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FORMULATION AND EVALUATION OF HERBAL SOAP

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Abstract:

Herbal soap is made with natural components with the goal of maximizing their medicinal advantages while producing a cleaning solution that is both environmentally friendly and highly effective. Incorporating different herbal extracts, essential oils, and natural additives with skin-enhancing qualities like antibacterial, antioxidant, and moisturizing benefits is the main emphasis of this study. Choosing appropriate plant-based components, incorporating them into a soap base, and creating a well-balanced product are the steps in the process.

To make sure the soap is mild and doesn't irritate skin, evaluation criteria include pH measurement, foam stability, washing effectiveness, and skin compatibility. Herbal elements including neem, aloe vera, turmeric, and essential oils improve the soap's ability to combat common skin issues like irritation, dryness, and acne. To preserve the skin's natural barrier function, pH levels are maintained within its normal range, while foam quality and washing efficacy are tailored to customer preferences.

The findings imply that herbal soap provides skin care advantages with less chemical exposure, making it a safer option than commercially available synthetic soaps. According to the study's findings, herbal soap compositions may both support ecologically friendly, sustainable practices and satisfy customer desire for natural skincare products. For large-scale manufacturing, more advancements in formulation methods and prolonged shelf-life testing are advised.

Keywords:*Herbal soap , ecologically,washing,manufacturing,neem*

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INTRODUCTION:

Herbal soap preparation is a type of medication or pharmaceutical that contains antibacterial and antifungal chemicals. Typically, it uses plant parts including leaves, stems, roots, and fruits to treat illnesses or injuries and promote overall health.Fungi, staphylococcus aureus, and streptococcus species are the most frequent causes of skin infections. Formulations for herbal soap that comprise antibacterial and antifungal substances are classified as medicines. They often use plant components including leaves, roots, stems, and fruit to heal wounds, prevent disease, or promote health [1].

Although chemical soap can lead to dry skin, skin damage, and skin allergies, soap is used to keep oneself clean and fresh. Many skin disorders can be brought on by the chemicals in soap. They clog pores, limit cell respiration, and accelerate the aging process of the skin by slowing down the skin's natural regeneration process. There are plants that work well for adding a natural color to a product. Certain plants work wonders for stress relief. Additional herbal additions might help the skin by reducing acne or reducing irritation. Because of this, several plants contain a variety of essential minerals and vitamins that are quite beneficial. The leaf of neem and its extract has antibacterial, antifungal, and anti-inflammatory qualities[2].

Types of herbal soap :

Based on their shape, application, and use, the following five groups of skin-washing products can be loosely categorized.

- Body soaps
- Face wash
- soaps for toilets
- dishwashing liquid

Cosmetics by themselves are insufficient to take care of skin and body parts; a variety of chemical toxins and microorganisms found in the atmosphere can cause chemical illness and damage to skin. The Neem (*Azadirachta indica*) tree has gained global recognition due to its several medical benefits[3].

Skin anatomy:

The skin is the biggest organ in the body. Everything on the body is covered. It serves as a barrier to ward against damage, sickness, light, and heat. In addition, the skin maintains water and fat stores and controls body temperature.

- Prevents water loss • Is a sensory organ

It serves as a barrier between the organism and its surroundings, preventing the entry of microbes, and it helps produce vitamin D when exposed to sunshine.

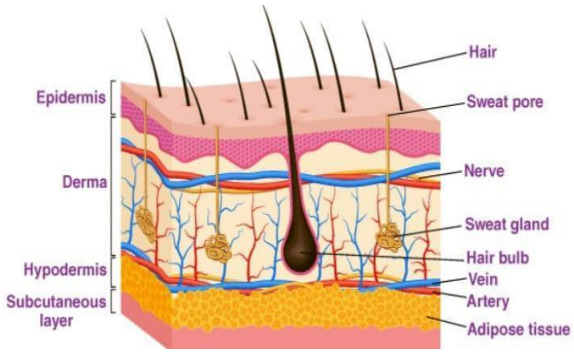

Figure. 1 Skin anatomy

Everywhere on your body, skin changes in thickness, color, and texture. For instance, there are more hair follicles on your head than anyplace else. However, your feet's soles are devoid of any. Furthermore, compared to other parts of your body, the skin on the palms of your hands and the soles of your feet are somewhat thicker.

There are three layers to the skin. Every layer has a certain purpose.

- Epidermis
- Dermis • Hypodermis, or subcutaneous fat layer, [4]

Most common skin diseases :

Skin irritations
Acne
eczema
Psoriasis
Dry skin and urticaria
Allergy [5].

Planning of work :

1. Gathering of the Content.
2. Removal of a particular plant.
3. Making Herbal Lotion
4. Assessment of Herbal Soap
5. Data compilation
6. Report submission.

MATERIALS AND METHODS:

Materials :

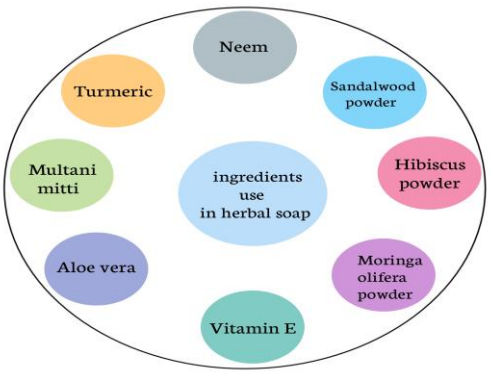

Fig.2. Iingredients use in herbal soap

1.Neem :

• Equivalent to: Nimba, Aristha, Neem
• *Azadirachta indica* is the name in science
• Meliaceae Family
• Chemical Components: Neem leaves include azadirone, nimbin, nimmbidin, vanilic acid, glycosides, B-sitosterol, nimbectin, kaempeerol, and quercursertin.
• Applications: It could have anti-allergenic properties. It could serve as an anti-inflammatory. Neem leaves are applied topically to treat skin conditions, wounds, head lice, and skin diseases[6].

Fig.3.Neem (*Azadirachta indica)*

2.Tulsi :

•Equivalent to holy basil, Tulsi derives from the dried and fresh leaves of Ocimum species, including *Ocimum sanctum L*. and *Ocimum basilicum L*.
The Lamiaceae family.
• Chemical components: It mostly consists of carvacrol, eugenol, and eugenol-methyl ether. It has caryophyl-lin as well. Fixed oil with strong drying qualities is found in seeds.
• Use: Because of its anti-inflammatory, antiseptic, and antibacterial qualities, tulsi is used to treat skin issues like acne and skin irritation[7].

Fig.4.Tulsi (*Ocimum basilicum L)*

3.Sandalwood :

•Synonym: Sandalwood tree; biological source: dried *Santalum album* bark, a member of the Santalaceae family.

• chemical components: phytosterols, esters, aldehydes, cedrol, and Santalol
Uses: Relieve sunburn
Eliminate sunburn Lessen wrinkles[8].

Fig.5.Sandalwood powder (*Santalum album)*

4.Aloe Vera[9,10] :

• Synonym: Aloe vera
• Botanical name: *Aloe barbadensis*
• Family: Asphodelaceae
• Biological source: Aloe is the dried latex Of leaves of various species of Aloes.
• Uses: Treats sunburns, acts as a moisturizer, treats acne, antiseptic, wound healing, antibacterial.

Fig.6.Aloevera (*Aloe barbadensis)*

5. **Moringa oleifera bark charcoal:**

• Botanical name: *Moringa oleifera*
• Family: Moringaceae
• It is used as preventing acne breakouts on skin.
• It is also helps in removing blemishes, dark spots, pimples and blackheads.
• It is used for skin whitening agent
• It possess anti-bacterial, anti-inflammatory and anti-oxidant activity.
• It also possess antiseptic property. Moringa contains Vitamin A and also contains vitamin C, which helps to recover damaged skin cells.
• Moringa oil may also assist to enhance the appearance of your skin. Dark spots, acne, and other skin problems may leave your face with unwanted markings and scars. Moringa may help to smooth these characteristics and give you a radiant, even appearance[11]].

Moringa leaves are plants that are known to have antioxidant activity. Antioxidants contained in Moringa leaves have activity to neutralize free radicals thereby preventing oxidative damage to most of the biomolecules and providing significant protection against oxidative damage[12].

Fig.7.*Moringa olifera* powder (*Moringa oleifera)*

6. Multani mitti :

• Synonym- Multan clay

• Biological source- It consists of hydrous aluminum silicates (clay minerals).

• Chief chemical constituents- Montmorillonite, Kaolinite, Attapulgite

• Uses-

Nourishes skin, Reduce oiliness, Remove blackheads[13].

Fig.8.Multani mitti

7.Hibiscus:

• Synonym: Hibiscus

• Biological Source: *Hibiscus rosa sinesis*

• Family: Malvaceae

• Uses:

1.Promote hair growth and reduce hair volume

2.Good hair

3.Protect skin

4.Improve scalp and itching

5.Prevent premature graying of hair[14].

Fig.9.Hibiscus (*Hibiscus rosa sinesis*)

8.Turmeric Podwer

• Synonym: Haldi

• Biological source: Turmeric consists of dried, as well as fresh rhizomes of plantknown as *Curcuma longa linn.*

• Family: Zingiberaceae.

• Chemical constituents: Curmin, Dimethoxy Curmin.

• Use: Use as antibacterial. Help to brighten skin and the appearance of uneven tone, leaving you with clearer skin[15].

Fig.10.Turmeric (*Cucurma longa*)

9.Rose :

• Family: Rosaceae

• Botanical name: *Rosa Rubiginosa*

• Rose oil: It is extracted from the petals of various type of roses.

• Uses: Nourish, hydrated, heal the skin[16].

Fig.11.Rose water (*Rosa Rubiginosa)*

10.Vitamin E :

• Rejuvenates and restores dehydrated skin

• Moisturizes the skin

• Reverses premature skin aging

• Lightens dark spots

• Acts as a cleansing agent

• Prevent wrinkle[17].

Fig.12. Vitamin e capsule

Fig no 12 :Herbal soap

Formulation of polyherbal soap :

Table.No.1: The formula is preparation of herbal soap.

S.No.	Ingredients	F1	F2	F3	Uses
1.	Soap base	40 gm	55 gm	80 gm	Remove the dirt.
2.	Sandalwood powder	1 gm	2 gm	3 gm	Fragrance.
3.	Turmeric powder	1 gm	1.5 gm	2 gm	Skin brightening
4.	Moringa olifera powder	1 gm	1 gm	2 gm	Skin whitening agent
5.	Hibiscus powder	1 gm	1 gm	3 gm	Protect skin
6.	Multani mitti	1 gm	1.5 gm	3 gm	Oil Absorbing
7.	Aloe vera	1 gm	1 gm	3 gm	Antioxidant, colling agent.
8.	Rose water	Q.S	Q.S	Q.S	Skin smoothening
9.	Vitamin e capsule	1 ml	1 ml	1 ml	Moisturizer
10.	Neem oil	1 ml	1 ml	1 ml	Antibacterial.
11	Tulsi powder	1 gm	1 gm	2 gm	Antiseptic, Antibacterial

Method of preparation [18] :

• Fill a beaker with the required amount of soap base.
• Make sure to maintain and control the temperature when heating the soap base in a water bath.
• After heating, the soap base will turn liquid.
• Next, incorporate the components indicated in the formulation table. To get the right mixture, bring the mixture to a boil in a water bath without stirring.
• This mixture is poured into the soap mold.
• It was allowed to cool at room temperature for a few hours.
• Soap is created.

• Advantages of herbal soap :

Natural elements found in herbal soap, such as plant extracts, essential oils, and herbs, provide a number of benefits over synthetic soaps.

1. Gentle on the skin: Herbal soaps are often gentler and milder on the skin than synthetic soap, making them suitable for more delicate skin types.
2. Natural ingredient: They usually contain natural substances like aloe vera that hydrate and nourish the skin.
3. Chemical-Free: Herbal soaps are less likely to cause allergic reactions and skin irritation because they don't include harsh chemicals, artificial fragrances, or synthetic colors.
4. Eco-Friendly: Because herbal soaps are manufactured with natural components, they are usually biodegradable and eco-friendly in comparison to synthetic ones.
5. Natural antibacterial properties: Some herbal ingredients, such as tea tree oil and neem, contain antibacterial properties that help detoxify and protect the skin from infections.

Methods :

Antioxidant activity

Antioxidant activity was carried out using the reducing power method. In this approach, a rise in the reaction mixture's absorbance denotes a rise in

antioxidant activity or reducing power. In this procedure, 2.5 mlof 0.2 Molar phosphate buffer (pH 6.6) and a 1 percent w/v solution of potassium ferricyanide are combined with 1 ml of test sample diluted with distilled water (2.5 ml). After that, this combination is incubated for 20 min at 500 °C. After incubation, the mixture is recovered, and 2.5 ml of 10% C2HCl3O2 is added. The reaction mixture is centrifuged for 15 min at 250 rpm, and the upper supernatant layer of the solution (2.5 ml) is removed and combined with 2.5 ml of purified water and 0.1 percent ferric chloride (0.5 ml). In comparison to a control, the resultant solution is exposed to UV at 700 nm [23].

Antibacterial assay

The antibacterial experiment was conducted against two bacterial strains, Gram-positive (B. subtilis) and Gram-negative (S. Typhi), using the disc diffusion method. In this method, nutritional agar medium plates were seeded with 100 l of suspension of each microbe, containing around 100–150 CFU/ml. After being dried and sanitized, filter paper discs (6 mm in diameter) soaked in 400 g of test solution were gently placed on the agar plates. The antibacterial activity of the extracts was assessed following a 24-hour incubation period at 37 °C by measuring the diameter of the zone of inhibition in millimeters [23].

RESULTS:

• Evaluation of herbal soap :

1. Organoleptic evaluation :

1.Color: dark brown.
2.Odour: earthy and distinctive.
3.Appearance: Good.
4.Shape: Round shape.

Table no 2 : Evalution parameter of herbal soap .

S.No.	Parameter	F1	F2	F3
1.	Colour	Brown	Brown	Dark brown
2.	Odour	spicy smell	Distinctive	earthy and distinctive.
3.	Apprence	Good	Good	Good
4.	Shape	Round shape	Round shape	Round shape

2. Physical evaluation :

1.PH :

The pH was determined by using pH paper.

Table no 3 : PH

Parameter	F1	F2	F3
PH	11	**12**	**7**

2.Foam heigh test :

A 0.5-gram sample of soap was taken and dissolved in 25 milliliters of purified water. It should then be placed in a 100 ml measuring cylinder and filled with water to reach a 50 ml volume. The foam height was measured above the aqueous volume after 25 strokes, and the aqueous volume was measured up to 50 ml [19].

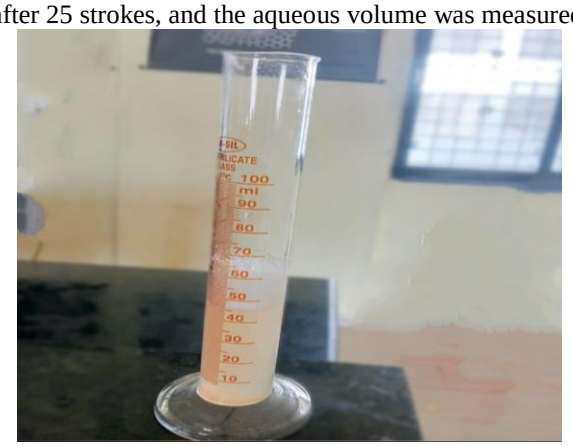

Fig.13.Foam hight

Table no 4: value of foam .

Parameter	F1	F2	F3
Foam Hight	2.5	2.7	3.0

3. Foam retention :

Fill a 100 milliliter measuring cylinder with 25 milliliters of the 1% soap solution, then shake it ten times. The volume of foam was measured every minute for four to five minutes [20].

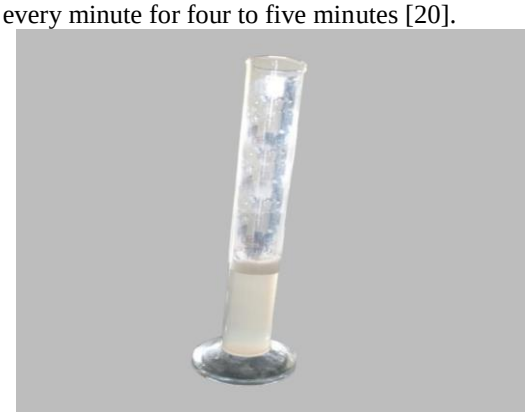

Fig 14.Foam retention

Table no:5: Value of foam reaction .

Parameter	F1	F2	F3
Foam formation	142	144	150

4.Irritation test :

At least three participants were chosen for the primary skin irritation test, and after preparing soap strips and applying them to their hands, the degree of irritation was measured [21].

Fig.15.Irritation test for herbal soap

Table no :6 : Irritation test of herbal soap .

Parameter	F1	F2	F3
Irritation test	No irritation	No irritation	No irritation

5.Washing Capability :

A number of crucial factors are taken into account while assessing the washability of herbal soap in order to guarantee both its efficacy and user pleasure. To start, the soap's water solubility is evaluated to see how well it lathers and rinses off, which affects how easy it is to use. After use, the amount of residue on the skin or washcloth is checked since too much residue might compromise the effectiveness of the soap and the comfort of the user.In order to minimize dryness and irritation, the soap's pH level is also analyzed to make sure it is in line with the skin's natural pH. To guarantee complete washing, the soap's lather stability and capacity to remove various kinds of oil and grime are also assessed. Together, these factors aid in evaluating the general washability and efficacy of herbal soaps for everyday usage.[22]

Table 7 : Washing Capability.

Parameter	F1	F2	F3
Washing capability	Good	Good	Excellent

DISCUSSION:

The goal of the study on the formulation and assessment of herbal soap is to provide an environmentally responsible, skin-beneficial substitute for conventional soap by including natural components such as plant extracts, essential oils, and natural additions. The main elements of the formulation process, the assessment techniques, and the conclusions' ramifications can serve as the framework for the conversation.Traditional saponification methods were used in the soap manufacture, which involved mixing oils and fats

with a strong alkali (usually sodium hydroxide). But what made this study special was the inclusion of a variety of herbal components that were chosen for their therapeutic and medical qualities.

Among them was neem extract (Azadirachta indica), which has antibacterial qualities.Aloe Vera Gel, also known as Aloe barbadensis, for its calming and hydrating properties.Curcuma longa, or turmeric, for its anti-inflammatory and antioxidant properties.Essential oils for scent and added antibacterial or antifungal properties, such as tea tree or lavender oil.These components were carefully chosen and used because of their potential to boost cleaning action, promote healthy skin, and provide therapeutic advantages. In order to create a stable soap composition that could lather effectively while still being skin-compatible, the proportion of oils to herbal extracts was tuned.Both qualitative and quantitative metrics were used in the assessment of the herbal soap.Numerous crucial factors were examined, such as the pH balance: The pH of the soap was kept between 5-7, which is quite similar to the pH of the skin (around 5.5). A pH that is adjusted prevents dryness and irritation by ensuring that the soap does not interfere with the skin's acid layer.Stability of Foam and Cleaning Effectiveness: Stability and foam formation are critical elements in determining customer happiness. The potential of herbal soaps containing natural oils and extracts to create a rich, stable foam while yet having sufficient cleaning power was assessed. The soap's capacity to eliminate pollutants, oils, and filth was unaffected by the herbs and oils.

Antimicrobial Activity: Many herbal extracts, such as neem and tea tree oil, possess strong antimicrobial properties. Tests conducted on herbal soap demonstrated enhanced antimicrobial activity against common skin pathogens, such as Staphylococcus aureus and Escherichia coli. This confirms the ability of the soap to not only clean but also offer therapeutic benefits for conditions such as acne or skin infections.Moisturizing Properties in which the one of the main advantages of herbal soap over conventional synthetic soap is its ability to retain moisture. Herbal extracts, like aloe vera, were shown to improve the moisturizing effect of the soap, reducing skin dryness, which is often associated with regular soap use. The addition of glycerin and natural oils (coconut or olive oil) also contributed to the soap's hydrating

Sensory evaluation by a group of volunteers assessed parameters like lather quality, fragrance, skin feel, and after-wash softness. Responses revealed that the essential oils used in the herbal soap gave it a pleasing scent, and that it left the skin feeling smooth and renewed. The absence of harsh chemicals such as sulfates or parabens made the soap more appealing to health-conscious consumers seeking natural products.Herbal soap's biodegradability and lack of artificial ingredients that are bad for the environment are two of its main benefits. This study encourages the use of natural components in soap formulation, which supports a sustainable approach to skincare goods. The usage of eco-friendly packaging and plant-based oils and extracts is in line with consumer trends that want to lessen their environmental impact.

Compared to synthetic soaps, which often contain harsh detergents, artificial fragrances, and chemical preservatives, herbal soap presents a healthier alternative for the skin and the environment. This study found that herbal soap not only matched but often surpassed synthetic counterparts in terms of cleansing efficacy, antimicrobial activity, and skin compatibility. Commercial soaps, while effective cleaners, can strip the skin of natural oils, leading to dryness and irritation, which was notably reduced with the use of herbal soap.

This study paves the way for future research on the optimization of herbal soap formulations, the investigation of various herbal combinations, and the enhancement of sensory appeal without compromising natural integrity. It may also investigate the creation of herbal soaps customized for particular skin conditions, like psoriasis, eczema, or sensitive skin, through the use of specialized herbal extracts or oils. Finally, long-term clinical trials may confirm the long-term advantages of using herbal soap on skin health.

CONCLUSION:

In conclusion, the formulation and evaluation of herbal soap demonstrate the potential for using natural ingredients to create effective, eco-friendly, and skin-beneficial products. The use of plant-based ingredients, such as essential oils, herbal extracts, and natural colorants, contributes to enhanced antimicrobial, antioxidant, and moisturizing properties. Evaluation tests on pH, foam stability, cleansing action, and skin compatibility confirm that herbal soap can offer a safer alternative to synthetic products, minimizing harmful chemicals and potential irritants.Overall, herbal soap formulations not only provide skin health benefits but also promote sustainability and environmental friendliness, making them a promising option for consumers seeking natural and holistic skincare solutions. Further research and optimization can improve the formulations to enhance shelf life, sensory properties, and therapeutic effects.

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