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## **DEVELOPMENT AND EVALUATION OF A HERBAL LIP BALM ENRICHED WITH BEETROOT EXTRACT**

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### **ABSTRACT:**

Cosmetics have been in high demand since ancient times, with a modern shift towards naturally derived products. Herbal lip balms, designed to hydrate, soothe chapped lips, and protect against drying, are widely used but not without drawbacks. This review explores the formulation, benefits, and concerns surrounding natural lip balms, emphasizing their role in maintaining lip health while addressing potential risks associated with everyday use.

The growing demand for natural and organic cosmetics has led to the exploration of plant-based ingredients for skincare products. This study focuses on formulating a lip balm using beetroot (*Beta vulgaris*) extract, capitalizing on its natural pigments, antioxidants, and nutrients. The aim is to develop a lip balm that offers aesthetic appeal, moisturizing benefits, and antioxidant protection. The formulation was evaluated for its physicochemical properties, stability, moisturizing efficacy, and consumer acceptance. Results indicated that the beetroot-infused lip balm demonstrated stable color, smooth texture, and high consumer satisfaction, highlighting the potential of beetroot extract in natural cosmetic formulations.

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**KEYWORD:** Formulation , Herbal lip balm , Evaluation , Extraction

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### **INTRODUCTION:**

Herbal lip balms, in particular, have garnered attention for their potential to provide nourishment, protection, and aesthetic appeal using natural ingredients. Unlike conventional lip balms, which often contain artificial colors, preservatives, and fragrances, herbal lip balms rely on the therapeutic properties of plants and natural extracts. These products not only offer hydration and protection but also leverage the beneficial properties of their botanical components.

One such promising ingredient is beetroot (*Beta vulgaris*). Renowned for its rich color and high nutritional value, beetroot is an excellent source of betalains, vitamins, and antioxidants. Betalains, the pigments responsible for beetroot's vibrant color, have been shown to possess anti-inflammatory and antioxidant properties, making them suitable for skin care applications. Additionally, beetroot extract provides a natural and appealing red hue, eliminating the need for synthetic dyes in lip balms.

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### **Role of Ingredients:**

#### **1.Beeswax**



Beeswax acts as an emollient, creating a protective layer on the skin's surface that helps to lock in moisture. This barrier prevents lips from drying out and protects them from harsh environmental factors such as wind and cold weather.

It serves as a thickening agent, giving lip balm its solid form. Beeswax ensures that the lip balm remains firm and stable at room temperature, which is essential for easy application and portability.

#### **Castor oil:**



The anti-inflammatory and antimicrobial properties of castor oil can aid in the healing of minor cuts or irritations on the lips. This makes it beneficial for maintaining healthy lips and preventing infections.

As a natural oil, castor oil is generally safe for use on the skin and is suitable for most skin types. It is a preferred ingredient in natural and organic lip balm formulations due to its non-toxic and environmentally friendly nature.

#### **Vitamin E:**



Vitamin E is a powerful antioxidant that helps protect the lips from damage caused by free radicals and environmental factors such as UV radiation and pollution. This protection helps prevent premature aging of the skin on the lips.

Vitamin E has excellent moisturizing properties, helping to keep the lips hydrated. It works by sealing in moisture and preventing the lips from becoming dry and chapped, which is especially beneficial in harsh weather conditions.

#### **Flavour:**



Rose oil has antibacterial and antimicrobial properties that can help to protect the lips from infections and bacteria. This is particularly useful in preventing infections in minor cuts or cracks on the lips.

The pleasant and soothing fragrance of rose oil adds a sensory dimension to lip balm. The natural scent of roses can have calming and uplifting effects, enhancing the overall user experience.

#### **Beetroot:**



#### ***Taxonomical Classification:***

**Botanical name:** *Beta vulgaris*

**Common name:**

Marathi - Biit

Hindi – Chukandar

Tamil - Bītrūt

**Kingdom:** *Plantae*

**Phylum:** Angiosperms (flowering plants)

**Class:** Eudicots

**Order:** Caryophyllales

**Family:** *Amaranthaceae*

**Genus:** Beta

**Species:** *Beta vulgaris*

Beetroot is rich in betalains, pigments that give it a vibrant red color. When used in lip balm, beetroot provides a natural and appealing tint, eliminating the need for synthetic dyes. This natural color can enhance the aesthetic appeal of the lip balm, providing a subtle to deep red hue, depending on the concentration used.

Beetroot contains antioxidants such as betalains, vitamin C, and manganese. These antioxidants help protect the lips from damage caused by free radicals and environmental stressors, reducing the signs of aging and maintaining healthy, youthful-looking lips.

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#### **Anatomy of lips:**

The lips, also known as the labia oris, are a visible and highly expressive part of the human face. Here's a detailed overview of their anatomy:

##### **1.Skin:**

The outer layer of the lips is covered by skin, which is relatively thin and lacks the stratum corneum, the outermost layer found in other areas of the body. This lack of a stratum corneum contributes to the characteristic reddish or pinkish color of the lips.

##### **2.Vermilion Zone:**

This is the pinkish-red portion of the lips, located between the skin of the face and the mucous membrane of the mouth. It contains a high density of blood vessels, giving it its distinctive color.

##### **3.Vermilion Border:**

Also known as the vermilion margin, this is the distinct edge or boundary between the skin of the face and the vermilion zone of the lips. It is more pronounced in some individuals and is often emphasized with cosmetics such as lip liner.

#### 4.Philtrum:

This is the vertical groove or furrow on the upper lip, extending from the nasal septum to the upper lip's vermilion border. It varies in depth among individuals and is a prominent feature of facial anatomy.

#### 5.Cupid's Bow:

The double curve or indentation in the middle of the upper lip, resembling the bow of Cupid, the Roman god of love. It is a characteristic feature of the upper lip's shape and varies in prominence among individuals.

#### 6.Mucous Membrane:

The inner surface of the lips transitions into a mucous membrane, which is moist and more delicate compared to the outer skin. This mucous membrane is continuous with the lining of the mouth (oral mucosa).

#### 7.Labial Frenulum:

This is a small fold of tissue that connects the inner surface of the lips to the gums or the oral mucosa. It helps to stabilize the position of the lips and restricts excessive movement.

#### 8.Muscles:

The lips are controlled by a ring of muscles called the orbicularis oris muscle. These muscles allow for various movements of the lips, including puckering, smiling, frowning, and speaking.

#### 9.Nerve Endings:

The lips are highly sensitive due to the presence of numerous nerve endings. This sensitivity enables the lips to detect touch, pressure, temperature, and pain, making them important for activities such as speaking, eating, and kissing.

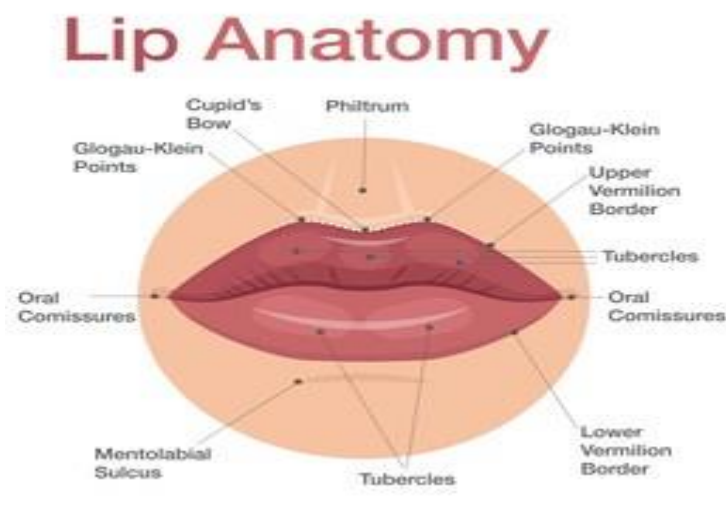


Fig.1 Lip Anatomy

#### Lips Disorder

- **Cheilitis:** This is inflammation of the lips, which can be caused by factors such as dryness, allergic reactions, or infections.
- **Angular cheilitis:** This is inflammation and cracking at the corners of the mouth, often caused by yeast or bacterial infections, or nutritional deficiencies.
- **Herpes labialis (cold sores):** Cold sores are caused by the herpes simplex virus and result in painful, fluid-filled blisters on or around the lips.
- **Actinic cheilitis:** This is a precancerous condition caused by sun damage, leading to dryness, cracking, and sometimes thickening of the lips.
- **Fordyce spots:** These are small, raised, yellow or white spots that can appear on the lips due to sebaceous glands.
- **Lip cancer:** This is a type of oral cancer that can occur on the lips, often manifesting as a sore or growth that doesn't heal.

- **Allergic reactions:** Lips can also be affected by allergic reactions to certain foods, medications, or cosmetics, leading to swelling, redness, or itching.
- **Granulomatous cheilitis:** This is a rare condition characterized by swelling of the lips due to granulomatous inflammation, which may be related to conditions like Crohn's disease or sarcoidosis.

## MARERIAL AND METHODS:

Sr. No.	Ingredients	F1( gm)	F2(gm)	F3(gm)
1	Beetroots	0.5	0.5	0.5
2	Beeswax	4	3	5
3	Coca butter	3	4	4
4	Castor oil	2	2	2
5	Vitamin E	0.5	0.5	0.5
6	Flavour	0.5	0.5	0.5

### *Extraction of selected plant:*



**Fig.12 Soxhlet Extractor**

### **In this method,**

1. Choose a suitable solvent based on its ability to dissolve the desired compound from the solid material. Factors such as polarity, boiling point, and solubility of the compound influence the selection of the solvent.
2. Prepare the solid material by grinding it into a fine powder or cutting it into small pieces to increase the surface area for extraction. Ensure that the solid material is thoroughly dried to remove any moisture.

### **PROCEDURE**

1. Weigh accurately all the required ingredients.
2. In a clean evaporating dish, take Bees wax first and melt it in a water bath (not exceeding the temperature range of 50- 64°C).
3. Then add the beetoot powder, Sesame oil and castor oil respectively and stir vigorously and label it as A
4. Then in another evaporating porcelain dish, take Honey and Vitamin E (pour the capsule content into Honey) and mix thoroughly and label it as B.

5. Pour the contents of porcelain Dish B into Dish A by observing the uniform temperatures of both the dishes and adding it drop by drop with vigorous stirring.
6. Finally, add Rose oil to the Formulation and finally pour the liquid lip balm into a clean wide-mouth container. Keep the lip balm for cooling at room temperature .

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## Evaluation of herbal lip balm:

### 1.Physical evaluation of the formulation

The formulation were inspected visually for their appearance , colour , odour.

### 2.Measurement of pH

The pH was measured using a pH meter, which was calibrated before each use with standard buffer solutions at pH 4, 7, 9. The electrode was inserted into the sample 10 minutes prior to taking the reading at room temperature.

### 3.Viscosity

The viscosity of the formulations was checked using a Brookfield Viscometer (DV-I PRIME, USA). The lip balm were rotated at 0.3, 0.6, 1.5 rotations per minute. The viscosity of the gel was obtained by multiplying the corresponding dial reading with the factor given in the Brookfield Viscometer catalogue.

### 4.Spreadability

Begin spreading the lip balm by using gentle pressure and smooth motions.Pay attention to how easily the lip balm spreads across the surface of your skin. Note any resistance, dragging, or uneven distribution.Assess the ability of the lip balm to cover the entire test area uniformly without leaving clumps or patches.

Spreadability Calculated by,

$$S = M.L / T$$

where,

M = wt tied to upper slide

L = length of glass slides

T = time taken to separate the slides

### 5.Stability

Analyze the stability of active herbal ingredients and other components.Test for degradation or loss of potency of herbal extracts due to exposure to light, oxygen, or temperature fluctuations.Assess compatibility between the lip balm base and herbal ingredients to prevent interactions that could lead to degradation.

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## CONCLUSION :

Your product sounds impressive! With its patented formula combining a humectant, an emollient, and an occlusive humectant, along with added benefits like nutrition, scar healing, and sun protection, it offers comprehensive care for lips. The inclusion of honey, hyaluronic acid, and SPF further enhances its appeal. Plus, being made from 100% botanical ingredients is a great selling point for health-conscious consumers.

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