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DEVELOPMENT AND CHARACTERIZATION OF PLANT EXTRACT-ENRICHED SOAP FOR SKIN CARE

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ABSTRACT

Ayurvedic cosmetic is also known as herbal cosmetic. Cosmetic alone is not sufficient to take care of skin. Herbal drugs has medicinal properties to fighting skin problems. An herbal soap was formulated using leaf extract of Azadirachta indica (neem), mangifera indica (mango), citrus lemon, sapindus mukorossi (reetha). The extract of all herbal plants prepared and soap was formulated by using polymers like stearic acid, glycerin soap base. Soap was evaluated. The formulated soap showed antibacterial activity.

KEYWORDS: Herbal soap, Azadirachta indica, Mangifera indica, Citrus lemon, antibacterial.

INTRODUCTION

Structure of Skin: The skin is the largest organ of the body. Skin is made up from water, protein, fats and minerals. Skin protect body from germs and regulates body temperature. Nerves in the skin help for sensation like hot and cold. It act as barrier between outside and inside environment.

Skin has three main layers, the epidermis, the dermis and the subcutaneous layer. The epidermis layer- it is the outermost layer of the skin. Cells present in these layer are called keratinocytes. Melanocytes that produce melanin are also present in this layer.

The dermis layer- dermis layer is beneath the epidermis layer. This layer contains fat, fibers and collagen. Dermis layer synthesizes vitamin D to absorb calcium on exposure to sunlight.

It consist of blood vessels. Nerves present in these dermis layer are sensitive to environmental factors like pressure and temperature.

The subcutaneous layer-this subcutaneous layer made up from fat and forms innermost layer. Its thickness is dependent upon the region.

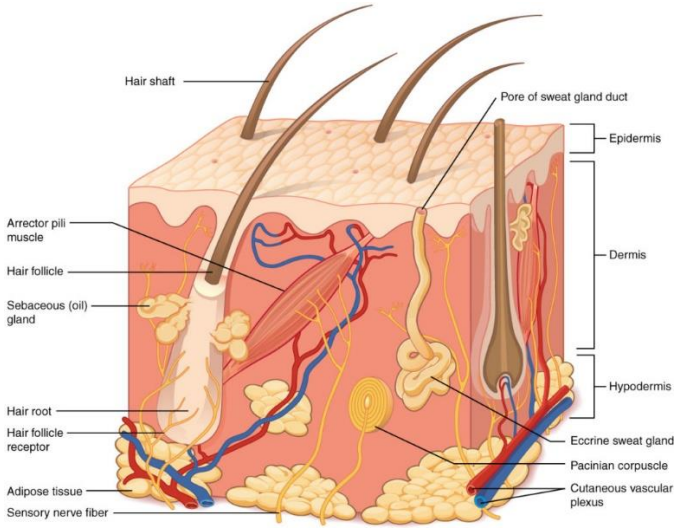


FIG NO 1. ANATOMY OF SKIN.

Functions of the Skin

- Production of vitamin D.
- Protection from the environment
- Prevent water loss
- Sensation
- Regulation of temperature

Herbal soaps are also known as natural soaps. They are made from plant based ingredients and extracts. Soap is the term for a salt of a fatty acid or for a variety of cleansing and lubricating products produced from such a substance. Soaps are used for washing, bathing, and other types of housekeeping. Soaps act as surfactants, emulsifying oils to enable them to be carried away by water. Bath Soap is formulated to clean body. It is also known as body soap. Body soap contains skin friendly soaps in solution form that are anything but easy to utilize and eliminating germs and microscopic organisms from body. Bath soaps are cleaning products that have become an essential in our daily life. Cleaning products play an essential role in our daily life. Qualities of good Bath Soaps are it should be bubbly, cleansing, and hardness, conditioning and creamy. The aim the present work is to formulate an herbal soap

containing Antibacterial & antifungal activity. Herbal soap contains uses of part of plants such as like leaves, stem, roots & fruits. Herbal soaps has many advantages over synthetic soap. Natural elements found in herbal soap like plant extracts, essential oils and herbs. Herbal soaps are milder on the skin. The absence of chemicals, artificial perfumes lowers the possibility of allergic responses. Herbal soaps are biodegradable and environmental friendly.

MATERIAL AND METHODS

Plant collection

Collection of Neem

NEEM (Botanical Name: *Azadirachta indica*)

The leaves of Azadirachta indica were collected from local area, after that the leaves were shade dried and grind in grinder.

Collection of Mango

MANGO (Botanical Name: *Mangifera indica*)

The leaves of *Mangifera indica* were collected from local area, after that the leaves were shade dried and grind in grinder.

Collection of lemon peel

LEMON PEEL (Botanical Name: *Citrus lemon*)

The peel of *Citrus lemon were collected* from local area, after that the peel were shade dried and grind in grinder and coarse powder was obtained.

Collection of Reetha

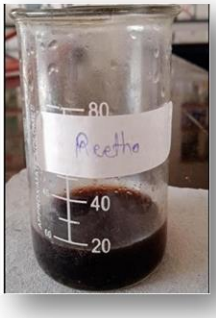
REETHA (Botanical Name: *Sapindus mukorossi*)

The seeds of *Sapindus mukorossi* were collected from local area, after that the seeds were shade dried and using mortar and pestle the seeds were grinded.

Table No 1: List of Material.

SR.NO	NAME OF MATERIAL	CATEGORY
1.	Neem	Antibacterial
2.	Mango	Anti-aging
3.	Lemon	Anti-acne
4.	Reetha	Foaming agent
5.	Stearic acid	Hardening agent
6.	Glycerin	Soap base
7.	Rose oil	Fragrance

Extraction



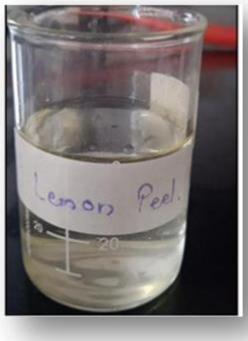


Fig No.2: Neem Extract. Fig No.3: Mango Extract. Fig No. 4: Reetha Extract. Fig No. 5: Lemon Peel Extract.

The *Azadirachta indica.*[11] *Mangifera indica, Citrus lemon, Sapindus mukorossi* was washed, and allow to dry and then grind it separately with addition of rose water (maceration process). Reetha powder were boiled in distilled water at 45^0C until its 1/2 the concentration (decoction process). Then the extract was filtered through clean cotton cloth and then filtered through filter paper. Use extracts according to need.

Table No 2: Formulation of herbal soap.

Ingredients	Quantity	Use
Neem Extract	20 ml	Antibacterial
Mango Extract	20 ml	Anti-aging
Lemon Peel Extract	10 ml	Antioxidant
Reetha Extract	2 ml	Surfactant
Stearic Acid	0.5 gm	Hardening
Rose Oil	4-5 drops	Fragrance
Glycerine soap base	q.S.	Base

PROCEDURE

Glycerin soap base was weighed and melted in a water bath.

↓

The plant extract were added to the melted soap base.

↓

Stearic acid was dissolved in a small amount of hot water and added to the mixture.

↓

As the fragrance enhancer, the oil of R. indica was added.

↓

The ultimate mixture was stirred using a stirrer.

↓

The melted mixture was poured into moulds and left until solidified.

Fig No.6- Formulated Herbal Soap.

EVALUATION PARAMETERS

1) Physical characteristic

I) Colour- Brown

II) Odour- Aromatic

III) Texture- smooth.

2) Physico-chemical evaluation

I) pH

2 gm of formulated soap was dissolved in 10 ml of distilled water. The pH was measured by calibrated pH meter.

Fig No. 7: Reflux Assembly.

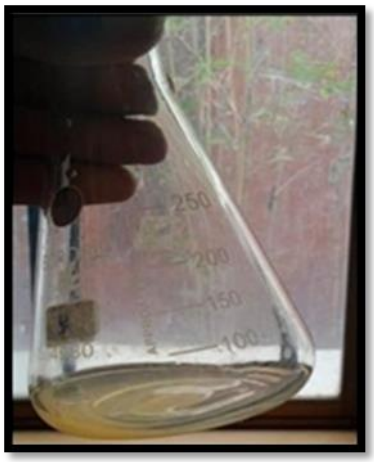


Fig No. 8: Titration Result.

II) Determination of percentage (%) free alkali content Weigh 5 gm of formulated soap and add to 50 ml of neutralized alcohol and was boiled for 30 min. under reflux on a water bath, then cooled. Titrate it with 0.1 N HCl by adding 2-3 drops of phenolphthalein indicator.

III) Foam height

Exactly 0.5 gm of soap was dissolved in 25 ml distilled water. Then, transferred it into 100 ml measuring cylinder and volume was made up to 50 ml with water. 20 strokes were given and allowed to stand till aqueous volume measured up to 50ml and the foam height above the aqueous volume was measured.

Fig. No. 9: Foam height.

IV)Foam retention

About 1% soap solution was prepared and from this, 25 ml was taken in a 100 ml measuring cylinder. The cylinder was covered with hand and shaken for 2 min. The volume of Foam at 1 min. interval for 3 min. was recorded.

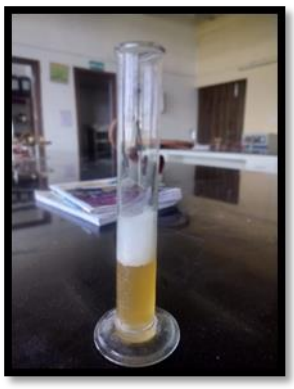


Fig No. 10: Foam Retention.

V) Moisture content

The moisture content was determine for the percentage water present in the soap. The soap was weighed and recorded as "wet weight of sample" and was dried from 100-115^{o} C in a hot air oven. The sample was cooled and weighed to find "dry weight of sample". The moisture contentwas determined using formula

$$Percentage\ moisture\ content = \frac{Initial\ Weight - Final\ Weight}{Initial\ Weight} \times 100$$

VI) Total fatty matter

Total fatty matter was calculated by reacting soap with acid in the presence of hot water and calculate the fatty acid content.

5 gm of formulated soap was dissolved in 75 ml of hot water. To this solution add 10 ml of 15% H_2SO_4 until a clear solution was obtained. Fatty acids that are present on the surface of the resulting solution are solidified by adding 7 gm beeswax and heated again. Then, it was allowed to cake. Cake was removed and blotted to dry and weighed to obtain the TFM using the formula:

$$Percentage\ total\ fatty\ matter = \frac{Weight\ of\ cake - \ Weight\ of\ the\ wax}{Weight\ of\ soap\ (gm)} \times 100$$

Fig. No. 11 Total Fatty matter.

VII) Cleaning efficiency by thumb impression test

Thumbs of hands exposed to environment and placed gently on a sterile nutrient agar medium plate. Then, the impression of one thumb washed with the prepared herbal soap and the other thumb washed with the control soap was placed on the same nutrient agar medium plate separately. The behavior of microbial growth on the plates was observed after an incubation period of 24 hrs at 37^{o}C.

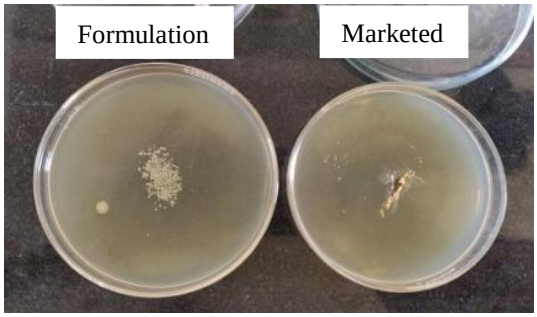


Fig No.12: Cleaning Efficacy Test.

VIII) Anti-microbial activity of herbal soap

Agar well diffusion method was used for determination of anti-microbial activity of herbal soap.

The Herbal soap was dissolved in distilled water to obtain a suspension of different concentration. Four wells were created, add different concentration of solution into the well. The plates were incubated at 37^0C for 24h. The zone of inhibition was measured.

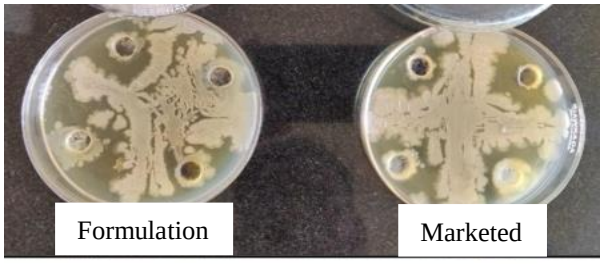


Fig No.13: Zone of inhibition.

RESULT AND DISCUSSION

The physiochemical properties parameters such as color, odor, appearance and pH were tested. The pH of the soap was found to be 9 it indicates that the prepared soap was basic in nature. Moisture content was found to be 2.1%. Remaining parameters such as foam height, foam retention, percentage free alkali, TFM and moisture content were also determined and showing good results computed in table. Thumb impression test was carried out to investigate the effectiveness of the formulated soap taking a commercial soap as standard the result of the test were shown photographically. Microbial growth found in herbal soap was less. Anti-microbial test was done for determination of anti-microbial activity and the formulated herbal soap shows zone of inhibition.

Table No. 3: RESULT AND DISCUSSION.

Parameter	Standard value	Observed value
Color	-	Brownish green
Odor	-	Aromatic
Texture/Appearance	-	Smooth
pH	8-10	9
Moisture Content	About 10%	2.1%
Foam Height	1.3-22 cm	10 cm
Foam retention	Over 5 min	6 min
Free Alkali content	Less than 2%	0.6 %
Total fatty matter	36.8%	4.4 %

The present work is concerned with the formulation of herbal soap was dry, stable, showing no color change and good appearance and is foamy in nature. It showed good skin compatibility and causes no irritation. Herbal soap showed that the bacterial colonies formed on the unwashed thumbprints are higher than the washed thumbprints. The formulated herbal soap showed better efficiency in cleaning microbes from washed thumbs which is evident by the reduced number of colonies formed on the agar plate.

CONCLUSION

The formulated herbal soap showed considerable antibacterial activity. The leaves of plant A. indica, M. indica, peel of C. lemon, and fruits of S. mukorossi was extracted using rose water. The prepared formulation tested for different test it gave good results. It does not give any irritation to skin. Based on the study it can be conclude that formulated herbal bath soap must be standardized and can be used as a promising alternative to commercial chemical containing skin moisturizer and antibacterial soap.

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