



FORMULATION AND EVALUATION OF HERBAL SOAP CONTAINING ETHANOLIC EXTRACT OF LEUCAS ASPERA PLANT (LEAVES)

K. Thamizhvanan*, Anna Balaji, B. Navya, D. Saritha, K. Vytheswaran, P. Anudeep

Sree Vidyanikethan College of Pharmacy, Sree Sainath Nagar, A. Rangampet, Tirupati-517102, Andhra Pradesh, India.

ABSTRACT

Soaps are one of the modern day cosmetics used to maintain and enhance the vigor of skin. However general chemical soaps may cause dryness and irritation to the skin. This is when herbal soaps interestingly gained the popularity. Herbal soaps are made using plant extracts or phytoconstituents which are beneficial to the skin. These also contain ingredients like Vit-E, aloe vera essential oils that help maintaining the good health of the skin. Herbal soap also avoid drying of the skin because of the presence of glycerine. In non-organic soaps glycerine is extracted and used for other purposes. Whereas in herbal soap glycerine is one of the main ingredient used therefore these soaps help in retaining the moisture and provides soft touch to your skin. This is one of the reasons for high cost of herbal soaps.

KEY WORDS: Phytoconstituents, Skin, Glycerine, Antibacterial, Triglyceride, Aroma therapy.

INTRODUCTION

Soaps that are being used in our daily life have a history of about 6000 years. In general salts of fatty acids are considered as soaps. These act as cleansing agents [1]. A Soap gets its cleansing property because of its molecular structure i.e; presence of long hydrocarbon chain with a carboxylic acid group on one end which is usually bonded to Na (or) K. These are available in different forms like hard soaps and soft soaps based on the ingredients used [2]. Soaps are prepared by process called saponification which involves the conversion of the fat (or) lipid (triglycerides) into soap and alcohol in the aqueous alkali under required temperature (heat). Here the triglyceride reacts with the dye to produce soap (salts of fatty acids) [3]. These are other kind of soaps which are not used for cleansing purpose and are produced using metal ions like Calcium, magnesium and chromium. General antibacterial soaps contain paraben triclosan and toxic petrochemicals that imbalance the hormones in humans which may cause further health damage. Unlike this organic soaps use natural antibacterials like essential oils these essential oils not only have antibacterial property but also add up aroma which

helps in providing aroma therapy [4]. These do have adverse effects when not used in required concentrations.

DRUG PROFILE

Leucas Aspera (Thumbai leaf)

- Name :Thumbai plant
- Scientific name : Leucas aspera
- Kingdom :Plantae
- Phylum :Angiosperma
- Sub-Phylum :Gamopetalae
- Class :Dicotyledonae
- Order :Tubiflorae
- Family :Labiatae
- Genus :Leucas
- Species :aspera

EXTRACTION

An extract is a substance made by extracting a part of a raw material, often by using a solvent such as ethanol, oil or water. Based on the natural resources such as plant are used in the preparation of medicines in both traditional Chinese medicines and Ayurveda.

Plants are used to prevent or cure the diseases because of lack of knowledge upon the scientific development in healthcare. In present scenario both developing and developed countries are depending upon the Ayurveda and traditional Chinese medicine to improve their health condition [5].

Based on the today's population dependence Ayurveda has become economic and has effective treatment and reduced side effects. Most of the medicines which are developed from the natural sources to prevent various diseases. so there is increased focus upon the usage of traditional medicine or Ayurveda [6].

The medicines which are prepared from the plants through extraction in Ayurveda and the traditional Chinese. So extraction plays a major role in traditional medicines. The extraction of desired natural products through the raw materials and it is the first step in obtaining natural products. Extraction process can be having different methods such as distillation method solvent extraction and sublimation according to the extraction principle [7].

Take the leaves of the leucas aspera they must be dried in a shade and they must be powdered, with the tougher herbs which are moderately coarsed and they must be taken in a pouch in a Soxhlet apparatus along with the ethanol and the extract which is flows from the Soxhlet after the complete cycle of the extract, so that the extraction can be done in the process of the soxhlation [8].

Determination of percentage yield

The leaves which are taken in the Soxhlet apparatus where along with the ethanol at below 40°C continuous process will be taken throughout until the completely extraction happens in the Soxhlet apparatus and it must be calculated.

The ethanol can be separated with the vacuum rotatory evaporator and the crude extract can be used for the preparation of the soap along with the soap base [9].
Percentage yield = Practical yield / theoretical yield × 100

PHYTOCHEMICAL SCREENING

Test for Carbohydrates

A. Molisch reagent

Take two test tubes and take one test tube with sample solution and two drops of molisch reagent. In other test tube add 2ml of concentrated sulphuric acid solution.

Add few ml of the sample solution. The reddish violet using appears at the between of the junction of the two liquids and it confirms the presence of the carbohydrates.

B) Reducing sugar test

i) Fehlings test:

Take the sample solution and to that add 5ml of the fehling's reagent solution. Add this mixture to be heated. Then yellow or brownish red cuprous oxide precipitate is formed. and this indicates the presence of the reducing sugar.

ii) Benedicts test

5ml of the benedict's reagent is added to the sample solution in a test tube and it is kept at the water bath for 2 minutes. If red colored precipitate is seen then it indicates the presence of the reducing sugars.

iii) Iodine test

This test is for the particularly starch. Take the sample solution add iodine solution, then it forms the complete blue colour solution. Such that on heating this blue colour will be disappeared and on cooling again the blue colour reappears.

Test for Alkaloids

a) Dragendorff reagent

Take the test tube containing the sample solution to that add few drops of dragendorff's reagent (potassium bismuth blue). If orange or orange red precipitate will be appeared then it confirms the presence of the alkaloids.

b) Wagers test

The sample solution is treated with the wagers reagent (potassium trioxide) if reddish brown precipitate is appeared then it indicates the presence of the alkaloids.

c) Mayers test

The sample solution is treated with the mayers reagent (potassium iodide) then it shows cream colour precipitate. Then it confirms the presence of the alkaloids.

d) Hagers test

Take the sample solution in a test tube and add 3ml of hagers reagent. If yellow coloured precipitate will occur then this can be confirmed by the presence of the alkaloids.

Test for Glycosides

a) Test for sterol glycosides

i) Liebermann burchard test

To the alcoholic extract of the sample add chloroform and few drops of acetic anhydride and mix it well. To that above mixture add concentrated sulphuric acid. Brown or violet ring will appear in between the two junctions and the upper layer shows the bluish green colour and lower layers shows red colour.

ii) Salkowski test

To the alcoholic extract of the sample add chloroform and concentrated sulphuric acid from the side walls of the test tube. Then in between the junction of the two liquids yellow colour ring is appeared and reddish blue colour will exhibit and green fluorescence by the acid layer.

Test for Anthraquinone Glycosides

i) Borntrager test

Take the sample and add 5ml of dilute hcl and add 5ml of ferric chloride and keep it for boiling for 10 mins on the water bath and cool to the room temperature and then filter it. To that filtrate add tetrachloride or benzene and equal amounts of ammonium solution. Then the pink or red

colour is seen then this indicates presence of the anthraquinones [10].

Infrared Spectroscopy

Spectroscopy is defined as the study of the interaction between matter and electromagnetic radiation as a function of the wavelength or frequency of the radiation.

Infrared spectroscopy (IR spectroscopy) is the spectroscopy that deals with infrared region of the electromagnetic spectrum, that is light with a longer wavelength and lower frequency than visible light.[11]

The analysis of infrared light interacting with a molecule is known as infrared spectroscopy.

But conventionally the Wave NO.Vs %Transmittance is plotted (because the numbers are more manageable) In this spectroscopy method there are two types of changes which will occur in molecule.

Molecular rotations

Rotational transitions are of little use to the spectroscopist.

Molecular vibrations

The positions of atoms in a molecules are not fixed; they are subject to a number of different vibrations.

Formulation of soap base

The reaction of the alkali and the fatty acids are called as saponification reaction. The lye which was prepared by the sodium hydroxide and the distilled water in a beaker and it must be heated on temperature below the 50°C until the clear solution is appeared [12].

Different Types of Soap Bases

Soap bases are of three types

- 1) Hard
- 2) Liquid
- 3) Soft types

Hard type of bases are used in the making of the classic and hard soaps liquid type are suitable for the shampoos and shower gels preparation. Soft type of base is used for the making of the scrubs. If we look at the chemical formulae soaps are the sodium salts of the fatty acids, which are obtained by the alkaline hydrolysis of the fats. The classic and most common soap base contains the following components [13].

- *Distilled water
- *Alkali
- *Glycerine
- *Surface active substances
- *Essential oils

Making Of the Soap Base:

Remember that you should not work without the rubber gloves and should boil the soap in a ventilated room and in protective clothing, because you will be working

with the alkali, which can make your skin turn red on contact and it is very caustic or cause burning and bleeding. So you need to neutralise the alkali [14]. The following substances that neutralises the alkali like Acetic essence, Citric acid etc

As we see here when we are making a soap we should not use a metallic vessel and we should not stir the mixture with a metal spoon. We should always use a wooden stick instead. While we are working with an alkali, we have to pour the chemical into the water, and not the other way around, because it is easy to overdo it with the second method: If we add much amount of alkali then the soap become crumbly. And the reaction also will be very strong. At the same time we don't make a good soap with little amount of alkali. So the base may not be thicken [14]. We need to calculate the amount precisel

Now we have to determine the effect you want to achieve and we need to prepare oil basis. Here the soap base should also contain super fat. So the oils which help to moisten and nourish the skin the hard oil which were present in the soap are melted and the liquid are combined with them. At that time the alkali solution is added to the oils here when we see the temperature of the oil and alkali should be identical [15]. We should stir the mixture very carefully then place the soap base in the water base and complete the heating process. We can test the soap whether the base is ready by a special pH meter, or you can carefully test the soap on the end of the tongue: to indicate whether the base is ready its stops stinging your tongue.

Formulation of Soap

Take the 100 grams of the soap base above in an 250ml beaker which it must be stirred and it must be melted at 50°C and this melted soap base must be added with the extract 3ml and and add two drops of the scent or sandalwood perfume and it must be poured in the soap mould.

This must be dried for 5min later it will be having the shape of the mould and this will be the formulation of the soap [16].

After cooling it must be taken for the organoleptic studies and the evaluation studies.

Characterization of herbal soap

Organoleptic evaluation

The prepared herbal soap must be subjected for the organoleptic evaluation such as the colour, smell and clarity of soap under any white background by the visual inspection and the results are noted down [17].

Determination of the pH value

The prepared herbal soap was used for determination of the pH using the pH meter.

Take 1 gm of the soap is taken in 100ml beaker, to this beaker add 10-15ml water and stir it for completely dissolving.

The resulting solution was placed in the pH meter and where electrode is dipped in to the solution and the value of the pH must be noted down.

Determination of percentage free alkali

Take the 5gms of the soap and dissolve in 50ml of the neutralized alcohol in an conical flask and reflux on water bath for 30minutes.

This must be cooled and add 1ml of phenolphthalein indicator and titrated with 0.1M HCl. $\text{NaOH}=0.31(v_a/w)$

Where,

V_a = volume of acid

W = weight of soap

Foam height

Take 1gm of the soap and it must be dissolved in 50ml of the distilled water in a 100ml graduated measuring cylinder.

Shake the measuring cylinder for 2-3 minutes and it must be allowed to stand for 10 minutes and the volume of the foam can be calculated by the following formulae.

Foaming ability= L_1-L_2

Where,

L_1 =volume in ml of foam with water

L_2 =volume of ml of water only.

Foam retention

The retention of the soap foam can be checked out by the prepare 25ml of the 1% soap solution and this must be transferred to in to a measuring cylinder and it must be shaken for 10 times and it must be recorded for the volume of foam for 5-10 minutes interval.

Table 1: Making Of the Soap Base

INGREDIENTS	QUANTITY
Sugar	23.6g
Distilled water	32.7g
Sodium hydroxide	15.7g
Palm oil	34.0g
Coconut oil	35.3g
Castor oil	34.0g
Glycerine	19.6g
Ethyl alcohol	38.0g

Table 2: Evaluation parameters

S.NO	PARAMETER	RESULT
1	Formulation	Soap
2	Colour	Dark green
3	Odour	Aromatic
4	Appearance	Good
5	pH	7.3
6	Foam height(cm)	26 cm
7	% free alkali	0.32%
8	Foam retention(min)	10 min
9	Saponification Value	0.32

Saponification value determination

The determination of saponification value about 2gm of the herbal soap and it must be taken in a conical flask and 0.5M KOH solution must be added to it,

Then this mixture must be heated to about 55°C along with the stirring of the mixture in an hot water bath [18].

The temperature was furtherly increased up to 100°C with the reflux process for about 1 hour. Titration was to perform with the phenolphthalein was an indicator and 0.5M HCl. The end point is observed as pink color disappearance [19]. Saponification value can be determined by the

Saponification value=avg. volume of KOH $\times 28.05$ /weight of oil (gm)

Determination of moisture content:

The herbal soap which was prepared must be subjected to the moisture content and about 5-6gms of the soap sample was taken in a china dish was weighed and to this china dish dried and free from the moisture. The sample must be heated for about 2hours at 101°C temperature. After this process the heating the china dish and remove this weigh it, then calculate the moisture content is calculated by the formulae [20].

Moisture content= Difference weight $\times 100$ /Initial weight

Results and Discussion

Procurement of plants (leaves)

The raw material of selected plant *Leucas aspera* (leaves) were collected from the surrounding college premises, air dried, powdered, and the crude leaf extraction was extracted, the evaluation parameters studied and mentioned below.

The analysis of infrared light interacting with a molecule is known as infrared spectroscopy.

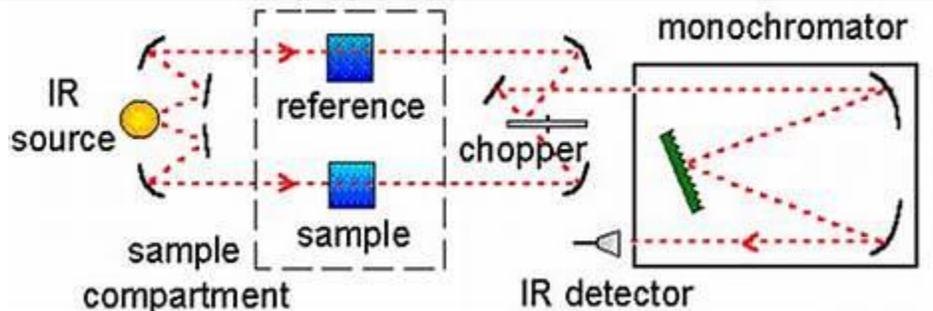


Table 1: Plot of Absorbance or transmittance vs Wave no. gives an IR spectrum

IR Region

Region of IR	Wave length (μm)	Wave number (cm^{-1})
Near IR (Overtone region)	0.8-2.5	12,500-4000
Mid IR (Vibration- rotation region)	2.5-50	4000-200
Far IR (Rotation region)	50-1000	200-10
Most used	2.5-25	4000-400

CONCLUSION

The ethanolic extract of herbal *Leucas aspera* leaves was selected for the preparation of herbal soap. According to this research, it was found that the extract of *Leucas aspera* could be an effective alternative and economic than the other herbal soap. Herbal soap formulation plays a vital role in overcoming the side effects caused by the synthetic soap. However most of the materials used in preparation in herbal soaps are natural and user friendly in nature and exhibit scrubbing action and moistening skin with antioxidant function. The alcoholic Soxhlet extract indicated the highest percentage yield. The

prepared formulations were standardized by evaluating various physicochemical properties such as pH, clearance, appearance, % free alkali, foam height, foam retention, alcohol- insoluble matter in which they exhibit satisfactory results.

ACKNOWLEDGEMENT

Nil

CONFLICT OF INTEREST

No Interest

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