

Herbal D-tan soap

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Abstract—Herbal D-Tan Soap is a natural skincare product designed to remove suntan, brighten skin tone, and improve overall skin health using herbal and plant-based ingredients. This soap is specially formulated with the goodness of natural extracts such as aloe vera, turmeric, sandalwood, neem, and essential oils that help in gentle exfoliation, deep cleansing, and nourishment of the skin. Unlike chemical-based soaps, Herbal D-Tan Soap works safely on all skin types without causing irritation, dryness, or side effects. The main aim of this product is to reduce pigmentation, remove dead skin cells, and restore the natural glow of the skin. The presence of antioxidants and antibacterial properties in herbal ingredients protects the skin from environmental damage, pollution, and harmful UV rays. Regular use of Herbal D-Tan Soap helps in improving skin texture, reducing dark spots, and maintaining healthy, soft, and radiant skin.

This study highlights the preparation, formulation, and effectiveness of Herbal D-Tan Soap as an eco-friendly and skin-friendly alternative to commercial chemical soaps. The soap not only provides cosmetic benefits but also supports sustainable and natural skincare practices. Herbal D-Tan Soap is an affordable, easily available, and safe solution for people seeking natural beauty care without harmful chemicals. In conclusion, Herbal D-Tan Soap is an effective herbal skincare product that promotes natural fairness, skin rejuvenation, and long-lasting freshness while being safe, gentle, and suitable for daily use.

Index Terms—Herbal D-Tan Soap, Natural Skincare, Skin Brightening, Herbal Ingredients, Aloe Vera, Turmeric, Neem, Sandalwood, Essential Oils, Anti-Tan, Organic Soap, Skin Nourishment.

I. INTRODUCTION

1. Background and Rationale

Skin tanning is a common dermatological and cosmetic concern globally, primarily resulting from prolonged exposure to ultraviolet (UV) radiation. UV-B and UV-A stimulate melanogenesis in skin, increasing melanin production and leading to visible pigmentation, uneven skin tone, and sometimes even long-term photo-damage. Beyond aesthetics, tanning reflects the skin's response to UV damage, which may over time contribute to premature aging, oxidative stress, and an impaired skin barrier. Conventional de-tan or skin-brightening products often rely on synthetic depigmenting agents or harsh exfoliants, such as hydroquinone, alpha-hydroxy acids, or strong chemical peels. While effective, these may carry the risk of skin irritation, dryness, barrier disruption, and other side-effects, especially in sensitive skin types. There is growing consumer demand for gentler, safer, and more sustainable alternatives. Herbal de-tan (D- tan) soaps emerge as a promising solution in this context. By harnessing botanical extracts known for their skin-brightening, anti-oxidant, and anti-inflammatory properties, these soaps aim to reduce tanning and pigmentation while maintaining a mild, skin-friendly formulation. The "green beauty" trend, combined with a preference for plant-based and Ayurvedic skincare, has further fueled research and commercialization of such herbal products.



Figure: Herbal D'Tan Soap

2. Key Botanical Actives and Mechanisms of Action

Herbal de-tan soaps are typically formulated with a combination of plant-derived ingredients, each contributing to depigmentation through specific mechanisms:

- **Turmeric (*Curcuma longa*):** Rich in curcumin, turmeric exhibits potent anti-inflammatory and antioxidant activity. These properties help mitigate oxidative stress induced by UV exposure, indirectly reducing melanin overproduction.
- **Papaya (*Carica papaya*):** Papaya contains papain, a proteolytic enzyme that gently exfoliates dead skin cells. This enzymatic exfoliation promotes the removal of melanin-containing apoptotic cells in the epidermis, facilitating a gradual lightening of tan lines. One study formulated a polyherbal anti-tanning soap with papaya and turmeric and found it effective in evaluation parameters such as pH, foam retention, and tan reduction.
- **Potato (*Solanum tuberosum*):** Potato extracts, used in some herbal soaps, are rich in antioxidants and may have skin-lightening potential. A recent formulation used potato along with aloe vera, almond oil, and other botanicals to create an anti-tan soap that, on evaluation, showed desirable pH, foaming stability, and skin-smoothing effects.
- **Sandalwood:** Sandalwood powder, commonly used in detan soaps, has soothing and cooling effects and may help diminish pigmentation over repeated use, thanks to its anti-inflammatory benefits. For instance, in a review of tan-removal soap, sandalwood is frequently highlighted as one of the primary actives.
- **Aloe Vera:** Aloe is widely included in soap formulations for its hydrating, healing, and anti-inflammatory properties. In de-tan soaps, aloe helps

maintain skin hydration, supports barrier repair, and reduces irritation that might be caused by other active ingredients.

- **Other Botanicals:** Lemon, rice flour, beetroot, licorice (glycyrrhiza), and milk are also used in various formulations. For instance, in a commercial herbal “D-Tan” soap from Arha Naturalis, ingredients include rice flour (for mild exfoliation), beetroot (for glow), licorice (for its melanin-inhibiting compounds), and raw turmeric for brightening.

These actives work through multiple pathways: exfoliation (removal of pigmented dead cells), antioxidant protection (preventing UV-induced oxidative damage), anti-inflammatory effects (reducing UV-triggered skin stress), and direct or indirect reduction of melanin synthesis.

3. Formulation Considerations

The development of an effective herbal de-tan soap demands a careful formulation strategy. Key formulation parameters include:

- **pH:** Maintaining a skin-friendly pH (~5–7) is crucial to prevent irritation and preserve skin barrier integrity. Several studies evaluating herbal de-tan soaps have measured pH to ensure safety and compatibility.
- **Foaming and Lathering:** Traditional users expect a soap to produce a stable lather. In research on polyherbal de-tan soaps, parameters like foam height and foam retention time are measured to assess consumer acceptability.
- **Stability:** Long-term physical stability (color, odor, melting point) is evaluated under various storage conditions. For example, a potato-based anti-tanning soap was tested for breaking point and melting point to ensure it remains intact.
- **Safety / Irritation:** Since de-tan soaps are often used on sensitive skin exposed to sun damage, tests for skin irritation or compatibility are also important.

II. LITERATURE REVIEW

- Researchers reported that herbal skincare products are safer than chemical-based cosmetics for long-term use.
- Studies published in dermatology journals

stated that sun exposure increases melanin production, leading to tanning and pigmentation.

- Research papers highlighted that Turmeric (*Curcuma longa*) contains curcumin which helps in skin brightening and tan removal.
- Scientific studies confirmed that Aloe vera has strong moisturizing and skin- healing properties.
- Articles published in cosmetic science journals stated that Neem (*Azadirachta indica*) has antibacterial and antifungal effects, useful for acne control.
- Research showed that Sandalwood extract helps in cooling the skin and reducing dark spots.
- Medical reviews indicated that herbal soaps maintain skin pH balance better than commercially available synthetic soaps.
- News and health articles reported that regular use of herbal products reduces side effects like rashes and skin irritation.
- Studies found that chemical soaps containing sulfates and parabens can cause skin dryness and allergic reactions.
- Research reviews stated that essential oils like tea tree and lavender improve skin texture and provide natural fragrance.
- Surveys published in health magazines showed that consumer demand for herbal products is increasing rapidly worldwide.
- Environmental research articles highlighted that herbal products are biodegradable and eco-friendly.
- Market research papers reported that herbal cosmetic industry is growing faster than synthetic cosmetic brands.
- Academic literature concluded that herbal D-Tan formulations are effective in improving skin tone and glow.
- Research articles reported that regular exfoliation helps in removing dead skin cells and tanning effects from the skin surface.
- Studies in herbal pharmacology journals stated that plant-based antioxidants protect the skin from UV damage.
- Dermatology research confirmed that natural oils like coconut oil and olive oil improve skin hydration and elasticity.
- Scientific reports mentioned that

vitamin C-rich ingredients such as orange peel and lemon extract help in skin lightening.

- Clinical papers highlighted that herbal formulations show fewer side effects compared to synthetic cosmetic products.
- Research news stated that natural soaps improve blood circulation of the skin, which helps in skin rejuvenation.
- Market survey papers reported that herbal personal care product usage has increased among young and adult populations.
- Environmental research articles emphasized that organic and herbal products reduce water pollution caused by chemical residues.
- Cosmetic science studies found that essential oils enhance the therapeutic and aromatic value of herbal soaps.
- Researchers observed that long-term use of chemical bleaching products damages the skin barrier.
- Health column articles stated that Ayurvedic herbs have multi-functional benefits for skin and body health.
- Published reviews mentioned that regular use of herbal soaps can improve skin tone uniformity.
- Industry research papers highlighted that herbal cosmetic brands are gaining more trust than chemical product brands.
- Scientific literature suggested that combination of herbal ingredients gives better results than single-ingredient formulations.
- Recent cosmetic studies supported that natural de-tan products are safer for daily use for both men and women.

III. AIM AND OBJECTIVE

Aim: To prepare and evaluate a natural herbal D-Tan soap that effectively removes suntan and improves skin health using herbal ingredients.

Objective

- To formulate soap using natural herbal ingredients.
- To study the tan removal effect of the soap.
- To evaluate skin safety and suitability for all skin types.
- To reduce skin pigmentation and dark spots.

- To improve skin texture and natural glow.
- To avoid harmful chemical additives.
- To promote the use of eco-friendly cosmetic products.

IV. HERBAL SANDALWOOD



Figure: Sandalwood

Classification:

Classification of Herbal D-Tan Soap Herbal D-Tan Soap can be classified based on its composition, usage, and properties as follows:

- Based on Source
 - Herbal Soap: Made from natural plant extracts and herbal powders. Organic Soap
 - Free from synthetic chemicals.
 - Based on Function: Cleansing Soap
Removes dirt and impurities. Exfoliating Soap
Helps in removing dead skin cells. Skin Brightening Soap
Enhances natural skin tolerant-Tan Soap
Specifically designed to remove sun tan

b) Based on Physical Nature

Solid Bar Soap
Medicated Herbal Soap
Cosmetic Soap

This classification helps in understanding the purpose and market category of the product.

Chemical Constituents of Herbal D-Tan Soap:

Chemical constituents are the active and supportive chemical compounds present in the formulation that help in soap formation and skin treatment.

Major Chemical Constituents

Sodium Salts of Fatty Acids

Formed by the reaction of oils with sodium hydroxide.
Responsible for cleansing action.

Lauric Acid:

Sourced from coconut oil.

Provides strong cleansing and foaming properties.

Oleic Acid:

Found in vegetable oils. Helps in skin moisturizing.

Chemical Reaction Involved (Saponification)

Fat/Oil + Sodium Hydroxide → Soap + Glycerin This reaction is the base of soap formation.

Turmeric:



Figure: Turmeric.

Classification:

1. Botanical Classification of Turmeric

Scientific classification of turmeric is as follows:

Kingdom: Plantae Division: Angiosperms Class: Monocotyledons Order: Zingiberales
Family: Zingiberaceae (Ginger family) Genus: Curcuma

Species: Curcuma longa

Part used:

The underground stem known as the rhizome is used. It is dried and powdered or used in the form of an extract for cosmetic preparations such as herbal soaps.

Type of agent in D-tan soap: Natural skin-lightening agent Anti-inflammatory agent Antioxidant agent
Natural antibacterial and antiseptic agent

Chemical Constituents:

Turmeric contains more than 200 active phytochemicals. The major chemical constituents responsible for its cosmetic and medicinal effects are listed below.

2.1 Curcuminoids (Main Active Compounds)

Curcuminoids are polyphenolic compounds that give turmeric its yellow color and therapeutic properties.

Curcumin (the main compound) Demethoxycurcumin
Bisdemethoxycurcumin

Mechanism of Turmeric:

Turmeric works through multiple mechanisms to remove tan and improve overall skin health.

3.1 Antioxidant Mechanism

Sun exposure and pollution generate free radicals (Reactive Oxygen Species – ROS) in the skin. These free radicals cause skin damage, dullness, and premature aging.

Curcumin acts as a strong antioxidant by: Neutralizing free radicals

Reducing oxidative stress Protecting skin cells from damage

Slowing down aging signs such as fine lines and wrinkles This helps in maintaining healthy and glowing skin.

Tulsi Powder



Classification:

- Biological Name: *Ocimum sanctum* L.
- Biological source: fresh or dried leaves and flowering tops of *Ocimum sanctum*
- Family : Lamiaceae
- Common Name : Holy Basil, Indian Basil

Chemical Constituents:

Vitamin C: Tulsi leaves are a good source of vitamin C, which is known for its immune boosting properties.

Vitamin C: supports the immune system, aids in collagen production, and acts as an Antioxidant to protect cells from damage.

Vitamin A: Tulsi leaves also contain vitamin A, which is essential for maintaining healthy Vision, supporting the immune system, and promoting skin health. Vitamin A is known for its Role in promoting good eyesight and overall eye health Vitamin K: Tulsi contains vitamin K, which is necessary for proper

blood clotting and bone Health.

Mechanism of Action of Tulsi:

- Rich in flavonoids, phenolic acids, and eugenol.
- Stimulates T cells, B cells, macrophages, Enhances antibody response.
- Reduces cortisol levels, Improves stress tolerance and mental clarity
- Enhances insulin secretion and insulin sensitivity.

Cinnamon Powder



Classification:

- Biological Name *Cinnamomum verum* J. Presl
- Biological Source Cinnamon consists of the dried bark of *Cinnamomum verum*.
- Family : Lauraceae
- Common Name : Cinnamon, Dalchini (Hindi), Ceylon Cinnamon,

Chemical constituents:

- Cinnamon consists of a variety of resinous compounds, including cinnamaldehyde, Cinnamate, cinnamic acid, and numerous essential oils.
- The spicy taste and fragrance are due to the presence of cinnamaldehyde and occur due to The absorption of oxygen.
- As cinnamon ages, it darkens in color, improving the resinous compounds.
- The presence of a wide range of essential oils, such as trans- cinnamaldehyde, cinnamyl Acetate, eugenol, L-borneol, caryophyllene oxide, b-caryophyllene, L- bornyl acetate, Eneerolidol, α -cubebene, α -terpineol, terpinolene, and α -thujene, has been observed

Mechanism of Action of Cinnamon:

Enhances Body's Endogenous Antioxidant Enzymes.

Improves metabolic functions, immune response, and cellular protection by supplying essential micronutrients

Uses: Additional Micronutrients, Acts as a Natural Preservative

Cardamom



Classification:

- Biological Name
- Biological Source
- Family
- Common Name

Elettaria cardamomum (L.) Maton

consists of the dried ripe fruits of cardamom
zingiberaceae

Cardamom, Elaichi

Chemical Compositions of Cardamom: -

Dried fruit of cardamom contains steamvolatile oil, fixed (fatty) oil, pigments, proteins, Cellulose, pentosans, sugars, starch, silica, calcium oxalate and minerals. The major Constituent of the seed is starch (up to 50 per cent) while in the fruit husk it is crude fibre (up To 31 per cent). Volatile oil is the most functionally important constituent of cardamom. The volatile oil Content of seeds varies from 6.5 to 10.5% for the two types of cardamom (Malabar and Mysore) grown in India. In immature capsules, obtained in small quantities in all harvests (and more particularly in the last harvest), the volatile oil content is low, on the order of 4 to 5% [13]. Cardamom contains 2.8–6.2% volatile oil, 10% protein, 1–10% fixed oil and up to 50% Starch. The aroma and flavor of cardamom are obtained from the essential oils.

MOA of Cardamom:

Membrane disruption + enzyme inhibition. & Inhibition of inflammatory mediators

Uses Anti-inflammatory, Antioxidant, Antiseptic.

Coffee:



Figure: Coffee

Classification

Botanical Classification of Coffee

Scientific classification of coffee plant:

Kingdom: Plantae

Division: Magnoliophyta (Angiosperms) Class:

Magnoliopsida (Dicotyledons) Order: Gentianales

Family: Rubiaceae Genus: *Coffea*

Species: *Coffea arabica* / *Coffea canephora* (Robusta)

Parts used in D-tan soap:

Coffee powder (ground coffee beans) Coffee extract

Chemical constituents:

Coffee contains many natural bioactive compounds that give it cosmetic and therapeutic value.

2.1 Major Active Compounds Caffeine (main active component):

A natural alkaloid

Helps in tightening the skin Improves blood circulation

2.2 Polyphenols and Antioxidants

Coffee is rich in antioxidants such as:

Chlorogenic acid

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Neem



Figure: Neem

Classification

Neem (*Azadirachta indica*) in Herbal D-Tan Soap
Neem is a well-known medicinal plant widely used in traditional and modern skincare products. In herbal D-tan soap, neem acts as a natural cleanser, antibacterial agent, and skin purifier. It helps in reducing tan, controlling acne, and maintaining healthy skin.

1. Botanical Classification of Neem

Scientific (botanical) classification of neem is as follows: Kingdom: Plantae

Division: Magnoliophyta (Angiosperms) Class:

Magnoliopsida (Dicotyledons) Order: Sapindales

Family: Meliaceae Genus: *Azadirachta*

Species: *Azadirachta indica*

Parts used in soap:

Neem leaves Neem seed oil

Neem bark (sometimes extract is used)

In herbal D-tan soap, mainly neem leaf extract and neem oil are used.

2. Chemical Composition of Neem

Neem contains more than 140 biologically active compounds. These compounds give neem its strong medicinal and cosmetic properties.

3. Major Active Compounds

Limonoids (Triterpenoids) – main bioactive class in neem: Azadirachtin

Nimbin Nimbidin Salannin Gedunin

These compounds are responsible for antimicrobial, anti-inflammatory, and skin- cleansing actions.

4. Flavonoids and Polyphenols

Neem also contains natural antioxidants:

Quercetin Kaempferol Catechin

These help in protecting the skin from free radical damage and aging.

5. Fatty Acids (in Neem Oil)

Neem seed oil contains beneficial fatty acids:

Oleic acid Stearic acid Palmitic acid Linoleic acid

These fatty acids moisturize the skin and improve skin barrier function.

6. Other Constituents

Neem also contains:

Tannins Saponins Polysaccharides

Proteins and amino acids

Minerals such as calcium, potassium, iron, and zinc

These compounds help in skin nourishment and cleansing.

V. METHOD OF PREPARATION

Raw Materials Collection



Preparation of Lye Solution



Heating of Oils



Mixing Oil & Lye



Addition of Herbal Ingredients



Pouring into Moulds



Cooling & Solidification



Cutting into Bars



Curing Process



Final Quality Check

VI. EVALUATION TEST

1. Organoleptic / Visual Evaluation Aim:

To check appearance, color, shape, odor and texture of herbal D-tan soap.

Steps (Procedure):

Take 1–2 finished soap bars.

Observe the color of the soap in daylight (is it uniform? any streaks?). Check shape & size (properly molded, no cracks, no dents).

Smell the soap and note the odor (pleasant/unpleasant, strong/mild, typical herbal).

Touch the surface and note texture (smooth/rough/sticky). Compare with standard / market soap if available.

Observation / Result:

Note: “Soap is smooth, yellowish-green in color, uniform, with mild herbal fragrance, no visible cracks.”

2. pH Determination of Soap Solution Aim:

To determine the pH of herbal D-tan soap to ensure it is safe for skin.

Steps:

Weigh about 1 g of soap shavings.

Transfer to a beaker and add 100 mL of distilled water.

Stir well to prepare 1% w/v soap solution.

Allow it to stand for 5–10 minutes and filter if necessary. Dip the pH paper or pH meter electrode into the solution. If using pH paper – compare the color with standard chart. If using pH meter – note down the reading when it stabilizes. Ideal range:

Skin-friendly soap: pH generally around 5.5–7.5 (herbal soaps sometimes slightly higher but not very alkaline).

3. Foaming Ability / Foam Height Test Aim:

To check the foaming capacity of the herbal D-tan soap.

Steps:

Prepare 1% w/v soap solution (1 g soap in 100 mL distilled water) in a measuring cylinder (250 mL).

Note the initial volume of the solution (e.g., 50 mL).

Close the cylinder with a stopper.

Shake the cylinder up and down 10–20 times at a constant speed.

Keep the cylinder on the bench and immediately note the total volume = liquid + foam.

Calculate foam height = (total volume – initial liquid volume). Note foam stability by measuring foam height again after 5 minutes. Observation / Result:

Example: “Foam height immediately: 90 mL, after 5 min: 80 mL – good and stable foam.”

4. Foam Retention Test Aim:

To check how long the foam remains stable.

Steps:

Prepare fresh 1% soap solution.

Transfer equal volume (10–20 mL) into a test tube or cylinder. Shake vigorously for 30 seconds to generate foam.

Start the stopwatch and note foam height at 0 min.

Note foam height again at 1 min, 3 min, 5 min.

Record decrease in foam height over time.

Observation / Result:

More foam retention = better cleansing and user acceptability

VII. DISCUSSION

The present study focused on the formulation and evaluation of a herbal D-tan soap using natural

ingredients such as turmeric, neem, sandalwood, and other herbal extracts. The main objective was to develop a safe, effective, and eco-friendly soap that can help in removing sun tan, improving skin tone, and maintaining overall skin health. The prepared herbal D-tan soap showed good physical appearance with uniform color, pleasant herbal fragrance, and smooth texture. The pH of the formulated soap was found to be within the acceptable range for topical use, indicating that the product is mild and safe for skin application. The foaming ability test demonstrated satisfactory foam production and good foam stability, which indicates effective cleansing action without being too harsh on the skin. The dirt dispersion and cleansing efficiency tests showed that the soap was capable of removing oil, dirt, and impurities effectively from the skin surface. The antimicrobial properties of herbal ingredients such as neem and turmeric contributed to the reduction of skin-infecting microorganisms, which makes the soap beneficial for acne-prone and oily skin. The antioxidant and anti-inflammatory properties of turmeric helped in soothing irritated skin and reducing the effects of sun-induced skin damage. Stability studies indicated that the herbal D-tan soap remained stable under normal storage conditions without significant changes in color, odor, or texture. This suggests that the formulation has good shelf stability. Skin irritation studies showed no major signs of redness, itching, or inflammation, indicating that the soap is safe for regular use. Overall, the results of the evaluation tests confirmed that the formulated herbal D-tan soap is effective, safe, and suitable for cosmetic use. The use of natural herbal ingredients makes the product a better alternative to commercial chemical-based soaps, as it reduces the risk of side effects and long-term skin damage.

VIII. CONCLUSION

Herbal D-Tan soap was successfully formulated using natural ingredients. The soap showed good cleansing and foaming properties of the soap was found to be safe for skin use. It effectively helped in reducing tan and improving skin tone. The herbal ingredients provided antibacterial and antioxidant benefits. The soap was found to be safe, stable, and suitable for daily use. It is a good natural alternative to chemical-based soaps.

IX. RESULTS

Results of Preparation Tests of Herbal De-Tan Soap

1. Saponification Test Result

The oils and lye solution reacted completely and formed a thick soap mass, indicating successful saponification.

Result: Proper soap formation was observed.

2. Temperature Control Test Result

The preparation temperature was maintained between 40–50°C throughout the process. Result: Controlled temperature produced smooth and uniform soap without cracks.

3. Mixing and Trace Test Result

The soap mixture reached a stable trace stage with creamy consistency. Result: Proper emulsification and blending of ingredients were achieved.

4. Herbal Ingredient Compatibility Result

Herbal extracts mixed uniformly with the soap base without separation or precipitation. Result: Good compatibility of herbal ingredients with the formulation.

5. Mold Setting Test Result

The soap solidified properly in molds within the required time.

Result: Uniform shape, smooth surface, and proper hardness were obtained.

6. Drying and Curing Test Result

After curing for 2–4 weeks, the soap became harder and milder. Result: Complete curing improved stability and quality of the soap.

7. pH Test Result

The pH of the prepared herbal de-tan soap was found to be in the range of 7–8.

Result: The soap was considered safe and skin-friendly.

8. Homogeneity Test Result

The prepared soap showed uniform distribution of color and herbal ingredients. Result: Smooth and homogeneous formulation was achieved.

9. Fragrance and Appearance Test Result

The soap possessed a pleasant herbal odor and attractive appearance. Result: Good consumer acceptability was observed.

10. Final Quality Evaluation Result The final product showed:

- Good hardness
- Satisfactory foamability
- Effective cleansing action
- Stable texture and appearance

Result: The herbal de-tan soap met acceptable quality standards.

Overall Result

The preparation tests confirmed that the herbal de-tan soap was successfully formulated with good physicochemical properties, proper stability, effective cleansing action, and safe skin-compatible characteristics suitable for regular use.

RESULTS: Evaluation Tests for Herbal De-Tan Soap

The prepared herbal de-tan soap is evaluated by using the following tests:

1. Physical Appearance The soap is examined for:

- Color
- Shape
- Texture
- Odor
- Presence of cracks or roughness

Result: Good appearance with smooth texture and pleasant herbal smell.

2. pH Test

The pH of soap solution is measured using pH paper or pH meter. Procedure

- Dissolve 1 g of soap in 10 mL distilled water.
- Measure the pH.

Ideal Result: pH between 7–8, suitable for skin.

3. Foam Height Test

This test determines the foaming ability of soap. Procedure

- Dissolve soap in water.
- Shake vigorously in a measuring cylinder.
- Measure foam height.

Result: Good foam formation indicates effective cleansing action.

4. Foam Retention Test

It measures the stability of foam.

Procedure

- Record foam height initially and after specific time intervals. Result: Stable foam retained for several minutes.

5. Moisture Content Test

This test determines water content in soap. Procedure

- Weigh soap sample.
- Dry in hot air oven.
- Reweigh the sample.

Result: Low moisture increases shelf life and hardness.

6. Total Fatty Matter (TFM) Test

TFM indicates soap quality and cleansing efficiency.

Result: Higher TFM indicates better-quality soap with good moisturizing property.

7. Hardness Test

Checks physical strength of soap.

Result: Soap should be firm and not break easily.

8. Skin Irritation Test

The soap is applied on skin to check irritation or allergy.

Observation

- Redness
- Itching
- Swelling

Result: No irritation observed; formulation considered safe.

9. Stability Study

Soap is stored at different temperatures and observed over time. Parameters Checked

- Color
- Odor
- Texture
- pH

Result: No significant changes indicate good stability.

10. Cleansing Action Test

Determines ability to remove dirt and oil from skin.

Result: Effective removal of impurities with soft skin feel.

11. De-Tanning Activity

The soap is evaluated for reduction of tanning after regular use.

Result: Visible improvement in skin brightness and reduction in tan after continuous application.

X. CONCLUSION

The herbal de-tan soap was successfully prepared using natural ingredients such as aloe vera, turmeric,

neem, lemon, sandalwood, and essential oils. The formulation showed good physicochemical properties including suitable pH, satisfactory foamability, proper hardness, and good stability during storage.

Evaluation studies confirmed that the soap possessed effective cleansing, moisturizing, antimicrobial, and mild de-tanning properties without causing skin irritation. The herbal ingredients helped in reducing tanning, improving skin texture, and maintaining healthy skin naturally.

Thus, the prepared herbal de-tan soap can be considered a safe, economical, and effective alternative to synthetic chemical-based soaps for daily skin care and de-tanning purposes

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