Formulation and Evaluation of Anti-fungal Poly-herbal Soap

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Abstract: In terms of medicine and commerce, herbal goods have gained relevance on a global scale. Despite a growth in consumption, industrialised and developing nations have severe concerns about the effectiveness, safety, and quality of these herbal medications. Pursuing the formulation and evaluation of a pure herbal formulation is the purpose of the current study. Lantana camara, Moringa Oleifera and Corn silk extracts were used to create the Anti-fungal poly-herbal soap, which was created using a transparent soap base. Physical assessment, pH, foaming ability, and foam stability were the physicochemical formulation parameters that were identified. In the end, it was determined that formulation F1, is the most promising one since it exhibits superior physicochemical properties like pH level is nearly identical to that of the skin and anti-fungal activity when compared to other formulations.

***Index Terms*- Poly-herbal soap, Extraction of Herbal plants, Formulation, Evaluation.**

INTRODUCTION

A salt of fatty acid called soap is utilised in many cleaning and lubricating goods. Soaps are surfactants that are typically used for washing, bathing, and other household tasks. Soaps are used to wash away dirt, bacteria, and odor-causing substances from the body. Commercial soap typically contains hazardous compounds including poisonous mercury, aluminium, barium, bisphenol, plastics, and other materials that are vaporised and then absorbed through the skin with harmful side effects.

Herbal Soap:

The manufacture of herbal soap is a medicine because it has antibacterial, anti-aging, anti-oxidant, and antiseptic characteristics. It mostly uses plant parts such seeds, rhizomes, nuts, and pulps to treat wounds, treat illnesses, and promote health. When compared to the ingredients of commercial soap, herbal soap does not contain artificial colours, scents, fluorides, or other additives. Due to their high medical value, cost effectiveness, availability, and compatibility, herbs are the natural items most frequently used in the treatment of practically all diseases and skin disorders.

Advantages of Soap:

1. The fat membrane that binds the bacteria together and renders it inactive is broken down by soap.
2. proven to be among the easiest and most efficient ways to combat infections.
3. Effect of moisturising.
4. Aids in removing corrosive acids.

Disadvantages of Soap:

1. Since soap is alkaline and sensitive skin is typically acidic, it irritates the skin.
2. When soap is used with hard water, which has a lot of calcium dissolved in it, scum forms.
3. Carbonate salt deposits from soap are left behind on the skin.
4. Soap degrades when it is stored.

Ideal Properties of Soap:

- Cleaning: The power of soap to wash away oil and dirt from the skin.
- Conditioning: This is accomplished by the soap's emollients and moisturisers.
- Hardness: is a crucial component of soap since it affects how long it will last.

SKIN LAYER:

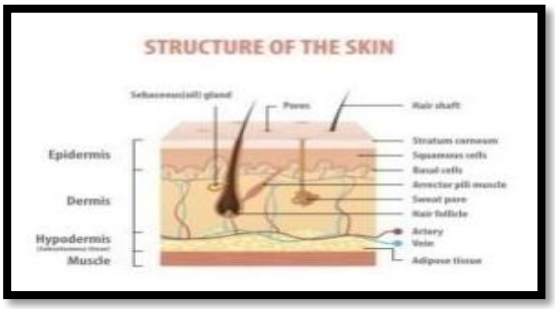


Fig no.1 - Skin Layer

Skin:

The largest organ in the body, the skin is composed of water, protein, lipids, and minerals. Your skin controls body temperature and guards against infections. Skin nerves enable you to experience emotions like heat and cold. The epidermis, dermis, and hypodermis are its three constituent layers; each has a distinctive anatomy and function. The complicated network that makes up the skin's structure acts as the body's first line of defence against viruses, UV rays, chemicals, and mechanical harm.

Skin types and their Care:

- Normal
- Dry
- Greasy
- Combination skin, which includes both dry and oily skin; and

Skin-care instructions:

1. One of the most crucial skin care tips is to understand your skin type.
2. Sip plenty of water.
3. Constantly keep your skin hydrated.
4. Make use of products devoid of synthetic materials.

Introduction to Fungal Disease

Mycosis, often known as a fungal infection, is a condition brought on by a fungus (yeast or mould). Although fungi (plural of fungus) can cause infections in your mouth, throat, lungs, urinary tract, and many other parts of your body, fungal infections are most frequently found on your skin or nails. Different topical formulations, such as soaps, lotions, serums, ointments, gels, liquids, and creams, can be used to treat fungus infections. But in daily life, soaps are more practical and environmentally friendly. both in terms of cost and time efficiency.

Fungal infection and Symptoms

- Skin that is scaly and itchy.
- Redness & Itching.
- Swelling & Blisters.

- Type of Fungal Infection:

On your body, fungus can cause skin infections. Athlete's foot, jock itch, ringworm, and yeast infections are a few of the most prevalent

MATERIALS: Anti-fungal Herbs:

Numerous of these medicinal plants have been shown to have antifungal qualities that have been used empirically to prevent or treat a variety of ailments. Three medicinal plants are employed in Benin's traditional approach of treating candidiasis: Lantana camara, Moringa oleifera, and maize silk.

Sr .no	Herbs	Supplier
1	Lantana camara	Local supplier
2	Moringa oleifera	Local supplier
3	maize silk	Local supplier

Table no.1-Herbs for Polyherbal Soap

Exicipients used in polyherbal soap:

In order to prepare Antifungal polyherbal soap, the selected plant material was shade dried and made into coarse particles and these powder materials were subjected for maceration.

Sr. No	Name of ingredients	Manufactured/ Company
1	Propylene glycol	Molychem Pvt.Ltd
2	Glycerine	Loba chemie Pvt.Ltd
3	Ethanol	Loba chemie Pvt.Ltd
4	Sodium lauryl sulfate	Molychem Pvt.Ltd
5	Stearic acid	Molychem Pvt.Ltd
7	Sodium hydroxide	Molychem Pvt.Ltd
8	Triethanolmine	Molychem Pvt.Ltd.
9	Rose oil	Fine chem Ltd

Table no.2 – Materials for Polyherbal Soap

METHODS OF EXTRACTION

MACERATION OF *lantana Camara:*

Maceration using Methanol

⇩

L. camara powder weighing 20 g was combined with the proper amount of solvent.

⇩

vessel that was covered and left to stand for 24 hours.

⇩

After decanting after 24 hours, the liquid was then filtered via a Buchner funnel.

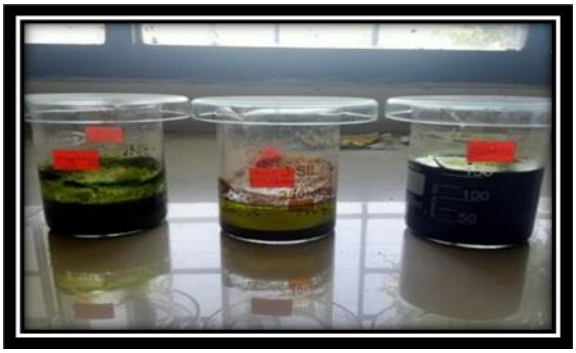
MACERATION OF *Corn silk*

Maceration using ethanol
⇩
10 grammes of maize silk powder were steeped in 80 millilitres of ethanol.
⇩
vessel that was covered and left to stand for 3 days (72 hours).
⇩
using Whatman No. 1 filter paper to filter.

MACERATION OF *Moringa Oleifera*

Maceration using ethanol
⇩
10 grammes of moringa powder soaked in 80 millilitres of ethanol
⇩
vessel that was covered and left to stand for 3 days (72 hours).
⇩
Using Whatman No. 1 filter paper, filtered.

a)Lantana camara b) corn silk c) Moringa oleifera



FORMULATION OF POLYHERBAL SOAP:

To prepare polyherbal soap, different plant extracts were combined in varying ratios.

Components required for making polyherbal soap:

Sr. No	Ingredients	F1	F2	Role
1	L,camara: Corn silk: Moringa	2:2:2	2:2:2	Anti-fungal
2	Sodium hydroxide	1.6g	1.6g	Stabilazer
3	Propylene glycol	18.75 ml	18.75 ml	Moisturizer
4	Sodium lauryl sulfate	15g	15g	Surfactant
5	Stearic acid	13g	6.5g	Harden the soap
6	Triethanolmine	5 ml	5 ml	Maintain pH
7	Ethanol	19 ml	19 ml	Solubilizer
8	Glycerine	6.25 ml	6,25 ml	Moisturizer
9	Rose oil	2 ml	2 ml	Fragrance
10	Distilled water	Upto 100 ml	Upto10 0 ml	Vehicle

Table no.2- Formula for Herbal Shampoo

METHOD:

The lye solution was made by mixing 1.6g NaOH and 2.ml distilled water in a250beaker. Heat the contents of a 250 ml beaker with a stir bar to 60 °C while adding 18.75 g of propylene glycol, 6.25 g of vegetable glycerin, 19 g of 95% ethanol solution, and 15 g of sodium lauryl sulphate. Add 13 g of stearic acid after this temperature is attained, then raise the mixture's temperature to 68 °C. Once the liquid has reached the desired temperature, add the 50:50 lye solution gradually while stirring continuously for 20 minutes, halting only when required, or until the mixture becomes translucent.

L.camara, Moringa oleifera, and corn silk extract were added to the aforementioned combination in the required amounts, and the volume was then measured. Add 5ml triethanolamine to maintain the pH.

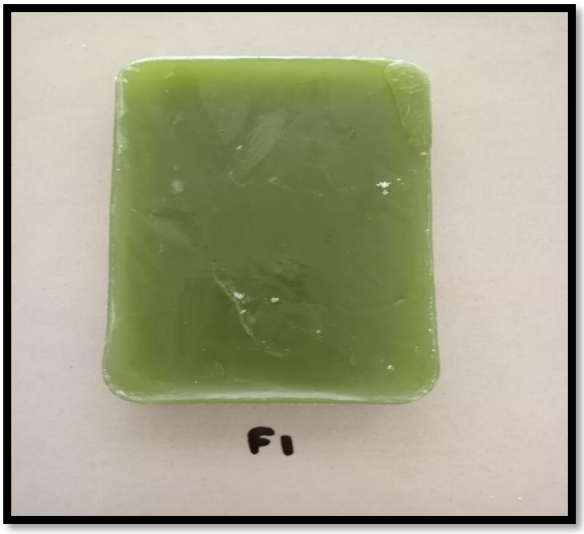


Fig no.3 –Poly- Herbal Soap

EVALUATION OF POLY-HERBAL SOAP:

The following physicochemical parameters were evaluated to confirm the quality of prepared formulation.

Determination of clarity, colour and odour: Clarity and colour were examined visually on a white background, and the fragrance was detected.

pH: All of the prepared formulations' pH values were measured using a digital pH metre. Separately diluted in 100 cc of distilled water, each of the nine

formulations was kept for two hours. Using a previously calibrated Digital pH meter, the pH was determined.

Percentage free alkali content: Weighing about 10g of dried soap, 150 ml of pure water was added to the beaker. To dissolve the soap, it was heated for 30 to 40 minutes at reflux on a water bath. This solution was cooled, transferred with the washings to the 250 ml conical flask, and the capacity was filled with distilled water. Two drops of the phenolphthalein indicator were added to 10 ml of the soap solution in the titration flask. The solution was then titrated against 0.1M HCl until it became colourless.

Foam height:50ml of distilled water were mixed with 1gm of sample soap. After that, it was put into a measuring cylinder and filled with water to a volume of 100 ml. 25 strokes were administered while standing until the aqueous volume reached 100 ml, at which point the height of the foam above the aqueous volume was measured.

Moisture content: A sample of soap weighing 10g was weighed right away and noted as the "wet weight of sample". Using the appropriate drying equipment, this wet sample was dried to a constant weight at a temperature not to exceed 239 °F (115 °C). After cooling, the sample was weighed once more, and the result was noted as the "dry weight of sample". The following equation was used to calculate the sample's moisture content:12. %W=100 A- B/B ×100

Where %W is the percentage of moisture in the sample, A is the weight in gram of the wet sample, and B is the weight in gram of the dry sample.

Total Fatty Matter: A 250 ml beaker was filled with 5 g of soap that had been precisely weighed. The soap was completely dissolved with the addition of 100 cc of hot water. To make the contents somewhat acidic, 40 ml of 0.5 N nitric acid was added. In a water bath, the mixture was heated until a layer of fatty acids was floating on top of the solution. The fatty acids were separated after cooling in ice. The residual solution was mixed with 50 cc of chloroform and then poured into a separating funnel. Shake the mixture and give it time to divide into two layers. Drainage was done on the bottom layer. To the residual solution in the separating funnel, 50 ml of chloroform was added the fatty acid that was dissolved in chloroform was once more separated and added to the fatty substance that had been gathered. In a pre-weighed china plate, the fat was measured. Weighed the residue after allowing the contents to evaporate. Calculated the proportion of fatty matter in the provided soap sample using the difference in weight.

Alcohol Insoluble Matter:50ml of boiling alcohol was used to dissolve 5g of soap sample. With 20 ml of warm ethanol, the solution was filtered through tarred filter paper before being dried at 105°C for an hour. The weight of dried filter paper was taken. Formula:

% alcohol insoluble matter = residual weight multiplied by 100 / sample weight

Saponification value determination: The amount of potassium oxide, measured in milligrammes, needed to completely saponify 1 g of fat or oil. According to Schumtterer et al. (1983), it is defined as the average molecular weight of fatty acids found in oil or fat. About 2 gramme of the soap sample was taken for the saponification value determination and placed in a conical flask with a 0.5 M KOH solution. On a hot water bath, this mixture was cooked to a temperature of around 55 degrees Celsius while being continually stirred. The temperature was then raised by another 100 degrees Celsius, and boiling continued for approximately one hour. Phenophtlein was used as an indicator during the titration process, along with 0.5M HCl. The observed final point is pink color to disappear.

Saponification is calculated as Saponification Value = Avg Volume of KOH X 28.056/ Weight of oil (g)

Anti-microbial test: The agar well diffusion method was used in the antimicrobial efficacy trials to determine the biological activity of the optimised formulations against the C. allbicans. After allowing the solutions to diffuse for two hours, the agar plates were incubated at 37°C for 24 hours. The produced formulations were then put into separate cups pierced into sterile nutrient agar that had already been seeded with test organisms. Each cup's zone of inhibition (ZOI) was measured and compared.

RESULT AND DISCUSSION

Sr.No	Parameter	Observation
1	Color	Green
2	Odour	Aromatic
3	clarity	clear
4	pH	5.82
5	% free alkali content	1.6%
6	Foam height	6.5
7	Moisture content	3.5%
8	Total fatty matter	78%

9	Alcohol Insoluble Matter	20%
10	Saponification value	190.79

Visual Assessment: The color, odor and clarity were all assessed. The F1 formulation was found to have a better physical look as per the results.

Sr.No	Parameter	observation
1	Color	Green
2	Odour	Aromatic
3	clarity	clear

Determination of pH:

The pH of the anti-fungal poly-herbal soap was found to be between 5.5 to 7.0.

Percentage free alkali content:

The percentage free alkali content of the polyherbal soap was found to be1.6%

Foam height:

The foam height of the polyherbal soap was found to be 6.5cm.

Moisture content:

The moisture content of the polyherbal soap was found to be 12.6%

Total Fatty Matter:

The total fatty matter of the polyherbal soap was found to be 78%

Alcohol Insoluble Matter:

% alcohol insoluble matter = residual weight multiplied by 100 / sample weight

The % alcohol insoluble matter of the polyherbal soap was found to be 20%

Saponification value determination:

Saponification Value = Avg Volume of KOH X 28.056/ Weight of oil (g)

The Saponification value of the polyherbal soap was found to be 190.79

Anti-microbial test: The zone of inhibition for Candida albicans was found to be 28mm.

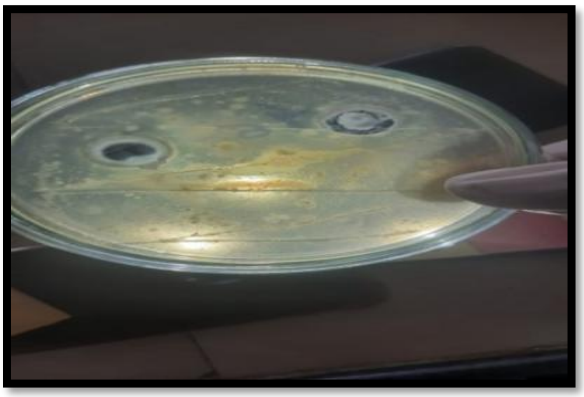


Fig no.3: Anti-microbial test:

CONCLUSION

The physicochemical and biological characteristics of the prepared soap were examined. The use of soap was attractive and had a pleasant aroma and hue. The pH was found to be between 7 to 10, which is within the recommended range. Other measures that represented the normal soap values were found. The amount of free alkali, foam ability, foam stability, moisture content, and alcohol insoluble matter were some of these.

According to biological characteristics including an antifungal and antioxidant study, the made soap is a rich source of both antioxidants and antifungal. According to the study's conclusions, it is possible to make cold-process herbal soap while taking into account a variety of variables, including skin state, herbal potentials, and their activity. This kind of herbal remedy

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