



FORMULATION AND EVALUATION OF HERBAL LIP BALM BY USING PRICKLY PEAR CACTUS FRUIT (OPUNTIA FICUS-INDICA LINN) TO LIGHTEN THE DARK LIPS.

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ABSTRACT

This research work is based on the formulation and evaluation of herbal lip balm by using natural ingredients like rose oil, vitamin E, petroleum jelly (base), cactus fruit juice (colouring agent), ghee (moisturizer). It is one of the cosmaceutical products. This formulation applied on the lips to prevent drying and protect against adverse factors of the environment. It helps to protect the natural health and beauty of the lips. Homogenous mixing method was used to produce the lip Balm. Various evaluation parameters were carried out. The pH was found to be 7.1 to 7.2, melting point 66°C to 67°C, spreadability and stability studies were performed. Natural lip balm prepared from the above natural ingredients can be better opinion for treatment of various lip disease.

HERBAL LIP BALM

INTRODUCTION

Cosmetics plays a significant role in current life style. The current trend is going grow in almost all industries including cosmetics to adopt more natural way of life. The usages of herbal cosmetics are increased in personal care system. Natural products are used for folk medicine purposes throughout the world for thousands of years. The herbal cosmetic products have pharmacological properties such as antimicrobial, anti-inflammatory and cytotoxic effects. Herbal cosmetic products include various formulations. The word herbal indicates safety as compared to synthetic products which are having various adverse effects on human health colouring lips is the ancient practice to enhance the beauty of lips and to give glamour touch to the face make up. For this the choice for shades of colour, textures, lustres have been changed and became wider. This can be observed from the lip jelly, lip balm, lipstick marketed in hundreds of sheds of colours to satisfy the demand.^[1]

LIP BALM

Lip balm is a cosmetic product similar to lip stick. They are used to prevent lip dryness and protect against hazardous environmental factors. This work involved the production of a lip balm by formulated with natural or herbal raw materials. Checking of stability test of lip balm are Melting point, evaluation of organoleptic characteristics like colour, odour and appearance and functionality evaluation (spread-ability test).

Lip balm is a cosmetic product that both men and women use to keep their lips healthy. It is used to preserve the shape and appearance of the lips and guard against sores and cold sores on the affected lips. The important of the key components are butters, oils, and waxes, must be balanced for creating the lip balms.^[2]

Characteristic of lip balm

- 1) Resistance to temperature variation
- 2) Pleasant flavour
- 3) Smoothness during application
- 4) Innocuousness
- 5) easy intentional removal

Application of Natural Lip Balm

- Natural Lip balms are the product that 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.
- Natural Lip balm is a product. It is 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.^[3]

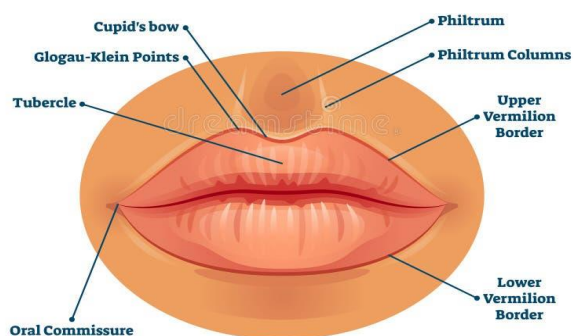
Advantages of Natural Lip Balm

- ❖ Lip balms help to protect the natural health and beauty of the lips.
- ❖ Sun block lip balms are proved to prevent ultraviolet rays from hurting the lips.
- ❖ They are not gender specific products and both men and women can use them.
- ❖ Lip balm products help to protect lips affected by cold sores, chapping and dryness.
- ❖ Contact of the product with the skin will not cause a sensation of friction or dryness, and should allow the forming of a homogeneous layer over the lips in order to protect the labial mucous susceptible to environmental factors such as UV radiation, dryness and pollution.
- ❖ It refreshed, renewed and also addresses lip-related symptoms resulting from cold, flu and allergies.
- ❖ The use of natural lip cosmetic to treat the appearance of the face and condition of the skin.

LIP ANATOMY

Lips are soft, pliable anatomical structures that form the mouth margins of most vertebrates. They are composed of a surface epidermis (skin), connective tissue, and a muscle layer (in typical mammals). Hair, sweat glands, and sebaceous (oil) glands are all found in the outer skin of a man. The lips' edges, known as the vermilion border, are covered with reddish skin and densely packed with sensitive nerve endings. The reddish skin serves as a transition layer between the hair-bearing tissue on the outside and the mucous membrane on the inside. A moist mucous membrane lines the inside of the lips. The inner surface of newborn infants is significantly thicker, with sebaceous glands and minute projections known as papillae. These structural adaptations appear to aid the sucking process. The orbicularis oris muscle, which encircles the opening, supplies the majority of the substance to each lip. This muscle, along with others that radiate out into the cheeks, allows the lips to be shaped and expressed in a variety of ways.

ANATOMY OF THE LIPS



- From superficial to deep, the layers of the upper and lower lips include the epidermis, subcutaneous tissue, and mucosa.
- In cross-section, the superior and inferior labial arteries can be observed as they course between the orbicularis muscle fibres and the mucosa.

LIP DISORDER

I. Swelling

An allergic reaction can make the lips swell. The reaction may be caused by sensitivity to certain foods or beverages, drugs, lipstick or airborne irritants. These causes can be identified and then eliminated, the lips usually return to normal. But frequently, the cause of the swelling remains a mystery. A condition called hereditary angioedema may cause recurring bouts of swelling. Nonhereditary conditions such as Erythema multiforme, sunburn, cold and dry weather, or trauma may also cause the lips to swell.^[4]

II. Sun Damage

Sun damage may make the lips, especially the lower lip, hard and dry. Red speckles or a white filmy look signal damage that increases the chance of subsequent cancer. This type of damage can be reduced by covering the lips with a lip balm containing sunscreen it is used for the protect the face from the sun's harmful rays.

III. Inflammation

With inflammation of the lips, the corners of the mouth may become painful, irritated, red, cracked, and scaly. may result from a deficiency of vitamin B2 in the diet.

IV. Discoloration

Freckles and irregularly shaped brownish areas are common around the lips and may occur for many years. Kawasaki disease, a disease of unknown cause that usually occurs in infants and children 8 years old or younger, can cause dryness and cracking of the lips and reddening of the lining of the mouth.

V. Sores

A raised area or a sore with hard edges on the lip may be a form of skin cancer. Other sores may develop as symptoms of other medical conditions, such as oral herpes simplex virus infection or syphilis. Still others, such as keratoacanthoma, have no known cause.^[5]

Types of lip Balms

1. UV filter lip balm

This sort of lip balm can be used all year long, but it is especially beneficial in the summer or when visiting an area with more solar activity.

2. Nourishing lip balm

This type works best in winter.

3. Moisturizing lip balm

Your lips may split if you use this lip balm in the cold since it absorbs too quickly. For dry lips, this kind of lip balm is beneficial. You can use moisturising lip balm all year long.

4. Medicated lip balm

It should be applied with care. It acts as a softening and antiseptic medication.

5. Tinted Lip balm

You can wear tinted lip balm year round.

Merits

1. Lip balm helps to protect natural health and beauty of lips.
2. Lip balm helps to protect lips affected by cold sores, chapping and dryness.
3. It also work perfectly as overnight lip repair.
4. Cracked and sore lips are repair by lip balm and free from irritation.

Demerits

1. Lip balm made of low quality ingredients can harm lips seriously.
2. Low quality lip balm dry the lips instead moisturizing it.
3. Lip balm addiction is another disadvantage usually seen in it.
4. Naturally derived flavour and colour are more difficult to obtain and also have issue related to stability.

MATERIALS AND METHODS

The following materials are;

1. Base – Petroleum Jelly
2. Oils - Ghee
3. Colouring Agent – Cactus fruit (*Opuntia ficus-indica*)
4. Flavouring Agent – Rose oil
5. Antioxidant – Vitamin E

Table 1: COMPOSITION OF LIP BALM.

S.NO	NAME OF THE INGREDIENTS	QUANTITY	USES
1	Petroleum Jelly (Base)	3.5g	Glossiness and hardness
2	Butter	1.0g	Moisturizer
3	Colouring Agent – Cactus fruit juice	1.5g	Attractiveness
4	Antioxidant – Vitamin E	3.5g	Maintain the stability
5	Flavouring Agent – Rose oil	Q.S	Flavouring agent

1. BASE

Waxes form an important group of raw materials for the manufacture of personal care products and decorative cosmetics. Waxes are used in various industries and products. They are mainly used in candles, but also have important applications in the food, cosmetic and pharmaceutical industries as thickeners / emulsifiers. Chemically, wax is a complex mixture of hydrocarbons and fatty acids bonded to esters. Waxes are harder, less greasy, and more brittle than grease. They are highly resistant to moisture, oxidation and bacteria. There are four types of waxes:

- (a) Animal waxes: beeswax, lanolin, and spermaceti.
- (b) Vegetable waxes: Carnauba, candelilla, jojoba.
- (c) Mineral waxes: ozokerite, paraffin, microcrystalline, ceresin.
- (d) Synthetic waxes: Polyethylene, carbowax, Acrawax, stearon.

The waxes most used for cosmetic products are beeswax, carnauba and candelilla. Waxes are esters of fatty acids and fatty alcohols. Therefore, jojoba oil is a wax, not an oil. Physically, wax has a high melting point (50-100°

C). The most used wax is beeswax, which is a good emollient and thickener.

Two other natural waxes commonly used in cosmetics are carnauba wax and candelilla wax. Both are harder and have higher melting points, making them more stable and suitable for dry goods, for example: lip balm. Cocoa butter is a natural fat found in cocoa beans and gives lip balm its smoothness. It will nourish and moisturize lips, and help heal chapped and dry lips as it contains antioxidants. Another important and useful ingredient of lip balm is white beeswax with a melting point of 62-64° C. It is useful for bonding oils and waxes with high melting points. It is used in 3-10% of total formulations. It shrinks on cooling and thus facilitates the preparation of moulded products. At concentrations above, it creates a dull appearance and causes the balm to crumble during application. Candelilla wax has a melting point of 65-69° C and can be used in 5-10% of formulations. Candelilla and beeswax mixtures are great for making lip balms. If camellia wax is used a little more than beeswax, the product will have a smooth and shiny appearance. On the other hand, carnauba wax increases the melting point of

the foundation and hardens the lip balm, so it is used in very small amounts. It gives the product an attractive gloss.^[6]

Petroleum jelly

Petroleum jelly has been used for years to help with skin moisturizing and healing. However, some types could

contain carcinogenic ingredients. For safety, only buy triple-distilled products like Vaseline. It may also increase the risk of skin irritation and acne in those prone to these symptoms. It is an inexpensive skin care product that is available in most drugstores.



2. OILS

Oils and fats differ in physical form; this is usually a solid at room temperature. Fats and oils are glycerol esters chemically made up of glycerol and fatty acids and are also known as triglycerides. Fatty acids can be saturated or unsaturated, thus determining the stability and character of the oil. Oils that are high in saturated fatty acids (lauric, myristic, palmitic, and stearic acids) include coconut oil, cottonseed oil, and palm oil. Oils with a high degrees of unsaturated fatty acids (oleic, arachidonic, linoleic acids) are canola oil, olive oil, corn oil, almond oil, safflower oil, castor oil, and avocado oil. Saturated oils are more stable and do not go rancid as quickly as unsaturated oils. However, unsaturated oils are smoothers more valuable, less greasy, and better absorbed by the skin. Natural butters such as Shea butter, avocado butter or cocoa butter are not real butter but natural fats. In general, natural butters are excellent emollients and thickeners, and depending on the type, they can have various additional properties (e.g., antioxidant and soothing properties of Shea and avocado butter due to phenolic compounds). The oil mixture must mix properly with the wax to form a suitable film on the skin of the lips being applied. The ideal blend is one that allows the product to spread easily and creates a thin film with good coverage. Sunflower or olive oil, both of which give excellent shine to the lips Castor oil is used in many lip balms due to its good qualities, although today people use other oils or solvents. Refined quality castor oil has a beautiful colour, is odourless and tasteless. Castor oil is a very good plasticizer.

Antioxidant must be added to castor oil to prevent rancidity although it does not go rancid as easily as other vegetable oils such as olive or almond oil or Jojoba oil is known for its emollient properties that can prevent lips from becoming dehydrated. Rosehip oil is excellent for maintaining the skin's natural moisture balance. Vitamin E is a well-known antioxidant that plays an important role in the base of lip balms. Peppermint essential oil invigorates and revitalizes the skin. Cinnamon essential

oil is an excellent antioxidant. Lavender essential oil soothes and nourishes the skin. And Grapefruit essential oil is soothing and refreshing for dry lips. Almond oil is a pale- yellow oil with a mild characteristic odour. It is composed of mainly oleic acid glycerides with small amounts of other acids, namely linoleic, myristic and palmitic. It has emollient properties.^[7]

3. COLOURING AGENTS

Dyes or colorants are mainly used to give cosmetic products a distinct appearance. Colour has been used in cosmetics since ancient times. Basically, the desire to buy a cosmetic product is controlled by the three senses of sight, touch and smell. As such, colour is an important ingredient in cosmetic formulations. Colour is provided to the lips in two ways. The first requirement is met by soluble dyes and the second requirement is met by insoluble dyes and pigments making the film more or less opaque. Modern lip balms contain both for a combined effect.^[8]

Colorants must be on the list of certified colorants under the Drugs and Cosmetics Act. Natural colours from various plant and fruit sources. Colorants of natural origin are non-toxic and have no physiological activity. It has to be a certain chemical compound because then only its colouring can be trusted, its dosing will be more practical and easy. Its tinctorial (dyes) strength should be high enough that only a small amount of is sufficient to use. The dye must be insensitive to light, temperature, hydrolysis and micro-organisms and must therefore be stored stably. Dyes must not be affected by oxidizing or reducing agents and pH changes, nor should they interfere with tests and assays. Water-soluble colorants are also preferred along with oil- and alcohol-soluble colours. The most important feature of colorants is compatibility with other ingredients and drugs. It must not have the unpleasant taste and smell of cashmere wool, and must be readily available and inexpensive. Examples of natural dyes obtained from beetroot, saffron, turmeric, etc. The saffron is a perennial plant

and is grown in Kashmir in India. It is also grown in Spain, France, Greece and Iran.^[9]

Prickly pear cactus fruit



- ❖ It is a slow growing perennial shrub up to 3-5 m height.
- ❖ The root-system spreads horizontally.
- ❖ Stems (cladodes) are very thick, succulent, oblong, 30-40 cm long (up to 70-80 cm) and 18-25 cm wide.
- ❖ The epidermis is very thick and waxy, thus very water repellent and sun reflecting.
- ❖ It bears large yellow flowers, followed by white, yellow, or reddish purple fruits.
- ❖ It is widely grown in warmer areas for the fruit and edible.
- ❖ The hard seeds are used to produce an oil.

SYNONYM : Cactus *Opuntia*, Prickly pear,

BIOLOGICAL SOURCE : *Opuntia ficus-indica* Linn.

FAMILY : Cactaceae

TAMIL NAME : சப்பாத்தி கள்ளி

SPANISH NAME : Tuna

ENGLISH NAME : *Opuntia ficus-indica*

COMMON NAME : Prickly pear.

CHEMICAL CONSTITUENTS

Linoleic, linoleic acids, palmitic acid.

The main compounds - octadecadienoic acid (29-44%)

Hexadecanoic acid (8.6-32%).

THERAPEUTIC USES

Treating diabetes

High cholesterol,

Obesity and hangovers

Antiviral

Anti-inflammatory properties.

4. FLAVOURING AGENT

Flavours or flavouring agents are generally needed to mask the four basic taste sensations. Taste refers to a mixed sensation of taste, touch, smell, sight, and hearing, all of which involve a combination of physicochemical and physiological actions that affect the perception of food Substances. Creating an acceptable taste is more of an art than a science. Flavours are selected based on the flavour of the drug or other ingredients incorporated.

Fragrances used in lip balms must not contain any ingredients that could be irritating or toxic. These should be delicious and be able to mask the greasy smell of the base. Flavouring agents are an essential ingredient in masking the smell of oils or waxes as well as creating an appealing taste. They are commonly used in the concentration range of 2-4% of the total formulation. The flavours should be stable and compatible with the other ingredients of the lip balm. The flavours should not be so strong that they conflict or overwhelm other flavours that can be used with lip balm. Fruity flavoured perfumes have also been advocated. Also something edible can be used. Commonly used flavours are apricot, strawberry, raspberry, cherry, honey, rose water etc. Honey has the ability to serve as a natural food preservative.^[10]

5. ANTIOXIDANT

Many cosmetics that are marked now a day's often contain antioxidant as the active ingredients. It is known that oxidation reaction could produce free radicals. Which can start chain reaction that will damage skin cells. Increasing the number of free radicals could initiate the wrinkling, photo aging, drying of the skin. It is well known that plants can produce natural antioxidant compounds that could control the oxidative stress caused by sunlight and oxygen. The cosmetic formulation usually contain various combination of plant extract Aloe-vera, green tea, Vitamin E, rosemary ,grape, seed, blueberry.

Method of Lip Balm Preparation

The production technology of lip balm includes the following steps:

- Raw materials are checked for its quality (cosmetic products must comply with strict safety standards)
- The ingredients are dosed, melted, and mixed (this stage involves special equipment)
- This mixture is treated in a vacuum to remove bubbles
- The mixture is crystallized for about 48 hours
- The mixture is then remelted
- The mixture is cut into pieces which are shaped as required
- The lip balm is packaged into a casing.^[11]

Preparation of lip balm**Step 1.**

Take a container at it cleanly washed and dried then the container fill sufficient amount of petroleum jelly.

**Step 2.**

Take a another beaker and knife are used to cut a prickly pear cactus fruit and add few drops of prickly pear cactus fruit juice.

**Step 3.**

Stirrer are used to mix the petroleum jelly with prickly pear cactus fruit juice drops.

Step 4.

Add to few ml of ghee to a container and mix continuously.

**Step 5.**

Vitamin E is a well-known antioxidant that plays an important role in the base of lip balms. Next add antioxidant vitamin E.

**Step 6.**

Finally add few drops of rose oil to the container and mixed well.

**Step 7.**

They are stored in cold place we get sufficient amount of herbal lip balm.



Once you have everything stirred and smoothed down, the lip balm is ready to use. Apply it to your lips with your finger, and cover it with a lid when you are not using it. There is no need to refrigerate the lip balm.

Benefits and uses for petroleum jelly**1. Heal minor skin scrapes and burns**

A study shows source that petroleum jelly is effective in keeping skin moist during post-surgery healing. This may be particularly good for regular, less dramatic skin injuries. Make sure that the surface you apply petroleum jelly on is properly cleaned and disinfected. Otherwise, bacteria and other pathogens can get trapped inside and delay the healing process.

2. Moisturize your face, hands, and more**Face and body lotion**

Apply petroleum jelly after a shower. As an occlusive moisturizer, it prevents your skin from drying out. You can also use it for dry noses during cold or allergy season.

Cracked heels

Soak your feet in warm water with some salt added to it. Towel-dry thoroughly and apply petroleum jelly and clean cotton socks.

Improve your gardening hands

After washing and drying, use some petroleum jelly and a clean pair of gloves to help lock in moisture and accelerate healing.

Ghee

Cow Ghee (clarified butter) has been used for centuries as a natural moisturizer. Kokum Butter heals ulcers & fissures, and reduces the degeneration of the skin cells. The result – soft & supple lips. Not only are natural ingredients more nutritious for your skin, but they're also easier on the environment and more cost-effective than store-bought products. Plus, you can customize your homemade lip balm to suit your needs and preferences.



Rose oil

Rose oil has many anti-inflammatory, anti-bacterial, and antioxidant benefits for your skin. Your lifeless, dry, and aging skin benefits from using this oil. Massaging with rose oil reduces the age on the face and also fades the

signs of age on the face. This popular oil is often used to help elevate your mood and encourage feelings of love and balance. When applied topically, it has been shown to soothe and hydrate skin for a calming effect.



EVALUATION OF LIP BALM ORGANOLEPTIC PROPERTIES

The formulation was studied for physical Appearance, colour and odour. These Characteristics were evaluated by physical Observation. Texture and homogeneity were tested by pressing a small quantity of the Formulation between the thumb and index finger. The presence of coarse particles and Consistency were used to evaluate the texture and homogeneity of the formulations. Skin feel (including stiffness, greasiness, and grittiness) was also evaluated.

A. TEXTURE

The formula lip balm sample is placed on slide. Texture analysis of Lip balm has been recorded by organoleptic evaluation.

B. COLOUR

Lip balm colour analysis was evaluated. The three readings that contribute to the brightness, redness of the sample being examined.

C. ODOUR

The pleasant odour is present due to the presence of Rose oil.

D. GREASINESS (APPEARANCE)

The oil test was reviewed to determine the amount of oil in a formulated lip balm. In this study 1 gram of lip balm was placed on filter paper and the sample was left at room temperature for 24 hours.

Table 2: Organoleptic Properties.

Parameters	Observations
Colour	Faint Pink
Odour	Pleasant
Appearance	Excellent, smooth
Texture	Smooth and Soft

pH

One gram of the preparation is dispersed in 25 ml of distilled water. The pH of the preparation was determined using a pH meter pre-calibrated with

standard buffer solutions (pH 4, 7 and 10). The measurement was performed three times.^[12]

MELTING POINT

The melting point was determined using a Melting Point instrument. Briefly, one end of the capillary tube was

sealed; formula is fed from one end into the capillary to a certain height. The capillary is introduced into the melting point apparatus and the temperature at which the molten mass is recorded.

SPREADABILITY TEST



Spreadability is determined using a slide. The formulation is sandwiched between two blades and a load is applied; the recipe has been spread on the slides. Visual observations were made regarding the uniformity of the layer formation.^[13]

STABILITY TEST

The formulation of the lip balm has been evaluated for stability for 30 days under various temperature conditions mainly room temperature (25°C), higher

temperatures in the oven (40°C) and refrigerator (5°C). Characteristics such as organoleptic properties and Spreadability were evaluated on days 7, 15, and 30.

Table no. 3: Stability studies of lip balm at different temperature.

PARAMETER (Temperature)	COLOUR	ODOUR	SPREADABILITY	MELTING POINT	PH
25°C ± 2°C	Faint Pink	Pleasant	Good, Uniform	66°C	7.1
5°C ± 2°C	Faint Pink	Pleasant	Good, Uniform	67°C	7.1
40°C ± 2°C	Faint Pink	Pleasant	Intermediate	67°C	7.2

a. Preliminary Stability Test

Formula evaluated on preliminary stability tests including physical properties (colour, odour and appearance) and flow testing. Since this formula does not cause any physical or balance changes, it has been tested for normal stability.

b. Normal Stability Study

An amount of 25 g of the substance has been prepared for routine stability testing, where the physical properties (colour, odour, and appearance), flow ability and the melting point was evaluated for 5 days at room temperature. Samples are well preserved.^[14]

RESULT AND DISCUSSION

In the present study many organic products like Ghee, vitamin E capsules, White petroleum jelly, prickly pear cactus fruit juice, Rose oil can help to keep the lips hydrated and healthy. The prepared Lip balm was evaluated for organoleptic characteristic like colour, odour, texture, appearance was evaluated. Then the Melting point, Spreadability, Stability, pH and stability studies performed. After performing the stability studies at room temperature 25°C ± 2°C, Refrigeration 5°C ± 2°C and oven temperature 40°C ± 2°C for 30 days. It was concluded that prepared Lip balm shows uniform application without any deformation at any temperature. The melting point 66°C and 67°C and mean pH which is nearest to the neutral pH.

CONCLUSION

In this study petroleum jelly, ghee, prickly pear cactus fruit, vitamin E and rose oil are used to we are prepare the herbal lip balm. We prepare the herbal lip balm are applied to many volunteers, In the herbal lip balm are not produce the any irritancy to lip. It is very safe and not contain any irritability. It provide the satisfactory effect. We prepare the lip balm are have the many properties like, it provide the beauty of lip, avoid the dryness of the lip, protect from the UV rays and environment pollution, provide the smoothness and easily available in market.

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