

# FORMULATION AND EVALUATION OF HERBAL PERFUMING LOTION ENRICHED WITH ESSENTIAL OILS AND PLANT EXTRACTS

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## *Abstract*

Aim is to formulate the moisturizing lotion by the use of herbal entities for the superior qualities. The lotion comes over the conglomeration of natural oils, various plant extracts and the other gentle ingredients that aids to keep the skin soft, smooth and being protected. It conducts a healthy layer over the skin barrier. Active chemical entities are., Tamanu oil, Jojoba oil, Rosewood essential oil, Aloe-vera gel, Mint leaf extract, and Vitamin E were chosen for the natural healing, moisturizing, and antioxidant benefits. To get a right texture and a proper creamy, stable, to the lotion the constituents like stearic acid, cetyl alcohol, and the emulsifiers have been used over the formulation. Here, the addition of herbal extracts leads to the pleasant odour like., mint leaves give the soothing effect and the pleasant aroma. As these all make the lotion easy to flow by providing convenient action. After the preparation overall formulation undergoes various tests like., pH determination, thickness, Spreadability, particle size and the stability. It ultimately results over the smooth, pleasant, non-greasy texture, which make it more suitable for the regular use on the skin in both cosmetic and dermatological applications.

**Keywords:** Introduction to the formulation aspects, Pharmacology of skin, Formulation, evaluations, objective, Motive.

## **INTRODUCTION:**

The skin is the largest organ of the human body and acts as a protective barrier against physical, chemical, and microbial agents. From a pharmacological perspective, it serves as both a target site and a route of drug delivery in topical formulations such as lotions, creams, and ointments. Aim is to get a smooth, nourishing lotion with a pleasant odour.

By blending plant botanical) extracts and essential oils, the aim is to prepare a body lotion that not only hydrates the skin but also addresses specific concerns such as dryness, irritation, and inflammation, while promoting a sense of well-being through aromatherapy. Acting as a Humectant with eventually retains the moisture for the longer duration. The formulation which contains the herbs are proved by ayurveda. Herbal remedies in rich the bodies with nutrients with other useful minerals. An herbal lotion that can give effective protection to skin and free from any toxicity. As they are natural and are found to be safe to use as compared to chemical-based formulation. Lotions are semi-liquid form it directly applied on the body. As study of the

layer with its structure is a crucial element the determination of all the pharmacological action is evenly dependent on it.

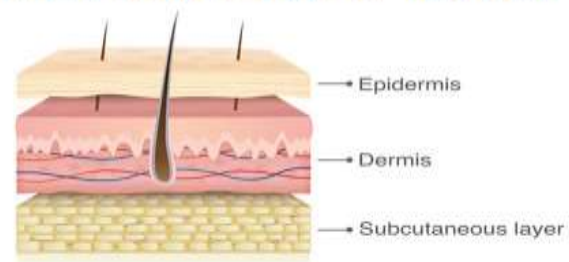
### The skin includes 3 layers:

**Epidermis:** The outermost layer, containing the stratum corneum, which regulates permeability and prevents water loss.

**Dermis:** The middle layer rich in collagen fibers, blood vessels, and nerves that support skin elasticity and nourishment.

**Hypodermis (subcutaneous tissue):** Provides insulation and cushioning.

### Three Main Layers of The Skin



### Mechanism for topical pharmacology of skin:

In topical pharmacology, the stratum corneum is the key barrier controlling absorption. Lotions are formulated as oil-in-water emulsions that improve hydration, soften the skin, and facilitate penetration of active ingredients through this barrier. The active components, such as Tamanu oil and Mint leaf extract, act locally on the skin to produce anti-inflammatory, antimicrobial, antioxidant, and soothing effects without entering systemic circulation. Thus, understanding the pharmacology of the skin is essential for developing effective lotion formulations that ensure proper absorption, stability, and targeted therapeutic action.

In recent years, there has been increasing interest in plant-derived ingredients for topical skincare owing to their diverse biological activities and lower risk of synthetic side effects. Among these botanicals, Calophyllum inophyllum oil (commonly known as Tamanu oil) and extracts of Mentha species (mint leaves) have shown promise in improving skin health through anti-inflammatory, antimicrobial, antioxidant, and wound-healing properties. Tamanu oil is obtained from the nuts of Calophyllum inophyllum and has long been used in traditional medicine across tropical and subtropical regions for the treatment of wounds, burns, scars, and skin infections. Phytochemical studies have demonstrated that Tamanu oil contains fatty acids such as oleic, linoleic, palmitic, and stearic acids, along with resinous and phenolic compounds responsible for its biological effects. Recent studies have confirmed its antimicrobial, anti-inflammatory, and wound-healing activities, indicating potential use in cosmetic and therapeutic formulations. Formulations leading herbal entities in skincare and cosmetics have gained consistent attention in recent years due to increasing consumer awareness of natural, safe, and eco-friendly products. Derived from plants, herbs, and other botanical sources, these formulations harness the bioactive compounds present in nature, such as flavonoids, alkaloids, terpenes, and phenolic acids, which offer a wide range of therapeutic and cosmetic benefits. Unlike synthetic chemicals, which may cause skin irritation, allergic reactions, or long-term health concerns, herbal ingredients are generally considered gentler and compatible with the skin's natural physiology. Historically, the use of plant-based products for enhancing skin health can be traced back to ancient civilizations. Cultures such as the Egyptians, Greeks, Indians, and Chinese relied on botanical extracts, oils, and powders to cleanse, protect, and rejuvenate the skin.

### AIM AND OBJECTIVES

**AIM:** To formulate and evaluate a herbal perfuming lotion that serves as a natural skin care solution, combining plant-based oils, herbal extracts, and essential oils to improve skin health, nourishment, and protection.

The study aims to develop a safe, effective, eco-friendly, and culturally inspired alternative to synthetic cosmetic products, ensuring sustainability, dermatological safety, and traditional relevance through the use of Tamanu oil, Jojoba oil, Rosewood essential oil, Aloe vera gel, Mint leaf extract, and Vitamin E.

### ASSETS

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## 1. Combining Herbal Benefits

The formulation blends multiple bioactive botanicals—each offering unique therapeutic actions:

Tamanu oil – wound healing and anti-inflammatory

Aloe vera – soothing and moisturizing

Mint extract – cooling and antimicrobial

Rosewood oil – antioxidant and aromatic

Together, these create a synergistic herbal complex that enhances overall skin vitality and resilience.

## 2. Natural Skin Care Solution

Designed as a purely natural cosmetic, the lotion avoids synthetic perfumes, parabens, and artificial colorants. It offers a gentle, chemical-free skincare alternative, suitable for daily use on all skin types.

The ingredients naturally support hydration, healing, and rejuvenation, reflecting the growing preference for green, holistic beauty solutions.

## 3. Skin Health Improvement

The lotion promotes moisturization, elasticity, and protection by improving skin barrier function.

Humectants like glycerin and propylene glycol retain moisture, while antioxidants (Vitamin E and plant phenolics) prevent oxidative stress and premature aging.

## 4. Safety and Efficacy

Evaluations on pH, spreadability, homogeneity, stability, and skin compatibility confirmed that the lotion is non-irritant, balanced, and dermatologically safe.

Its natural actives provide effective skincare benefits without adverse reactions common to synthetic formulations.

## 5. Sustainability and Eco-Friendliness

The use of biodegradable, renewable, and plant-derived ingredients supports the green cosmetics movement. Sustainable sourcing of oils and herbal extracts reduces environmental impact and promotes eco-conscious product development.

## 6. Cultural and Traditional Relevance

The formulation is inspired by traditional herbal practices and Ayurveda, where natural oils and plant extracts have long been used for skincare and healing.

This connection to heritage-based medicine gives the lotion both scientific credibility and cultural authenticity.

## *MOTIVE*

### 1. To formulate a herbal perfuming lotion for natural skin care

To develop a plant-based lotion using Tamanu oil, Jojoba oil, Rosewood essential oil, Aloe vera gel, Mint extract, and Vitamin E that serves as a natural and safe alternative to synthetic cosmetics.

The aim is to create a non-toxic, eco-friendly, and skin-compatible herbal formulation suitable for daily use.

### 2. For skin moisturization and nourishment

To ensure the lotion provides deep hydration and skin nourishment through ingredients like Jojoba oil, Aloe vera, and Glycerin, which act as natural humectants and emollients.

This objective focuses on maintaining skin softness, elasticity, and smoothness while preventing dryness and flakiness.

### 3. To evaluate anti-inflammatory, antioxidant, and healing properties

To utilize Tamanu oil, Mint extract, and Vitamin E for their anti-inflammatory, antioxidant, and wound-healing activities.

The goal is to develop a lotion that soothes irritated skin, reduces redness, and protects against oxidative damage, promoting overall skin recovery and protection.

### 4. Physicochemical parameters of the lotion

To evaluate key formulation parameters such as pH, viscosity, spreadability, homogeneity, and stability to

ensure the lotion is physically stable, easy to apply, and suitable for all skin types.

These tests confirm product quality, texture consistency, and shelf-life.

### 5. Safety, skin compatibility, and efficacy

To perform irritancy or patch tests to confirm that the herbal lotion is non-irritant, hypoallergenic, and dermatologically safe.

This ensures the lotion is effective for sensitive skin and safe for long-term topical use

### 6. Sustainable and eco-friendly formulation practices

To support green cosmetic development by using biodegradable, renewable, and non-toxic herbal ingredients.

This promotes environmental sustainability while reducing the impact of chemical-based cosmetics.

### 7. Cultural and traditional herbal knowledge

To integrate traditional Ayurvedic herbs such as Tamanu and Aloe vera, known for their ancient skin-healing uses, into a modern scientific formulation.

This connects traditional medicine with modern skincare innovation.

### 8. Compare herbal lotion performance with commercial synthetic lotions

To compare the developed herbal lotion with marketed synthetic perfumed lotions in terms of texture, fragrance retention, moisturization, and user satisfaction.

This helps demonstrate the superior safety, natural fragrance, and therapeutic benefits of herbal formulations.

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## **BRIEF OVERVIEW**

### **Potential ingredients**

#### **1. Tamanu oil**

Botanical Name: *Calophyllum inophyllum* Linn.

Family: Clusiaceae (Guttiferae)

Colour: Greenish-yellow oil

Constituents: Calophyllolide, inophyllums, oleic acid  
linoleic acid, stearic acid

Uses: Acts as a wound healer, anti-inflammatory,  
antibacterial, and skin-regenerating agent.



#### **2. Jojoba Oil**

Botanical Name: *Simmondsia chinensis* (Link) C.K. Schneid.

Family: Simmondsiaceae

Colour: Clear golden-yellow liquid

Constituents: Wax esters, tocopherols (Vitamin E),  
long-chain fatty acids and alcohols

Uses: Natural emollient and moisturizer; helps balance sebum,  
keeps skin soft and non-greasy.



#### **3. Rosewood Essential Oil**

Botanical Name: *Aniba rosaeodora* Ducke

Family: Lauraceae

Colour: Colourless to pale yellow

Constituents: Linalool, geraniol, terpineol, nerol

Uses: Provides pleasant fragrance, antioxidant and  
antimicrobial activity; promotes smooth and youthful skin.



#### **4. Mint Leaf Botanical Name: Extract**

*Mentha piperita* Linn. / *Mentha arvensis* Linn.

Family: Lamiaceae

Colour: Light green

Constituents: Menthol, menthone, flavonoids,  
rosmarinic acid, tannins

Uses: Cooling, soothing, anti-inflammatory, and



### 5. Aloe Vera Gel

Botanical Name: *Aloe barbadensis* Miller

Family: Liliaceae (Asphodelaceae)

Colour: Transparent to light green gel

Constituents: Aloin, barbaloin, polysaccharides, anthraquinones, vitamins A, C, E

Uses: Natural moisturizer; heals wounds, soothes burns, reduces dryness, and provides antioxidant effects.



### 6. Vitamin E

Source: Natural vegetable oils (sunflower, soybean)

Colour: Pale yellow viscous liquid

Constituents:  $\alpha$ -,  $\beta$ -,  $\gamma$ -,  $\delta$ -tocopherols

Uses: Antioxidant; protects skin from oxidative stress, improves elasticity, and delays aging signs.



### 7. Glycerin

Source: Derived from plant oils such as coconut or palm oil

Colour: Colourless, clear, viscous liquid

Constituents: Glycerol ( $C_3H_8O_3$ )

Uses: Humectant that retains skin moisture and prevents dryness.



### 8. Stearic Acid

Source: Vegetable fats and oils

Colour: White, waxy solid

Constituents: Saturated long-chain fatty acid ( $C_{18}H_{36}O_2$ )

Uses: Thickener and stabilizer; improves cream consistency and spreadability.



### 9. Cetyl Alcohol

Source: Coconut or palm oil

Colour: White waxy flakes

Constituents: Hexadecanol ( $C_{16}H_{34}O$ )

Uses: Emollient and co-emulsifier; enhances lotion smoothness and texture.



### 10. Propylene Glycol

Source: Plant-based or synthetic glycol

Colour: Colourless, clear liquid

Constituents: Propane-1,2-diol

Uses: Humectant and solvent; improves absorption and keeps lotion moist.



### 11. Methyl Paraben

Source: Synthetic (chemically prepared from p-hydroxybenzoic acid).

It can also occur naturally in some fruits like blueberries.

Colour: Colour-less crystalline solid or white powder.

Constituents: Methyl ester of p-hydroxybenzoic acid.

Uses: Used as a preservative in cosmetics, lotions, and pharmaceutical formulations.

Prevents growth of bacteria and fungi.

Increases shelf life of products.



### 12. Propyl Paraben

Source: Synthetic (derived from p-hydroxybenzoic acid).

Also found naturally in small amounts in some plants and foods.

Colour: White crystalline powder or colourless solid.

Constituents: Propyl ester of p-hydroxybenzoic acid.

Uses: Acts as an antimicrobial and antifungal

preservative in creams, lotions, and foods.



### 13. Perfume Agent

Source: Mixture of natural essential oils

Colour: Light yellow aromatic liquid

Constituents: Terpenes, esters, aldehydes (depending on blend)

Uses: Gives pleasant herbal fragrance and improves sensory appeal.

### 14. Distilled Water

Source: Purified water

Colour: Colourless

Constituents: H<sub>2</sub>O

Uses: Solvent and vehicle for aqueous ingredients in lotion formulation.

### *Methods of preparation*

The lotion was prepared using the emulsion method, comprising oil and aqueous phases by conglomeration of both via., following process: (Under the influence of specified temperature)

1. Phase A (Oil phase): Stearic acid, cetyl alcohol, and oils (Tamanu, Jojoba, Rosewood) were melted together at  $70 \pm 2$  °C.
2. Phase B (Water phase): Distilled water, Glycerin, Propylene glycol, Aloe vera gel, and Mint extract were heated separately at the same temperature.

3. **Emulsification:** The aqueous phase was slowly added to the oil phase under continuous stirring to form a uniform emulsion.
4. **Phase C (Cooling phase):** After cooling to below 40 °C, Vitamin E, preservative mixture, perfume, and natural color were incorporated.
5. The lotion was stored in sterilized containers and evaluated for various parameters.

## Key Considerations

### 1. Emulsification and Stability

**Emulsifier Choice and Ratio:** This is the most critical factor. The emulsifying wax holds the water and oil together. A general starting point for the emulsifier is 20-25% of the total oil phase weight. For example, if you use 20g of oils, you'd use about 4-5g of emulsifying wax.

**Heating:** Both the oil and water phases must be at a similar, high temperature (usually above 70°C) when combined to ensure the emulsifier activates properly and creates a stable, long-term emulsion.

### 2. Preservation

**Absolute Necessity:** Since this is a water-containing product, it must contain a broad-spectrum preservative to prevent mold, yeast, and bacterial growth. Water + Oils = a microbial buffet.

**Usage Rate:** Follow the supplier's recommended usage rate for your chosen preservative (often between 0.5% and 1%).

### 3. Oil Characteristics

**Tamanu Oil:** It has a distinctive, strong aroma and a deep green color. This color will likely tint your lotion pale green or yellow. Be mindful of how its natural scent combines with the Rosewood oil. Tamanu is often used at a lower percentage (e.g., 5-10% of the oil phase) due to its potency.

**Jojoba Oil:** This is technically a liquid wax, very similar to human sebum.

### 4. Essential Oil Dilution

**Rosewood Oil:** This is the scent and a therapeutic component. It must be used at a safe skin dilution rate, typically 0.5% to 1% of the total finished lotion weight. Be aware of any restrictions on Rosewood oil's source (often called Bois de Rose). Sustainable alternatives like H2O, Wood are sometimes preferred due to conservation efforts.

### 5. Sanitization

**Hygiene:** Sterilize all equipment, containers, and your workspace (with 70% isopropyl alcohol) before starting. Contamination introduced during the process can spoil the formulation even preservatives.

## EVALUATION TESTS

### 1. Organoleptic Characters

#### Motive:

To examine the general appearance and sensory properties like color, odor, and texture of the lotion.

#### Method:

Visual and sensory inspection was done to observe color, odor, and overall appearance (smoothness, consistency, and homogeneity).



## 2. pH Determination

### *Motive:*

To check whether the lotion's pH is compatible with normal skin (5.0–7.0), ensuring it is safe and non-irritant.

### *Method:*

A 10% lotion dispersion in distilled water was prepared. pH was measured using a digital pH meter at room temperature.



## 3. Spreadability Test

### *Motive:*

To determine how easily the lotion spreads on the skin — indicating smoothness and ease of application.

### *Method:*

Performed using the slip and drag method between two glass slides.

Formula used:  $S = M \times L / T$ ,

where M = weight tied to upper slide, L = length moved, T = time taken.



## 4. Stability Studies

### *Purpose:*

To check the physical stability of the lotion under different storage conditions (temperature and time).

### *Method:*

Samples stored at

Room temperature ( $25 \pm 2$  °C)

Elevated temperature ( $40 \pm 2$  °C)

Refrigeration ( $4 \pm 1$  °C)

Observed for 1–3 months for phase separation, color, odor, and pH changes.

## 5. Washability Test

### *Purpose:*

To evaluate how easily the lotion can be washed off from the skin surface.

### *Method:*

The lotion was applied to the skin, allowed to dry slightly, and then washed with water to observe ease of removal.



## 6. Irritation / Patch Test (Skin Compatibility Test)

### **Purpose:**

To ensure the lotion is non-irritant and safe for topical use.

### **Method:**

A small quantity of lotion was applied to a 2–3 cm<sup>2</sup> area on the forearm of 10–20 healthy volunteers.

Observed for redness, itching, or irritation after 24 hours.



## 7. Homogeneity Test

### **Purpose:**

To ensure the lotion is uniform in consistency and free from lumps or phase separation.

### **Method:**

Visual inspection and gentle rubbing between fingers were done to check for smooth and even texture.

## CONCLUSION

The study developed and evaluated a herbal perfumed lotion made from a blend of natural oils, plant extracts, and gentle stabilizers designed to nourish the skin while adding a pleasant fragrance. The formulation, which included Tamanu oil, Jojoba oil, Rosewood essential oil, Aloe vera gel, Mint extract, Vitamin E, glycerin, and distilled water, proved highly effective in moisturizing, soothing, and protecting the skin while supporting its natural healing process.

Stabilizing agents like stearic acid, cetyl alcohol, and propylene glycol gave the lotion a smooth consistency, and preservatives such as phenoxyethanol and glycerin ensured it remained safe and free from microbial contamination. Testing showed that the lotion had the right pH, viscosity, and spreadability, along with lasting fragrance and excellent user comfort. It was stable, gentle, and pleasant to apply—demonstrating its potential as a safe, natural, and effective skincare and perfuming product.

Future research could focus on long-term stability, detailed clinical testing, and innovative approaches like nano-delivery systems to enhance its performance and market potential. Herbal entities formulations in skin care and cosmetics represent a fusion of traditional wisdom and modern scientific innovation. They offer benefits, including safety, low toxicity, therapeutic efficacy, and eco-friendliness, making them suitable for long-term use. Advances in extraction techniques, delivery systems have enhanced the stability, bioavailability, and effectiveness of herbal actives, while rigorous quality control and standardization ensure safety, consistency, and consumer trust. Challenges such as variability in raw materials, stability issues, and regulatory compliance, the growing consumer preference for natural and sustainable products continues to drive research and innovation in this field.

Overall, Cosmetics with herbal entities hold great promises for providing effective, safe, and environmentally responsible personal care solutions, bridging the gap between nature and modern cosmetology. Overall, this herbal perfuming lotion offers an eco-friendly, natural alternative to synthetic cosmetics by combining therapeutic skin care with a refreshing sensory experience.

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