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FORMULATION AND EVALUATION OF POLYHERBAL SOAP AND ITS ANTI MICROBIAL ACTIVITY

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ABSTRACT

People have been using medicinal plants for centuries to treat various ailments. The extract from the leaves, stems, and roots of these plants has been a natural remedy for many health issues. Commercial soaps often contain harmful ingredients, making natural herbal soaps a good alternative. Bacterial skin infections are common and require proper treatment and skincare. Some herbal plant extracts and oils have been found to have antibacterial properties. To address this, an antimicrobial Polyherbal soap was formulated using ingredients like Neem leaves, Tulsi leaves, Aloevera, Turmeric rhizome, Great basil, Cucumber powder, Papaya powder. Neem leaves powder have traditionally been used to treat skin disorders due to their antioxidant properties. Aloe vera is known for preventing aging, reducing acne, and moisturizing the skin. Turmeric is beneficial for treating skin injuries and conditions like psoriasis. The Polyherbal soap was tested for its antimicrobial activity and showed positive results. So, the use of medicinal plants in soap production offers cost-effective benefits with minimal side effects.

KEYWORDS:

Polyherbal Soap, Neem leaves, Tulsi leaves, Aloevera, Turmeric rhizome, Great basil, Cucumber powder, Papaya powder, antimicrobial activity.

INTRODUCTION

Cleanliness is a very important thing due to the increasing number of diseases caused by bacteria as and germs.[1] Soap is a substance used with water for washing and cleaning, made of a compound of natural oils or fats with sodium hydroxide or another strong alkali, and typically having perfume and coloring added. Even today, soap is not just used for cleaning to maintain the health of the skins; there are also some soap that also serves as softening soap and whitening soap. In making soap often used various kinds of fats or oils as raw material. For being used in soap manufacture the type of oil needs to be selected in accordance with the use of soap itself.[2]

Now-a-days herbal extracts are used in the cosmetic preparations for augmenting beauty and attractiveness. Herbal cosmetics are classified on the basis of dosage form like-cream, powder, soaps, solutions, etc. and according to part or organ of the body to be applied for like; cosmetics for skin, hair, nail, teeth and mouth etc. Considering todays life style, the demand for natural and eco-friendly personal care product has surged in recent year which gives freshness and glowing skin. Nowadays, adverse effects of synthetic chemicals on health, skin and environment. Among this product soaps serve as a fundamental necessity for personal hygiene and skin care. Poly herbal soaps which combine multiple herbal extract and herbs which having the therapeutic properties of various plants offering an alternative that is both effective and gentle on the skin. Herbs such as Neem leaves, Tulsi leaves, Aloevera, Turmeric rhizome, Great basil, Cucumber powder, Papaya powder have long been used in traditional medicine for their antibacterial, antifungal, anti-inflammatory property[3,4].

Natural cleaning soap practise is a medicine it incorporate antibacterial, anti-aging, anti- oxidant, anti-septic properties which specifically makes use of of part of plant like seeds, rhizomes, nuts and pulps to remedy for an harm or disease or to obtain health. Herbal soap do no longer comprise the artificial colours, flavours, fluorides etc., while as compared to the content of commercial soap. Herbs are the herbal merchandise generally located inside the remedy of just about all diseases and skin issues owing to their excessive medicinal price, cost powerfulness, availability and compatibility[5]

MATERIAL AND METHODS

Collection of Plant Parts

For the preparation of polyherbal soap, various fresh and dried herbal materials were collected including Neem leaves, Tulsi leaves, Aloevera, Turmeric rhizome, Great basil, Cucumber powder, Papaya powder.Aloes, Tulsi were collected from Ultra College of Pharmacy. Turmeric Rhizome, Neem Powder, Cucumber Powder, PapayaPowder, Great Basil were collected from the Kannadiyar Shop, Simmakal Madurai. All plant materials were washed thoroughly, shade dried (where needed), and pulverized to fine powder using a mechanical grinder[6].

DOUBLE BOILING / MELT & POUR METHOD

First, 70 g of transparent glycerin soap base was taken and cut into small cubes. The pieces were transferred into a double-boiler and melted on slow heat for 10–15 minutes. After complete melting, the following herbal ingredients were weighed individually (2 g each using a digital balance): Neem powder, Tulsi powder, Turmeric powder, Aloe vera powder, Great basil.1 mL of Rose essential oil were added into the mixture during heating. The herbal powders were slowly incorporated into the molten soap base with continuous stirring to avoid lump formation. Then 1 ml of coconut oil, oil were added as moisturizing agents. The mixture was stirred thoroughly for 5 minutes to ensure uniform dispersion of herbs. The prepared herbal soap mixture was poured into a mold pre-lubricated with butter paper and allowed to solidify at room temperature. After 24 hours, the solidified soap block was removed and cut into equal pieces. The formulated poly herbal soap was stored in airtight containers for further evaluation.[7]

Table 1: Ingredients used in formulation of poly herbal soap

S.NO	HERBAL INGREDIENTS	QUANTITY	IMAGES
1.	GREAT BASIL LEAVES	20g	
2.	NEEM LEAF	3g	
3.	ALOEVERA	2g	
4.	TULSI	2g	
5.	TURMERIC	3g	
6.	CUCUMBER	2g	
7.	PAPAYA	2g	
8.	SOAP NUT	3g	
9.	ROSE OIL	1ml	

S.NO	HERBAL INGREDIENTS	QUANTITY	IMAGES
10.	COCONUT OIL	1ml	
11.	VITAMIN E CAPSULE	1ml	
12.	SOAP BASE	70g	

PHYSICAL PARAMETER RESULT OF POLYHERBAL SOAP[8-10]

pH: "Standard pH of polyherbal soap: **8.0 – 10.0**

The pH of the prepared polyherbal soap was found to be **8.5**.The soap exhibited a light green color, indicating uniform incorporation of herbal ingredients

MOISTURE CONTENT:

"Standard moisture content of polyherbal soap:**10% – 15%"**

The value of **11**% shows good and acceptable for herbal soaps.

TOTAL FATTY MATTER:

STD: 76% AND ABOVE (High Quality Premium Soap)

The Total Fatty Matter (TFM) of the prepared polyherbal soap was found to be **80**%. This indicates that the soap comes under **Grade I** quality, showing good cleansing efficiency, mildness on skin, better hardness, and superior overall quality.

FOAM HEIGHT &FOAM RETENTION:

The final result of foam height is **13cm**, indicating good foaming ability and effective surfactant action of the herbal ingredients present in the soap.The foam height measured after the specified retention time showed a foam retention value of **57.69%,** indicating that more than half of the initial foam was retained over the test period.

SKIN IRRITATION TEST:

The skin irritation test of the formulated polyherbal soap was carried out to evaluate its safety for topical application. The results showed no signs of redness, swelling, itching, or inflammation on the test skin during and after the observation period. Hence, the formulation passed the skin irritation test, indicating that the polyherbal soap is non-irritant and safe for regular skin use.

Table 2: Physical and Biological Evaluation of Poly Herbal Soap

CHEMICAL ANALYSIS		
SI.NO	**PARAMETER**	**RESULT**
1.	pH	8.5
2.	Moisture content	11
3.	Total fatty matter	80%
4.	Foam height	13cm
5.	Foam retention	57.69%
6.	Skin irritation test	Pass

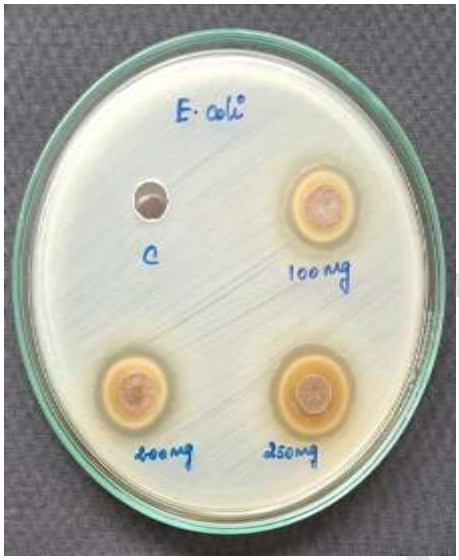
ANTIMICROBIAL ACTIVITY[11]

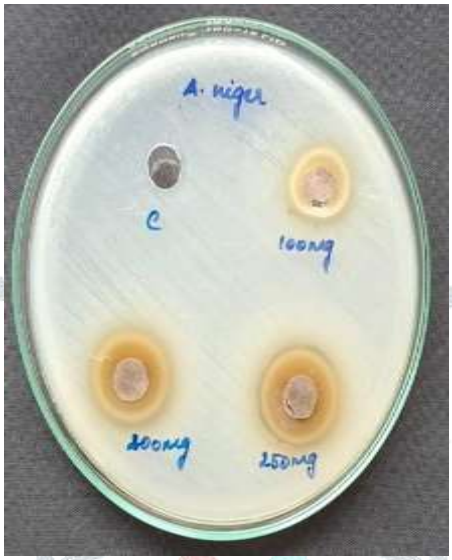
Preparation of growth media: Nutrient agar was taken (2.3 gm with 100ml of distilled water) for preparation of growth media. Prepared Nutrient agar was autoclave at 120^0c 9 and 15 1b.Pressure and then nutrient agar was poured in petri plates under the laminar flow with suitable sterile conditions.

Determination of zone of inhibition: Anti-fungal & Antibacterial activity was checked by agar well diffusion method. In this method a previously liquefied medium was inoculated with 0.2ml of fungal and bacterial suspension having a uniform turbidity at temperature of 400^0c.20ml of culture medium was poured into sterile petri dish having internal diameter of 8.5 cm. After complete solidification of liquefied inoculated medium. The wells where made aseptically with cork borer having 6mm diameter in each of this plate oil solution was placed carefully. The plates were incubated at 37^0c for 24 hours in case of bacteria & at27^0c for48hours in case of fungi. After incubation period was over, zone of inhibition was measured.

Table 3:Anti microbial activity of herbal soap

S. No	Microbial strains	Concentration in mg & Zone of Inhibition in mm/ml		
		100	200	250
1	*Escherichia coli*	18	19	21
2	*Aspergillusniger*	14	18	21





RESULTS AND DISCUSSION

The Polyherbal soap results of various evaluation parameters are shown in the table 2. The table depicts that the pH of the herbal formation was 8.5 which was optimum for its utilization on the skin. Higher as well as lower skin pH refers to the harmful effects on the skin .The foaming index of the given herbal formulation was found to be 57.69% while the foam retention time was found to be 10 minutes. This means the lather producing ability of the soap was satisfactory and stable. The total fatty mater determination was 80%. The quality of soap is represented by the total fatty matter. If the total fatty matter is lower, then it is not optimum for the dry skin. Greater the fatty matter more it helps in moisturizing the skin The percentage of moisture content in the herbal soap was evaluated to be 3.5%. Greater the moisture, more will the deterioration of the sample. In addition, the antimicrobial testing was successfully performed as shown in the table 3 with successful inhibition of the microorganism E. coli and S. aureus. Conclusion The evaluation parameters carried for standardizing the herbal soap by color determination, pH, TFM, ethanol soluble content, Saponification value were carried out. This led to an outcome of the formulation of stable Polyherbal soap possessing potent antimicrobial activity against various micro-organisms such as *E. coli* and *A.niger*. In addition this formulation was found to be used for daily use and did not cause any skin irritation. The blends of various oils in this soap formulation helped in providing specific activity to the formulation possessing potent medicinal properties.

CONCLUSION

The evaluation parameters carried for standardizing the herbal soap by color determination, pH, TFM were carried out. This led to an outcome of the formulation of stable Polyherbal soap possessing potent antimicrobial activity against various micro-organisms such as *E. coli* and *A.niger*. In addition this formulation was found to be used for daily use and did not cause any skin irritation. The blends of various oils in this soap formulation helped in providing specific activity to the formulation possessing potent medicinal properties.

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