

# Formulation and Evaluation of Lip Balm Prepared Using Beet Root Extract

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## ABSTRACT

Cosmeceuticals are the products of cosmetics that are biologically active ingredients that impersonate medical or drug like benefits. The design, quality, formulation of lip balm made from natural ingredients were studied. In this study, lip balm has been made by using various ingredients like beetroot, almond oil, aloe vera, vitamin E and rose essence. A homogeneous mixing method was used to produce lip balm. The formulation of lip balm was tested by applying it on a glass slide.

Various parameters such as chemical stability, pH melting point, and spread ability were carried out for the evaluation of lip balm. The pH was found to be 6.0 and the melting point was 63-65 °C. After performing stability studies at room temperature (25.0±3.0°C), refrigerated condition (4.0± 2.0°C) and oven temperature (40.0± 2.0°C), it proved that prepared lip balm was uniform in nature, was perfectly applied, without any deformation at room temperature and refrigeration. Lip balm prepared from above ingredients could be a better option for treatment of various lip issues

## Chapter 1

### INTRODUCTION

Due to the presence of hazardous synthetic excipients in cosmetics, there has been a great public concern regarding the use of organic sources. Lips do not have any oil glands; thus, it is important to provide extra moisture and protection throughout the day.

Conventional lip balm often contains petrolatum, synthetic waxes, alumina, paraben, hydrogenated oils and artificial fragrances and colors which are toxic. Often the lip balm is eaten by the user, thus it becomes a major issue for health regulators. Cosmeceuticals are the ingredients that have medicinal properties that benefit topical action and provide protection against degenerative skin conditions. The present work was carried out by using these ingredients that have less side effects. Products used to protect lips rather than to decorate them are well known as lip balms.

They form an adherent, moisture resistant film of oily substances. Usually without any dye. Beeswax is a natural compound secreted by female bees that is often used in cosmetics, particularly lip balm. This substance is very moisturizing, can help protect the lips from the harmful rays of the sun, and has a pleasant smell. Beeswax acts as a natural emulsifier. Vitamin E is an antioxidant and a natural conditioner.

Vitamin E helps to maintain the soft, youthful texture of the lips by reducing the signs of aging. Coconut oil penetrates deep into the skin tissue and its fatty acids help to moisturize the lips. The anti-

inflammatory properties of coconut oil reduce redness and pain associated with chapped and sunburnt lips. Honey has antibacterial, antifungal and antioxidant properties which is why honey is used for healing wounds. Beetroot is rich in antioxidants that make the lips soft, supple and improve the elasticity of the skin

## Chapter 2. Ingredients and uses

- Coconut oil
- Beeswax
- Vitamin E
- Honey
- Beetroot extract
- Rose water

### 1. Coconut oil:-



**Figure Number 1:- Coconut oil**

Coconut oil, derived from the meat of mature coconuts, has emerged as a versatile and highly valued natural product with a wide array of applications. Renowned for its distinct aroma, creamy texture, and myriad health benefits, coconut oil has been utilized for centuries across various cultures for culinary, medicinal, and cosmetic purposes.

With its unique composition rich in medium-chain fatty acids and antioxidants, coconut oil has garnered attention not only in traditional medicine but also in modern scientific research. From nourishing skin and hair to supporting heart health and metabolism, the multifaceted properties of coconut oil continue to captivate consumers and researchers alike, making it a staple in households and industries worldwide.

### Beeswax: -



**Figure Number 2 :- Bees wax**

Beeswax, a natural secretion produced by honeybees, stands as a testament to the intricate harmony between nature and the industriousness of these remarkable insects. Revered for millennia for its versatile properties, beeswax serves as a cornerstone in various human endeavors, spanning from ancient civilizations to modern industries.

As bees construct their intricate hives, they produce this waxy substance to build honeycomb cells and safeguard their precious honey reserves. Beyond its role in bee colonies, beeswax finds itself woven into the fabric of human civilization, revered for its myriad applications in cosmetics, pharmaceuticals, art, and craftsmanship. With its unique blend of compounds, including esters, fatty acids, and hydrocarbons, beeswax offers not only structural integrity but also therapeutic and aesthetic benefits. As we delve into the fascinating world of beeswax, we uncover a natural treasure imbued with history, ingenuity, and boundless possibilities.

**2. Vitamin E: -**



**Figure Number 3:- Vitamin E**

Vitamin E, often heralded as the "skin vitamin," stands as a vital nutrient essential for maintaining optimal health and well-being. As one of the body's primary antioxidants, vitamin E plays a crucial role in neutralizing harmful free radicals, protecting cells from oxidative damage, and bolstering the immune system.

Beyond its antioxidant properties, vitamin E encompasses a diverse array of functions, influencing everything from cardiovascular health to neurological function and skin integrity. Found abundantly in various foods such as nuts, seeds, and leafy greens, as well as available in supplement form, vitamin E continues to captivate researchers and health enthusiasts alike with its potential therapeutic benefits. In this exploration of vitamin E, we uncover its multifaceted roles in promoting vitality, longevity, and resilience throughout the human body.

**3. Honey:-**



#### **Figure Number 4:- Honey**

Honey, often dubbed "liquid gold," has been cherished across civilizations for its delightful taste, rich cultural significance, and diverse medicinal properties. Formed through the laborious efforts of bees gathering nectar from flowers, honey serves as a timeless symbol of vitality and healing. Its remarkable ability to resist spoilage, coupled with its antibacterial, anti-inflammatory, and antioxidant properties, has made it a staple in both culinary traditions and traditional medicine practices worldwide.

From ancient rituals to modern kitchens, honey continues to captivate with its golden hue, evocative aroma, and myriad health benefits, offering a sweet and wholesome connection to nature's bounty.

#### **4. Beetroot extract: -**



**Figure Number 5 :- Beetroot extract**

Beetroot extract, derived from the vibrant root vegetable known for its deep crimson hue, represents a potent and versatile natural compound with a myriad of health benefits. Rich in essential nutrients, antioxidants, and bioactive compounds, beetroot extract has garnered increasing attention in both traditional and modern medicine for its potential therapeutic properties.

From supporting cardiovascular health and enhancing exercise performance to promoting liver detoxification and combating inflammation, the multifaceted benefits of beetroot extract continue to be explored by researchers and health enthusiasts alike. With its vibrant color and nutrient-rich composition, beetroot extract offers a promising avenue for harnessing the power of nature to optimize health and well-being.

#### **5. Rose Water:-**



**Figure Number 6:- Rose water**

Rose water, a fragrant distillation of rose petals, stands as a time-honored elixir cherished for its delicate

scent, versatile applications, and potential therapeutic benefits. Dating back centuries, rose water has been revered across cultures for its aromatic allure and its role in beauty rituals, culinary creations, and holistic remedies.

Produced through the steam distillation of rose petals, this aromatic water captures the essence of the rose plant, imbuing it with a subtle yet captivating fragrance and a host of bioactive compounds. From soothing skin irritations and enhancing mood to flavoring culinary delights and symbolizing love and beauty, rose water holds a special place in the hearts and homes of individuals worldwide.

As we explore the enchanting world of rose water, we uncover its timeless charm and its potential to elevate both body and soul.

### Chapter 3. Advantage & Disadvantage of Beetroot Lip Balm

#### Advantages of Beetroot Lip Balm

1. **Natural Color:** Beetroot lip balm offers a natural tint derived from the vibrant pigments present in beetroot extract, providing a subtle and flattering hue to the lips without the need for synthetic dyes
2. **Moisturizing Properties:** Beetroot contains natural sugars and antioxidants that help to hydrate and nourish the lips, making beetroot lip balm an effective moisturizing treatment for dry or chapped lips.
3. **Antioxidant Benefits:** Beetroot is rich in antioxidants such as vitamin C and betaines, which help to protect the lips from oxidative damage caused by free radicals, promoting healthier and more youthful-looking lips.
4. **Potential Health Benefits:** Some studies suggest that beetroot extract may have anti-inflammatory and wound-healing properties, which could benefit the delicate skin of the lips, especially in cases of minor irritations or inflammation.
5. **Environmentally Friendly:** Beetroot lip balm is often made with natural, biodegradable ingredients, making it a more environmentally friendly option compared to synthetic lip balms that may contain petroleum-based or non-biodegradable components. This aligns with the growing consumer preference for eco-friendly beauty products.
6. **Customization Potential:** Homemade beetroot lip balm recipes often allow for customization, enabling users to adjust the ingredients and proportions according to their preferences. This flexibility allows individuals to tailor the lip balm to suit their specific needs, such as adjusting the intensity of the color or scent.
7. **Nutrient-Rich Formulation:** Beetroot is packed with vitamins, minerals, and antioxidants that offer potential benefits beyond moisturizing the lips. Ingredients commonly found in beetroot lip balm recipes, such as coconut oil and shea butter, further enhance its nutrient profile, providing additional skin-nourishing properties.
8. **Natural Fragrance:** Beetroot lip balm offers a subtle, natural fragrance derived from the botanical ingredients used in its formulation. This can be appealing to individuals who prefer skincare products with minimal or no added fragrances, especially those sensitive to synthetic fragrances or artificial additives.

#### Disadvantage of beet root extract

1. **Staining Potential:** The natural pigments present in beetroot extract may stain the lips, especially if the lip balm is applied in large amounts or left on for an extended period. This could result in temporary discoloration of the lips, which may be undesirable for some users.



2. **Sensitivity Concerns:** Some individuals may be allergic or sensitive to components present in beetroot extract, such as certain proteins or compounds. This could lead to allergic reactions or skin irritation upon application of beetroot lip balm.
3. **Limited Shelf Life:** Beetroot lip balm may have a shorter shelf life compared to synthetic lip balms, as natural ingredients are more prone to degradation over time. Without the use of preservatives or stabilizers, beetroot lip balm may spoil more quickly and require refrigeration or shorter expiration dates.
4. **Variable Color and Scent:** The color and scent of beetroot lip balm may vary depending on factors such as the concentration of beetroot extract used, the extraction method, and individual variations in beetroot pigments. This could result in inconsistencies in color and scent between batches of lip balm, which may not be ideal for some users looking for uniformity.

## PRODUCT PHOTOS



**Figure Number 7:- Product photos**

## Chapter 4. Formulation

| Sr no. | Ingredients      | uses                         | Quantity |
|--------|------------------|------------------------------|----------|
| 1      | Coconut oil      | Moisturize                   | 30 ml    |
| 2      | Beeswax          | Natural emulsifier           | 5.5 gm   |
| 3      | Vitamin E        | Antioxidant                  | 0.30 gm  |
| 4      | Honey            | Emollient                    | 2 gm     |
| 5      | Beetroot extract | Pigment                      | 50 gm    |
| 6      | Rose water       | As cooling agent & fragrance | 3 ml     |

**Table No .1 Fromulation**

### 1. Melting point: -

The melting point of lip balm was found to be in the range of 680C- 690C, which matches the appropriate melting point of between 650 -750C.

### 2. Organoleptic Properties: -

Prepared lip balm has shown red color with pleasant Oduor.

### 3. Test of Spread ability: -

uniform, no fragmentation, perfect application, without any deformation at room temperature [Spredability-8 cm.].

### 4. Measurement of pH: -

The pH of lip balm was near to neutral pH i.e. 7.2, this would not cause any irritation to the lips.

### 5. Stability Studies: -

Stability of drug can be defined as the time from date of manufacture and the packaging of the formulation, until its chemical or biological activity is not less than a pre-determined level of labelled potency and its physical characteristics have not changed appreciably. The purpose of stability testing is to provide evidence on how the quality of a drug substance or drug product varies with time under the influence of variety of environmental factors such as temperature, humidity and light, enabling recommended storage condition and shelf lives. Stability studies were carried out for 1 month /30 days at room temperature (25.0+- 3.00C), refrigeration (4+-2.00C) and oven temperature (40.0 +-2.00C).

### 6. Greasiness: -

A greasiness test was examined to identify the amount of oil in the formulated lip balm. In this study, 4 g of lip balm was placed on the filter paper, and the sample was left at room temperature for 24 hours. [2 drops].

## Chapter 4.1 Making Process

### Ingredients:

1. **Coconut oil:** - 30 ml
2. **Beeswax:** - 5.5 gm
3. **Vitamin E:** - 0.30 gm
4. **Honey:** - 2 gm
5. **Beetroot extract:** - 50 gm
6. **Rose water:** - 3 ml



**Process of making**

**STEP 1:** Begin by melting the beeswax and almond oil together in a heat-safe container or double boiler over low heat. Stir occasionally until fully melted and well combined.

**STEP 2:** Once the beeswax and oil are melted, remove the mixture from heat and allow it to cool slightly.

**STEP 3:** While the mixture is still warm but not hot, add the rosewater, beetroot extract, honey, and the contents of the vitamin E capsule (if using). Stir well to ensure all ingredients incorporate

**STEP 4:** Quickly pour the mixture into clean lip balm containers or tubes before it solidifies. Be sure to work efficiently as the mixture may start to solidify as it cools.

**STEP 5:** Allow the lip balm to cool and solidify completely before using. This may take a few hour depending on the temperature of your environment.

**STEP 6:** Once cooled, cap the lip balm containers or tubes and store them in a cool, dry place away from direct sunlight.

**Chapter 4.2. Here’s how to apply lip balm for the best protection: -**

**Step One: Uncap the container.**

If the balm is in a tube, you only need to raise it about a half centimeter. If it’s in a container, apply a pea-sized amount to your finger.

**StepTwo:** Apply to the bottom lip. Rub the balm on your bottom lip, just along the outside.

**Step Three:** Apply to the top lip. Rub the balm on your top lip, just along the outside.

**Step Four:** Rub your lips together. Rub your top and bottom lip together. This helps spread the balm evenly over your entire mouth.

**How to use**



**Figure Number 8:- How to use lip balm**

**Chapter 4.3 How Often Should You Apply Lip Balm?**

According to dermatologists, you should only put on lip balm a few times throughout the day.

Most experts recommend that you apply it in the following situations:

1. When you wake up in the morning.

2. After eating or drinking.
3. When you go to bed at night.

### Chapter 5. Evaluation

| Sr No. | Evaluation parameter    | Observed value |
|--------|-------------------------|----------------|
| 1      | Melting point           | 63°C -65°C     |
| 2      | Organoleptic properties | -              |
| 2.1    | Colour                  | Red            |
| 2.2    | Odour                   | Pleasant       |
| 2.3    | Appearance              | Smooth         |
| 3      | Test of spread ability  | -              |
| 4      | pH measurement          | 6.0            |
| 5      | Skin irritation         | No             |
| 6      | Breaking point          | 29gm           |

**Table no. 2 Evaluation of lip balm**

#### Chapter 5.1. Test of spread ability-

It was observed that the lip balm at room temperature (25.0±3.0°C) and refrigerator (4.0± 2.0°C) showed; Good: uniform, no fragmentation; perfect application, without deformation of the lip balm, but Intermediate: uniform; leaves few fragments; appropriate application; little deformation of the lip balm at oven temperature (40.0± 2.0°C).

#### Chapter 5.2. Stability studies-

| parameter      | Temperature Conditions |            |              |
|----------------|------------------------|------------|--------------|
|                | 25.0±3.0°C             | 4.0± 2.0°C | 40.0± 2.0°C  |
| Colour         | Red                    | Red        | Red          |
| Oduor          | Pleasant               | Pleasant   | Pleasant     |
| Melting Point  | 63°C                   | 65°C       | 64°C         |
| Spread ability | Good                   | Good       | Intermediate |
| pH             | 6.0                    | 6.0        | 6.2          |

**Table 3: Stability studies of lip balm at different temperature**

#### Evaluation Parameters:

**Color:** Assess the vibrancy and consistency of the color imparted by the beetroot powder. Ensure it provides a pleasing tint to the lips without being too intense or uneven.

**Texture:** Evaluate the smoothness and spread ability of the lip balm. It should glide easily onto the lips without feeling too greasy or waxy.

**Moisturization:** Determine the effectiveness of the lip balm in hydrating and nourishing the lips. It should leave the lips feeling soft, smooth, and hydrated without any greasy residue.

**Fragrance:** If essential oils are added for fragrance, assess the aroma and its compatibility with the overall product. The fragrance should be pleasant and not overpowering.

**Longevity:** Evaluate how long the lip balm stays on the lips and its ability to provide lasting hydration and color throughout the day.

**Packaging:** Consider the practicality and aesthetic appeal of the lip balm containers or tubes. Ensure they are easy to use, hygienic, and visually appealing.

**Sensory Experience:** Take into account the overall sensory experience of using the lip balm, including its scent, texture, and color. The lip balm should provide a pleasant and enjoyable experience for the user.

### Summary

Beetroot lip balm presents a natural and wholesome solution for lip care, harnessing the inherent benefits of beetroot extract. This lip balm stands out for its dual function of imparting a subtle tint to the lips while delivering essential moisture and nourishment. The formulation relies on basic yet effective ingredients like beeswax and coconut oil, supplemented optionally by shea butter or essential oils for added benefits and fragrance. By utilizing beetroot powder for color, this lip balm eliminates the need for synthetic dyes, appealing to those seeking a more natural approach to lip care.

The process of making beetroot lip balm is straightforward, involving melting and combining the ingredients before incorporating the beetroot powder for color infusion. Once poured into lip balm containers, the mixture solidifies to create a smooth and nourishing lip product. Evaluation parameters encompass various aspects such as color vibrancy, texture, moisturization, fragrance (if added), longevity, packaging, and overall sensory experience. This comprehensive assessment ensures that the lip balm not only imparts a pleasing tint but also effectively hydrates and protects the lips while offering an enjoyable user experience.

Beetroot lip balm's appeal extends beyond its cosmetic benefits, with its formulation focusing on enhancing lip health and aesthetics in a holistic manner. The inclusion of beetroot extract, rich in antioxidants and nutrients, underscores its potential to promote lip wellness. Additionally, the absence of synthetic additives aligns with the growing preference for eco-friendly and natural beauty products. By prioritizing simplicity and efficacy, beetroot lip balm embodies a thoughtful approach to lip care, catering to individuals seeking a more sustainable and wholesome alternative for their beauty routine.

In summary, beetroot lip balm encapsulates the essence of natural lip care, offering a delicate balance of color, moisture, and nourishment. Its formulation and making process emphasize simplicity, effectiveness, and sustainability, while its evaluation parameters ensure a high-quality end product. With its gentle yet transformative properties, beetroot lip balm embodies the convergence of nature and beauty, providing a refreshing alternative in the realm of lip care.

### Conclusion

Cosmetics chemists meticulously select ingredients with specific chemical properties to enhance the efficacy and user experience of their products. For example, in the formulation of lip balm, a balance between emollients and waxes is crucial to achieve the desired texture. Oils and butters act as emollients, softening and smoothing the skin, while waxes like beeswax provide structure and thickness. Our patented lip balm incorporates a combination of humectants, emollients, and occlusive agents to lock in moisture and nourish the lips. It caters to both men and women, offering additional benefits such as scar healing and sun protection. Our product concept focuses on long-lasting hydration, utilizing botanical ingredients like honey, hyaluronic acid, and SPF for optimal lip care.

In our research, we aimed to develop a lip balm using predominantly natural ingredients. Beetroot extract serves as a natural colorant, while rose water provides fragrance. Vitamin E capsule acts as an

antioxidant, and almond oil serves as a moisturizing agent. Through comprehensive physicochemical studies, we confirmed the successful formulation of the lip balm, ensuring its safety and efficacy. Beeswax was used as a base in the current formulation, but future iterations may explore natural alternatives like shea butter or paraffin wax.

Furthermore, our study explored the potential of natural dyes derived from plant sources for cosmetic applications. Solvent extraction methods, particularly using ethanol, yielded satisfactory results in terms of dye yield and color strength. Lip balms formulated with these natural dyes exhibited stability and good application properties even after prolonged storage. Importantly, they proved non-irritating and safe for use as organic cosmetics. To enhance the quality of extracted dyes, a comprehensive understanding of extraction procedures and plant treatments is essential. Optimization of solvent selection and concentration adjustment are crucial factors in maximizing dye yield and achieving desired colors.

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