Volume 11, Issue 6, June – 2026 International Journal of Innovative Science and Research Technology
ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26jun597

Formulation and Evaluation of Herbal Lip Balm

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Publication Date: 2026/06/20

Abstract: This research aimed to develop and evaluate a natural herbal lip balm made from plant and bee ingredients. The formulation included beeswax, vitamin E, rose oil, cocoa butter, turmeric, and aloe vera juice. These ingredients were chosen for their moisturizing, soothing, antioxidant, and anti-inflammatory benefits. The goal was to create a lip care product that relieves chapping and supports healing without using synthetic chemicals. The lip balm was made by melting and blending the waxes and butters, adding the oils and active herbal extracts, and then pouring the mixture into containers to solidify. The final product was tested for key physical and performance factors. These included physical stability to check for separation, crystallization, or spoilage during storage, pH to ensure skin compatibility, melting point to see how the balm behaves at different temperatures, and spreadability to evaluate how easily it applies to the lips. Sensory characteristics like texture, appearance, and scent were also recorded. Results showed that the herbal lip balm stayed stable under the tested conditions

Keywords: *Cosmetic, Lip Dryness, Natural, Lip Moistures, Lip Balm.*

How to Cite: Supriya Sankpal; Pooja Mogare; Mrudula Gharge; Akanksha Pawar; Hemraj Salunkhe; Pratik Jadhav (2026) Formulation and Evaluation of Herbal Lip Balm. *International Journal of Innovative Science and Research Technology*, 11(6), 665-671. https://doi.org/10.38124/ijisrt/26jun597

I. INTRODUCTION

Herbal cosmetic products are often associated with therapeutic properties like antimicrobial, anti-inflammatory and, sometimes, cytotoxic activities. A lip balm is a cosmetic item similar to a lipstick but mainly used to prevent and treat dry lips and protect them from harmful environmental stressors. In this project, a lip balm was made with natural ingredients from plants and bees. Lips are thin and sensitive, and because they don't have sebaceous glands, they dry out easily and are prone to irritation and damage from the sun, pollution, cold weather, and lack of moisture. Herbal lip balm provides a soft, natural way to help protect, hydrate and repair damaged skin like this. The prepared product was examined for quality and performance in various tests. The melting point was determined to check physical stability and behavior under heat. Organoleptic properties i.e. colour, odour and overall appearance were tested for the consumer acceptability. We tested functionality by measuring spreadability to see that the balm applies smoothly and evenly. Together these evaluations indicate the effectiveness and stability of the natural formulation as a topical lip care product.

The lips differ from the rest of the skin. The upper layer of healthy skin (stratum corneum) is made up of about 15-16 layers of cells and forms a strong protective barrier. But the lips have only about 3-4 layers in this outer layer so they are much thinner and more delicate than facial skin. The lips have very few melanin cells and the blood vessels are visible and make the lips look pink. Lips don't have sweat glands or hair follicles, so they don't have the natural oils and sweat that protect other skin. Lips don't create oil so they need extra moisture and protection during the day.

Natural ingredients are becoming more popular as many people are concerned about harmful synthetic chemicals in cosmetics. Cosmeceuticals are substances that combine cosmetic and medical effects when applied to the skin. In this work we used natural ingredients, which are less likely to cause side effects. Lip balms are products that are made to protect the lips instead of just beautifying them. They form a thin oily film that helps to retain moisture and usually do not contain dyes. Common natural ingredients are:

Beeswax- Produced by bees commonly used in lip balms. It adds moisture helps protect lips from sun damage and is a natural emulifier. It also has a pleasant fragrance.

Vitamin E- An antioxidant and conditioner, vitamin E keeps lips soft and can help reduce signs of aging.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26jun597

Aloe vera- Soothes irritation with anti-inflammatory properties and antioxidants that protect the skin from damage. In addition to improving appearance, cosmeceuticals offer therapeutic benefits for the skin. They may help prevent or slow skin damage. We selected these ingredients for this work because they tend to cause fewer side effects. Lip emollients, or lips not to beautify them. They form a thin layer of oily substances on the lips that is resistant to moisture. The film moisturizes and protects the lips. Usually these products do not contain strong dyes.

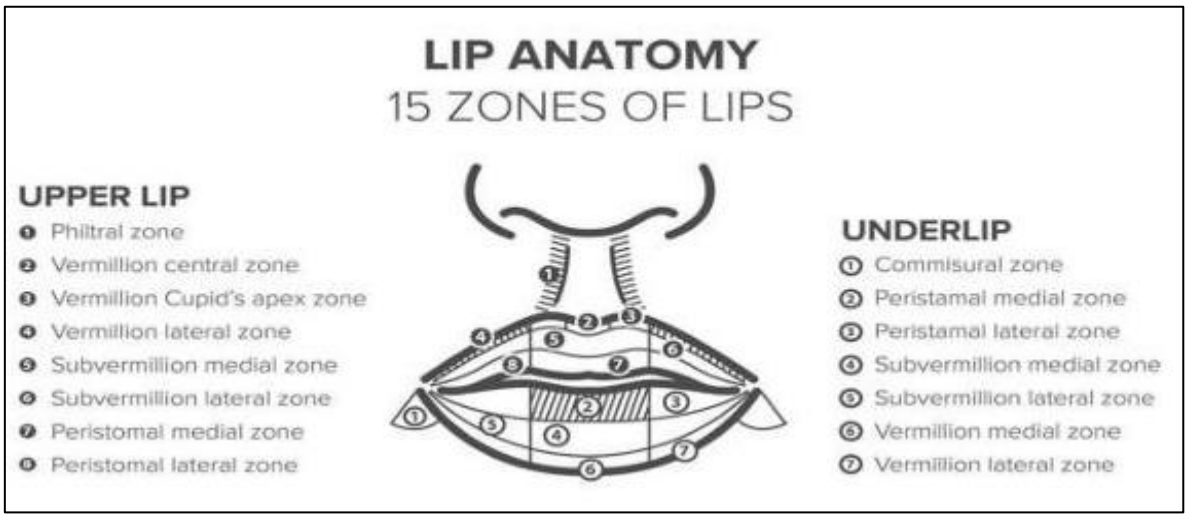

Fig 1 Lip Anatomy

➢ *Anatomy of Lips:*

- *Cupid's Bow*

Cupid's bow is the M-shaped curved area in the middle of the upper lip. It plays an important role in the beauty and shape of the lips.

- *Philtrum*

The philtrum is the small vertical groove between the nose and the upper lip. It is formed during facial development and contributes to facial appearance.

- *Vermilion Border*

The vermilion border is the line that separates the red part of the lips from the surrounding skin. It gives the lips their distinct shape and outline.

- *Oral Commissures*

These are the corners of the mouth where the upper and lower lips join. They help in smiling, speaking, and other facial expressions.

- *Upper Lip*

The upper lip is the soft movable tissue above the mouth opening. It helps in speaking, eating, drinking, and expressing emotions.

- *Lower Lip*

The lower lip is the larger fleshy part below the mouth. It assists in chewing food, speech, and maintaining oral functions.

- *Vermilion Zone*

The vermilion zone is the visible red portion of the lips. Its red color is due to a rich blood supply. This area has very thin skin and lacks sweat glands, making it prone to dryness.

- *Labial Mucosa*

The labial mucosa is the moist inner lining of the lips. It helps keep the lips soft, moist, and protected from dryness.

➢ *Lip Disorders:*

- *Cheilitis*

Cheilitis is inflammation of the lips that causes redness, dryness, scaling, and cracking. It can occur due to infection, irritation, allergies, or nutritional deficiencies.

- *Angular Cheilitis*

Angular cheilitis affects the corners of the mouth, causing painful cracks and soreness. It is commonly associated with fungal or bacterial infections.

- *Chapped Lips*

Chapped lips occur when the lips become dry and cracked due to dehydration, cold weather, excessive sun exposure, or frequent lip licking.

- *Herpes Labialis (Cold Sores)*

Herpes labialis is a viral infection caused by the herpes simplex virus. It produces painful, fluid-filled blisters on or around the lips.

- *Lip Pigmentation*

Lip pigmentation refers to darkening of the lips. It may result from smoking, excessive sun exposure, cosmetic products, hormonal changes, or nutritional deficiencies.

- *Contact Allergic Cheilitis*

This condition develops when the lips react to allergens found in products such as lipsticks, toothpaste, cosmetics, or certain foods. Symptoms include redness, itching, swelling, and dryness.

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- *Actinic Cheilitis*

Actinic cheilitis is damage to the lips caused by long-term exposure to sunlight. The lips may become rough, dry, and scaly. If left untreated, it can develop into a precancerous condition.

- *Allergic Contact Cheilitis*

Allergic contact cheilitis is a delayed allergic reaction that occurs when the lips come into contact with substances that trigger an immune response. Common allergens include ingredients in lipsticks such as castor oil, shellac, colophony, azo dyes, sesame oil, and preservatives. This condition causes inflammation, irritation, and discomfort of the lips.

II. MATERIAL AND METHODS

➢ *Active Ingredients-*

- *Aloe Vera*
- *Vitamin E*
- *Beeswax*
- *Cocoa Butter*
- *Rose Oil*
- *Turmeric*

➢ *Composition of Lip Balm:*

Table 1 Composition of Lip Balm

Sr. No.	Name of ingredient	Quantity	Role
1)	Aloe vera	2gm	API
2)	Vitamin E	3.5gm	Antioxidant
3)	Beeswax	3.5gm	Hardening agent
4)	Cocoa butter	1gm	Moisturizer
5)	Rose oil	1.5gm	Flavouring agent
6)	Turmeric	q.s	Colouring agent

- *Aloe vera*

✓ Synonym - Aloe vera
✓ Biological source – Aloe barbadensis
✓ Family- Liliaceae

Aloe vera is a popular ingredient in lip balm formulations due to its moisturizing, soothing and wound healing properties. The gel extracted from leaves of aloe vera contains polysaccharides, vitamins, amino acids, enzymes and antioxidants that help to maintain the hydration and softness of the lips. It is a natural emollient that helps to reduce dryness, irritation and cracking of the lips. Aloe vera is especially useful in herbal lip balm formulations as it offers a cooling and anti- inflammatory effect and thus can be used for the treatment of chapped and damaged lips. The mucopolysaccharides present in aloe vera help to bind moisture to the surface of the skin and thus improve the hydration of the lips for a longer period. These properties make aloe vera a common ingredient in cosmetic and dermatological preparations such as lip balms, creams and ointments.

Fig 2 Aloe Vera

- *Vitamin E:*

Vitamin E is often included in lip balms because it is a strong antioxidant and a good moisturizer. It helps nourish dry, chapped lips by improving moisture retention and protecting skin cells from oxidative damage caused by free radicals and environmental exposure. Vitamin E also helps stabilize the oily ingredients in a lip balm by preventing lipid oxidation and rancidity, which extends product shelf life. As a skin-conditioning agent, it supports repair of cracked lips and helps maintain the lip barrier. Medicinal benefits include antioxidant protection and support for the immune system by helping maintain healthy immune cell function.

Fig 3 Vitamin E

- *Beeswax:*

✓ Synonym- Cera alba (white beeswax), Cera flava(yellow beeswax)
✓ Biological source- Obtained from honeycomb of Apis mellifera
✓ Family- Apidae

It is collected and purified for use in cosmetics and pharmaceuticals. In lip balms, beeswax forms a protective barrier on the lips that reduces moisture loss, keeping lips soft

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26jun597

and hydrated for longer. It also gives the product firmness and structure, improves texture and stability, and makes application smooth and even. Chemically it contains fatty acids, esters, and vitamin A, which help soothe and heal dry or cracked lips. Because it is natural, non-toxic, and skin-friendly, beeswax is a common ingredient in herbal lip care. Uses include stiffening creams and balms, acting as an emulsifier in cosmetic formulations, and use in ointments, tablet coatings, candles, and polishes.

Fig 4 Beeswax

- *Cocoa Butter:*

✓ Synonym – Theobroma oil, Cacao butter
✓ Biological Source – Obtained from the roasted seeds of Theobroma cacao
✓ Family – Malvaceae

Cocoa Butter is a natural fat extracted from cocoa beans and is widely used in cosmetic and lip care products for its excellent emollient and moisturizing properties. Lip balm formulations use cocoa butter to help keep the lips soft, smooth and hydrated as it forms a barrier that helps reduce the loss of moisture. It easily melts at body temperature, which gives lip balm its smooth texture, and makes it easy to apply to the lips. Cocoa butter naturally contains fatty acids and antioxidants that help to nourish and protect dry or cracked lips from environmental damage. It also helps to improve the elasticity of lips and aids in healing of damaged skin. Herbal and flavored lip balms frequently contain cocoa butter because it has a rich moisturizing effect and a pleasant chocolate like aroma.

Fig 5 Cocoa Butter

- *Rose Oil:*

✓ Synonym – Rose essential oil
✓ Biological source - Rose oil is derived from the flowers of the rose plant.
✓ Family - Rosaceae

Rose oil is an essential oil extracted from the petals of roses. It is widely used in cosmetic and herbal lip care products because of its pleasing aroma and skin-soothing properties. Rose oil is often used in lip balms to help to moisturize and soften dry lips, as well as provide a refreshing floral aroma. It is loaded with natural compounds that have antioxidant and mild anti-inflammatory properties that aid in protecting lips from dryness and environmental damage.

Fig 6 Rose oil

- *Turmeric:*

✓ Synonym- Haldi
✓ Biological source- Turmeric consists of the dried rhizomes of curcuma longa
✓ Family- Zingiberaceae

Turmeric powder is widely used in herbal cosmetic and lip care products because of its natural antioxidant, anti-inflammatory and antimicrobial properties. Turmeric powder in lip balm formulations shields lips from dryness, irritation and environmental damage and promotes healthy and nourished lips. The active compound in turmeric, curcumin, soothes dry, cracked lips and may help to reduce minor irritation. Mixing turmeric powder with moisturizing ingredients like beeswax, cocoa butter, oils or aloe vera also helps to heal damaged lip skin and keep lips soft and smooth. Turmeric is typically used in small quantities in herbal lip balms as it has beneficial protective effects and may impart a slight natural tint to the product.

Fig 7 Turmeric

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➢ *Method of Lip Balm Preparation:*

- Take a cleanly washed and dried container and then add sufficient amount of aloe vera gel.
- In another beaker take coca butter and beeswax and melt it
- Add aloe vera gel in cocoa butter and beeswax.
- Add sufficient quantity of vitamin E capsule with continuous stirring.
- Finally add few drops of rose oil, add turmeric as colouring agent and mixed well.
- They are stored in cold place.

➢ *Evaluation of Lip Balm:*

- *Organoleptic Properties –*

The formulation was evaluated for physical appearance, colour and odour. These characteristics were assessed by physical observation.

✓ *Texture:*

Slide formula lip balm onto slide sample. Texture analysis of lip balm was recorded by organoleptic evaluation.

✓ *Colour:*

The colour analysis of lip balm was analyzed. The pale yellow colour of the sample being tested.

✓ *Odour:*

The pleasant odour is attributed to the presence of rose oil.

Table 2 Observation of Evolution Test

Parameters	Observation
Colour	Faint Yellow
Odour	Pleasant
Appearance	Excellent, Smooth
Texture	Smooth and Soft

Fig 8 Lip Balm

✓ *Melting point:*

Capillary containing herbal lip balm was dipped in liquid paraffin inside the melting point apparatus. Melting was determined visually and melting point was reported. The melting point was 69^0C.

Table 3 Observation of Melting Point

Test Sample	Melting point
Test 1	67^0C
Test 2	72^0C
Test 3	69^0C
Mean	69^0C

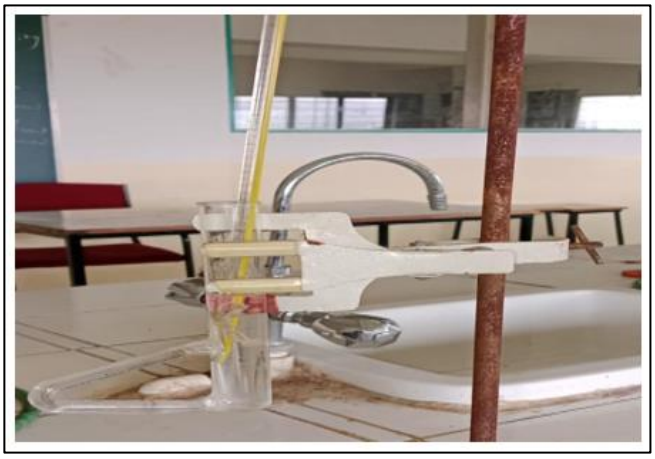

Fig 9 Melting Point

✓ *pH:*

One gram of the preparation is dispersed in 100 ml of distilled water. The pH of the preparation was determined using a pH meter pre-calibrated with standard buffer solutions (pH4, 7 and10). The measurement was performed three times. It was decided to keep the formulation's pH as neutral because an acidic or alkaline pH may irritate lips.

Table 4 Observation of pH

Sample Test	pH
Test 1	6.9
Test 2	7.2
Test 3	6.7
Mean	6.9

Fig 10 pH Meter

✓ *Spreadabillty:*

This involves applying (at room temperature) to a glass slide several times to see if the protective layer forms uniformly and to see if the product breaks, fragments, or deforms while being applied. The spread ability criteria that

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are employed Perfectly applied, leaves no pieces behind, and keeps the lip balm in its original shape. Intermediate. Consistent, leaves few pieces; proper application causes minimal lip balm deformation-bad.

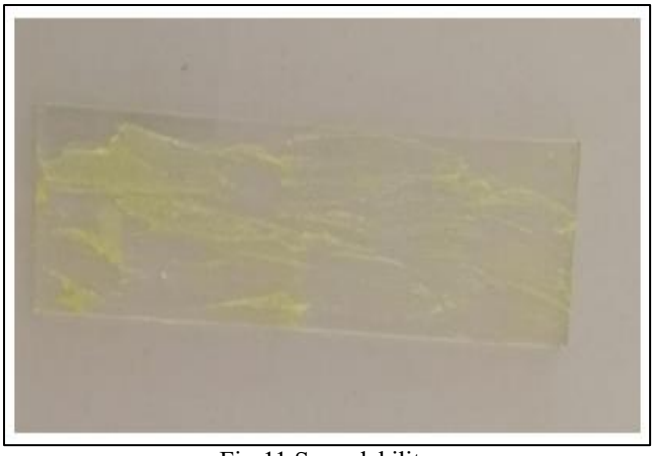

Fig 11 Spreadability

✓ *Stability Test:*

Stability tests were conducted for one month, the lip balm was stored at both room temperature and refrigerator.

✓ *Skin Irritation:*

It is carried out by applying small amount of formulated product on the dorsal surface of lef hand skin for 10 minutes. Then any kind of inflammation, rash, erythema, edema on skin examine.

Fig 12 Skin Irritation

III. RESULT

The herbal lip balm was successfully prepared using aloe vera, beeswax, cocoa butter, vitamin E, rose oil, and turmeric. The formulated lip balm showed a smooth texture, pleasant odor, and faint yellow color. It had good Spreadability, a melting point of 69°C, and remained stable during the one-month stability study. No skin irritation, redness, or allergic reaction was observed during the skin irritation test. Overall, the formulation showed satisfactory physical and stability characteristics.

- pH Test: The pH of the lip balm was close to neutral pH i.e 6.9
- Spreadability Test: The product should not drag but should have a smooth "slip" that makes it pleasant to apply
- Melting point: melting point of lip balm was found to be in the range of 60,which match with the appropriate melting point of between 65 and 75.

IV. CONCLUSION

The study concluded that herbal lip balm prepared from natural ingredients is safe, stable and effective for lip care. It also helps to moisturize, soften and protect dry or chapped lips. Also included are herbal elements like aloe vera and turmeric for their soothing and healing benefits. Therefore, the prepared herbal lip balm can be considered as a good natural alternative to synthetic lip care products. The formulation was kept at room temperature or in the refrigerator and demonstrated the same stability behaviour. The spread ability was assessed as good and organoleptic characteristics were stable. Storage under these condition was considered to be adequate since the functionality of the product was maintained. With a sufficiently high melting temperature (average 63^0C) The lip balm made from natural ingredients passed the stability test. Researchers found that these ingredients are safe to use in lip balm and offer a better option for its formulation. Excipients can be changed or mixed in unique ways to create a new formulation with higher quality. Current research suggests that the formulation will remain stable.

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