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Review Article

Formulation and Evaluation of Aloe Vera Herbal Soap

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ABSTRACT

Aloe vera herbal soap, prepared using natural plant-based ingredients, offers a gentle and nourishing solution for skin care. The formulation combines fresh Aloe vera gel with oils such as olive, coconut, sunflower, and castor oil, creating a bar suitable for both facial and body use. Aloe vera gel, rich in vitamins, minerals, amino acids, and antioxidants, provides anti-inflammatory, antimicrobial, and wound-healing benefits, while the plant-derived oils contribute moisturizing, antioxidant, and skin-protective properties. This soap is effective in cleansing the skin, removing makeup residues, and promoting hydration, making it particularly beneficial for acne-prone, dry, or sensitive skin. Physico-chemical evaluation of the formulation, including pH, foam height, foam retention, and stability, indicates the product is within acceptable ranges for safe use. Regular application may help reduce inflammation, prevent bacterial infections, lighten blemishes, and support overall skin health. Aloe vera soap thus represents a multifunctional skincare product that combines natural therapeutic benefits with daily cleansing needs.

INTRODUCTION

Aloe vera soap, crafted from natural ingredients, is known for its gentle and nourishing effects on the skin. This herbal bar serves multiple purposes — it effectively cleanses the face, removes makeup residues, and provides deep moisturization to the epidermis. Additionally, it has been found beneficial in managing common skin issues such

as acne, eczema, and other dermatological conditions. Botanically known as *Aloe barbadensis* Miller, Aloe vera belongs to the family Asphodelaceae (formerly Liliaceae). It is a perennial, succulent, and xerophytic plant characterized by its thick, fleshy, triangular leaves with serrated edges, pea-green coloration, and yellow tubular flowers. Native to the arid regions of Africa, Asia, Europe, and America, Aloe vera leaves consist of three distinct layers — the

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innermost clear gel, which is composed of about 99% water, and the remainder comprising glucomannans, amino acids, lipids, sterols, and vitamins. Traditionally, Aloe vera has been valued for its medicinal properties, particularly in the treatment of burns, cuts, insect bites, eczema, and digestive ailments due to its potent anti-inflammatory, antimicrobial, and wound-healing effects.

Collection of Herbal Plant Materials:

The formulation of herbal Aloe vera soap involves the use of a variety of natural plant-based ingredients known for their beneficial effects on the skin. The key ingredient, *Aloe vera* gel, is obtained from the inner leaf pulp of the *Aloe barbadensis* Miller plant. It is rich in bioactive compounds that help soothe, hydrate, and rejuvenate the skin. In addition to Aloe vera, various plant-derived oils such as olive oil, coconut oil, sunflower oil, and castor oil are incorporated into the formulation. These oils serve as natural emollients and moisturizers, providing nourishment and maintaining skin softness. Each ingredient contributes unique properties — olive oil enhances skin smoothness, coconut oil offers antimicrobial benefits, sunflower oil includes vitamin E for skin protection, and castor oil supports lather formation and deep cleansing.

Aloe Vera Gel:



Biological Source: Aloe vera gel is obtained from the inner parenchymatous tissue of the fresh leaves of *Aloe barbadensis* Miller, a member of the family Asphodelaceae (formerly Liliaceae).

Morphology:

Aloe vera is a succulent herbaceous plant that typically grows to a height of 60–100 cm. The leaves are thick, fleshy, and lanceolate, with a green to grey-green coloration and serrated margins. Each leaf can reach up to 10 cm in width and contains a clear, mucilaginous gel within.

Uses:

- The gel is widely used in the treatment of minor skin wounds, burns, and irritations due to its soothing and healing properties.
- Boiled Aloe vera juice is traditionally applied to the scalp to help reduce hair fall and promote hair growth.

Benefits of Aloe Vera Gel:

Aloe vera gel is widely recognized for its diverse therapeutic and cosmetic benefits, attributed to its rich composition of bioactive plant compounds. It contains vitamins, minerals, enzymes, amino acids, and antioxidants that contribute to overall skin and health improvement. Some of its key benefits include:

- **Rich in beneficial plant compounds:** Aloe vera gel is a natural reservoir of vitamins (A, C, E, and B12), polysaccharides, and enzymes that support skin repair and hydration.
- **Antioxidant and antibacterial properties:** The presence of polyphenols helps inhibit the growth of harmful bacteria and protect the body from oxidative stress.
- **Promotes wound healing:** Aloe vera accelerates the healing of burns, cuts, and other

wounds by stimulating collagen production and tissue regeneration.

- **Reduces dental plaque:** Aloe vera juice has shown effectiveness in lowering dental plaque accumulation, serving as a natural alternative to chemical mouthwashes.
- **Treats canker sores:** Regular application of Aloe vera gel helps relieve pain and speeds up the healing of mouth ulcers.
- **Relieves constipation:** Aloe latex, when used in small doses, acts as a natural laxative due to the presence of anthraquinones, which stimulate bowel movement.
- **Improves skin texture and delays wrinkles:** Its moisturizing and antioxidant effects enhance skin elasticity and reduce signs of aging.
- **Lowers blood sugar levels:** Some studies suggest that Aloe vera may help regulate blood glucose, making it potentially useful for diabetes management (with proper medical supervision).

Olive Oil:



Biological Source: Olive oil is a natural liquid fat extracted from the ripe fruits of *Olea europaea*, belonging to the family Oleaceae.

Uses:

- Olive oil helps prevent premature skin aging by nourishing and protecting the skin from oxidative stress.
- It acts as an excellent natural moisturizer, maintaining skin softness and hydration.
- Commonly used as a gentle makeup remover, it effectively dissolves cosmetics without irritating the skin.
- Olive oil can aid in the healing of minor skin wounds due to its soothing and regenerative properties.
- Traditionally, warm olive oil has been used to reduce hair fall and improve scalp health.
- When combined with Aloe vera, it can help soothe and protect the skin from radiation-induced burns.

Benefits of Olive Oil:

- **Rich in healthy monounsaturated fats:** Olive oil primarily contains oleic acid, which supports cardiovascular and metabolic health.
- **High in antioxidants:** It provides phenolic compounds and vitamin E that protect cells from oxidative damage.
- **Strong anti-inflammatory effects:** Olive oil helps reduce inflammation, which contributes to its protective role against chronic diseases.
- **May help prevent strokes:** Regular consumption of olive oil has been linked to a reduced risk of stroke due to its beneficial effects on blood vessels.
- **Supports heart health:** It improves cholesterol balance and reduces blood pressure, thereby lowering heart disease risk.
- **Not associated with weight gain or obesity:** Despite being an oil, it promotes satiety and

metabolic balance, making it a healthy fat choice when consumed in moderation.

Coconut Oil:



Biological Source: Coconut oil is obtained from the dried kernel or meat of the mature fruit of *Cocos nucifera* L., which belongs to the family Arecaceae (Palmae).

Morphology:

Coconut oil is a colorless to pale yellow liquid at temperatures above 26°C and solidifies below 23°C. It has a melting point between 23°C and 26°C. The oil is soluble in alcohol at 60°C and highly soluble in chloroform.

Uses:

- Coconut oil is widely used as a natural moisturizer, providing deep hydration and nourishment to the skin.
- It is commonly used in body scrubs for exfoliation, leaving the skin soft and smooth.

Benefits of Coconut Oil:

- **Quick source of energy:** The medium-chain triglycerides (MCTs) present in coconut oil are rapidly metabolized by the liver, providing an immediate energy boost.

- **Antimicrobial properties:** Lauric acid and monolaurin in coconut oil exhibit strong antibacterial, antifungal, and antiviral effects.
- **Reduces hunger:** MCTs may increase satiety, helping in appetite control and weight management.
- **Helps reduce seizures:** Ketones produced from MCT metabolism may help reduce seizure frequency in individuals with epilepsy.
- **Boosts skin health:** Regular application improves skin elasticity, reduces dryness, and supports wound healing.
- **Protects hair:** Coconut oil nourishes the scalp, strengthens hair strands, and prevents protein loss, promoting smooth and shiny hair.
- **Improves oral health:** Oil pulling with coconut oil helps reduce harmful oral bacteria and promotes fresh breath.

Sunflower Oil:



Biological Source: Sunflower oil is extracted from the seeds of *Helianthus annuus* L., a member of the family Asteraceae.

Uses:

- Sunflower oil is primarily used as an edible cooking oil due to its light flavor, high smoke point, and nutritional value.
- It is also utilized in cosmetic formulations such as creams, lotions, and soaps for its moisturizing and skin-protective properties.

Benefits of Sunflower Oil:

- **Rich in vitamin E:** Sunflower oil is an excellent source of vitamin E, a potent antioxidant that protects skin cells from damage caused by free radicals. This helps prevent premature aging and the formation of wrinkles, keeping the skin smooth, youthful, and radiant.
- **Moisture retention:** The presence of linoleic acid helps strengthen the skin's natural barrier and maintain hydration, reducing dryness and flakiness.
- **Promotes skin healing:** Its anti-inflammatory and emollient properties make it beneficial for soothing irritated or sensitive skin.
- **Heart health:** When consumed, sunflower oil supports cardiovascular health due to its balance of unsaturated fatty acids that help manage cholesterol levels.

Castor Oil:



Biological Source: Castor oil is obtained by pressing the seeds of *Ricinus communis* L., which belongs to the family Euphorbiaceae.

Morphology:

Castor oil is a clear, colorless to pale yellow viscous liquid with a faint odor and a slightly unpleasant taste. It is soluble in alcohol and highly soluble in chloroform.

Uses:

- Castor oil is widely used to promote overall skin health due to its moisturizing and anti-inflammatory properties.
- It helps reduce puffiness and swelling, especially around the eyes.

Benefits of Castor Oil:

- **Prevents wrinkles:** Rich in antioxidants, castor oil helps neutralize free radicals that cause premature aging and fine lines.
- **Fights acne:** Its antibacterial and anti-inflammatory properties help in reducing acne and soothing irritated skin.
- **Reduces puffiness:** Regular application around the eyes can minimize swelling and dark circles.
- **Deeply moisturizes:** The high ricinoleic acid content provides intense hydration, keeping skin smooth and soft.
- **Soothes sunburn:** Castor oil has cooling and healing effects that relieve sunburned skin.
- **Treats dry lips:** It acts as a natural lip conditioner, preventing chapping and dryness.
- **Promotes healthy skin:** Overall, castor oil nourishes and rejuvenates the skin, enhancing its natural glow and elasticity.

• **Ingredients Used in the Formulation of Aloe Vera Soap:**

Sr. No.	Ingredient Name	Quantity (gm)
1	Distilled Water	35.5
2	Sodium Hydroxide (NaOH)	27.5
3	Fresh Aloe Vera Gel	28.5
4	Olive Oil	85
5	Coconut Oil	42.5
6	Sunflower Oil	28.5
7	Tallow	28.5
8	Castor Oil	14

Physico-Chemical Parameters of the Formulation:

Chemical Parameter	Standard Values
pH	6.5 – 7.5
% Free Alkali	0.25
Foam Height (cm)	2.5 – 3.0
Foam Retention (min)	0.5 – 2.5
Alcohol Insoluble Matter (%)	18.0
High Temperature Stability	45°C

Aloe Vera Facial Soap:

Aloe vera facial soap is formulated to be extra gentle and nourishing, making it suitable for both facial and body use. It is designed in small batches to ensure quality and consistency — the given recipe perfectly fills five out of six cavities of the oval silicone mold by Bramble Berry. For larger batches, the recipe can easily be doubled to fit into a standard loaf mold, such as the one by Crafters Choice. If fresh Aloe vera gel is unavailable, bottled Aloe vera liquid can be used as a substitute for water in the soap-making process. This maintains the same soothing and moisturizing qualities provided by the plant’s natural compounds.

Required Equipment:

To ensure safety and precision during soap preparation, the following equipment is recommended:

- **Safety goggles** – to protect eyes from lye or splashes.
- **Rubber gloves** – for hand protection during soap mixing.
- **Wooden or plastic soap mold** – to shape and set the soap.
- **Cucumber peeler** – to extract fresh Aloe vera gel from the leaf.
- **Large stainless steel or enamel pot** – for melting and mixing ingredients.
- **Weighing scales** – to accurately measure ingredients.

- **Hand stick blender** – to blend oils and lye solution into trace.
- **Two 3-quart plastic pitchers** – for mixing lye and oils separately.
- **Two wooden spoons** – for stirring the mixture.
- **Measuring cup (2–3 cup size)** – for precise liquid measurement.
- **8. Prepare the oils:** In a separate pot, melt the tallow (or butter) and coconut oil over low heat. Once melted, combine them with the remaining oils such as olive, sunflower, and castor oil. Mix well.
- **9. Add antioxidants:** If using, stir in rosemary oleoresin extract (ROE) to help preserve the oils and extend the shelf life of your soap

Directions to Make Aloe Vera Soap:

1. **Safety first:** Begin by putting on your goggles and rubber gloves to protect your eyes and skin from lye splashes. Work in a well-ventilated area.
2. **Prepare the lye solution:** Weigh the distilled water into a stainless steel or heavy-duty plastic container.
3. **Measure the lye:** Carefully weigh the sodium hydroxide (NaOH) into a separate small, dry cup.
4. **Mix lye into water:** Slowly sprinkle the lye into the water (never the other way around) while stirring continuously until it dissolves completely. The mixture will heat up rapidly.
5. **Add natural colorants (optional):** If desired, mix in green clay or chlorella powder to the lye solution for natural color and additional skin benefits.
6. **Cool the lye solution:** Place the lye mixture in a safe, ventilated area to cool for 30–40 minutes, or until it reaches a temperature of about 100–115°F (37–46°C).
7. **Incorporate sodium lactate (optional):** Once cooled, stir in sodium lactate (at about 1 teaspoon per pound of oils) to improve the soap's hardness and texture.
- **10. Combine lye and oils:** Slowly pour the cooled lye solution into the warm oil and Aloe vera mixture. Stir gently at first to avoid splashing.
- **11. Mix to trace:** Alternate between hand stirring and short bursts of the immersion blender until the soap mixture reaches “trace”—a light pudding-like consistency that indicates the oils and lye have emulsified properly.
- **12. Pour into molds:** Once trace is achieved, pour the soap batter into prepared molds. Tap the molds gently on the counter to release any trapped air bubbles.
- **13. Insulate the soap:** Cover the molds lightly with wax paper, then wrap with a towel or blanket to retain warmth and allow the saponification process to complete evenly.
- **14. Unmold the soap:** After 1 to 2 days, check the firmness of the soap. When it feels solid and can be removed without sticking, gently unmold the bars.
- **15. Cure the soap:** Place the soap bars on sheets of wax paper in a well-ventilated area to air-cure for at least 4 weeks. This curing period allows excess moisture to evaporate, resulting in a harder, milder, and longer-lasting soap.

Uses of Aloe Vera Soap:

1. **Aloe Vera Soap for Acne and Pimples:**



Aloe vera soap is highly effective in managing acne-prone skin due to its natural antibacterial and anti-inflammatory properties. It helps to reduce and control microorganisms responsible for causing acne and pimples. Regular use of Aloe vera soap gently cleanses the skin, removes excess oil and impurities, and prevents clogged pores, thereby reducing the occurrence of breakouts. The soothing and healing action of Aloe vera also helps calm redness, irritation, and inflammation associated with acne, promoting a clearer and healthier complexion. Continuous use can result in smooth, refreshed, and acne-free skin while maintaining the skin's natural moisture balance.

RESULT:



Aloe vera soap demonstrates multiple skin-beneficial properties, making it a valuable addition to daily skincare routines. It is gentle and soothing, helping to reduce inflammation and calm irritated skin. Its natural antimicrobial properties make it effective in fighting bacteria, which is particularly beneficial for acne-prone skin. Regular use of Aloe vera soap can help lighten the skin, fade scars, and diminish other blemishes, promoting a more even complexion. It is also highly suitable for dry skin, providing deep hydration and leaving the skin smooth, soft, and supple. The soap's effectiveness is enhanced by the presence of saponins in Aloe vera, which offer natural cleansing and antiseptic effects. This ensures that the soap not only

removes impurities and excess oils but also prevents infections in irritated skin, making Aloe vera soap an ideal choice for maintaining healthy, clear, and radiant skin.

CONCLUSION

Aloe vera herbal soap offers a natural and effective alternative to conventional soaps by combining the therapeutic benefits of Aloe vera with the nourishing properties of plant-based oils. The soap provides gentle cleansing while supporting skin hydration, reducing inflammation, and offering antimicrobial protection, making it suitable for acne-prone, dry, or sensitive skin. Its formulation promotes skin healing, improves texture, and maintains overall skin health. Although initial evaluations and physicochemical studies indicate favorable results, further clinical trials and long-term safety assessments are needed to fully validate its efficacy. To maximize benefits, users should select products that preserve the bioactive compounds of Aloe vera and perform patch tests when trying new formulations. With proper use, Aloe vera soap can serve as a safe, versatile, and skin-friendly option for both facial and body care.

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