

Formulation and Evaluation of Polyherbal Skin Glowing Soap

Sivaram R¹, Anu V², Midhuna Sr³, Shaliny Rp⁴, Sneha Noyal Das⁵, Teena Christy⁶

¹ professor, The Dale View College of Pharmacy and Research Centre, Trivandrum
^{2,3,4,5,6} students, The Dale View College of Pharmacy and Research Centre, Trivandrum

Submitted: 20-06-2023

Accepted: 29-06-2023

ABSTRACT

Poly-herbal skin glowing soap was prepared by using herbs like Manilkara zapota (sapodilla), Cinnamomum zeylanicum (cinnamon), Azadirchta indica extract. Herbal cosmetics are also known as traditional cosmetics as the natural content in the herbs does not have any side effect on the human body. Sapodilla has wide range of medicinal properties and its constituents have moisturizing, skin glowing, anti-aging properties and antioxidant activity. It is a good source of carotenoids, multi vitamins, essential mineral and lot of fibers. It is also one of the rich sources of sugars, proteins, ascorbic acid and minerals like iron, copper, zinc, calcium and potassium. Carotenoids have antioxidant activity, so it produces skin glowing effect and reduce the wrinkles. Cinnamon has antifungal, antioxidant, antibacterial properties and it dries out the skin by supporting enhanced blood flow. Neem is able to balance oil production, stimulate collagen formation, reduce post acne scars and minimize skin inflammation. The herbal formulation was prepared and evaluated for the analysis of pH, moisture content, foaming index, foam retention time, alcohol insoluble matter, total fatty matter and the microbial testing by using microorganism Escherichia coli done with zone of inhibition method. The prepared poly herbal soap has good appearance, high cleansing, foaming effect and good skin glowing effect and does not have any side effect.

KEYWORD: Poly-herbal soap; Skin glowing; Manilkara zapota (sapodilla); Cinnamomum zeylanicum (cinnamon); Azadirchta indica; Carotenoids; Escherichia coli; Zone of inhibition.

I. INTRODUCTION

SOAP

The word Soap (Latin Sapo) which is cognate with Latin sebum tallow originally was applied to the product obtained by treating tallow with ashes. "Soap considered commercially, a body which on treatment with water liberates alkali."⁽¹⁾





TYPES OF SOAP⁽²⁾






1. Natural/Herbal Soap
2. Liquid Soap
3. Moisturizing Soap
4. Anti-bacterial Soap
5. Chemical Free Soap
6. Foam Soap
7. Bar Soap
8. Body Soap

FORMULATION OF HERBAL SOAP

"These are the cosmetics which are prepared using plant product having cosmetic action".⁽³⁾ Herbal soaps are organic products made from rare herbs and 100% natural ingredients that are beneficial and healthier for skin. Herbal soaps using the cold process method that keep their glycerin to help and retain the moisture in the skin thereby making these soaps perfect for all skins and especially for dry skins conditions. These soaps are totally chemical free so there is barely chances of any harmful or side effects from them as these contain natural oils. The herbs infused in these soaps have therapeutic and healing characteristics that offer specific benefits to the skin, such as nourishment, strength, healing and moisturizing. These soaps also contain super fatty oil, vitamin E and essential oils, that all lead to the good health of then skin and overall health. Consumers who are shifting their preference in soaps from chemicals to organic and herbal soaps because of the associated benefits.⁽⁴⁾

II. MATERIALS AND METHODS

Ingredients	Biological Source	Chemical Constituents	Uses
<p>Sapota</p> 	<p>Consists of fruits of Sapotamanilkara belonging to the family Sapotaceae.</p>	<p>Sugar, protein, ascorbic acid, carotenoids, phenols, minerals like iron, copper, zinc.⁽⁵⁾</p>	<p>Skin glowing, moisturizes the skin, anti-aging.⁽⁶⁾</p>
<p>Neem</p> 	<p>Consists of all aerial parts of plant known as Azadiractaindica belonging to the family Meliaceae.</p>	<p>Nimbidine, Nimbine, Nimbocid, Azadiractin, Gallic acid, Epicatechu, Catechin, Margolone</p>	<p>Moisturizes the skin, soothes inflamed and irritated skin, fight against acne and pimples.⁽⁷⁾</p>
<p>Cinnamon</p> 	<p>Consists of the dried inner back of the coppiced shoots of Cinnamomumzeylani cumNees belonging to the family Lauraceae.</p>	<p>Cinnamicaldehyde, eugenol, benzaldehyde, cuminaldehyde, terpene hydrocarbons, caryophyllene</p>	<p>Reduces the signs of aging, heals and prevent acne, evens out skin texture.⁽⁸⁾</p>
<p>Orange peel</p> 	<p>Fresh or dried outer part of the pericarp of Citrus aurantium Linn, belonging to the family Rutaceae.</p>	<p>Volatile oil, limonene, aurantimarin, vitamin C, pectin.⁽⁹⁾</p>	<p>Renew dead cells, moisturizes the skin, lighten the dark spots, acne scars.⁽¹⁰⁾</p>
<p>Honey</p>	<p>Sugary secretion deposited in honey comb by the Honey bee Apismellifera and bees of other species of apis.</p>	<p>Glucose, fructose</p>	<p>Moisturizes and hydrates the skin, Fights acne and break out⁽¹¹⁾</p>

			
<p>Olive oil</p> 	<p>Fixed oil obtained by expression method from ripe fruit of Olea europaea Linn belonging to the family Oleaceae.</p>	<p>Pamitin, linolein, olein.</p>	<p>Emollient action, used in wrinkle treatment, moisturizes and fights against bacteria.⁽¹²⁾</p>
<p>Glycerin</p> 	<p>—</p>	<p>—</p>	<p>Humectant, relieve dryness, refresh the skin's surface, emollient.⁽¹³⁾</p>
<p>Soap Base</p> 	<p>—</p>	<p>—</p>	<p>Foaming, cleansing.</p>
<p>Rosemary oil</p> 	<p>Stem, leaves and flowering tops of Rosemarinus officinalis Linn belonging to the family Lamiaceae.</p>	<p>camphor, α-pinene, 1,8 - cineole, camphene, borneol, β-pinene, verberone, βcaryophylline, linalool.</p>	<p>perfume in soap making, Anti-inflammatory property⁽¹⁴⁾</p>

METHOD OF PREPARATION OF SOAP

Composition of different ingredients are mentioned in table 2 and the formula for preparation of F1, F2 and F3 are depicted on table 1

- Weigh required quantity of sapota paste; mix with extract of neem leaves and orange peel.
- Prepare honey and cinnamon mixture and add to it.
- Add required amount of olive oil and mix to obtain a smooth paste.
- To the resultant mixture glycerin is added in sufficient quantity to produce a humectant effect.
- Accurately weighed quantity of soap base is taken in a sterile beaker.
- Melt the soap base by placing it in a water bath.
- The prepared smooth paste is poured into the melted soap base with a constant stirring.
- Simultaneously sufficient quantity of perfume is added.
- Immediately transfer the mixture into the soap mold and allow to set for 24 hours at room temperature.

EVALUATION

1. **Foam ability:** Approximately 1g of herbal soap was taken and dissolved in distilled water (about 50ml) in a 100ml graduated measuring cylinder to determine the soap's ability to produce foam. It was taken for roughly 10 minutes in the measuring cylinder. After 10 minutes, the foam height was measured. The mean was calculated after recording the observations for five consecutive experiments.⁽¹⁵⁾
 2. **Foam retention test:** 25ml of the 1% soap solution was taken into a 100ml graduated measuring cylinder. The cylinder was covered with hand and shaken to 10 times. The volume of foam at 1 min's interval to 4 mins was recorded.⁽¹⁶⁾
 3. **Determination of sample pH:** Digital pH was used to determine the pH of the produced formulation metre. The formulation were diluted in 100ml of distilled water and kept in the refrigerator for 2 hrs. The pH formulation was measured with a pH meter that had already been calibrated meter.⁽¹⁷⁾
 4. **Moisture content:** 5g of sample was placed in a Petridish and dried for 2 hr. in the hot air oven at 105°C. It was cooled and weighed after the heating. The difference in weight indicates the loss of moisture.⁽¹⁸⁾
- Moisture content = $\frac{m}{M} \times 100$
- m = loss in mass of the material after drying.
M = mass of sample taken.
5. **Foam height:** 0.5g of sample of soap was dispersed in 25 ml of distilled water. This transferred into 100ml measuring cylinder and the volume was made up to 50ml with water. 25 strokes were given and allowed to stand till aqueous volume measured up to 50 ml and the foam height above the aqueous volume was measured.⁽¹⁶⁾
 6. **Alcohol insoluble matter:** In a conical flask, 2g of sample was taken. To this 50ml of warm ethanol was added and it was shaken vigorously. Until the sample was dissolved completely. The solution was filtered through a tarred filter paper along with 20ml warm ethanol and dried it at 105°C for 1hr. the weight of dried paper was noted.⁽¹⁹⁾
% Alcohol insoluble matter = $\frac{\text{weight of residue}}{\text{weight of sample}} \times 100$
 7. **Total fatty matter (TFM):** TFM was estimated by reacting soap with acid in the presence of hot water and calculate the fatty acid obtained. 10gm of the formulated soap was dissolved in 150ml distilled water and heated. To this 20ml of 15% H₂SO₄ added while heating until a clear solution was obtained. Fatty acids that are present on the surface of the resulting solution are solidified by adding 7gm beeswax and heated again. Then it was allowed to cake. Cake was removed and blotted to dry and weight to obtain the TFM using formula.⁽²⁰⁾ % TFM = $\frac{\text{Weight of cake} - \text{Weight of the wax}}{\text{Weight of soap}} \times 100$
 8. **Antimicrobial test:**
 - i) Preparation and dilution of soap sample extracts: With the help of sterile sharp knife soaps were scrapped at one side. 250mg and 500mg of each soap sample was weighed and dissolved in 1ml of sterile distilled water.
 - ii) Disc diffusion assay: Agar disc diffusion method was used to detect antimicrobial assay. The standardised 0.1ml saline suspensions of test organisms were inoculated on the surface of the sterile Muller-Hinton agar plate. Sterile filter paper disc prepared from different concentrations of the various soap samples were aseptically transferred directly into the surface of the plate with the help of sterile forceps. All the plates were incubated at 37°C for 24-48 hours and then were examined

for zone of inhibition around the disc. The zone of inhibition was determined by measuring the diameter in millimetre of zone to which the soap inhibited the growth of organism.⁽²¹⁾

III. RESULTS

The skin glowing herbal soap (100gm) was formulated as per the prescribed procedure and evaluated for various parameters.

➤ **ORGANOLEPTIC PROPERTIES;**

Prepared polyherbal skin glowing soap was evaluated for its physical parameters like color, odor, and appearance.

➤ **FOAM ABILITY:**

The foaming ability of various formulation was carried out in which F2 is showing much stable foam.

➤ **FOAM RETENTION TIME:**

The ability of foam retention of the polyherbal soap was carried out by foam retention test.

➤ **MEASUREMENT OF pH:**

The pH of all three formulation were checked using pH meter. The formulation was found to be satisfactory in the range of 8 which is ideal for soaps, which indicate that the prepared formulation are compatible with the skin.

➤ **MOISTURE CONTENT:**

The moisture content of herbal soap was performed. The ideal moisture content for soap was 10-14%.

➤ **FOAM HEIGHT:**

The ability to produce foam is paramount importance to the consumer. The formulated herbal soap F1, F2 & F3 produce foam height above 14cm. The ideal foam height produced by a soap is about 13-22cm. The foam produced by all three soap were stable even though the formulated soap F2 was more comparatively uniform and stable than F1 & F2.

➤ **ALCOHOL INSOLUBLE MATTER:**

Alcohol insoluble matter is a parameter used to determine the purity of soap. The limit for alcohol insoluble matter for toilet soap of grade 2 and grade 3 is 10%. The formulations F2 have least amount of alcohol insoluble matter.

➤ **TOTAL FATTY MATTER:**

Determination of fatty matter was examined and found out.

$\% \text{TFM} = \frac{\text{Weight of cake} - \text{Weight of the wax}}{\text{Weight of the soap (gm)}}$

The value for Total Fatty matter is greater in F2 formulation than F1 and F3.

➤ **ANTI-MICROBIAL TEST**

The anti-microbial test of prepared formulation was performed and the zone of inhibition was calculated. The results indicated that there is a concomitant increase in the diameter of zone of inhibition. The F2 formulation showed greater zone of inhibition than F1 and F3, indicates a high anti-microbial activity against the test micro-organism.

Table no:2: EVALUATION RESULTS

EVALUATION PARAMETERS	F1	F2	F3
Colour	Brown	Brown	Brown
Odour	Forest mint	Forest mint	Forest mint
Appearance	Opaque	Opaque	Slightly transparent
Consistency	Hard	Hard	Hard
pH	8.85	8.22	8.89

Moisture Content	11.08%	6%	19.52%
Foam Height	15cm	16cm	16cm
Alcohol Insoluble Matter	41.9%	38.96%	46.05%
Total Fatty Matter	69.8%	77.3%	64.2%

IV. DISCUSSION

The polyherbal skin glowing soap was prepared using 3 different concentration and were subjected to evaluation of various parameters. The formulated soap was dry and was found in brown colour. The odour of 3 formulation is forest mint. Its consistency is hard. The appearance of F1 and F2 is opaque and F3 is slightly transparent. All formulated soap were found to be easily washable from the skin and is foamy in nature. The pH of prepared formulation is assisted with the help of pH meter. The pH of formulation (F1, F2, F3) ranges from 8.22 - 8.89. the formulation F2 showed the pH of 8.22 which is alkaline and was compatible to the skin. The moisture content of soap was used to estimate the percentage of water in the soap by drying the soap. The moisture content of soap ranges from 6% - 19%. From this F2 shows moisture content of 11.08%. Alcohol insoluble matter was also evaluated successfully which ranges from 41% - 46%. From this F2 shows 38.96%. the TFM of 3 formulation was found to be 50.03%, 69.8% & 59.3%. if the TFM is more, better the quality of the soap. From this F2 have more TFM when compared to F1 & F3. The foam height of F2 was found to be 16cm. the anti-microbial test of prepared formulation was performed and the zone of inhibition was calculated. The F2 formulation showed a maximum zone of inhibition (1.6cm) than F1 & F3. The increase in the diameter of zone of inhibition indicate a high antimicrobial activity against the test micro-organism. F2 formulation was found to be the best formulation due to good quality of soap with compatible pH. The F2 had minimal alcohol insoluble matter and the formulation has high amount of TFM. From this study it is evident that F2 formulation had significant activity

V. SUMMARY

Soap has the potential to be efficient, viable, safe and cost-effective system for administration of herbal constituents on account of their biodegradability, biocompatibility and suitability for topical application and low immunogenicity. Chemicals are always harsh to our skin which can cause burning sensation, irritation, roughness, redness to our skin. Nowadays mostly herbal products have high market demand due its less side effects, safe to use, do not cause any harmfulness to the skin, cost effective, convenient for people, eco-friendly and free from animal cruelty.

CONCLUSION

Natural remedies are safe as well as having less side effects. Herbal soap is used as cleansers and also, they nourish the skin and help to deal all the skin concerns. Preferably they are used for oily and dry skin physiology. It provides numerous essential nutrients that are required for maintaining the normal skin functioning. It also promotes the natural glow to the skin. In the present study, an attempt was made to formulate a herbal soap using different natural ingredients like sapota, cinnamon, neem oil, orange oil, honey. Three formulations (F1, F2, F3) of the soap were prepared by varying the proportions of additives and evaluated for their physicochemical properties like color, odor, pH, foamability, irritancy and microbial assay. Based on these tests, F2 soap formulation code was selected as the best formulation among the others.

REFERENCE:

- [1]. Gautam D Mehetre, Jaya P Ambhore, Rameshawar S Cheke, Sachin D Shinde; Concise Course in Cosmetic Science.

- [2]. <https://allportablesinks.com>blog>news>differnt-soap-types-and-theirus>
- [3]. bodia.com/2021/03/25/what-is-natural-soap
- [4]. C K Warman; Trees of India. Page no: 829
- [5]. pharmaeasy.in/blog/8-great-benefits-of-sapota-or-chikoo/
- [6]. Girish. K. et.al, Neem, A Green Treasure. *Electronical Journal of Biology*, 2008;4:102-111
- [7]. Girish. K. et.al, Neem, A Green Treasure. *Electronical Journal of Biology*, 2008;4:102-111
- [8]. Saharan, MoondChouhan and Gupta, A Textbook of Pharmacognosy. Page no: 249
- [9]. <https://www.sciencedirect.com/topics/agricultural-and-biologicalscience/orangepeels>
- [10]. healthshots.com/beauty/skin-care/how-to-use-orange-peel-for-glowing-skin
- [11]. Y Bhagyasri, Pavan Kumar, Sara and N Siva Subramanian; "Formulation and Evaluation of Polyherbal Facewash Gel for Anti-microbial Activity", *World Journal of Pharmaceutical and Life Science*. 2017;3(7):104-107
- [12]. Saharan, MoondChouhan and Gupta, A Textbook of Pharmacognosy. Page no: 302-303
- [13]. EdrisAli, Md. Sadequl Islam, Md. Ismail Hossan, Mst. Minara, Md. ArifulIslam. Extract of Neem (*Azadiractaindica*) leaf exhibits bactericidal effects against multidrug resistant pathogenic bacterias of poultry- *Ved Med science*, 2021;7(5):1921-1927.
- [14]. Hilda Butler, Poucher's Perfumes, Cosmetics and Soaps. Page no: 462
- [15]. Abdul Majeed Abdurrahman Isa, ShafirahSimsuri and NurulAiniAmran. Integration of Maceration and Freeze Concentration for Recovery of Vitamin C from Orange Peel Waste. *IOP Conf. series: Earth and Environmental Science* 268 (2019) 0121. Page no: 2
- [16]. C.K. Kokate, A.P Purohit, S.B. Gokhale; *Pharmacognosy*
- [17]. Abdul Majeed Abdurrahman Isa, ShafirahSimsuri and NurulAiniAmran. Integration of Maceration and Freeze Concentration for Recovery of Vitamin C from Orange Peel Waste. *IOP Conf. series: Earth and Environmental Science* 268 (2019) 0121. Page no: 2
- [18]. C.K. Kokate, A.P Purohit, S.B. Gokhale; *Pharmacognosy*
- [19]. Selvamani M, Surya Prakash R, Siva SankarD, Satish .K, Siva Guru M, L.V. Vigneswaran, M SenthilKumar; *World Journal of Pharmaceutical and Medical Research wjpmr*, 2022, 8(2), 170-173.
- [20]. Dr.A. Seetha Devi, D V Sivani D Anusha G Sarath, Syed MerajSulthana; Formulation and Evaluation of Antimicrobial herbal soap, *International Journal of Pharmaceutical science Review and Research*. page no: 123-124
- [21]. Varsha M Chaudhari; studies on Antimicrobial activity of antiseptic soaps and herbal soaps against selected human pathogens. *Journal of scientific and Innovative Research* 2016;5(6):201-204