

Preparation and Analysis of Natural Lip Balm using Pomegranate

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Abstract: *Everyday lip care products include dangerous heavy metals and preservatives. These heavy metals and other substances have other ways to get into your body except through the pores on your lips, like accidentally ingesting them. Lead has an impact on the heart and brain, chromium and cadmium can cause cancer, and preservatives may contribute to breast cancer. Lip balms are substances that are applied to the lips to stop dryness and offer protection from harmful environmental elements. Organic lip balms moisturize, hydrate, and guard against chapping and dryness - affected lips. They support preserving the lips' innate good looks and health. Lip balms can be used by both men and women and are not gender - specific items. According to the current study, Coconut oil and castor oil are among the organic ingredients that can maintain lips hydrated and healthy. Organoleptic properties, The produced lip balm's spreadability, pH testing, and consistency studies were evaluated. after conducting stability tests for two days at various temperatures, including room temperature (25.0°C), refrigerator (4 °C) and oven (40. ° C). Formulated lip balm exhibits uniform nature, flawless application, and no bending at ambient temperature (25.0 °C) and at refrigeration (4 °C), it was determined. The average pH was 7.2, which is almost neutral. There isn't advised to store items in ovens above 40.0°C due to product functionality degradation that was seen during regular Stability. The utilization of organic lip balm may be a superior solution for treating different lip problems.*

Keywords: Lip balm, Beeswax, coconut oil, pomegranate juice, castor oil, rose oil

1. Introduction

In today's world, cosmetic formulations are an integral component of lifestyle. Cosmetics are becoming more and more varied and popular every day. Cosmetics are produced by a large number of domestic and foreign producers. The cosmetics industry is expanding quickly [1].

Toxic substances used in cosmetic items make market expansion difficult. Consumers are quite picky when it comes to cosmetic items these days. Innovative cosmetics that are both safe to use and environmentally friendly are sought after by manufacturers [2].

Additionally, the present trend is moving towards a more natural way of living in practically all businesses, including the cosmetics industry. The best options include organic foods, herbal remedies, and Natural healing methods to promote a healthy lifestyle, and organic vegetable products are in high demand. In the personal care industry, via means of herbal cosmetics have multiplied. For decades, natural substances have been used folk medical reasons for countless generations. Numerous of them exhibit pharmacological traits like cytostatic, anti - inflammatory, and antibacterial activities. They are acknowledged as being beneficial for human medicine [3].

Based on these facts, in the past several years, interest in biodiversity and natural goods has increased, and a market for consumption known as the "green consumer, " which is developing mainly in European countries, has gained traction [4].

One cosmetic product used on the lips to stop dryness and shield them from damaging environmental elements is lip

balm. Lip balm gives the lips more color and a hydrating effect, enhancing their beauty and adding a touch of glitz to the face [5].

Achieving a balance between the base, oil coloring agents, and flavoring agents is crucial when making lip balms. Natural lip balms offer an organic option to nourish and preserve healthy lips. Since lip lubricants are frequently used, they should be safe and free from any harmful substances that could pose a risk to people [6].

Lip - related illnesses and disorders

Lip swelling due to allergic response is possible. Sensitivity to particular foods or drinks, medications, cosmetics, or airborne allergens may be to blame for the reaction.

The lips often return to normal once the cause is located, and then eliminated. Yet, the reason for swelling is typically unidentified. Hereditary angioedema is a disease that can take to recurrent swelling. Lip swelling can also result from nonhereditary disorders such as trauma, weather that is cold and dry, sunburn, and erythema multiforme. The lips, particularly the lateral lip, may become dry and hard from sun exposure. Damage that raises the risk of later cancer is indicated by red flecks or a filmy appearance.

This kind of damage can be minimized by applying sunscreen - containing lip balm to the lips or by wearing a broad - brimmed hat to shield the face from damaging radiation from the sun. The symptoms of lip inflammation (cheilitis) include:

Mouth corners may become sore, aggravated, scaly, cracked, and crimson. A diet that is deficient in vitamin B2 might cause cheilitis.

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Brownish spots with freckles on them are frequent and can stay for a very long time, lips - to - mouth region. These marks don't need to worry you. It's possible that numerous, minute, dispersed brownish - black specks are symptoms of the hereditary condition Peutz - Jeghers.

The situation when the intestines and stomach are affected develops polyps. Kawasaki illness, a condition with no known cause that typically affects newborns and youngsters that are under the age of eight, can lead to dryness, cracking, and the fading of the mouth's lining.^{[9][10][11][3]}

Lip Balm:

To avoid drying and shielding us from the weather, lip balm is used as a moisturizer. Although it is a cosmetic similar to lip balm, similarities to lipstick still apply, however, there is little information on this kind of formulation in cosmetic literature (stick form). Its similarity includes consistency and organoleptic properties. Requirements including temperature resistance, palatable flavor, safety, and application that is fluid and adheres to ease of deliberate removal. Lip balm and lip gloss cannot be used interchangeably; the former is a substance that males and females can use. Lipstick's main ingredients are fatty acids, which act as emollients and provide consistency in the form of waxes, oils, and butter. Among the most popular are castor oil, beeswax, carnauba wax, candelilla wax, paraffin, and cocoa butter.

Yet, there are some significant differences between lip conditioner and lipstick, particularly according to functionality: lip balm serves to preserve lips while lipstick is used to color them. Also, due to that there are more ingredients in lipstick formulations compared to lip conditioner formulas, they are more complex.

The quantity of the essential components, such as butter, oils, and waxes, must be balanced when creating lip balms so that the finished product has a fusion point between 65 and 75 degrees Celsius. The qualities of the making will change depending the on proportions of wax, oils, and colours. A long - lasting product is made by using a high ratio of pigment and wax, whereas the opposite can provide lipstick or lip conditioner that is more fluid.

Two distinct characteristic spots where a lip balm softens and ruptures might be negatively impacted by the chemicals utilized in the composition. The possibility exists of two formulations with similar fusion points, but differing consistencies. The formulator might have to work so hard to fix these issues. The ingredients must be in balance the making must improper fusing, thinning, and rupturing points^[12].

Characters of Lip balm:

These qualities should be present in a lip balm^[13].

- 1) It ought to soften the lips.
- 2) It ought to have a high level of indelibility.
- 3) It shouldn't irritate the lips' skin.
- 4) The film must stick to lips firmly without being crackly or tacky.

Lip balm usage:

Natural lip lubricants are items that are applied to the lips to prevent dryness and safeguard against harmful environmental elements. Natural lip lubricants are products that males and females may use.

To be able to make lip lubricants, Intense use of the primary components, such as including waxes, oils, and butter various excipients, must be balanced.

Health authorities must conduct a microscopic examination of the elements in lip balms since users frequently bite away at them^[14].

Why Use Pure Lip balm?

Lip conditioners enable the improvement of uniform cover lips with a shield of the labial mucous, which is sensitive to environmental variables including Dryness, pollution, and ultraviolet radiation.

Lip balms don't contain any water, thus they immediately lubricate your lips.

They also don't need a lot of additional preservatives due to the way they are made. You'll need this option if you want lip balms devoid of dangerous ingredients. Before purchasing, seek lip lubricants that are infused with essential oils or vitamin E to provide protection.

Lip balm's negative aspects:

Consequences are frequently brought on by selecting the incorrect product. Lip balm risks include the following:

Certain lip balms include allergens that result in an allergic response and a rash. Paradoxically, this rash can be unpleasant and frequently resembles chapped lips Hazardous ingredients - Certain lip cosmetics contain harmful ingredients that might harm your body. Avoid goods that include harmful substances including phenol, petrolatum, colour, and paraffin. Choose natural.

2. Materials

Table 1: Created lip balm's qualitative ingredients

No.	Component	Effectiveness in formulation
1.	Bees wax	Increase viscosity & melting point
2.	Coconut oil	Blending agent & Moisturizer
3.	Castor oil	Emulsifier
4.	Pomegranate extract	Coloring agent
5.	Vitamin E	Antioxidant
6.	Rose oil	Fragrance

Function of ingredients

Bees wax

Several insects in nature create wax, but Apo'so idea—particularly bees—makes wax which is highly valued and utilized by humans. Beeswax, which has vast range of uses, is resulting from the species of a *Apis mellifera*, *Apis cerana*, those that are most frequently produced by humans. As a result, it is simpler to obtain this bee product^[17]. Like many other lipids, beeswax is made up of several different classes of constituents, and each of these classes is composed of a

variety of compounds with chain lengths that vary by two carbon atoms. Since 1960, only by using current chromatographic techniques like gas - liquid chromatography has it been feasible to make headway in establishing the precise composition of beeswax since the near impossibility of fractionating wax components via methods like distillation and crystallization (GLC) [18].

Since the starting time, beeswax and oil have been combined in several ratios depending on the desired consistency for creams and ointments. When formulated and utilized properly in cosmetic products, beeswax has a comedogenicity grade of 0 to 2, it has, thus no potential to cause discomfort. Beeswax adds several highly beneficial qualities to cosmetic goods, including general healing and softening, acting as an antibacterial and a lubricant, and won't cause any issues or clog the pores [19].

Because of its distinctive qualities, beeswax is a fantastic element for cosmetics:

- Creates stable emulsions and enhances the water binding of creams and ointments.
- Gives the skin a non - conclusive protective action, enhancing the protective effect of sunscreen, improving its elasticity and plasticity to allow thinner films and provide more permanence on the visage and lips.
- Has thermo - stable and antibiotic properties.
- Avoids triggering a hypersensitive response.
- As little as 1 to 3% beeswax can frequently produce the desired results.
- It contributes to the sheen, consistency, and color stabilization of lip balms along with enhancing the appearance and consistency of creams and lotions.

Perhaps the most significant component of our lip balms is beeswax. This is the fact that it has natural moisturizers that help keep the skin looking firm and supple by retaining moisture from the air [7].



Figure 3: Bees wax

Coconut oil:

Coconut oil works well as a skin - friendly massage oil. It works well as a moisturizer on all skin types, including dry skin. Thankfully, using coconut oil has no risk of having any negative side effects on the body, unlike using mineral oil. Coconut oil would be a secure method of preventing skin flaking and dryness. Moreover, it postpones the evolution of creases and skin drooping, which naturally accompany it

again. Moreover, coconut oil aids in the care of eczema, psoriasis, dermatitis, and other skin infections. For precisely this reason, coconut oil serves as the primary ingredient in skin - care products like soaps, lotions, and creams. Because of its well - known antioxidant characteristics, coconut oil also aids in the prevention of early ageing and degenerative diseases [20].

The moisturizing properties of coconut oil are its main advantage. It is therefore perfect for chapped lips. Because the surface of lips is so thin and they are more exposed to the weather than other parts of your skin, they are particularly sensitive to moisture loss.



Figure 4: Coconut oil

Castor oil:

Castor oil is one kind of oil that is made from the seeds of the castor plant. This oil has a high antioxidant content and can treat a variety of skin and hair issues. The pharmaceutical and cosmetic industries, in particular, have long used castor oil as a basic material. Ricinoleic fatty acids, which can make up 80–90% of the fats that aren't saturated in castor oil, are particularly abundant. Ricinoleate occurs naturally as triglycerides (glycerides), which have three major functional groups and also may be converted into a few other, more beneficial chemicals [21].

Pomegranate extract:

Pomegranates possess a history utilized in conventional medicine and are a significant source of bioactive chemicals. Pomegranate juice has a high - level antioxidant performance and has been proven helpful in preventing atherosclerosis [22].

Among the natural components in pomegranate fruit is anthocyanin, which has antibacterial, antioxidant, and natural coloring properties [23].



Figure 6: Pomegranate crush



Figure 7: Vitamin E

Vitamin E:

Tocopherol acetate, which is the source of vitamin E, is a known potential contact sensitizer. Since then, utilized for years as a lipophilic antioxidant. It was mentioned that tocopherol and tocopherol acetate are both regarded as safe skin care products and that vitamin E rarely causes ACD. Yet, it was shown that the frequency of vitamin E sensitivity has been rising. Many cosmetics and cosmetics for lips contain tocopherol acetate as an ingredient. widespread ACD over the body, including a case affecting the face, and extremities, has been linked to vitamin E. But the following no cases of ACC linked to vitamin E are described across the literature. It serves as an anti - ageing agent and is utilized to keep the softness [24].

Rose oil:

Natural scents known as essential oils are derived from almost every component of a plant. Essential oils are liquid, flammable fragrance molecules that are usually derived from plants. Although essential oils are not technically oils in the traditional sense, they frequently have a low solubility in water. Useful substances mostly terpenoids, benzenoids, fatty acid derivatives, and alcohols, which are volatile compounds. Aromatherapy oils are widely acknowledged as secure by FDA and other agencies. Although their widespread usage in cosmetics, essential oils' precise method of action is not entirely understood. The chemical, physical, and sensory qualities of essential oils—which vary significantly from oil to oil—determine their functions. The oil contains different chemical components, all of that contribute to the overall character [25].



Figure 9: Rose oil

3. Methods

Lip Balm Making

Ingredients: Beeswax, Pomegranate juice, coconut oil, castor oil, Vitamin E capsule, Rose oil

Beaker A

First, you need to crush a pomegranate to extract its juice. Then, in a beaker, combine 25ml of the pomegranate juice with 2.5ml each of coconut oil & castor oil. Next, place the beaker in a water bath and heat the mixture until the pomegranate juice and oils are evenly blended.

Beaker B

In another beaker, place some beeswax and then pour the mixture from beaker A into the beeswax. Heat the mixture in a water bath and stir it vigorously until the beeswax has melted. Finally, add two vitamin E capsules and continue to stir the mixture vigorously. After adding Rose oil to the formulation, pour the liquid lip balm into a clean container with a wide opening. Let lip balm cool down at ambient temperature.



Figure 10: Prepared lip balm

Evaluation of Lip Balm

Melting point

Using a melting point instrument (VEEGO mode - VMP - D, India), a melting point of a lip balm was ascertained. A glass capillary with one end flame - sealed was filled with a sample of a lip balm. The melting point apparatus, which featured a magnetic stirring facility, was then filled with liquid paraffin and the capillary containing the sample was put inside. The melting of the sample allowed for the recording and visual determination of the melting point.

Organoleptic properties

The lip balm's sensory attributes, including its colour, scent, flavour, and overall appearance, were assessed.

Examining spreadability

To evaluate the regularity of the protective layer it formed, the product was repeatedly put on a glass slide during the spreadability test (conducted at room temperature). The test also sought to ascertain whether the lip balm stick fractured, deformed, or fragmented while being applied. For the test, the analyst defined the following criteria:

G (Good): consistent and flawless application with no fragmentation or lip lubricant distortion.

I (Intermediate): consistent application with minimal lip balm deformation and only a few pieces left behind.

B (Bad): significant lip balm deformation, difficult or improper application, and numerous fragments left behind.

Measurement of pH

The pH level of the lip balm was evaluated to check for any potential negative effects. It was essential to keep the

product's pH as neutral as possible because an acidic or alkaline pH could irritate the lips. One gramme of the sample was dissolved in 100 millilitres of water as part of the pH testing procedure, and the pH was then measured using a pH meter.

Stability studies

Accelerated stability testing was used to assess the prepared lip balm's performance in various scenarios. For a period of 30 days, the product was held at oven temperature (40.0 2.0 oC), refrigerator (4 2.0 oC), and room temperature (25.0 3.0 oC). After 30 days, the lip balm's sensory qualities, melting point, spreadability, and pH were evaluated.

4. Result & Discussion

Organoleptic characteristics

The study's conclusions and discussion section presented the findings of several tests done on the manufactured lip balm. According to the sensory analysis, the lip balm had a lovely scent and was pink in hue. Table 2 and Figure 1 contain further information regarding the findings and discussions.

Table 2: Lip balm organoleptic properties

Parameters	Observations
Colour	Pink
Appearance	Excellent, Smooth
Odour	Pleasant

Melting point

The lip balm's melting point was determined to be between 68 and 69 degrees Celsius, which is within the suitable melting point range of 65 to 75 degrees Celsius.

Examination of spreadability

As illustrated in Figure2, the prepared lip balm initially displayed G - Good qualities, including uniformity, absence of fragmentation, flawless application, and lack of deformation.



Figure 11: Spreadability



Figure 12: At room Temperature



Figure 13: At refrigeration



Figure 14: At oven temperature

Measurement of pH

As the lip balm's pH level was about 7.2, or almost neutral, it is unlikely to irritate the lips.

Stability studies

Stability is the length of time from the date of formulation till packaging when a drug substance or product preserves its chemical or biological activity and maintains its physical properties without deviating too far from the labelled potency. Stability testing's goals are to show how much a drug substance or product's quality can change over time under the effect of different environmental elements including temperature, humidity, and light as well as to recommend suitable storage settings and shelf lives. At room temperature (25.0°C to 3.0°C), refrigeration (4°C to 2.0°C), and oven temperature (40.0°C to 2.0°C), stability tests were carried out for 30 days or one month. Table 3 presents all of the results in full.

Table 3: Stability studies of lip balm at different temperatures.

Parameters	Temperature conditions		
	25.0 ± 3.0 °C	4± 2.0 °C	40.0 ± 2.0 °C
Color	Pink	Pink	Pink
Odor	Pleasant	Pleasant	Pleasant
Melting point	69°C	69oC	68°C
Spreadability	G	G	G
pH	7.2	7.2	7.1

G - Good: homogeneous, no fragmentation; flawless application, without any distortion of the lip balm.

I - Intermediate: the lip balm is homogeneous, leaves few pieces, is applied properly, and hardly deforms.

The created lip balm was found to exhibit consistency, absence of fragmentation, flawless application, and no deformation at room temperature (25.0 3.0°C) and refrigeration (4 2.0°C), earning it the grade "G - Good". Nonetheless, it demonstrated some regularity, leaving a few fragments, and adequate application with slight deformation at oven temperature (40.0 2.0 °C), which is classed as "I - Intermediate".

5. Conclusion

The stability test revealed that the formulation behaved similarly whether maintained at ambient temperature or in the refrigerator. With a spreadability rating of "Good" and stable organoleptic characteristics, storage under these circumstances was reasonable. The spreadability tests showed that the lip balm had high spreadability at room temperature. It was not advised to store the product in the oven at 40.0 2.0°C, nevertheless, because the stability test revealed a loss of product functioning. The produced organic lip balm has a suitable melting point (with a mean of 69°C) according to the stability test, making it a prospective treatment for a variety of lip issues.

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