

Formulation Development and Evaluation of Polyherbal Soap

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Submitted: 01-11-2023

Accepted: 12-11-2023

ABSTRACT –

Polyherbal can be defined as the use of more than one herb in a medicinal preparation. The concept is found in Ayurvedic and other traditional medicinal systems where multiple herbs in a particular ratio may be used in the treatment of illness. Polyherbal formulations are widely used in traditional systems of medicine like Ayurveda for wound healing. The polyherbal concept is found in ayurvedic and other traditional medicine system where multiple herbs in a particular ratio may be used in treatment of illness. Polyherbal are used in the prevention and cured of different physical and mental diseases as well as disorders.

Soap is a salt of a fatty acid used in a variety of cleansing and lubricating products. In a domestic setting, bathing, and other types of housekeeping. In industrial uses, soaps are used as thickeners, components of some lubricants, and precursors to catalysts. Soap is the combination of the oil and water. Soaps having two phases one is a water and another is oil. Soap having different uses in daily life as well as in the medication. The medicated soap mostly prescribed by dermatologists for the treatment of different skin disorders. i.e., acne, scar, pimples etc.

Key Words-Ayurveda, Herbal formulation, Formulation of herbal soap, Importance of herbal soap, Importance of Ayurveda.

I. INTRODUCTION –

Skin is the major sensual body part in. It helps as an obstacle that defends the body part and collects sensual statistics from the surroundings. Additionally, it assists in caring the body's temperature at a well level. Miscellaneous characteristic cells and arrangements can be found in the skin. The hypodermis, dermis, and epidermis are the three primary layers. Ever since the earliest times, people have employed medicinal plants as a form of treatment. Numerous curative plants leaves, stems, and roots have been used as a natural cure to treat a diversity

of maladies and afflictions. A report published by WHO stated that a whopping 34% of all occupational disorders are skin diseases and data of 2020 revealed that skin diseases death in India reached 17,857 i.e. 0.21% of total deaths. So, in order to counteract the situation, the best option is to incorporate herbal potentials in the formulation, which provide fewer effects and impart good treatment options with lesser side effects and higher safety. So, the present work focuses on the preparation of medicated herbal soap incorporating different herbs active potentials, making it antioxidant and antibacterial active soap, which can be used as a regular bathing soap.

Nowadays, there is an increasing consumer demand for cosmetics comprising natural ingredients as healthier, organic, and ecological product². Consumers are more and more refusing synthetic chemicals in beauty and cosmetic products. An ordinary soap is organized without a non-natural surfactant, with accumulation of useful ingredient from natural material, such as essential oil or plant extract. The hot process soap is called a transparent or translucent soap. The soap has good detergency or cleansing power, good moisturizing effects, long-lasting fragrance, and less of irritant. Herbal soaps are prepared by adding various dried herbs, flowers and stems into soap base.

Skin from infectious microorganisms and their spreading the skin hygiene plays an important role to avoid the contagious diseases. This polyherbal soap support reduces health benefits-associated with conduction of spreadable Disease more meritoriously. Plants having the Medicinal properties are being used as a traditional medicine from times immemorial. The various extract from the stem, roots and leaves, of various medicinal plants have been employed as a natural remedy in curing various ailments and diseases. Even many of the plant based products have been replaced use of synthetic chemicals, the efficacy and safety of ayurvedic Products could not find their match. The many plant-based medicines have been supplanted

by Synthetic chemicals; ayurvedic goods' safety and usefulness have not been proven. In comparison to chemical products treatment, herbal treatments have the benefit of being, readily available, having less adverse effects and inexpensive the advantage of using herbal drugs is that they are Cheap, easily available and has fewer side effects in comparison to chemical Products... As a result, research has accelerated in the direction of developing natural products for various disease treatments that is higher in quality, less costly, and has no adverse side effects when compared to chemical products.

Soaps are cleaning agents, used as first line defence against the microorganisms to protect the body. Now days we are using no. of brand products to maintain beauty which are made by chemicals, one of that spotting, irritations etc. Environmental pollution, food habits, life style, stress full are leading to cause dermal infections. To reduce side effect and improve the therapeutic effects, usage of natural herbs is necessary in beauty sector. India filled with number of medicinal plants which can cure skin diseases, protect the body from microorganisms. Our body's external surface 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 such as body temperature regulation, blood reservoir; provide protection from external environment, 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 most frequently appears skin disorders are eczema, warts, acne, rashes, psoriasis, allergy etc. Since prehistoric time's herbal medicines, plant products, and extracts, are imitative for its utilisation. Since the existence of mankind as functional foods, medicines, cosmetics, dyes as well as in prevention, cure and treatment of various diseases the plants comprised with different pharmacological active properties are in utilize. The extracts produced by roots, stems, leaves, flowers possessing medicinal properties which act as a natural remedy for the disease or ailment. For the washing and maintaining the body by use of soap was first time mentioned by Galen. Currently present some chemical soaps can frequently causes the dryness and skin irritation. Due to the efficacy on topical disorders the popularity of herbal-based soap is increasing. The most commonly soap making were taken from animal and nature; many

industries and peoples made soap by using the animal fats with lye.

On the current day soap is fabricate with fats and an alkali with a most common method cold process also some peoples make soap using historical hot process. The definition of hygiene if as maintenance of cleanliness practices which carries utmost importance of health. The most common mode of transmitting the microorganism ishands. Hand washing is absolutely important precaution to prevent the spreading of contagious diseases. There are many chemically based market products are available of which frequent use can lead to irritation of skin also resistant among pathogen. For centuries plant extracts and products have been used in traditional medicine, functional foods, etc. In compare to chemical products main merit of natural source is that they are available easily, cheap, and harmless. There are many polyherbal or monoherbal soap with different plant extracts such as Aloe Vera, Cassia fistula, Azadirachta indica. but in present study we have prepared and evaluate polyherbal soap using different plant extracts. The aim of current study to make polyherbal soap using the abstract of Brassica oleracea var. Capitata (Cabbage), Azadirachta indica (Neem), Rubia cordifolia (Manjistha), as well as Cassia fistula (Garmalo) and to evaluate the parameters such as appearance, pH, physical evaluation, foam height, foam retention, high temperature stability so that it can further standardized and used commercially.

> Development of Herbal Soap –

In the development of polyherbal soap active herbal component like aloe Vera, Avocado and turmeric plays an important role. Polyherbal soap can decrease the concentration of melanin.

'Melanin' is the pigment that gives colour to skin, Hair, and eyes. It is created by cells called melanocytes, which are found in the outer layer of skin. The increase in the level of melanin is called as hyperpigmentation.

Aloe Vera –

Aloe Vera may reduce melanin production after sun exposure. The plant contains aloesin, a compound that showed promise in suppressing tyrosine.

Turmeric –

The active compound in turmeric may reduce melanin synthesis. This compound, called curcumin, works by inhibiting tyrosinase. This

suppresses the ability of melanocytes to create more melanin.

Avocado-

Avocado is rich in vitamins such as B and C along with adequate fibre content. It contains glutathione, which works as an antioxidant to inhibit tyrosinase. Tyrosinase is an enzyme that helps in melanin production.

>Working of Herbal Soap –

The barrier function of skin is principally attributed to the stratum corneum. Only small molecules, usually less than 500 Dalton, and lipophilic compounds can penetrate the skin barrier. As such, the stratum cornea primarily functions as a barrier between the deeper layer of skin and the outside environment, preventing toxins and bacteria from entering the body. It also helps to keep moisture from evaporation into the atmosphere, which keeps the skin hydrated. The washing routine significantly reduced the number of cell layers in the stratum corneum and its thickness in both the atopic patient and normal individuals of both sexes. When you wash your hands with soap, it dislodges the dirt, grease, oils, and disease-ridden faecal matter particle on your hands by creating these micelles. Soap when used for cleaning, soap solubilizes particles and grime, which can then be separated from the article being cleaned. In hand washing, as a surfactant, when lathered with a little water, soap kills microorganism by disorganizing their membrane lipid bilayer and denaturing their proteins. It also emulsifies oils, enabling them to be carried away by running water.

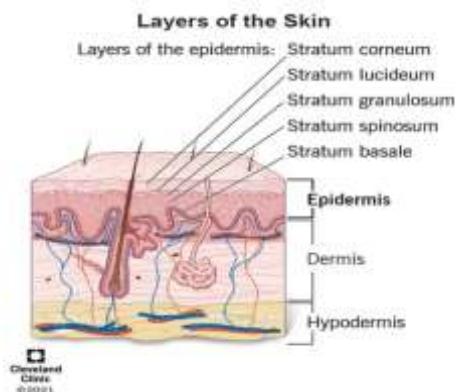


Figure. 1 – Layer of skins

>Material and Methods –

1. Aloe Vera –



Figure 2. Aloe Vera

- **Biological Source** – Aloe vera is obtained from the dried juice of the leaves of Aloe barbadensis Miller, known as Curacao aloe, (Aloe Vera). Aloe perryi Baker, known as Socotrine aloe.
- **Family** – Liliaceae.
- **Medicinal Uses** – Traditionally, aloe vera is medicinal plant. This medicinal plant has been employed to treat skin problems [burns, wounds, and anti-inflammatory processes]. Moreover, Aloe Vera has shown other therapeutic properties including anticancer, antioxidant, antidiabetic, and antihyperlipidemic.

2. Neem –



Figure 3. Neem

- **Biological Source** – Neem consists of the fresh or dried leaves and seed oil of Azadirachta indica J. Juss (Melia Indica or M. azadirachta Linn.)
- **Family** – Mimosaceae.
- **Medicinal Uses** – Neem preparations are reportedly efficacious against a variety of skin diseases, septic sores, and infected burns. The leaves, applied in the form of poultices or decoctions, are also recommended for boils, ulcers and eczema. The oil is used for skin

diseases such as scrofula, indolent ulcer, and ringworm.

3. Manjistha –



Figure 4. Manjistha

- **Biological Source** – Manjistha consist of dried roots of *Rubia cordifolia* L.
- **Family** – Rubiaceae.
- **Medicinal Uses** – Manjistha is commonly used as blood purifier. It has many other therapeutic properties like calcium channel blocking, anti-diabetic, antistress, and anti-platelet. It has anticancer activity and is used in the treatment of skin disorders.

4. Garmalo –



Figure 5. Garmalo.

- **Biological Source** – Garmalo is obtained from *Cassia fistula*.
- **Family** – Fabaceae.
- **Medicinal Uses** – The Leaves of Amaltas or Garmalo can be used in skin condition like ringworm, eczema, and skin eruptions. Amaltas root may help with dermatological problems. The fruit pulp of Amaltas was also found to be beneficial in treating skin diseases

and worms. These leaves of amaltas may be used in erysipelas.

5. Turmeric –



Figure. 6 – Turmeric

- **Biological Source** – Turmeric is obtained from a rhizomatous herbaceous perennial plant *Curcuma longa*.
- **Family** – Zingiberaceae.
- **Medicinal Uses** – In Ayurvedic practices, turmeric is thought to have many medicinal properties including strengthening the overall energy of the body, to improving digestion, dispelling worms, relieving gas, regulating menstruation, dissolving gallstones, and relieving arthritis.

6. Avocado –



Figure. 7 –Avocado

- **Biological Source** – The avocado is obtained from *Persea americana*.
- **Family** – Lauraceae.

- **Medicinal Uses** –The fruit, leaves, and seeds are used to make medicine. Avocado fruit is used to lower cholesterol levels, to increase sexual desire, and to stimulate menstrual flow.

>Other Material -

- **Propylene Glycol** – Propylene glycol [IUPAC name – propane-1,2-diol] is a viscous, colourless liquid, which is nearly odourless but possesses a faintly sweet taste. As it contains two alcohol groups, it is classed as diol. It is miscible with a broad range of solvents, including water, acetone, and chloroform. In general, glycols are non-irritating and have very low volatility.
- **Glycerine** – Glycerol also called glycerine or glycerine, is a simple triol compound. It is a colourless, odourless, viscous liquid that is sweet tasting and non-toxic. The glycerol backbone is found in lipid known as glycerides. Because, it has antimicrobial and antiviral properties, it is widely used in wound and burn treatment approved by the U.S. food and drug administration. Conversely, it is also used as a bacterial culture medium. Its presence in blood can be used as an effective marker to measure liver disease. It is also widely used as a sweetener in the food industry and as a humectant in pharmaceutical formulations. Because of its three hydroxyl group, glycerol is miscible with water and is hygroscopic in nature.[also called ethyl alcohol, grain alcohol, drinking alcohol, or simply alcohol] is an organic compound. Ethanol is volatile, flammable, colourless liquid with a characteristics wine like odour and pungent taste. It is a psychoactive recreational drug, and the active ingredients in alcoholic drinks.
- **Sodium Lauryl Sulphate** – Sodium lauryl sulphate [SLES], an accepted contraction of sodium lauryl ether sulphate [SLES], also called sodium alkylethersulfate, is an anionic detergent and surfactant found in many personal care product [soaps, shampoos, toothpaste,etc.] and for industrial uses SLES is an inexpensive and very effective forming agent. SLES, sodium lauryl sulphate [SLS], ammonium lauryl sulphate [ALS], and sodium pareth sulphate are surfactants that are used in many cosmetic product for their cleaning and emulsifying properties. It is derived from palm kernel oil or coconut oil. In herbicides, it is used as surfactant to improve

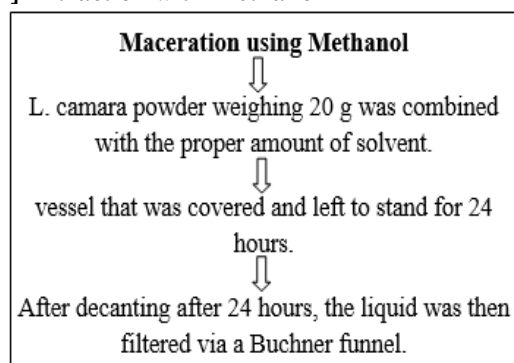
absorption of the herbicidal chemicals and reduce time the product takes to be rain fast, when enough of the herbicidal agent will be absorbed.

- **Stearic Acid** –Stearic acid is a saturated fatty acid with an 18-carbon chain. The IUPAC name is octadecanoic acid. It is a soft waxy solid. The triglyceride derived from three molecules of stearic acid is called stearin. Stearic acid is a prevalent fatty-acid in nature, found in many animal and vegetable fats, but is usually higher in animal fat than vegetable fat. It has a melting point of 69.4 degree Celsius and a pKa of 4.50.
- **Sodium Hydroxide** – Sodium hydroxide, also known as caustic soda. It is an inorganic compound. It is a white solid ionic compound consisting of sodium cations and hydroxide anions.
- **Triethanolamine** – Triethanolamine, or TEOA, is an organic compound. It is colourless, viscous liquid. It is both a tertiary amine and a triol. A triol is a molecule with three alcohol groups. Approximately 150000 tonnes were produced in 1999. It is a colourless compound although samples may appear yellow because of impurities.
- **Rose Oil** – Rose oil is the essential oil extracted from the petals of various types of rose. Rose ottoes are extracted through steam distillation, while rose absolutes are obtained through solvent extraction; the absolute being used more commonly in perfumery. Even with their high price and the advent of organic synthesis, rose oils are still perhaps the most widely used essential oil in perfumery.

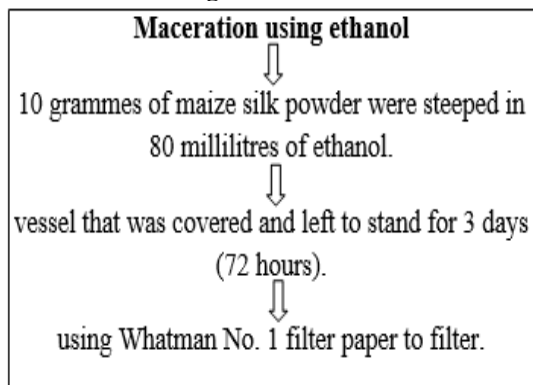
>Method -

1] Extraction –

A] Extraction with Methanol -



B] Extraction Using Ethanol –



2] Method-

- a] Take 1.6g NaOH and 2.ml distilled water in a 250beaker.
- b] 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 glycerine, 19 g of 95% ethanol solution, and 15 g of sodium lauryl sulphate.
- c] Add 13 g of stearic acid after this temperature is attained, and then raise the mixture's temperature to 68 °C.
- d] Once the liquid has reached the desired temperature, add the 50:50 lye solutions gradually while stirring continuously for 20 minutes, halting only when required, or until the mixture becomes translucent.

>Ingredient Table -

Sr.no	Ingredient Name	Used
1.	Aloe Vera	Wound Healing
2.	Neem	Bactericidal
3.	Manjistha	Skin lightener
4.	Garmalo	Cooling agent
5.	Sodium hydroxide	Stabilizer
6.	Propylene Glycol	Moisturizer
7.	Sodium Lauryl Sulphate	Surfactant
8.	Stearic Acid	Harden the soap
9.	Triethanolamine	Maintain pH
10.	Ethanol	Solubilizer
11.	Glycerine	Moisturizer

>Marketed Formulations -

Sr.no	Brand Name	Use
1.	Godrej No.1 Sandal and Turmeric soap	Fragrance soap
2.	Santoor Aloe Fresh Soap	Skin Soap
3.	Kazicare Skin Brightening Soap	Beauty Soap
4.	Yardley lavender soap	Quality soap

>Evaluation Parameter –

1. Organoleptic Properties – Organoleptic properties are the properties that stimulate human sensory organs.

A] Colour – Colour is a very important organoleptic property. Colour can increase the patient acceptance. Colour also made the product attractive.

B] Odor – Odor is also very important organolepticproperty. Odor means a smell can increase patient acceptance towards the product.

C] Taste – Taste is also one of the important organoleptic properties. A good taste can increases the patient acceptance

D] Appearance –Appearance is also one of the most important properties. A good appearance can increase the patient acceptance.

2. pH – pH means a potency of hydrogen. pH can state the nature of substance i.e., the substance is acidic, basic, or neutral.

3. Blooming Strength – The test determine the weight in grams needed by a specified plunger to

depress the surface of chocolate without breaking it at a specified temperature.

4. Stability Studies – A general method for predicting the stability of any product is accelerated stability studies, where the product is subjected to elevated temperature as per ICH guidelines. A short term accelerated stability study was carried out for the period of 3 months for prepared formulation.

5. Hardness –The hardness of polyherbal soap can be determined by the Pfizer and Monsanto apparatus. The hardness of polyherbal can be determined for the transportation and stability.

6. Melting Point - The residual heat of the polyherbal soap will melt it. Do not rely on appearance alone when microwaving polyherbal soap.

7. Physical Stability – To check the physical stability, sample of soap was kept in closed container for 1 month at 28°C after one month interval, Test sample of soap was observed for physical appearance and drug degradation.

8. Drug content determination - Drug content of medicated soap was determined by Thin Layer Chromatography. Here, control was taken as aqueous TLC plates were prepared by using silica gel G and plates were activated for half an hour. Spotting was carried out on both plates i.e., control and test plate by using capillary. Run both the plates in mobile phase i.e., Toluene: Ethyl acetate: Water having ratio 7:3:2. After running of both plates air drying of plates was carried out. Further, visualization of both plates was carried out by using iodine chamber. By comparing the RF value of both the plates i.e., control and test, Drug content in Medicated tonic was determined.

9. Estimation of herbal drug – Estimation of herbal drug carried out by TLC and HPTLC.

10. Protein content – The protein content was determined by following formula, Calculation of protein content:

$$\text{Total nitrogen (\% w/w)} = V / \bar{V} \times 0.14$$

Where,

V = Volume of 0.1 N H₂SO₄ required for titration

W = Weight in g of the sample

$$\text{Protein (\% w/w)} = \text{Total nitrogen (\%)} \times 6.25$$

11. Moisture content – The moisture content can be carried out by the following formula,

$$\text{Formula: Moisture Content (\%)} = \frac{W_2 - W_3}{W} \times 100$$

Where,

W = weight of sample (g)

W₂ = weight of empty petri dish (g) + sample (g)

W₃ = weight of the petri dish after drying (g)

12. Viscosity – The viscosity is an important evaluation parameter. The soap with a viscosity of 50 or less is considered to be low viscosity soap.

II. CONCLUSION

It can be concluded that the batch as an optimized batch, provides sweetening property as compared to others, pH and stability profile to be satisfactorily. The flavonoids in soap may help protect the skin. The organoleptic properties of soap are excellent for masking unpleasant odour associated with some active agents and imparting a smooth and foamy texture to composition of active agents. The drugs extract which are used in the dose range are safe consumption and can be applied without any risk of side effects

REFERENCES

- [1]. Kapoor, V. P. (2005). Herbal cosmetics for skin and hair care.4 (4). 306-315. 8. Niharika, A., Aquicio, J. M., & Anand, A. (2010). Antifungal properties of neem (Azadirachta indica) leaves extract to treat hair dandruff. E-ISRJ, 2, 244-52.
- [2]. Kapoor, V.P...(2005).Herbal cosmetics for skin and hair care.4 (4).306-315.
- [3]. Priyadarshini G, Kumar RP, Kumar NP. Formulation and evaluation of antifungal herbal soap using acahypha indica.
- [4]. Karnavat DR, Amrutkar SV, Patil AR, Ishikar SK. A Review on Herbal Soap. Research Journal of Pharmacognosy and Phytochemistry. 2022 Jul 1; 14(3):208-13.
- [5]. Zeeshan afsar&salmakhanam Formulation and evolution of polyherbal soap and hand sanitizer 2016
- [6]. Choudhari S, SutarM, Chavan M, Formulation, Evaluation and Antibacterial Efficiency of herbal hand wash, Indo American Journal of Pharmaceutical Research 2016; 6(04): 5202-2503.
- [7]. Hunt JA. A short history of soap. Pharm J 1999; 263:985-9.
- [8]. D. A. Johansen, Plant Micro technique, New York, M.C. Graw Hill, 1940, 120.
- [9]. Sharma a, yadav r, guha v, soni u. N, Patel j. R, 2016; formulation and evaluation of herbal hand wash, world journal of pharmacy and pharmaceutical sciences, 5(3): 675-683.
- [10]. Rakesh K. Sindhu, Formulation Development and Antimicrobial Evaluation of Polyherbal Soap, Journal of



- Pharmacology,2019, Vol 19 Supplement 2, Pgno.1342.
- [11]. Shreya Talreja, A complete pharmacognostic review of amla, World Journal of Pharmacy and Pharmaceutical Sciences,2019, Vol8, Issue 4, Pgno 622.
- [12]. Dr. L. V. Vigneswaran, Formulation and Evaluation of Polyherbal Soap, World Journal of Pharmaceutical and Medical Research,2022, Vol-8(2), pg- 170-173.
- [13]. Kumar, K. P., Bhowmik, D., Tripathi, K. K., and Chandira, M. (2010). Traditional Indian Herbal Plants Tulsi and Its Medicinal Importance. Research Journal of Pharmacognosy and Phytochemistry, 2(2), 93-101
- [14]. Afsar, Z., Khanam, S., and Aamir, S. (2018) Formulation and comparative evaluation of polyherbal preparations for their Disinfectant Effects, 1 (1), 54-65.
- [15]. Dhanasekaran, M. (2016) International Research Journal of Pharmacy. 7(2), 31-35