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## Research Article

# Formulation and Evaluation of Herbal Lip Balm

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### ABSTRACT

Lip balm is a cosmetic preparation intended to protect, moisturize, and improve the appearance of lips. Environmental factors such as sunlight, pollution, cold weather, and dehydration often cause dryness, cracking, and pigmentation of lips. Herbal lip balms prepared using natural ingredients have gained considerable attention due to their safety, effectiveness, and minimal side effects compared with synthetic products. The present study aimed to formulate and evaluate a herbal lip balm using natural ingredients such as beeswax, cocoa butter, coconut oil, almond oil, aloe vera extract, beetroot extract, vitamin E, and rose oil. Various evaluation parameters including appearance, pH, spreadability, melting point, stability, skin irritation, and moisturizing effect were assessed. The developed formulation exhibited satisfactory physical characteristics, good stability, pleasant appearance, and excellent moisturizing properties. The study concludes that herbal lip balm can serve as a safe and effective alternative to commercially available synthetic lip care products.

### INTRODUCTION

The lips are among the most sensitive parts of the human body because they lack sebaceous glands and possess a thin epithelial layer. As a result, they are highly susceptible to dehydration, dryness, cracking, and environmental damage. Lip balms are topical formulations applied to lips to prevent moisture loss and provide protection against adverse climatic conditions. Herbal cosmetics have become increasingly popular because consumers

prefer products containing natural ingredients. Herbal lip balms contain plant-derived oils, waxes, extracts, and antioxidants that nourish and protect lips without causing harmful effects associated with synthetic chemicals. The use of herbal ingredients such as aloe vera, coconut oil, almond oil, beetroot extract, and beeswax offers multiple benefits including hydration, antioxidant protection, healing of cracked lips, and natural coloration.

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In recent years, the global demand for herbal and natural cosmetic products has increased significantly due to growing consumer awareness regarding the potential adverse effects of synthetic chemicals. The cosmetic industry has witnessed a paradigm shift towards the development of products derived from natural sources that offer both therapeutic and aesthetic benefits. Herbal cosmetics are generally considered safer, biocompatible, environmentally friendly, and suitable for long-term use compared to conventional cosmetic products. Lip balm is one of the most widely used cosmetic preparations intended to maintain lip hydration and protect the lips from environmental stressors such as ultraviolet radiation, cold weather, low humidity, pollution, and wind exposure. Continuous exposure to these factors can result in lip dryness, fissures, inflammation, and premature aging. Therefore, an effective lip care product is essential for maintaining healthy lips and enhancing their appearance.

Conventional lip balms frequently contain synthetic ingredients such as petroleum jelly,

artificial colorants, synthetic fragrances, parabens, and preservatives. Although these substances may provide immediate moisturization and improved product stability, prolonged use may lead to irritation, allergic reactions, lip sensitization, and consumer concerns regarding safety. Consequently, there is increasing interest in replacing synthetic components with naturally derived alternatives that possess moisturizing, antioxidant, antimicrobial, and healing properties.

Natural ingredients such as beeswax, cocoa butter, coconut oil, almond oil, aloe vera extract, and beetroot extract have been extensively investigated for their beneficial effects on skin and lip health. Beeswax acts as a natural occlusive agent that forms a protective barrier against moisture loss, whereas cocoa butter and plant oils provide emollient and nourishing effects. Aloe vera is known for its soothing, wound-healing, and anti-inflammatory properties, while beetroot extract serves as a natural colorant rich in bioactive compounds and antioxidants. Vitamin E contributes to product stability and protects tissues from oxidative stress.



**Figure 1. Herbal ingredients used in the formulation of herbal lip balm**

## AIM

To formulate and evaluate a herbal lip balm using natural ingredients for moisturizing, protecting, and improving the appearance of lips.

## OBJECTIVES

- To prepare herbal lip balm using natural ingredients.
- To evaluate physical and chemical characteristics.
- To determine stability and safety of formulation.
- To assess moisturizing and protective effects.
- To develop an economical and effective herbal cosmetic product.

## NEED OF HERBAL LIP BALM

Lips are continuously exposed to environmental stress. Frequent use of synthetic lip care products may lead to irritation and allergic reactions. Herbal lip balms offer:

- Natural moisturization.
- Protection against dryness.
- Healing of cracked lips.
- Safe long-term use.
- Reduced risk of adverse effects.

## ADVANTAGES OF HERBAL LIP BALM

1. **Natural Composition:** Herbal lip balms are prepared using natural ingredients such as beeswax, plant oils, herbal extracts, and natural colorants, making them safer than synthetic products.
2. **Provides Deep Moisturization:** Natural oils like coconut oil and almond oil help retain moisture, preventing dryness and chapping of lips.

3. **Prevents Cracked Lips:** The emollient properties of herbal ingredients help repair damaged lip tissues and reduce lip cracking.
4. **Free from Harmful Chemicals:** Herbal lip balms generally do not contain parabens, artificial colors, synthetic fragrances, or petroleum-based substances.
5. **Rich in Antioxidants:** Ingredients such as vitamin E, aloe vera, and beetroot extract contain antioxidants that protect lips from oxidative damage caused by environmental pollutants.
6. **Soothes Irritated Lips:** Herbal ingredients possess anti-inflammatory properties that help reduce irritation, redness, and discomfort.
7. **Promotes Healing:** Aloe vera and vitamin E accelerate the healing of dry, rough, and damaged lips.
8. **Provides Natural Color:** Natural colorants like beetroot extract impart a pleasant tint without the use of synthetic dyes.
9. **Long-Lasting Protection:** Beeswax forms a protective barrier on the lips, reducing moisture loss and protecting against environmental stress.
10. **Suitable for Sensitive Skin:** Due to the absence of harsh chemicals, herbal lip balms are generally suitable for individuals with sensitive skin.
11. **Environment-Friendly :** Herbal formulations are biodegradable and often produced using sustainable natural resources.

## INGREDIENTS USED AND THEIR ROLE



Sr. No.	Ingredient	Quantity (% w/w)	Role in Formulation
1	Beeswax	20%	Base material and hardening agent; provides structure and consistency to the lip balm
2	Cocoa Butter	15%	Emollient and moisturizer; prevents dryness and improves smoothness
3	Coconut Oil	25%	Hydrating and nourishing agent; enhances lip softness
4	Almond Oil	15%	Softening agent; rich in vitamins and essential fatty acids
5	Aloe Vera Extract	10%	Healing and soothing agent; helps repair dry and damaged lips
6	Beetroot Extract	5%	Natural colorant; imparts a pleasant pink tint and antioxidant benefits
7	Vitamin E	2%	Antioxidant; protects lips from oxidative damage and improves product stability
8	Rose Oil	1%	Natural fragrance; provides a pleasant aroma and soothing effect
9	Preservative	q.s. (Quantity sufficient)	Enhances microbial stability and extends shelf life

## DESCRIPTION OF INGREDIENTS

### Beeswax

Beeswax is a natural wax produced by honey bees. It provides consistency, firmness, and protective barrier properties to lip balm formulations. In lip balm formulations, beeswax serves as a structuring agent that provides the desired hardness, consistency, and stability to the product. It forms a protective occlusive layer on the surface of the lips, thereby reducing transepidermal water loss and helping to maintain lip hydration for extended periods. This protective barrier also shields the lips from harsh environmental conditions such as wind, cold weather, and low humidity.

### Cocoa Butter

Cocoa butter is a natural fat extracted from cocoa beans. It acts as an excellent moisturizer and protects lips against moisture loss. Cocoa butter is a natural vegetable fat obtained from the roasted seeds of *Theobroma cacao* (cocoa bean). It is widely utilized in pharmaceutical, cosmetic, and skincare formulations due to its excellent moisturizing, emollient, and skin-conditioning properties. Cocoa butter possesses a pale yellow

color, characteristic chocolate aroma, and a melting point close to human body temperature, which makes it particularly suitable for lip care and topical preparations.

### Coconut Oil

Coconut oil contains fatty acids that deeply nourish and hydrate lips. It possesses antimicrobial and antioxidant properties. Coconut oil is a natural edible oil extracted from the kernel of mature coconuts of *Cocos nucifera*. It is one of the most commonly used ingredients in cosmetic and pharmaceutical formulations due to its excellent moisturizing, nourishing, and protective properties. Coconut oil is rich in medium-chain fatty acids, particularly lauric acid, capric acid, caprylic acid, and myristic acid, which contribute to its therapeutic and cosmetic benefits.

### Almond Oil

Almond oil is rich in vitamins A and E and helps soften and condition lips. Almond oil is a natural vegetable oil obtained from the kernels of *Prunus dulcis* (sweet almond). It is widely used in cosmetic, pharmaceutical, and skincare products because of its exceptional moisturizing,



nourishing, and skin-conditioning properties. Almond oil is rich in essential fatty acids, vitamins, minerals, and antioxidants that contribute significantly to maintaining healthy skin and lips.

### **Aloe Vera Extract**

Aloe vera provides soothing, anti-inflammatory, and wound-healing properties that help repair damaged lips. Aloe vera is a succulent medicinal plant belonging to the family Asphodelaceae and is scientifically known as *Aloe barbadensis* Miller. It has been extensively used in traditional and modern medicine due to its remarkable moisturizing, soothing, healing, and anti-inflammatory properties.

### **Beetroot Extract**

Beetroot extract acts as a natural coloring agent and contributes antioxidant activity. Beetroot extract is obtained from the roots of *Beta vulgaris*, a nutrient-rich plant belonging to the family Amaranthaceae. It is widely recognized for its vibrant red-purple color and high content of bioactive compounds, making it a valuable ingredient in cosmetic and pharmaceutical formulations. Beetroot is a rich source of betalains, flavonoids, phenolic compounds, vitamins, minerals, and antioxidants that contribute to its therapeutic and cosmetic properties.

### **Vitamin E**

Vitamin E protects lip tissues from oxidative damage and enhances product stability. Vitamin E is a fat-soluble vitamin widely used in pharmaceutical, cosmetic, and skincare formulations because of its potent antioxidant and skin-protective properties. The most biologically active form of Vitamin E is  $\alpha$ -tocopherol, which plays a crucial role in protecting cell membranes

from oxidative damage caused by free radicals. Due to its excellent stability-enhancing and moisturizing properties, Vitamin E is considered an important ingredient in herbal lip balm formulations

### **Rose Oil**

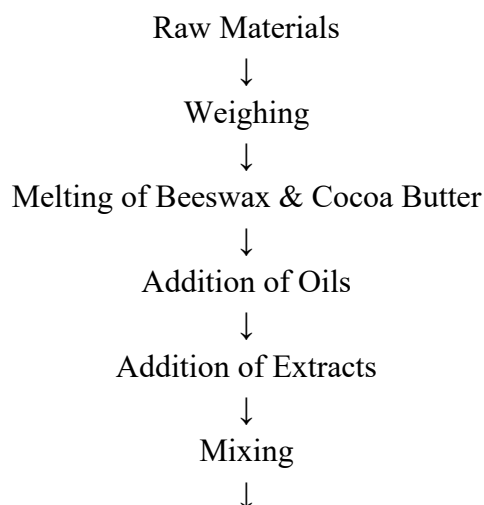
Rose oil imparts pleasant fragrance and provides soothing effects. Rose oil is a highly valued essential oil obtained from the petals of *Rosa damascena* and other species of the genus *Rosa*. It is widely used in cosmetic, pharmaceutical, and aromatherapy products because of its pleasant fragrance, skin-conditioning properties, and therapeutic benefits. Rose oil contains various bioactive compounds such as citronellol, geraniol, nerol, phenylethyl alcohol, and flavonoids, which contribute to its distinctive aroma and beneficial effects on the skin

## **MATERIALS AND METHODS**

### **Materials**

Beeswax, cocoa butter, coconut oil, almond oil, aloe vera extract, beetroot extract, vitamin E, rose oil, preservative, glass beaker, weighing balance, water bath, spatula, lip balm containers.

### **Method of Preparation**



Pouring into Containers  
↓  
Cooling & Solidification

↓  
Finished Lip Balm

**Figure 2. Flow chart showing preparation of herbal lip balm.**

Ingredients	F1 (% w/w)	F2 (% w/w)	F3 (% w/w)
Beeswax	18	20	22
Cocoa Butter	15	15	15
Coconut Oil	28	25	22
Almond Oil	15	15	15
Aloe Vera Extract	10	10	10
Beetroot Extract	5	5	5
Vitamin E	2	2	2
Rose Oil	1	1	1
Preservative	q.s.	q.s.	q.s.
Total	100	100	100



**Figure 3. Various stages involved in herbal lip balm preparation.**

## EVALUATION PARAMETERS

### 1. Organoleptic Evaluation

The prepared formulation was evaluated for color, odor, texture, and appearance.

**Table 2. Organoleptic Evaluation of Herbal Lip Balm**

Parameter	Observation
Colour	Light Pink to Dark Pink
Odour	Pleasant Rose Aroma
Appearance	Smooth and Uniform
Texture	Soft and Non-Gritty
Consistency	Semi-Solid
Glossiness	Moderate

Homogeneity	Good
Surface Defects	Absent

### 2. pH Determination

The pH was determined using digital pH meter and found suitable for lip application.

### 3. Melting Point

The melting point was measured to ensure product stability under normal conditions.

### 4. Spreadability



The ease of application on lips was evaluated.

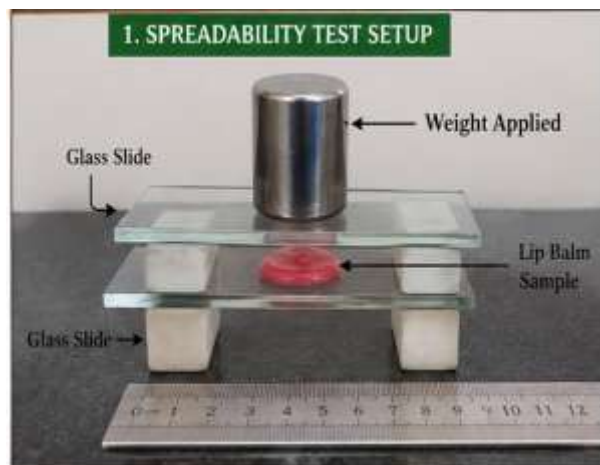


Figure 4 Spreadability Test Setup

## 5. Stability Study

The formulation was stored at room temperature and accelerated conditions for three months.

Table 4. Stability Study Results

Parameter	Day 0	Day 30	Day 60	Day 90
Colour	Pink	Pink	Pink	Pink
Odour	Pleasant	Pleasant	Pleasant	Pleasant
Texture	Smooth	Smooth	Smooth	Smooth
pH	6.5	6.5	6.4	6.4
Appearance	Good	Good	Good	Good
Stability	Stable	Stable	Stable	Stable

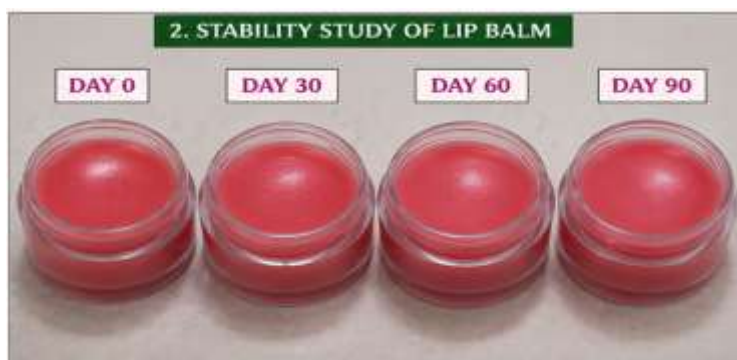


Figure 5 Stability Study

## 6. Skin Irritation Test

Patch test was performed to determine irritation potential.

## 7. Moisturizing Effect

The moisturizing ability was evaluated by observing reduction in lip dryness.

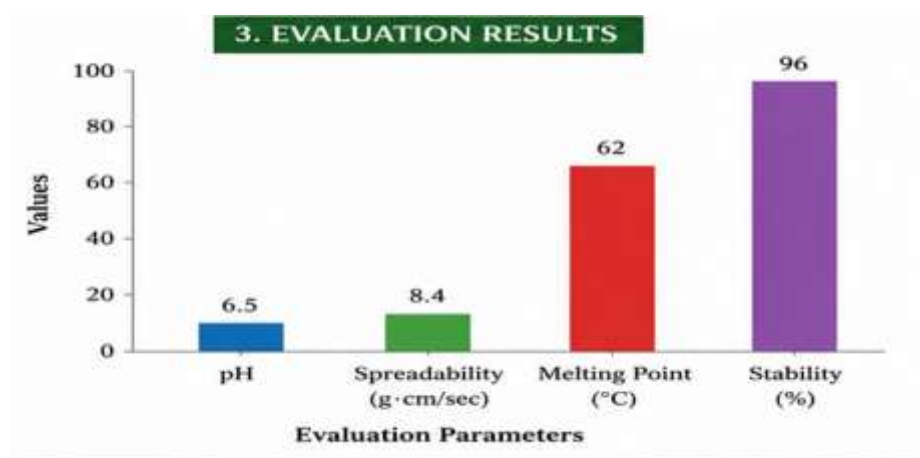
## 10. RESULTS AND DISCUSSION

The prepared herbal lip balm exhibited smooth texture, uniform color, pleasant fragrance, and good consistency. The pH was found compatible with lip tissues. The formulation showed excellent spreadability and remained stable during storage. No irritation or adverse reactions were observed.

Beetroot extract imparted attractive natural color while aloe vera and oils improved moisturization.

**Table 5. Comparison of Prepared Herbal Lip Balm with Marketed Lip Balm**

Parameter	Prepared Herbal Lip Balm	Marketed Lip Balm
Ingredients	Natural	Synthetic + Natural
Artificial Colour	Absent	Present
Preservatives	Minimal	Moderate
Moisturization	Excellent	Good
Skin Irritation	Nil	Mild in Sensitive Skin
Cost Effectiveness	High	Moderate
Environmental Impact	Eco-Friendly	Moderate
Consumer Acceptability	Excellent	Good



**Figure 6 Evaluation Result**

## CONCLUSION

The present study successfully formulated and evaluated a herbal lip balm using natural ingredients. The formulation demonstrated good stability, spreadability, moisturizing effect, and user acceptability. Herbal lip balm offers a safe, economical, and effective alternative to synthetic lip care products. The prepared formulation can be further developed for commercial application and large-scale production.

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