



# FORMULATION AND EVALUATION OF PAPAYA LIP BALM

## AUTHORS

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## ABSTRACT

Cosmetics are the substances used to alter the appearance of the human body. Current cosmetic lip products are based on use of toxic chemical ingredients with various adverse effects. Now a days the demands for herbal cosmetics in the world market are increasing<sup>[1]</sup> leading to usage of natural ingredients for the production of lip balm<sup>[2]</sup>. In the present work, Lip Balm using Carica papaya as the main ingredient is prepared. The pH of the Lip balm was found to be 7.5 and the melting point was 60°C - 61°C. After performing stability studies at room temperature (27.0°C ± 3.0°C), refrigerated condition (5.0°C ± 2.0°C) and oven temperature (42.0°C ± 2.0°C), it proved that prepared Lip balm was uniform in nature, without any deformation at room temperature and refrigeration. The prepared lip balm was evaluated for the parameters such as colour, appearance, odour, pH, patch test, spreadability, aging, stability and melting point.

**Keywords:** Papaya extract, Coconut oil, Almond oil, Beeswax, Vitamin E, Rose oil

## 1. INTRODUCTION

Cosmetics play a significant role in today's life style. Currently, the trend is going green in almost all industries including cosmetics to adopt more natural way of life<sup>[3]</sup>. The most preferable source of ingredients are natural food, herbal medicines and natural curing practices for healthy life and also there is much demand for the organic vegetable products. Lip care products are one of the products widely used. Lip inflammation occurs when the corners of mouth becomes broken, chapped, and painful, hence it is essential to moisturize the lips to avoid the pain and inflammation<sup>[4]</sup>. Chapped, dry and cracked lips are very common beauty problem, particularly in harsh weathers. Mostly, people face dry and cracked lips in winter but this problem also

continues in summer too. Problematic ingredients such as menthol, camphor, and peppermint oil, which can make dry lips worse over the long term<sup>[5]</sup>. Cosmetics made up of herbal extracts for skin care are very popular for their reliability<sup>[6]</sup>. Papaya has anti-inflammatory enzymes that promotes healing and also enriched in Vitamin C, which is powerful antioxidant.

## 1.1 TYPES OF LIPBALM

### A. Tinted Lip Balm

Tinted lip balm is used to moisturize and color the lips. Tinted lip balm is a great alternative for users who don't want to apply the deep coat of lipstick. The tinted lip balm is used by users not just for moisturizing but also provides lips the luminous wash color<sup>[8]</sup>.

### B. Plumping Lip Balm

The plumping lip balm is a kind of lip balm that doesn't just moisturize the lips, but also makes the lips look more round. Plumping lip balms is made to give protection to the lips, but at the same time it has special ingredients to make the lips look fuller<sup>[9]</sup>.

### C. Medicated Lip Balm

The medicated lip balm is a kind of lip balm that is used or is prescribed by doctors for chapped lips. Medicated lip balms are most likely to be the least soothing and irritating lip balms amongst the others. This lip balm is usually prescribed by dermatologists in medication for chapped lips and other conditions regarding the lips<sup>[10]</sup>.

### D. Flavoured Lip Balm

The flavoured lip balm is a kind of lip balm which has flavourings. Flavoured lip balms are lip balms that are added with flavour such as vanilla, mint, mango and many more fruity flavours. This lip balm is made for moisturizing and is also added with special flavours in order to entice the taste buds and smell of the users<sup>[11]</sup>.

### E. Organic Lip Balm

The organic lip balm is a kind of lip balm which have organic or natural ingredients. While there are other lip balms which has chemical ingredients that may harm the lips and skin, the organic lip balm is usually made from organic ingredients such as avocado oils, jojoba oils, beeswax, vitamin E, hemp, and cocoa butter. The organic lip balm still functions like any other lip balms, which provides moisture and protection from dry and chapped lips. Rising global demand for natural products whose production is harmless to the environment has stimulated the development of natural cosmetics and, within this category, organics (95% organic raw materials). The image of environmentally friendly production is one of the strongest attractions of organic products. Lip balm is a cosmetic product similar to lipstick whose purpose is to prevent lip dryness and protect against adverse environmental factors<sup>[12]</sup>.

## F. SPF Lip Balm

The SPF lip balm is a kind of lip balm which contains ingredients that protect the lips from the harmful effects of the Sun's rays. The SPF lip balm functions like a sunscreen to protect the lips from sun damage, burning, and even skin cancer. Lip balm protects the lips from environmental factors such as UV radiation, temperature fluctuations, and dehydration<sup>[13]</sup>.

## 1.2 ADVANTAGES AND DISADVANTAGES OF NATURAL LIP BALM

### 1.2.1. ADVANTAGES

- Natural Lip balms helps to care the natural health and beauty of the lips and can be used by both men and women and help to protect lips affected by cold sores, chapping and dryness.

### 1.2.2 DISADVANTAGES

- Lip balms made of low quality ingredients can harm the lips seriously.
- Compared to commercially-prepared Lip balms, homemade Lip balm tend to stay on the Lips for a shorter duration of time.
- Natural oils used in the Lip balms have other disadvantages such as greasier and less spreadability<sup>[13]</sup>.

## 1.3. ANATOMY OF LIPS

Lip anatomy includes a variety of structures that contribute to its function and appearance. Here's a quick rundown of the anatomy of the lips:

- **Skin:** The outer layer of the lips, like the rest of the body, is made up of skin. The skin of the lips, on the other hand, is thinner and more sensitive.
- **Vermilion border:** This is the noticeable margin that separates the red-colored vermilion region of the lips from the surrounding skin.
- **Vermilion zone:** The vermilion zone is the reddened area of the lips. It has a higher concentration of blood vessels, which gives it a reddish color.
- **Philtrum:** The philtrum is a vertical groove or indentation in the center of the top lip that extends from the base.

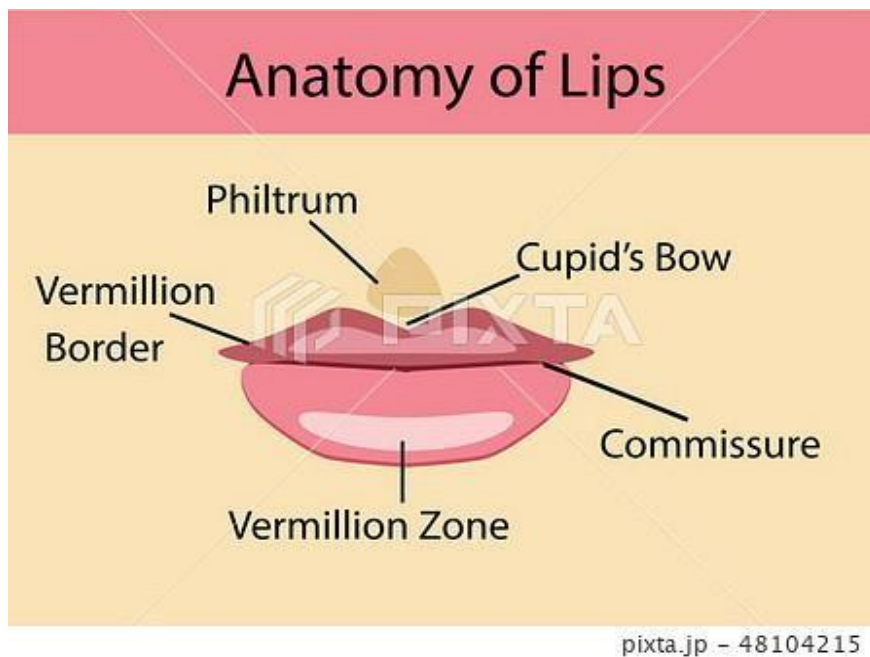


Figure no 1: Anatomy of lips

- **Cupid's bow:** The centre portion of the top lip's double curve or V-shaped area is known as the cupid's bow.
- **Oral mucosa:** The oral mucosa is a thin, moist layer of tissue that covers the inner surface of the lips. It helps to keep the lips moist and is distinct from the outer skin. Lips include tiny glands called labia that generate saliva to keep the lips moisturized and make speaking and eating easier.

The orbicularis oris muscle, which surrounds the mouth and aids in smiling and puckering, is one of the several muscles that make up the lips and are responsible for their movement and expression

- **Nerve endings:** The lips have a high density of nerve endings, making them highly sensitive to touch, temperature, and pain<sup>[14]</sup>.
- **Blood vessels:** The lips have a rich blood supply, which gives them their characteristic red color and plays a role in maintaining their health and vitality. Understanding the anatomy of the lips is crucial for various medical and cosmetic procedures, including lip augmentation, reconstruction, and treating lip-related conditions<sup>[15]</sup>.

#### 1.4. PROBLEMS RELATED TO LIPS

The lips may be impacted by a number of conditions or issues. The following are some typical lip-related issues:

**A. Cheilitis:** refers to inflammatory, allergic, irritant, or neoplastic alterations of the lips. With inflammatory, allergic, or irritant processes, patients complain of eroded or dry, cracked lips that may or may not be swollen and are possibly painful or itchy<sup>[15]</sup>.

**B. Dry lips:** When the lips lose moisture and become dried, dry lips develop. Environmental variables like low temperatures, dry air, or very frequent lip-licking can all contribute to this.

Lips that are dry can feel tight, split, and even peel.

**C. Lips:** A more extreme form of dryness, chapped lips can be painful, uncomfortable, and even bleed. Long-term dryness, sun exposure, wind exposure, or severe weather can all lead to chapped lips.

**D. Fever Blisters:** Also known as cold sores, fever blisters are tiny, uncomfortable, fluid-filled blisters that develop on or around the lips. The herpes simplex virus is the culprit behind them, and are highly contagious. Cold sores can be recurrent and tend to flare up during periods of stress or illness.

**E. Angular cheilitis:** An inflammation and cracking of the mouth's corners are symptoms of the illness known as angular cheilitis. It may result from conditions including bacterial or yeast infections, poor nutrition, or protracted moisture exposure<sup>[16]</sup>.

**F. Lip infections:** Bacteria, viruses, or fungus can cause an infection on the lips. Swelling, redness, discomfort, and the development of pus-filled blisters or sores are all signs of infection.

**G. Allergic responses:** Some people may experience allergic responses to certain components in food, cosmetics, or lip care products. Swelling, itching, redness, and even lip blistering are all symptoms of allergic responses.

**H. Lip discoloration:** Numerous factors, such as sun exposure, smoking, some medicines, or underlying medical disorders, can cause changes in lip color. Lips might seem darker in this condition<sup>[17]</sup>.

### 1.5.DIFFERENCE BETWEEN CONVENTIONAL LIP BALM AND HERBAL LIP BALM

Conventional lip balm	Herbal lip balm
Conventional lip balm contains petroleum, synthetic wax, alumina, paraben, hydrogenated oils and artificial fragrances which possess harmful effects sometimes.	They are made with natural and organic ingredients, free from synthetic chemicals and additives.
Lip balm are often eaten by the users, so the health regulators have toxic effect due to ingredient that goes with lip balm.	They prioritize using plant-based oils, butters, and waxes to moisturize and nourish the lips.

**Table 1: Difference between Conventional and Herbal lip balm**

### 1.6 INGREDIENTS:

- BEESWAX



**Figure no 2 : Beeswax**

- PAPAYA EXTRACT



**Figure no 3: Papaya Extract**

- COCONUT OIL



**Figure no 4: Coconut oil**

- VITAMIN E



**Figure no 5: Vitamin E**

- ALMOND OIL



**Figure no 6: Almond oil**

- ROSE OIL



**Figure no 7: Rose oil**

### 1.7 PHARMACOGNOSY OF PAPAYA

**Biological name :** *Carica papaya*

**Common name :** Tree melon, papayero, papaw.

#### **Biological Source**

Papain is the dried and purified latex of the green fruits and leaves of *Carica papaya* L., belonging to family Caricaceae.



The plant is cultivated in Sri Lanka, Tanzania, Hawaii, and Florida. The plant is 5–6 m in height bearing fruits of about 30 cm length and a weight up to 5 kg. The epicarp adheres to the orange-coloured, fleshy sarcocarp, which surrounds the central cavity. This cavity contains a mass of nearly black seeds.

### Uses:

- ✓ Papaya has a potent skin lightening action owing to its exfoliating action and direct skin lightening effect of enzyme papain.
- ✓ Papain enzyme magically restores the even-toned look of your skin by accelerating the shedding of dead skin cells. No wonders many scrubs available in the market has papaya as one of the ingredients
- ✓ The pulp of ripe papaya fruit providing hydration and nutrition to the skin owing to its water, carbohydrate, and fat content. Instead of peel, use the pulp of ripe papaya. Mash it and just leave on your skin for 5-10 minutes.

### 1.8 DRUG PROFILE

Sr. No:	INGREDIENTS	USES
1.	BEESWAX	USED AS A BASE PROVIDES TEXTURE CREATE PROTECTIVE BARRIER
2.	PAPAYA EXTRACT	MOISTURIZE AND TREAT CHAPPED LIPS
3.	VITAMIN E	PRESERVATIVE
4.	ALMOND OIL	GIVES SOFTNESS
5.	COCONUT OIL	MOISTURIZE AND NOURISHES THE LIPS
6.	ROSE OIL	PERFUME COLORING AGENT

**Table 2: Drug Profile**

### 1.9 Benefits of using a Papaya Lip balm:

Papaya with antioxidants and vitamin A helps for slough off dead cells from the skin surface, skin whitening, reducing unwanted hair, exfoliating dead skin, repairing ageing skin etc. Fruit is rich in enzyme papain, vitamins mainly vitamin A, minerals, flavanoids and fibers<sup>[18]</sup>.

- **Helps soothe inflammation.** Papaya has well-documented anti-inflammatory and antioxidant properties. So a lip balm with papaya may help speed healing and quell inflammation caused by allergic reactions, sores, cheilitis, or minor burns or abrasions. Calendula is also a much more soothing choice than menthol for making “medicated” lip balm at home.
- **Helps with itchy lips.** While the evidence is mostly anecdotal, a study showed that calendula helps prevent dermatitis. So a homemade calendula lip balm is a possible natural remedy for soothing itchy lips.
- **Helps heal the skin barrier.** Your skin knows how to heal, and calendula helps support and hasten its natural reparative process. The effect is amplified in a lip balm, especially when paired with soothing essential oils, or healing ingredients such as beeswax and Vitamin E.
- **Helps lock in moisture.** Obviously, any good lip balm will stop moisture from escaping your lips. This soothing calendula lip balm ideal for use during the winter, on cold, windy days, or at bedtime as an overnight lip treatment.
- **May help heal infections.** Papaya has documented antibacterial and antiviral properties, and it appears to help soothe cold sores and fever blisters. However, there is more conclusive evidence behind lemon balm and St. John’s wort, so if cold sores ail you, you can also try a healing lip balm that contains one of these herbs (or antiviral lysine). Currently, there’s an ongoing study on a papaya and St. John’s wort treatment to help treat cold sores.

### 1.10 Application of Natural Lip Balm:

- Natural Lip balms are products applied onto the lips to avoid dryness and protect against adverse environmental factors.
- Numerous lip balms of chemical origin are currently available in the market from companies like The body shop, Nivea, Himalaya, Blistex, Babylip etc.
- Natural Lip balm being a product intended for use by both men and women.
- To produce lip balms, it is necessary to balance the concentration of the main ingredients including butters, oils and waxes and other excipients .
- Lip balms are often eaten away by the user and hence it is imperative that health regulators have a microscopic look at the ingredients that go in to the lip balm.

## 1.11. FORMULATION

INGREDIENTS	F1	F2
Beeswax	2 gm	10 gm
Papaya extract	2 ml	10 ml
Vitamin E	0.1 gm (1capsule)	1 gm
Almond oil	3 ml	15 ml
Coconut oil	2 ml	10 ml
Rose oil	2-3 drops	20-24 drops

**Table 3: Formulation**

## 1.12 Procedure

The herbal lip balm was formulated as per general method of formulation, in which the bees wax was melted in porcelain dish on water bath. Coconut oil, almond oil and rose oil were heated in other porcelain dish and both the phases were mixed at the same temperature. Fresh papaya extract with vitamin E were heated in another porcelain dish (just before mixing). All the contents were mixed at 150°C with continuous stirring. The mixture was transferred from water bath to ice-bath and was allowed to solidify and then taken out of the ice bath for further homogenization in mortar-pestle to get the desired texture. The homogenized herbal lip balm was kept in mold and kept under refrigeration condition, kept aside to cool. Once cooled, a smooth lip balm is obtained.

### Storage and precautions:

Store in cool and dry place.

Away from direct heat.

## 1.13 EVALUATION PARAMETERS

It is very essential to maintain a uniform standard for herbal lip balm, keeping this view in mind the formulated herbal lip balm was evaluated on the parameters such as melting point, physical appearance, etc. Respective formulation have given their result given below:

**1.13.1 Physical appearance:** Colour, odour and taste of lipbalm was determined.

**1.13.2 Melting point:** To determine the melting point, the material was made molten to fill capillaries. The capillaries were coupled to a system with a thermometer and emerged in vial with water at a controlled temperature. The temperature at which the melting point of the lip balm sample was observed was considered the melting point.

**1.13.3 Spreadability:** This is tested by applying the product (at room temperature) repeatedly on glass slide to usually observe the uniformity in the formation of the protective layer and determine if the product is fragmented, deformed or broken during application.

**1.13.4 Stability:** Prepared lip balm was placed for accelerated stability studies at room temperature to 30°C), and oven temperature (40°C to 20°C). As this type of cosmetic form undergoes softening and deformation at temperature over 50°C, then the oven condition was chosen as the highest temperature of the stability study. As this formulation gives the satisfied results so, it was submitted to be Normal Stability Study.

**1.13.5 Skin irritation test:** It is carried out by applying product on the skin for 10 minutes.

**1.13.6 pH Parameter:** The pH of the formulated herbal lipbalm was determined by using pH meter. The pH meter was calibrated by using buffer solution. It was determined to keep the pH of the lipbalm as close as neutral as possible and also to investigate the possibility of any side effect.

## 1.14 RESULT

EVALUATION PARAMETERS	OBSERVED VALUE
Color	Pink
Odour	Pleasant
Melting Point	60°C
Spreadability test	Good
Stability test	Good
Skin irritancy test	No irritation
pH	7.5

**Table No 4: Result**

## 1.15 CONCLUSION

The aim of the current research work is to prepare lip balm by using herbal and natural ingredients. Lip balm formulation was prepared and evaluated for organoleptic properties and other evaluation parameters like pH, spreadability and melting point. Stability testing was done and results of various tests implied that formulations are safe to use. Based on stability data, the storage condition for formulation is at 25°C - 35°C and pH was measured to be neutral (7-7.5).

Based on melting point studies, the melting point was measured to be 60°.

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