

Formulation And Evaluation of Poly Herbal Antibacterial Soap

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Abstract— Bacterial skin infections are most common amongst people, taking significant absorption for treatment and to maintain healthy skin.[1] Because some herbal plant extracts have antibacterial activity, the aim of this formulation is to form an antibacterial poly herbal bath soap using curcuma longa [Turmeric], Phyllanthus emblica [Amla], Azadirachta indica [Neem] and aloe vera. The current composition involves the formulation and evaluation of poly herbal antibacterial soaps. The antimicrobial activity of prepared soap was evaluated against streptococcus. As the formulation done with various easily available medicinal plants.[2]

Index Terms- Poly herbal soap, evaluation, herbs and Anti-microbial potential.

I. INTRODUCTION

Our body's external skin is being covered by skin or cutaneous membrane. Surface area and weight wise its largest organ of the body. The skin regulates the different functions similar as body temperature regulation, blood supply, give protection from external climate, cutaneous sensation, excretion and absorption, synthesis of vitamin D. The most exposed part to the sun light, environmental pollution and to some pathogens is skin. The list of maximum constantly appear skin diseases are eczema, knobs, acne, rashes, psoriasis, allergy etc. Soaps are cleaning agents, used as first line defence against the microorganisms to cover the body. Now a days we're using no. of brand products to maintain beauty which are made by chemicals, one of that is synthetic soap. Long term usage of this soaps can lead to skin dryness, patches, spotting, irritation etc. [2]

Herbal soaps are made using natural herbs and constituents that are healthier and beneficial for the skin and are less likely to cause any dangerous effect.

Some of the natural soap manufacturers also use aroma remedy and herbal treatments to offer the best skin treatment solution for your skin. Made of rare herbs and natural constituents, herbal soaps have found to be largely beneficial for the skin.

Depending on the recent discoveries done on medicinal plants, the use of herbal drugs has been tremendously increased in worldwide. shops comprehending with pharmacological active properties are in application since the actuality of humanity as functional foods, drugs, cosmetics, colorings as well as in prevention, cure and treatment of various conditions. The excerpt produced from roots, stem, leaves and flowers possessing medicinal properties acts as a natural remedy for the disease.

The application of the herbal plant and well as its extracts gave rise to a newer branch of medicinal wisdom related as 'Herbal Medicinal Products' These may be defined as the factory or part of factory used as a whole or as an extract for the treatment, prevention of disease or sickness to be applied in the health care operation. [3]

The herbs invested in these soaps have medicinal and recovery characteristics that offer specific benefits to the skin, alike as nourishment, strength, healing, and moisturizing. Herbal soaps preparations are drugs or medicines which contaminant-bacterial & anti-fungal agents which basically uses parts of shops similar as like leaves, stem, roots & fruits for treatment for an injury or complaint or to achieve good health. [4]

Skin :- It's the remotest part of the body and the largest organ which represents 8 of body weight. It's a complex structure that has different cells and filaments

that comprises the multi-layered structure of the skin. The outermost layer of our skin, called the epidermis, acts like a defensive guard. It's made up of layers of tough, scale- suchlike cells filled with a protein called keratin. This subcaste varies in consistence across the body, being thickest on the triumphs and soles. The dermis lies beneath the epidermis and is made of strong, flexible connective tissue. It's like the skin's support system, with collagen and elastic filaments woven through out. However, the elastic filaments can tear, leading to stretch marks, If the skin is stretched too much. Collagen is crucial for maintaining the skin's strength, but its product decreases with age, resulting in wrinkles. Skin isn't just about appearances; it's our body's first line of defense against infections, dangerous UV shafts, and injury. Keeping it healthy through proper care and protection is essential for overall well- being.^[5]

II. MATERIAL AND METHODS

Collection of plant material: -

The plant material Turmeric, Amla, Aloevera and Neem were procured from a Medicinal Garden or Ayurvedic Medical Shop. The plant Extraction of Herbal Ingredients:-

material was left to dry in the sun for 4 to 5 days. After it dried, it was crushed to get a fine, powdery substance.

For this study the maceration process is used for the extraction of herbal constituent used in the formulation. Maceration is the simple technique used for extraction of plant drug. In maceration process powdered or coarse plant material is soaked in suitable solvents such as ethanol It is Most commonly used inexpensive technique used for the extraction of different bioactive compounds from plant material Then this mixture of plant material and solvent is kept for longer time (2-3days), agitated at different intervals and filtered through a filtration medium. Solvent polarity is also important factor which affects the efficiency of extraction. Due to maceration, raptures the plant cell structure and chemical constituents expose to react with solvent, it helps to removal of active constituents from different plant materials.



Fig.1 Maceration

III. INGREDIENTS WITH MONOGRAPH

Drug Profile:

Aloe Vera

Synonym:- Aloe Barbadensis

Biological Source: The biological source of aloe is dried latex of leaves of it. It is also known as curacao aloe, cape aloe and socotrine aloe.

Family: Liliaceae.^[6]

Scientific Classification of Aloe Vera

Kingdom: Plantae

Order: Asparagales

Family: Asphodelaceae

Genus: Aloe

Species: A.vera

Uses:-

Treat skin, Nourishing and Antioxidant properties, Anti-bacterial and Anti-septic properties.

Turmeric

Synonym: Curcuma domestica

Biological Source: Turmeric is the dried rhizome powder of the *Curcuma longa* Linn plant.

Family: Zingiberaceae.^[7]

Scientific Classification of Turmeric

Kingdom: Plantae

Order: Zingiberales

Family: Zingiberaceae

Genus: Curcuma

Species: C.longa

Uses:

Antibacterial and Anti-ageing

Antiseptic properties
 Antioxidants and anti-inflammatory properties
 Improves Skin Complexion.
 Amla
 Synonyms: *Emblica Officinalis*
 Biological Source: This is consists of dried, as well as fresh fruits pericarp of the plant *Emblica officinalis*.

Family: Euphorbiaceae.^[8]
 Scientific Classification of Amla
 Kingdom: Plantae
 Order: Malpighiales
 Family: Phyllanthaceae
 Genus: *Phyllanthus*
 Species: *P.emblica*
 Uses:

Anti-ageing
 It have antioxidant and antibacterial properties
 It help to improve skin
 Reducing fine lines and wrinkles
 Reducing inflammation and redness

Neem

Synonyms: *Antelaeazadirachta L.*,
Azadirachtaindica, *Antelaeacanescons*, *Melia indica*.
 Biological Source: Neem consists of the fresh or dried leaves and seed oil of *Azadirachta indica J. Juss.*
 Family: *Meliaceae*.^[9]
 Scientific Classification of Neem
 Kingdom: Plantae
 Order: Sapindales
 Family: *Meliaceae*
 Genus: *Azadirachta*
 Species: *A. indica*
 Uses:

Antifungal Activity
 Antimicrobial Activity
 AntioxidantActivity.

FORMULATION TABLE:

SR. NO	DIENT	QUANTY TAKEN	ROLE OF INGREDIENT
1	Aloe Vera	1 gm	Anti-inflammatory, Antibacterial
2	Turmeric	1 gm	Antiseptic properties
3	Amla	1 gm	Antioxidant,
4	Neem	1 gm	Antimicrobial
5	Soap Base	Q.S	Cleansing
6	Ethanol	10 ml	Antiseptic
7	Steric acid	0.7 gm	Emulsifier
8	Peppermint oil	Q.S	Cooling Agent
9	Soft paraffin	1 gm	Moisturizing
10	Coconut oil	4 ml	Moisturizing, Cleansing
11	Rose oil	Q.S	Fragrant

Table No 1: Formulation table for poly herbal anti-bacterial soap.

Formulation of soap:

Soap was prepared by using melt and pour method, Glycerine soap base was taken and melt it. The soap base on the heating mantle, stearic acid, soft paraffin, ethanol, peppermint oil, rose oil to the melted soap base.

Add extractive products into the melted solution with continuous agitation for 30 minutes. The solution was prepared; Pour this solution into the soap moulds and freeze for 2-3 hours, soap was collected and packing in the paper.^[10]

IV. EVALUATION TEST

Evaluation of poly herbal antibacterial soap was following

Physical Evaluation: Organoleptic characters like shape, odour, colour and appearance was determined.
 pH :-

The pH of the prepared soap was assessed by touching a pH strip to the freshly formulated soap. Also perform by dissolving 1 gram in 10 ml water with the help of a pH meter.

Foam Height:-

0.5 grams of a sample of soap was taken and dispersed in 25 ml of distilled water. Then, transferred it in in to a 100-measuring cylinder; the volume was made up to 50 ml of water. 25 strokes were given and stood till the aqueous volume measured up to 50 ml and measured the foam height, above the aqueous volume was measured.^[2]

Foam retention:

25 ml of the 1% soap solution was taken into a 100 ml graduated measuring cylinder. The cylinder was covered with a hand and shaken 10 times. The volume of foam at one-minute intervals for four minutes was recorded.

Irritation:

It is carried out by applying prepared soap on the skin for 5- 10 minutes. If there is no irritation, then it is considered as a non-irritant product.

Determination of total moisture content:

5 g of sample was placed in a petri dish and dried in the hot-air oven at 105°C for 2 h. It was cooled and weight after the heating. The difference in weight of both sample indicates the loss of moisture.^[11]

Alcohol insoluble matter:-

Formulated soap 5g was dissolved in 50 ml of warm ethanol vigorously. The resulting solution was filtered through a tarred filter paper with 20 ml of additional warm ethanol. Then the filter paper was kept in the oven for 1 hour at 105°C. Finally, weight the sample residue was weighed.^[12]

V. IN VITRO STUDY

Anti bacterial Activity of Herbal Soap:

The standard cup plate technique was used to determine the antimicrobial activity. In this study, we evaluate the antibacterial activity of a polyherbal soap containing 1 ml each of turmeric, aloe, neem, and amla extracts using the cup plate technique. This method involves creating wells in agar plates inoculated with bacterial strains and measuring the zones of inhibition. Our aim is to determine the effectiveness of the polyherbal soap in combating bacterial pathogens in vitro. for this we used the Staphylococcus aureus bacteria.

Result and Discussion: -

The anti-microbial herbal soap evaluation was performed successfully. The polyherbal soap formulation was tested against one bacterial strains using the cup plate technique. The formulation exhibited significant antibacterial activity, showing clear zones of inhibition around the wells. In contrast, the standard soap and control (sterile distilled water) displayed no antibacterial activity.

The formulations have a brown color with an aromatic odor and had a good appearance. The formulation had a pH of 8, a foam height of 3 cm, and a foam retention time of 8 minutes. Additionally, the irritation test was successful, indicating the soap is safe for use.



Fig.7: Prepared poly herbal soap.

Sr.No	Parameter	Result
1	Shape	Circular
2	Colour	Brown
3	Odour	Aromatic
4	Appearance	Good

Organoleptic Parameter:

Table No 2: Organoleptic parameter

Physical Evaluation:

Parameter	Result
pH	8
Foam Height	3cm
Foam Retention	8 minute
Irritation Test	No Irritation
Moisture Content	36%
High	Soap melts above 45 ⁰

Table No3: Physical Evaluation

pH:- pH of prepared poly herbal soap was found to be 8.



Foam Height:- Prepared poly herbal soap foam height was found to be 3cm.



Foam Retention: - Prepared poly herbal soap foam retention was found to be 8min.



Irritation Test: - Prepared poly herbal soap was found no Irritation.



Moisture Content:

Weight of sample taken = 5gm
 Weight of sample after drying = 3.2gm
 Loss on drying = 5-3.2= 1.8gm
 Water content = $m/M \times 100$
 $= 1.8/5 \times 100$
 $= 36\%$

Anti-bacterial Activity:

The microorganisms used are Streptococcus aureus are gram positive bacteria were used to identify the antibacterial activity of the formulated soap against standard marked soap Observation: The antibiotic activity was determined based on the measurement of the diameter of the zone of inhibition in mm, the values were recorded.



Fig.8: Culture Media



Fig.9: Antibacterial Test

Sr.No	Drug Used	Microbe	Concentration	Zone of Inhibition
1	Control	S. Aureus	-	-
2	Standard	S. Aureus	1 mg/ml	16mm
3	Formulation	S. Aureus	1mg/ml	13mm

Table No. 4: Antibacterial Test

CONCLUSION

The polyherbal soap formulated with turmeric, aloe, neem, and amla extracts demonstrated significant antibacterial activity against the tested strains, confirmed by the clear zones of inhibition observed in the cup plate technique. With a balanced pH of 8, a satisfactory foam height of 3 cm, and a foam retention time of 8 minutes, the soap also passed the irritation test, indicating it is safe for use. These results highlight the soap's effectiveness and readiness for practical application, offering a natural and potent antibacterial solution

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