinal value. tulsi to be effective for diabetes they reducing blood glucose level tulsi also used in severe acute respiratory syndrome. Juice of its leaves gives relief in cold fever bronchitis and cough.

The main antifungal activity of Tulsi serves to be beneficial in soap formulation⁹. Reetha is an exceptional cleanser. Hence it's a perfect substitute for soap and facewash due the presence of saponins. It is also good for use on sensitive skin. A combination of Reetha and Chickpeas gives a gentle and enriching experience to the skin it has conditioning properties, therefore, it keeps skin moisturized and cool. Reetha prevents the skin from drying and keeps it soft and supple it also helps to treat eczema and psoriasis. Shikakai is quite effective in treating various skin infections like scabies and also used as an antiwrinkles property. In ancient times the written information on ayurveda like Charaka Samhita and Vajrasana has explained the usage of herbs in getting glowing complexion. The herbs used were chandana, nagkeshara, padmak, khus, yashtimadhu, manjistha, sariva, payasya, seta (sweta durva) and lata (shyama durva). These ayurvedic herbs are used to purify blood and eliminate vitiated doshas like (vata, pitta, kapha) from the body as they are mainly responsible for skin disorders and other diseases.

The herbs mentioned in Khushthagna Mahakashaya effective in skin disorders, include khadira, abhaya, amalaki, haridra, bhallataka, saptaparna, karavira, vidanga and jati. Some of the natural products used in ancient times include, the use of indigo and raktachandan as bindi/tika, madder root for beautifying lips and cheeks, aloe as skin protectant, chandan, vetiver and haldi as face packs. The use of ayurvedic herbs adds cosmetic value to the products.

The ayurveda is well known for the permanent cure for ailments and it is likely evident from the present market trends that the herbal cosmetic product will succeed in capturing the market. The knowledge about the structure and basic function of the skin and its appendages and knowledge of natural or herbal care or remedies for its problems will help to widen the importance of herbal cosmetics. The skin has the natural ability in continuously repairing to maintain its normal function. In young age the common skin problems are greasy skin and acne and during old age the skin becomes dry. To have a better skin, it is important to understand how our skin functions and to take proper precautions to maintain it.

II. LITERATURE REVIEW

1. Telange-Patil P.V et al ,2022 "Bacterial skin infections are most common among people, requiring significant attention for treatment and also to maintain healthy skin some herbal plant extracts have antibacterial activity."
2. R.Margret Chandira et al, 2022 "Herbal soap has been used traditionally for treating several epidermal dysfunctions, such as eczema, psoriasis, and acne and helps to boost immune response in tissue of affected skin area."
3. Patel Anu et al, 2022 "Herbal soap was prepared using coconut oil, castor oil, neem oil, lavender oil, rose oil, and NaOH (lye) and different extracts were included into basic saponification"

HERBAL SOAP

Herbal soap preparation is a medicine it contains antibacterial, anti-ageing, anti-oxidant, anti-septic properties which mainly uses parts of plants like seeds, rhizomes, nuts and pulps for treatment for an injury or disease or to achieve health. Herbal soap does not contain 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. The chemistry of herbal soap involves saponification, which is the chemical reaction that occurs when fats or oils are mixed with an alkali, typically sodium hydroxide (NaOH) or potassium hydroxide (KOH), to produce soap.

1. Fats or Oils: Herbal soaps are typically made from fats or oils, such as coconut oil, olive oil, palm oil, or shea butter. These fats or oils contain triglycerides, which are composed of glycerol molecules and fatty acid chains.
2. Alkali: An alkali, usually sodium hydroxide (NaOH) or potassium hydroxide (KOH), is used as a catalyst in the saponification process. The alkali reacts with the triglycerides in the fats or oils to break them down into their constituent molecules.
3. Saponification: The saponification process involves the hydrolysis of the triglycerides in the fats or oils by the alkali. The alkali molecule reacts with the ester.
4. Herbal Ingredients: Herbal soaps also contain herbal ingredients, such as dried herbs, botanicals, or essential oils, which are added to provide fragrance, color, and potential therapeutic properties.

TYPES OF HERBAL SOAP

There are various types of herbal soaps available that are made using different herbal ingredients. Some common types of herbal soaps include:

1. Lavender soap
2. Tea tree oil soap
3. Calendula soap
4. Neem soap
5. Aloe vera soap
6. Rosemary soap
7. Chamomile soap
8. Lemongrass soap
9. Patchouli soap
10. Turmeric soap

1. Lavender soap: Made using lavender essential oil, this soap is known for its calming and relaxing properties. It may help soothe irritated skin and promote a sense of well-being.

2. Tea tree oil soap: Tea tree oil is known for its antibacterial and antifungal properties, making this soap ideal for acne-prone or oily skin. It may help cleanse and purify the skin, while also helping to address skin conditions such as eczema or athlete's foot.

3. Calendula soap: Calendula is a herb known for its gentle and soothing calm properties, making it suitable for sensitive or irritated skin. It may help redness, inflammation, and itching, and promote skin healing

4. Neem soap: Neem is a natural herb with antibacterial and antifungal properties, making it a popular ingredient in herbal soaps. It may help cleanse and purify the skin, while also addressing skin conditions such as acne, eczema, or psoriasis.

5. Aloe vera soap: Aloe vera is a wellknown herb for its moisturizing and soothing properties. Aloe vera soap may help hydrate the skin, soothe sunburn, and promote skin healing.

6. Rosemary soap: Rosemary is an herb known for its antioxidant and antiinflammatory properties. Rosemary soap may help stimulate blood circulation, promote a sense of rejuvenation, and cleanse the skin.

7. Chamomile soap: Chamomile is a gentle herb known for its calming properties, making chamomile soap suitable for sensitive or irritated skin. It may help soothe redness, inflammation, and itching, and promote relaxation

8. Lemongrass soap: Lemongrass is a herb known for its invigorating and refreshing properties. Lemongrass soap may help cleanse the skin, boost mood, and provide a fresh citrusy scent.

9. Patchouli soap: Patchouli is an herb known for its earthy and musky aroma. Patchouli soap may help cleanse and deodorize the skin, while also providing a grounding and calming effect.

10. Turmeric soap: Turmeric is a herb known for its antioxidant and anti-inflammatory properties. Turmeric soap may help brighten the skin, address skin conditions such as acne or eczema, and provide a natural glow

PROPERTIES OF HERBAL SOAP:

1. Natural Ingredients
2. Mild and Gentle
3. Moisturizing
4. Antioxidant
5. Nourishing
6. Aromatherapeutic
7. Eco-friendly
8. Customizable

1. Natural Ingredients: Herbal soaps are typically made from natural ingredients such as plant extracts, essential oils, and herbs. These natural ingredients are often chosen for their skin-loving properties and are believed to provide various benefits for the skin.

2. **Mild and Gentle:** Herbal soaps are usually formulated to be mild and gentle on the skin. They are typically free from harsh chemicals, sulfates, and synthetic fragrances, which can be irritating to the skin. This makes herbal soaps suitable for people with sensitive skin
3. **Moisturizing:** Many herbal soaps contain moisturizing ingredients such as shea butter, cocoa butter, and natural oils, which can help to hydrate the skin and prevent dryness.
4. **Antioxidant-Rich:** Herbal soaps often contain plant extracts that are rich in antioxidants. Antioxidants help to neutralize free radicals, which are harmful molecules that can damage the skin cells and cause premature aging.
5. **Nourishing:** Herbal soaps are often formulated with nourishing ingredients such as vitamins, minerals, and essential fatty acids that can provide nutrition to the skin. These nutrients can help to support the skin's health and vitality, promoting a radiant and healthy complexion.
6. **Aromatherapeutic:** Herbal soaps often contain essential oils, which can provide aromatherapeutic benefits. The natural scents of essential oils can help relax the mind, uplift the mood, and provide a sensory experience during your skincare routine.
7. **Eco-Friendly:** Many herbal soaps are formulated with biodegradable ingredients and are packaged in environmentally friendly materials, making them a more sustainable choice for personal care products.
8. **Customizable:** Herbal soaps can be made at home or purchased from artisans, allowing for customization based on personal preferences or specific skin needs.

ADVANTAGES OF HERBAL SOAP:

1. **Natural Ingredients:** Herbal soaps are typically made from natural plant-based ingredients such as herbs, essential oils, and botanical extracts. These natural ingredients are often gentle on the skin and may help to soothe and nourish the skin without causing irritation or dryness.
2. **Hypoallergenic:** Herbal soaps are often hypoallergenic, meaning they are less likely to cause allergic reactions compared to synthetic soaps that may contain harsh chemicals and artificial fragrances.
3. **Environmentally Friendly:** Herbal soaps are generally considered to be more environmental friendly compared to synthetic soaps, as they are often biodegradable and do not contain harmful chemicals that may harm aquatic life or pollute the environment
4. **Aromatherapy Benefits:** Many herbal soaps contain essential oils, which can provide aromatherapy benefits. These essential oils may help to relax the mind, uplift the mood, and provide a sense of wellbeing during the bathing process.

DISADVANTAGES OF HERBAL SOAP

1. **Quality:** Herbal soaps are available in a wide range of brands and formulations, and the quality may vary. Some herbal soaps may contain lower quality ingredients or lack the desired efficacy, which can affect their performance.
2. **Limited Lather:** Herbal soaps may not lather as much as synthetic soaps due to their natural ingredients. While lather is not necessarily an indicator of cleaning efficacy, some people may prefer a rich lather during their bathing routine.
3. **Shorter Shelf Life:** Herbal soaps may have a shorter shelf life compared to synthetic soaps, as they do not typically contain preservatives. This means that they may spoil or become less effective over time, especially if not used within a certain period.
4. **Higher Cost:** Herbal soaps may be more expensive compared to synthetic soaps, as they often contain higher-quality natural ingredients. This can make them less affordable for some consumers, especially those on a tight budget.
5. **Limited Availability:** Depending on your location, herbal soaps may not be as widely available as synthetic soaps, which are mass-produced and readily available in most stores.

EVALUATION PARAMETERS

1. **pH of the herbal soap:** 10% of soap solution was prepared by dissolving 10 gm of soap in distilled water in a volumetric flask of 100 ml. For the determination of pH, pH meter was used. Electrode was introduced into the solution and the pH was noted down.

2. Colour and clarity characterization: The soap was visualized against a white background for the determination of its colour and to see the clarity of the formulated herbal soap.
3. Foam forming ability: For the determination of the herbal soap for its ability to form foam about 1.0 gm of soap was taken and was dissolved in distilled water (about 50ml) in a 100 ml graduated measuring cylinder. It the measuring cylinder was then shaken for about 2- 3 minutes and it was allowed to stand for about 10 min. Foam height was measured after 10 minute.
4. Retention time of foam: Foam retention time refers to the time for which the foam produced by the soap retains. The above procedure was repeated and the foam interval was measured for about 5-10 minutes.
5. Saponification value determination: The amount of Potassium Hydroxide in milligrams which is required for the complete saponification of fat or oil of 1 gm. In either word it is defined as the mean of molecular weight of fatty acid which is present in oil or fat. For the determination of saponification value about 2 gm of the soap sample was taken in a conical flask and 0.5M KOH solution was added to it. This mixture was heated to about 55 degrees Celsius along with stirring continuously on a hot water bath. Then the temperature was further increased 100 degrees Celsius.

III. CONCLUSION

According to previous studies, the antibacterial properties of neem were examined by water extraction of neem, basil, soap berry and acacia plants and by performing various tests. The proposed method showed good results during different experiments. It has been determined by some volunteers who used this soap that it does not cause skin irritation, thus proving that the soap does not cause skin irritation. In addition, various physical properties of the prepared soaps, such as pH, appearance and odor, which were found to be beneficial, were also evaluated.

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