



THE ROSE-ALOEVERA COMBINATION: ULTRA NOURISHING LIP-BALM

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ABSTRACT

The anatomical uniqueness of human lips renders them highly vulnerable to environmental stressors, structural defects, and nutritional deficiencies, necessitating specialized topical care. This paper explores the physiological science behind lip defects, highlighting the critical vitamins required for optimal labial health, and proposes a scientifically grounded methodology for formulating herbal lip balms. By synthesizing natural emollient bases with targeted botanical extracts, this work introduces a comprehensive framework detailing ingredient efficacy, step-by-step formulation procedures, and rigorous evaluation protocols. The proposed herbal approach offers a sustainable, biocompatible alternative to synthetic products, ensuring therapeutic nourishment while mitigating the risks of chemical toxicity and dependency. A combination of rose petals powder & aloe vera gel provide the extraordinary nourishment to cracked or rough lips.

KEYWORDS: Rose-aloe vera gel, Rose petal Powder, Lipbalm, Nourishment.

INTRODUCTION

The anatomical structure of the human lip is distinctly different from the rest of the facial skin, making it uniquely susceptible to damage. The labial mucosa and the vermilion border possess an exceptionally thin stratum corneum and entirely lack sebaceous glands, sweat glands, and hair follicles. Consequently, the lips are inherently incapable of generating their own protective lipid barrier or regulating local moisture, leading to frequent instances of trans-epidermal water loss. Defects such as severe chapping, cracking, and angular cheilitis frequently occur due to a combination of environmental desiccation, ultraviolet radiation, and internal physiological deficiencies. Maintaining healthy lips requires specific micronutrients; for instance, Vitamin E is essential for neutralizing oxidative stress, B-complex vitamins (especially Riboflavin) are critical for preventing angular stomatitis, and Vitamin C is vital for synthesizing the structural collagen matrix of the lips.

The primary objective of this paper is to define a systematic approach for formulating herbal lip balms that actively remedy these structural and nutritional deficiencies rather than merely masking them. Currently,

the commercial market is dominated by synthetic, petroleum-based lip care products, but these existing approaches are fundamentally insufficient for holistic dermatological health for several reasons. First, petroleum derivatives create a highly occlusive, impermeable barrier that provides temporary hydration retention but completely fails to deliver any active nutritional or cellular healing to the damaged labial tissue. Second, the widespread inclusion of synthetic artificial fragrances, parabens, and chemical preservatives in commercial balms frequently exacerbates lip defects by inducing allergic contact dermatitis and disrupting the skin's natural microbiome.

Anatomy of Lips

The lips are highly specialized structures that form the anterior opening of the oral cavity. They play a crucial role in speech, facial expression, food intake, and sensory perception. Unlike most areas of the skin, the lips possess a very thin epithelial layer and lack sebaceous (oil) glands and sweat glands. This unique anatomy makes them more vulnerable to dryness, cracking, and environmental damage.

The lips consist of both external and internal structures. Externally, the philtrum is the vertical groove located between the base of the nose and the upper lip. It is a prominent facial landmark that contributes to facial aesthetics. The Cupid's bow is the curved contour of the

upper lip that gives the lip its characteristic shape. The vermilion border is the sharp junction between the red-colored lip tissue and the surrounding facial skin. The labial commissures are the corners where the upper and lower lips meet.



Fig. No. 1: Anatomy of Human Lip.

Internally, the lips are composed of several layers. The outermost skin layer provides protection against environmental factors. Beneath this lies the subcutaneous connective tissue, which contains blood vessels and nerve endings. The lips are primarily controlled by the orbicularis oris muscle, a circular muscle responsible for lip movement during speaking, eating, whistling, and facial expressions. The inner surface of the lips is lined by a mucous membrane, which remains moist and protects the oral cavity.

The lips receive a rich blood supply from the superior and inferior labial arteries, branches of the facial artery. This extensive vascular network is responsible for the characteristic red color of the lips. Sensory and motor innervation is supplied by branches of the facial and trigeminal nerves, allowing the lips to detect touch, temperature, pain, and pressure.

Because the lips contain very little keratin and no oil-producing glands, they lose moisture more rapidly than other skin surfaces. Consequently, they require continuous hydration and protection to maintain their structure and function.

Types of Lip Defects and Their Scientific Causes

Lips are frequently exposed to environmental stressors and are prone to several disorders due to their delicate structure.

1. Dry Lips (Xerosis)

Dry lips occur when moisture content within the lip tissue decreases significantly. Since lips lack sebaceous glands, they cannot produce natural oils to maintain hydration.

Causes

Cold or dry weather, Dehydration, Excessive lip licking, Low humidity, Certain medications

Scientific Explanation: The thin epithelial layer of the lips allows rapid transepidermal water loss (TEWL). When moisture evaporates faster than it is replenished, the lips become rough, dry, and flaky.



Fig. No. 2: Dry Lips.

2. Chapped Lips

Chapped lips represent a more severe stage of dryness.

Causes: Prolonged exposure to wind and sun, Severe dehydration, Nutritional deficiencies, Habitual lip licking
Scientific Explanation: Continuous moisture loss damages the stratum corneum, the protective outer layer of the lips. This damage leads to cracking, peeling, inflammation, and sometimes bleeding.

3. Angular Cheilitis

Angular cheilitis is characterized by inflammation and painful cracks at the corners of the mouth.

Causes: Fungal infections (*Candida* species), Bacterial infections, Vitamin deficiencies, Excess saliva accumulation.

Symptoms: Painful fissures, Redness and swelling, Burning sensation
Scientific Explanation: Microbial growth in moist environments around the mouth causes tissue inflammation and breakdown of the lip epithelium.

4. Cold Sores

Cold sores are fluid-filled blisters caused by viral infection.

Cause: Herpes Simplex Virus Type-1 (HSV-1)

Symptoms: Painful blisters, Tingling sensation, Crusting and ulceration
Scientific Explanation: The virus remains dormant within nerve cells and reactivates during stress, illness, or immune suppression, producing recurrent lesions around the lips.

5. Allergic Lip Reactions

Certain individuals develop allergic reactions to ingredients found in cosmetics, foods, or medications.

Causes: Lipsticks and lip balms, Fragrances, Food additives, Preservatives
Symptoms: Swelling, Itching, Redness, Blister formation.

Scientific Explanation: Exposure to allergens triggers an immune response, causing inflammation and increased blood flow to the affected tissues.

6. Lip Discoloration

Lip discoloration refers to darkening or uneven pigmentation of the lips.

Causes: Smoking, Excessive UV exposure, Hormonal changes, Certain medications, Nutritional deficiencies
Scientific Explanation: Increased melanin production or

tissue damage stimulates pigmentation, resulting in darker lips.

a. Nutritional Deficiencies Affecting Lip Health

Nutritional deficiencies are among the most common causes of lip disorders. Adequate intake of vitamins and minerals is essential for maintaining healthy lip tissues.

b. Vitamins Required for Healthy Lips

1. Vitamin A

Vitamin A maintains epithelial tissue integrity and supports cell regeneration. It helps repair damaged lip tissue and prevents excessive dryness.

2. Vitamin B Complex

The B vitamins play a crucial role in cellular metabolism and tissue repair. They prevent cracking, inflammation, and ulcer formation.

3. Vitamin C

Vitamin C is essential for collagen synthesis. It accelerates wound healing, improves skin elasticity, and acts as a powerful antioxidant.

4. Vitamin D

Vitamin D supports immune function and tissue regeneration. It helps protect the lips from infections and promotes healthy healing.

5. Vitamin E

Vitamin E is one of the most important vitamins for lip care. It acts as a strong antioxidant, neutralizing free radicals that cause premature aging. It moisturizes the lips, reduces inflammation, enhances healing, and protects against environmental damage.

Nutrient Deficiency	Effects on Lips
Vitamin B2 (Riboflavin)	Cracked mouth corner cheilitis
Vitamin B3 (Niacin)	Dry, inflamed lips
Vitamin B6	Lip cracks and mouth ulcers
Vitamin B12	Pale, swollen lips
Iron	Angular cheilitis and poor healing
Zinc	Delayed wound healing and dryness
Essential Fatty Acids	Rough, scaly lips
Water	Dehydration and chapping

Table no. 1: Deficiency of nutrient & effect on Lips.

Benefits of Herbal Lip Balm Formulation

Herbal lip balms offer numerous advantages over synthetic lip care products because they contain natural oils, waxes, vitamins, and plant extracts.

Key Benefits

1. Provides Long-Lasting Moisturization Natural oils and waxes create a protective barrier that prevents moisture loss.
2. Prevents Dryness and Cracking Herbal ingredients maintain hydration and improve skin elasticity.
3. Protects Against UV Damage Certain herbal oils contain antioxidants that reduce sun-induced damage.
4. Supplies Antioxidants Ingredients such as Rose petal powder extract and vitamin E neutralize harmful free radicals.
5. Improves Softness and Smoothness Regular application keeps lips supple and healthy.
6. Enhances Natural Lip Color Natural pigments from herbal ingredients provide an attractive tint without synthetic dyes.
7. Antibacterial and Anti-inflammatory Effects Ingredients like honey help prevent infections and soothe irritation.

Methodology of Herbal Lip Balm Formulation

The formulation of herbal lip balm involves the careful selection, weighing, mixing, and processing of natural ingredients to produce a stable, safe, and effective product. The primary objective is to prepare a lip balm that provide moisturization, protection, nourishment, and an attractive appearance while avoiding the harmful effects associated with synthetic lip care products.

The herbal lip balm formulation described in the study utilizes natural ingredients such as beeswax, castor oil, sesame oil, honey, vitamin E, rose oil, and Rose petal powder. Each ingredient contributes specific therapeutic and cosmetic properties to the final product.

Principle of Formulation: The formulation is based on the preparation of a semi-solid emollient system in which beeswax serves as the structural base, while natural oils provide moisturization and nourishment. Rose petal powder acts as a natural coloring agent, and honey along with vitamin E contributes antioxidant, antibacterial, and healing properties. Proper blending of these ingredients ensures uniform consistency, stability, and efficacy.

Herbal ingredients prefer for Lip Care

1. Beeswax

Biological Source: Secreted from the abdominal glands of the honey bee, *Apis mellifera* (Family: Apidae). It contains Myricin (myricyl palmitate), cerotic acid, and hydrocarbon chains. **Cosmetic & Therapeutic Role:** Serves as a primary structuring, thickening, and hardening agent. It exhibits significant emollient and occlusive properties, creating a non-comedogenic protective barrier that seals in moisture and protects the lip/skin barrier from external environmental stress.



Fig No. 3: Beeswax.

2. Castor Oil

Biological Source: Cold-pressed fixed oil obtained from the seeds of *Ricinus communis* (Family: Euphorbiaceae).

Key Phytoconstituents: Ricinoleic acid (an unusual hydroxylated fatty acid making up approx 90% of its composition), oleic acid, and linoleic acid.

Cosmetic & Therapeutic Role: Functions as a robust humectant and natural plasticizer to prevent formulation

brittleness. It provides excellent gloss, high viscosity, and deep tissue hydration, reinforcing the skin's lipid barrier while offering anti-inflammatory benefits.



Fig No. 4: Castor Oil.

3. Vitamin E

Biological Source: Naturally derived or synthetic \alpha-tocopherol, frequently isolated from vegetable oils (e.g., soybean, sunflower, or wheat germ oil).

Key Phytoconstituents: Active \alpha-tocopherol.
Cosmetic & Therapeutic Role: Acts as a vital lipid-soluble antioxidant within the formulation, scavenging free radicals to protect cellular membranes from UV-induced oxidative stress. In the product matrix, it prevents the rancidity (peroxidation) of unsaturated oils, extending shelf life.

4. Sesame Oil

Biological Source: Fixed oil extracted from the mature seeds of *Sesamum indicum* (Family: Pedaliaceae).

Key Phytoconstituents: Sesamin, sesamolin, oleic acid, linoleic acid, and tocopherols.

Cosmetic & Therapeutic Role: Utilized as a nourishing emollient base with high dermal penetrability. It possesses natural photo-protective attributes, counteracts skin dryness, and delivers anti-inflammatory properties that soothe irritated epidermal layers.



Fig No. 5: Sesame Oil.

5. Rose Oil

Biological Source: Volatile essential oil obtained via steam distillation of fresh petals of *Rosa damascena* (Family: Rosaceae).

Key Phytoconstituents: Geraniol, citronellol, nerol, and phenylethyl alcohol. **Cosmetic & Therapeutic Role:**

Primarily incorporated as a premium natural fragrance, masking agent, and antimicrobial active. Therapeutically, it displays mild astringent, calming, and anxiolytic properties, enhancing the sensory profile of the topical application.



Fig No. 6: Rose Oil.

6. Honey

Biological Source: A natural saccharine secretion produced from plant nectar and deposited in honeycombs by *Apis mellifera* (Family: Apidae).

Key Phytoconstituents: D-fructose, D-glucose, inhibine (hydrogen peroxide-generating enzyme system), organic acids, and trace flavonoids.

Cosmetic & Therapeutic Role: Serves as an exceptional natural humectant that actively draws and binds moisture to the skin. It exhibits potent broad-spectrum antibacterial, tissue-healing, and anti-inflammatory properties, promoting rapid epithelialization of dry or cracked tissue.



Fig No.7: Honey.

7. Rose Petal Powder

Biological Source: Dried and finely pulverized petals of *Rosa damascena* (Family: Rosaceae).

Key Phytoconstituents: Anthocyanins (e.g., cyanidin-3,5-diglucoside), gallic acid, quercetin, and various polyphenols.

Cosmetic & Therapeutic Role: Functions as an eco-friendly, non-toxic natural coloring agent and texturizer. It offers mild physical exfoliation while imparting significant antioxidant, soothing, and toner-like astringent effects to the skin matrix.



Fig No.8: Rose Petal Powder.

8. Rose Aloe Vera Gel

Biological Source: Prepared by blending the mucilaginous inner leaf parenchymal gel of *Aloe barbadensis* Miller (Family: Asphodelaceae) with the pure hydro-distilled extract of *Rosa damascena* (Family: Rosaceae).

Key Phytoconstituents: Acemannan (long-chain acetylated polymannans), bradykinase enzyme, vitamins A, C, and E, amino acids, alongside rose-derived monoterpenes.

Cosmetic & Therapeutic Role: Acts as a refreshing, hydrating aqueous base that introduces immediate cooling relief. It provides profound anti-inflammatory, tissue-regenerative, and soothing activities, mitigating irritation and complementing the lipid-heavy ingredients by establishing a balanced, emollient -hydrogel system.



Fig No.9: Rose Aloe vera gel.

Formulation table

Table no. 2: Ingredients used.

Ingredients	Formula (F) / Quantity	Use / Role in Formulation
Beeswax	2.8 gm	Thickener, structuring agent
Castor oil	1.8 ml	Emollient, provides gloss
Vitamin E	2.2 gm	Antioxidant, skin-conditioning
Sesame oil	1.2 ml	Nourishing base oil
Rose oil	Q.S.	Fragrance, essential oil active
Honey	Q.S.	Humectant, natural antibiotic
Rose petal powder	1.2 gm	Natural colorant, mild exfoliant
Rose aloe vera gel	3.0 gm*	Hydrating base, soothing active

"Q.S." = Quantum Satis / Quantity Sufficient.
 * Asterisk denotes a suggested starting quantity to balance hydrating properties with wax/oils.

Formulation Method

Step 1: Weighing of Ingredients

All ingredients are accurately weighed according to the selected formulation. Precise weighing is essential because any variation in ingredient quantity may affect the texture, stability, melting point, and spreadability of the final product.

Step 2: Melting of Beeswax

The weighed beeswax is transferred into a clean evaporating dish and heated using a water bath maintained between 50°C and 64°C.

Purpose

1. To convert solid wax into a molten state.
2. To facilitate uniform mixing of oils and herbal ingredients.
3. To avoid direct heating which may degrade natural constituents.
4. The temperature is carefully monitored because excessive heat may destroy thermolabile compounds and affect the quality of the lip balm.

Step 3: Incorporation of Oils and Rose petal powder Powder

After complete melting of beeswax, the following ingredients are added gradually:

Castor Oil Sesame Oil

Rose petal powder Powder

The mixture is stirred continuously to obtain a uniform dispersion.

Purpose

1. Castor oil acts as a moisturizing and humectant agent.
2. Sesame oil provides antioxidant and healing properties.
3. Rose petal powder powder imparts a natural red color and antioxidant benefits.

This mixture is designated as Mixture A.

Step 4: Preparation of Vitamin E-Honey Mixture

In a separate evaporating dish, honey and vitamin E are mixed thoroughly. Vitamin E capsules are punctured and

their contents are added directly into honey.

Purpose

1. Honey acts as a natural humectant and antimicrobial agent.
2. Vitamin E provides antioxidant protection and improves product stability.
3. Continuous stirring ensures uniform mixing. This preparation is designated as Mixture B.

Step 5: Combining Mixture A and Mixture B

The temperature of both mixtures is adjusted to approximately the same level to avoid phase separation. Mixture B is then added slowly into Mixture A drop by drop with continuous stirring.

Importance

1. Prevents lump formation.
2. Ensures homogeneous distribution.
3. Produces smooth texture.
4. Maintains stability of active ingredients.
5. The stirring process continues until a uniform semi-liquid mass is obtained.

Step 6: Addition of Rose Oil

Rose oil is added at the final stage of formulation.

Purpose

1. Provides pleasant fragrance.
2. Enhances consumer acceptability.
3. Offers mild soothing effects.
4. Rose oil is added after cooling slightly because volatile oils may evaporate at high temperatures.

Step 7: Filling and Molding

The molten formulation is immediately poured into clean, dry lip balm containers. The containers are filled carefully to avoid air bubbles and uneven surfaces.

Step 8: Cooling and Solidification

The filled containers are allowed to cool naturally at room temperature. During cooling:

Beeswax solidifies. Oils become entrapped within the wax matrix. Final lip balm structure develops. The finished lip balm is then stored in airtight containers for further evaluation.



Fig No. 10: Final Product.

Evaluation of Herbal Lip Balm

Evaluation is an essential step in determining the quality, safety, stability, and effectiveness of the formulated herbal lip balm. Various physicochemical and biological tests are performed to ensure that the product meets standard requirements.

1. Organoleptic Evaluation

Organoleptic properties are evaluated using human sensory perception. Parameters Evaluated Colour, Odour, Appearance, Texture, Taste. These characteristics directly influence consumer acceptance. Observations

The prepared lip balm exhibited

1. Attractive red colour due to Rose petal powder pigment.
2. Pleasant fragrance due to rose oil.
3. Smooth texture.
4. Uniform appearance.

2. pH

Determination Objective

To ensure that the formulation does not irritate the lips.



Fig No.11: Rose Aloe vera Lipbalm.

Procedure

1. One gram of lip balm is dissolved in 100 ml distilled water.
2. The solution is stirred thoroughly.
3. A calibrated pH meter is used for measurement.

Significance

The normal lip surface maintains a slightly acidic to neutral environment.

An extremely acidic or alkaline formulation can: Cause irritation, Lead to inflammation, Increase dryness

3. Stability Study Objective

To determine the ability of the formulation to retain its characteristics over time.

Procedure

1. Lip balm samples are stored for 30 days under different conditions: Storage Condition Temperature

- a. Refrigerated 5°C
- b. Room Temperature 25°C
- c. Elevated Temperature 40°C

After storage, samples are examined for Colour change, Odour change, Texture change, pH variation, Spreadability Significance A stable product maintains its quality throughout shelf life.

Results

The formulations remained stable with no significant deterioration.

4. Spreadability Test Objective

To determine how easily the lip balm spreads on the lip surface.

Procedure

1. The lip balm is repeatedly applied on a glass slide at room temperature.

The analyst observes

Uniformity of application, Fragmentation, Breakage, Deformation, Grading System Good (G), Uniform application, No fragmentation, No deformation, Intermediate (I), Minor fragmentation, Slight deformation.

5. Skin Irritation Test Objective

To assess the safety of the formulation. Procedure

1. A small quantity of lip balm is applied on the dorsal surface of the hand.
2. Twenty healthy volunteers participate in the study.
3. The formulation remains in contact with the skin for approximately 10 minutes.

The area is observed for: Redness, Swelling, Rash, Erythema, Edema Significance

This test confirms dermatological compatibility.

Results

No irritation was observed in any volunteer, indicating that the herbal lip balm is safe for topical application.

6. Melting Point Determination Objective

To determine the temperature at which the lip balm softens or melts. Procedure

1. The lip balm sample is filled into a capillary tube.
2. The tube is immersed in liquid paraffin.
3. Temperature is increased gradually.
4. The melting temperature is recorded. Importance

Melting point affects: Storage stability, Product handling, Consumer usability Results Formulation

The melting points indicate that the formulations possess adequate hardness and can withstand normal environmental temperatures without melting.

Overall Evaluation Summary

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The evaluation studies demonstrated that the formulated herbal lip balm possessed desirable physicochemical properties, acceptable pH, excellent stability, good spreadability, suitable melting point, and no skin irritation. Among all formulations, F3 showed the best overall performance, exhibiting smooth texture, attractive appearance, good spreadability, stability, and optimum melting characteristics. Therefore, the formulated herbal lip balm can be considered safe, stable, effective, and suitable for regular use in maintaining healthy, moisturized, and attractive lips.

RESULT & CONCLUSION

The anatomical limitations of human lips, characterized by an absence of protective glands and a fragile cellular structure, make them uniquely susceptible to environmental damage and nutritional deficiencies. Addressing these defects requires formulations that go beyond simple occlusion to deliver essential transdermal vitamins, such as Vitamin E and B-complex derivatives, directly to the compromised tissue. The methodology presented in this paper demonstrates that carefully calibrated herbal lip balms can successfully fulfill these dermatological requirements while avoiding the toxicity associated with synthetic alternatives.

By strategically blending structural natural waxes with nutrient-dense botanical oils and evaluating them through rigorous physicochemical standards, it is possible to achieve a highly stable, therapeutic cosmetic product. While challenges regarding temperature sensitivity and shelf life persist, the overarching benefits of utilizing biocompatible, sustainably sourced ingredients make herbal formulations a vastly superior approach to long-term labial health. Ultimately, this comprehensive integration of anatomical science and botanical formulation provides a robust foundation for the future development of functional, natural dermatological therapies.

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