

Formulation and Evaluation of Harbal Soap

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Abstract: Commercial soaps often contain synthetic chemicals that may irritate or damage the skin, making herbal soaps a safer and more natural alternative. Herbal soaps are prepared using plant-based ingredients and medicinal herbs that provide nourishment and protection to the skin with minimal side effects. Many herbal soap formulations also incorporate aromatherapy oils and herbal extracts to improve skin health and provide a soothing effect. Because they are made from natural ingredients, herbal soaps are considered more skin-friendly and environmentally safe. Unlike soaps prepared from divalent metals such as calcium, magnesium, aluminum, or iron, which are generally insoluble in water, herbal soaps are designed for effective cleansing and skin care. Soaps are widely used for personal hygiene and laundry purposes, while certain calcium-based soaps are also utilized in animal feed formulations. In general, soap is produced through the saponification process, where fats or oils containing triglycerides react with a strong alkali such as sodium hydroxide or potassium hydroxide. This reaction produces glycerol and the salts of fatty acids, which form soap.

Keywords: Home grown Cleanser, Neem, Tulshi, VitE, Aloevera, Turmeric, Rose Water, Cleanser Base, Lavendar Basic Oil

I. INTRODUCTION

A Greek philosopher and botanist, classified plants into three major groups: trees, shrubs, and herbs. Herbs were further categorized into sweet herbs, salad herbs, and pot herbs. Sweet herbs included aromatic plants such as thyme, salad herbs included plants like wild celery, and pot herbs referred to edible plants such as onions. During the seventeenth century, selective breeding improved the taste and size of many pot herbs, which later came to be recognized as vegetables rather than simple culinary herbs. Herbal soaps are cleansing and skin-enhancing products prepared using natural plant materials and herbal ingredients. The major advantage of herbal cosmetics is their natural composition, which provides nutrients and beneficial minerals to the skin with minimal side effects. Skin and hair health are influenced by several factors, including lifestyle, nutrition, occupation, environmental conditions, and personal hygiene. Continuous exposure of the skin to sunlight and heat during summer can lead to dehydration, resulting in wrinkles, pigmentation, blemishes, freckles, and sunburn. Most commercially available soaps contain synthetic chemicals and antibacterial agents that may adversely affect the skin after prolonged use. Soaps and detergents are widely used cleansing agents essential for maintaining hygiene and preventing microbial contamination. These cleansing agents are available in various forms, such as solid, liquid, semisolid, and powdered preparations.

1.1 VARIOUS SKIN INFECTION



Fig. no.1-Bacterial infection



Fig. no.2-Fungal infection





Fig.no.3-Infection due to pollution



Fig.no.4-skin rashes

1.2 SOAP

Soap is common cleansing agent well known to everyone. Soaps are produced for a variety of purposes ranging from washing, bathing, medication etc. The cleansing action of the soap is due to the negative ions on the hydrocarbon chain attached to the carboxylic group of fatty acids. Anti-microbial soap affects against skin infection.

1.2.1 Types of herbal soap :

1. Toilet Soaps
2. Body Soaps
3. Face Wash
4. Cleansing Milk
5. Cleansing Cream

1.2.2 IDEAL PROPERTIES OF HERBAL SOAP :

1. Should Posses good water & lipid solubility.
2. It should be compatible with Active ingredients.
3. Cost Effective.
4. Pulls out Pollutants.
5. Soap Contain edible oil.

1.2.3 ADVANTAGES :

1. It helps in reducing skin infection & dry skin.
2. It reduces skin tanning, dryness and itching.
3. It also detoxifies the skin and removes dirt from the skin.
4. This soap has powerful antioxidants which keep the skin hydrated.
5. Natural, vegan ingredients.
6. Made with essential oils (no synthetics).

1.2.4 DISADVANTAGES :

1. It has shorter shelf life.
2. Overuse of Herbal Soap leads to Hypersensitivity reaction.

II. REVIEW OF LITERATURE

- i. **Sharma et al. (2022)** - Sharma S., Pradhan S., Pandit B., and Mohanty J.P. formulated and evaluated herbal soap using the cold saponification method with different bioactive plant extracts such as neem, aloe vera, lemon, coconut, and turmeric. The prepared soaps were evaluated for pH, foam retention, skin irritation, and hardness. The study concluded that herbal soaps prepared with natural ingredients showed good cleansing action, acceptable foam stability, and minimal skin irritation compared to synthetic soaps.



- ii. **Sharma and Verma (2023)** - Ajay Sharma and Ritu Verma conducted a systematic review on herbal soaps derived from plant extracts. The review emphasized the importance of botanical extracts, essential oils, and herbal constituents in improving skin health. Parameters such as pH, foamability, saponification value, and total fatty matter were discussed for evaluating soap quality. The authors concluded that herbal soaps are safer and eco-friendly alternatives to chemical soaps.
- iii. **Rajput et al. (2023)** - Jagruti Rajput and co-workers reviewed the preparation and evaluation of herbal soap prepared by the cold process method using neem oil, castor oil, coconut oil, lavender oil, and rose oil. The formulated soaps were tested for pH, moisture content, foam retention, antimicrobial activity, and total fatty matter. The study reported satisfactory antimicrobial activity and good skin compatibility of the herbal soap.
- iv. **Rajan et al. (2024)** - Rajan M. and colleagues formulated and evaluated polyherbal soap using the hot process technique. Herbal ingredients such as neem, tulsi, aloe vera, and turmeric were incorporated into the soap base. Evaluation parameters included colour, odour, pH, foam height, foam retention, and skin irritation test. The study showed that polyherbal soap possessed acceptable physicochemical properties and enhanced therapeutic benefits for skin care.
- v. **Das et al. (2024)** - Das S., Agarwal S., Samanta S., and Das R. prepared herbal soap using the cold process method and evaluated it through organoleptic and physicochemical tests. The soap showed good appearance, aromatic odour, suitable pH, satisfactory total fatty matter, and stable foam retention. The researchers concluded that herbal soaps prepared from natural extracts provide moisturizing and antioxidant effects on the skin.
- vi. **Pardhi et al. (2025)** - Pardhi N., Bisen A., and Pardhi S. published a review on formulation and evaluation of herbal soap. The authors discussed various herbal ingredients such as vegetable oils, essential oils, and medicinal plant extracts used in soap preparation. The review highlighted evaluation methods including pH determination, foam height, moisture content, and antimicrobial studies. The authors concluded that herbal soaps are gaining popularity due to their safety, sustainability, and therapeutic value.
- vii. **Gnaneshwari et al. (2025)** - Gnaneshwari V. and co-workers reviewed herbal soaps and discussed their composition, preparation techniques, and future applications. The study emphasized the use of natural oils and botanical extracts for improving skin health and reducing adverse effects associated with synthetic soaps. The review also highlighted the increasing demand for herbal cosmetic products in the pharmaceutical and cosmetic industries.
- viii. **Raj et al. (2025)** - Shivani Raj, Alpana Kumari, and Indrajeet Kumar reviewed formulation and evaluation approaches of herbal soaps prepared using ingredients such as neem, tulsi, aloe vera, turmeric, and rose extracts. Evaluation tests included colour, odour, texture, pH, foam height, total fatty matter, and moisture content. The study concluded that herbal soaps possess antibacterial, antioxidant, and anti-inflammatory properties and are suitable alternatives to commercial synthetic soaps.
- ix. **Mahesh et al. (2025)** - Mahesh G. and co-workers formulated polyherbal soap containing aloe vera, turmeric, neem, tulsi, jasmine, lotus flower powder, and vitamin E. The soap was evaluated for pH, colour, foam retention, skin irritation, and free alkali content. Results indicated good foam stability, mild alkalinity, and absence of skin irritation, demonstrating the effectiveness of herbal ingredients in soap formulation.
- x. **Bongoni et al. (2025)** - Bongoni R. and colleagues developed herbal scrub soaps using natural exfoliating agents and herbal extracts. The prepared soaps were evaluated for exfoliating properties, cleansing efficiency, texture, and antimicrobial activity. The study reported that herbal scrub soaps provide deep cleansing and therapeutic skin benefits without harmful chemical additives.



III. NEED FOR STUDY

Herbal soaps have gained considerable importance in recent years due to the increasing awareness regarding the harmful effects of synthetic chemicals present in commercial soaps. Most conventional soaps contain artificial colours, preservatives, detergents, and fragrances that may cause skin irritation, dryness, allergies, and other dermatological problems. Therefore, there is a growing demand for natural and herbal cosmetic products that are safe, effective, and eco-friendly. Medicinal plants such as neem, tulsi, turmeric, aloe vera, and other herbal ingredients possess antibacterial, antifungal, antioxidant, anti-inflammatory, and moisturizing properties, which are beneficial for maintaining healthy skin. Incorporation of these herbal ingredients into soap formulations can improve cleansing action and provide therapeutic benefits without producing harmful side effects. The preparation and evaluation of herbal soap are important to ensure the quality, safety, stability, and effectiveness of the product. Evaluation parameters such as pH, foamability, foam retention, moisture content, total fatty matter, hardness, and skin irritation tests help in determining the suitability of the soap for human use.

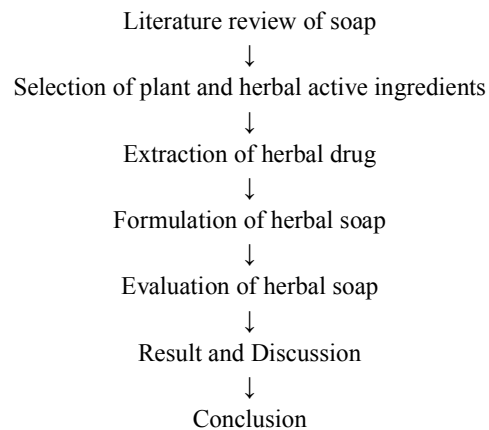
IV. AIM

The aim of the present investigation is “formulation and evaluation of herbal soap by using natural ingredients.

4.1 OBJECTIVES

1. To carry out the extraction process.
2. To carry out formulation of Herbal soap.
3. To carry out evaluation tests for desired Herbal product.
4. To reduce the bacterial infection.
5. To provide moisturizing the skin.

V. PLAN OF WORK



VI. PLANT PROFILE

Neem



Fig no. 5 – Neem Plant

Botanical name- *Azadiracta indica*.

Part typically used- Leave.

Color- Green.

Constituents- flavonoids, Alkoloids, Azadirone, nimbin, nimbidin, terpenoid, steroid, tannic acid and saponins.

Tulshi



Fig no.6 – Tulshi Plant

Biological name- *Ocimum tenuiflorum*.

Common name- holy basil.

Chemical constituents- eugenol germacrceterpens, flavonoids and terpenoid.

Part typically used- leaves.

Colour- Green.

Alovera



Fig no.7 – Alovera Plant



Biological name- Aloe Vera.

Common name- Aloe barbadensis Miller.

Chemical constituents- vitamin, enzyme, minerals, sugars, lignin, saponin, salicylic acid and amino acid.

Part typically used- leaves

Color- Green.

Turmeric



Fig no.8 – Turmeric Root

Biological name: *Curcuma longa*

Common name: haldi

Chemical constituents: protein, fat, Mineral and Carbohydrates.

Part typically used: root

VII. MATERIALS AND METHODOLOGY:

7.1 Materials

1. Neem
2. Tulshi
3. Alovera
4. Turmeric
5. Vitamin-E
6. Lavendar essential oil
7. Glycerine soap base
8. Hard soap

7.2 Collection and Extraction –

Fresh leaves of neem were collected from healthy plants, thoroughly washed with clean water to remove dust and impurities, and then dried properly. The same procedure was followed for tulsi leaves. After drying, the neem leaves were ground using a mixer to obtain the extract or juice. A similar extraction process was carried out for tulsi leaves. Fresh aloe vera gel was carefully separated and collected properly for use in the formulation. These natural extracts were used in the preparation of herbal soap to improve the quality and effectiveness of the final product.

VIII. PHYTOCHEMICAL SCREENING TEST:

1. Test for Alkaloids:

- a. Dragendroff's test:** 2 ml of extract + Few ml Dil. Hcl + Filter + Few Drops Dragendroff's reagent.



- b. Mayer's test:** 2ml of extract + 2% Hcl + Few drops Mayer's reagent.
- 2. Test for Flavonoids:**
Alkaline test: 2ml of extract + Few Drops NAOH Solution + Few ml Dil. HCL.
- 3. Test for Glycosides:**
Glacial acetic acid test: 2ml of extract+ glacial acetic acid + few drops Fecl3+ conc. H2SO4.
- 4. Test for Tannins:**
Fecl3 test: 2ml of extract+ 2ml Fecl3.
- 5. Test for Terpenoids:**
Salkowski test: 2ml of extract + Chloroform + few Drops Conc. H2SO4.
- 6. Test for Saponin:**
Froth test: 2ml of extract + 2ml Distilled Water (Shake Vigorously).9

IX. EXPERIMENTAL WORK

Formulation of Herbal soap-

1. Take a neem powder in a clean beaker.
2. Add tulsi powder, aloe vera gel, vitamin E, turmeric powder, and rose water into the same beaker.
3. Mix all the ingredients properly for about 2–3 minutes to obtain a uniform herbal mixture.
4. Cut the glycerine soap base into small pieces for easy melting.
5. Prepare a double boiler setup by taking water in a pan and heating it on an induction stove.
6. Place a small container over the heated water and add glycerine soap base into the container.
7. Heat the soap base until it melts completely.
8. After complete melting, add the prepared herbal mixture into the melted soap base.
9. Stir the mixture continuously to ensure proper mixing of all ingredients.
10. Turn off the heat and add a few drops of lavender essential oil for fragrance.
11. Pour the prepared soap solution into small soap moulds or containers for shaping.
12. Allow the soap to cool and solidify at room temperature.
13. Remove the soap carefully from the moulds after complete hardening.
14. Finally, pack the prepared herbal soap properly in paper or suitable packaging material.

9.1 FORMULATION TABLE:

Table No.1: Formulation table

INGREDIENTS	F1	F2	F3	ROLE OF INGREDIENTS
Neem	5gm	6gm	7gm	Antibacterial properties
Tulshi	2gm	4gm	3gm	Antimicrobial
Alovera	3gm	3gm	4gm	Moisturizer or sunburn
Turmeric	1gm	2gm	3gm	Antimicrobial
Vitamin-E	2gm	2gm	1gm	Antioxidant
Glycerin Soap Base	22gm	25gm	23gm	Soap base
Hard Soap	5gm	7gm	6gm	Hardening agent
Rose Water	5ml	7ml	6ml	Cooling agent emollient
Lavendar Oil	1ml	2ml	1ml	Flavouring agent

X. EVALUATION TESTS FOR HERBAL SOAP

1. Physical parameters :

- Colour:** Dark Brown
- Odour:** Herbal Smell



iii. **Appearance:** Good

iv. **Shape:** Circular

2. Physical Evaluation:

- a) **pH test:** The Ph was determined by using pH paper.
- b) **Foam retention:** 1% soap solution that is 25ml taken in 100ml measuring cylinder and shaking for 10min. The volume of foam at 1min and interval for 4-5 min was recorded.
- c) **Foam high test:** 0.5gm of sample in 25ml dis water and transfer to 100ml measuring cylinder and make the volume to 50ml. Water and shake 25 strokes keep it aside for few min. The foam min and foam height above the Aq. Volume was measured.
- d) **Foam stability:** Same quantity of soap sample and quantity of distilled water along with process was carried out as that of foam ability and the mixture was kept stand still for 30 min. After 30 min measurement of foam height was done from above the water volume.
- e) **Weight determination:** The weight was determined by using a Digital weighing balance.
- f) **Foamability:** 50 ml of distilled water was taken, and 2gm of soap sample was dissolved completely by stirring. It was then transferred into a 250 ml measuring cylinder along with washings. The volume was made up to 200 ml by adding distilled water. 25 uniform strokes were given to the mixture and kept stand still for some time until the water volume comes to 200 ml. The foam height was measured from above the water volume.

XI. RESULT AND DISCUSSION:

11.1 PHYTOCHEMICAL SCREENING TEST-

Table no.2: Phytochemical Test of Neem

Test	OBSERVATION	INFERENCE
1. Test for Alkaloids: Dragendroff's test:	Orange-red precipitate	Alkaloid present
Mayer's test:	Yellowish ppt	Alkaloid present
2. Test for Flavonoids: Alkaline test:	Yellow ppt	Flavonoid present
3. Test for Glycosides: Glacial acetic acid test:	Brown Colour	Glycoside present
4. Test for Tannins: Fecl3 test:	Blue-black	Tannins present
5. Test for Terpenoids: Salkowski test:	Reddish-brown ppt	Terpenoid present
6. Test for Saponin: Froth test:	Formation Of Layer	Saponin present



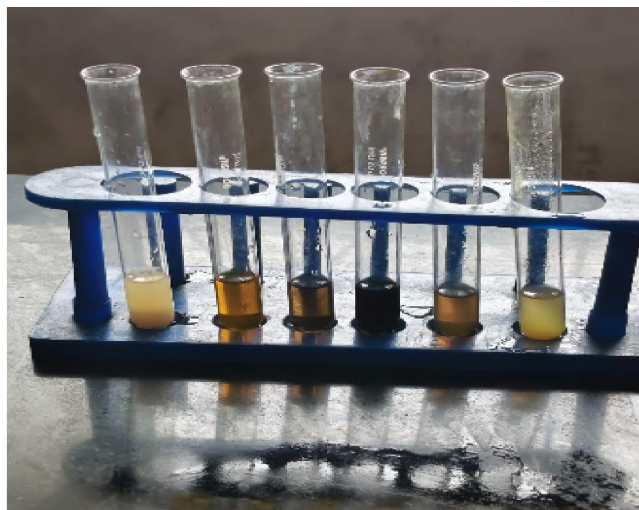


Fig no.9- Phytochemical Tests for neem extract

Test	OBSERVATION	INFERENCE
1. Test for Alkaloids: Dragendroff's test:	Orange-red precipitate	Alkaloid present
Mayer's test:	Yellowish ppt	Alkaloid present
2. Test for Flavonoids: Alkaline test:	Yellow ppt	Flavonoid present
3. Test for Glycosides: Glacial acetic acid test:	Brown ppt	Glycoside present
4. Test for Tannins: Fecl3 test:	Blue-black	Tannins present
5. Test for Terpenoids: Salkowski test:	Reddish-brown ppt	Terpenoid present
6. Test for Saponin: Froth test:	Colour ppt	Saponin absent

Table no.3: Phytochemical Test of Tulshi

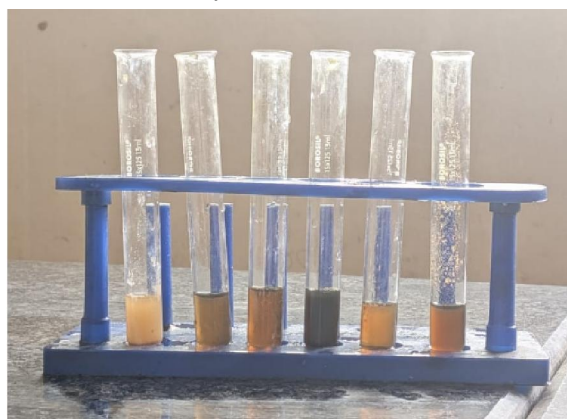


Fig no.10 - Phytochemical Tests for tulshi extract



Table no.4: Phytochemical Test of Turmeric

TEST	OBSERVATION	INFERENCE
1. Test for Alkaloids: Dragendroff's test:	Orange-red precipitate	Alkaloid present
Mayer's test:	Yellowish ppt	Alkaloid present
2. Test for Flavonoids: Alkaline test:	Yellow ppt	Flavonoid present
3. Test for Glycosides: Glacial acetic acid test:	No colour ppt	Glycoside absent
4. Test for Tannins: FeCl ₃ test:	Blue-black	Tannins present
5. Test for Terpenoids: Salkowski test:	Reddish-brown ppt	Terpenoid present
6. Test for Saponin: Froth test:	No colour ppt	Saponin absent



Fig no.11- Phytochemical Tests for turmeric extract

1. Physical Parameters:



Fig.no.12- Formulated soaps



Table no.5: Physical parameters

Properties	Characters
Colour	Dark brown
Odour	Herbal smell
Appearance	Good
Shape	Round

2. Physical Evaluation:

a. pH test:



Fig.no.13-pH paper test

Table No.6: pH test

Parameter	Result	Standard value
pH	7	6-8

b. Foam retention:

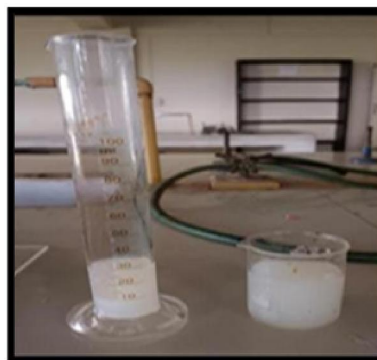


Fig.no.14-Foam Retention Test



Table. No 7: Foam retention

Parameter	Result
Foam retention	4.5
	4.0
	3.2
	3.0

c. Foam height test:

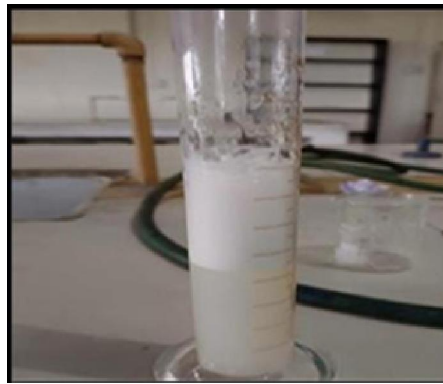


Fig.no.15-Foam Height Test

Table No.8: Foam height test

Parameter	Result
Foam height test	9 cm

d. Foam stability:

Table.No.9: Foam stability

Parameter	Result
Foam stability	4 min



e. Weight determination:



Fig.no.16-Weight determination Test

Table.No.10: Weight determination

Parameter	Result
Weight determination	46.01 gm

f. Foamability:



Fig.no.17-Foamability

Table.No.11: Foamability Parameter

Parameter	Result
Formability	10 cm

XII. CONCLUSION

The present study on the formulation and evaluation of herbal soap demonstrated that herbal ingredients such as neem, tulsi, aloe vera, turmeric, vitamin E, and lavender oil can be successfully incorporated into a soap base to prepare an effective and skin-friendly herbal soap. The prepared formulation showed good physicochemical properties including



acceptable appearance, color, odor, foamability, pH, and stability. The phytochemical constituents present in the herbal ingredients, such as flavonoids, alkaloids, tannins, glycosides, saponins, and terpenoids, contribute to the antimicrobial, antioxidant, anti-inflammatory, and skin-protective activities of the soap. Evaluation studies indicated that the herbal soap was safe for skin application and produced satisfactory cleansing action without causing irritation. The antimicrobial activity of the formulation suggested its effectiveness against common skin microorganisms, while the presence of natural herbal extracts improved the therapeutic and cosmetic value of the product. Compared with synthetic soaps, herbal soap offers the advantage of reduced side effects and better compatibility with the skin due to the use of natural ingredients. Thus, the formulated herbal soap can be considered a promising alternative to commercially available chemical soaps for maintaining healthy skin hygiene and protection.

REFERENCES

1. Sharma S., Pradhan S., Pandit B., Mohanty J.P. (2022). Formulation and Evaluation of Herbal Soap Using Natural Ingredients.
2. Sharma A., Verma R. (2023). Review on Herbal Soaps and Their Evaluation Parameters.
3. Rajput J. et al. (2023). Preparation and Evaluation of Herbal Soap by Cold Process Method.
4. Rajan M. et al. (2024). Polyherbal Soap Formulation and Evaluation.
5. Das S., Agarwal S., Samanta S., Das R. (2024). Preparation and Physicochemical Evaluation of Herbal Soap.
6. Pardhi N., Bisen A., Pardhi S. (2025). Review on Formulation and Evaluation of Herbal Soap.
7. Gnaneshwari V. et al. (2025). Herbal Soaps: Composition, Preparation and Future Applications.
8. Raj S., Kumari A., Kumar I. (2025). Formulation Approaches of Herbal Soaps.
9. Mahesh G. et al. (2025). Polyherbal Soap Containing Neem, Aloe Vera and Turmeric.
10. Bongoni R. et al. (2025). Development of Herbal Scrub Soap with Natural Exfoliants.
11. Ali S.M., Yosipovitch G. (2013). Skin pH and Cleansing Agents.
12. Barel A.O., Paye M., Maibach H.I. Handbook of Cosmetic Science and Technology.
13. Kapoor V.P. (2005). Herbal Cosmetics for Skin and Hair Care.
14. Pharmacognosy notes on phytochemical screening methods.
15. Cowan M.M. (1999). Plant Products as Antimicrobial Agents.
16. Neem medicinal properties review.
17. Turmeric and curcumin therapeutic applications.
18. Aloe Vera in skin care formulations.
19. Tulsi pharmacological activities review.
20. Warra A.A. (2013). Soap and Detergent Manufacturing Process.
21. <https://www.researchgate.net/publication/366000000> Formulation and Evaluation of Herbal Soap
22. <https://www.ijpsjournal.com/article/Review-on-Herbal-Soap>
23. <https://www.worldwidejournals.com/paripex/article/polyherbal-soap-formulation-and-evaluation.php>
24. <https://www.ijrpr.com/uploads/V6ISSUE1/IJRPR12345.pdf>
25. <https://www.pharmatutor.org/articles/herbal-scrub-soap-formulation>
26. <https://books.google.com/books?id=CosmeticScienceTechnology>
27. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5664031/>

