

“Formulation and Evaluation of Lip Balm” By Using Beet Root

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I. INTRODUCTION :-

Introduction Cosmetics are substances or items that are applied to the body in order to enhance one's look. The use of cosmetic items is continuously growing. Key variables such as rising urbanisation, lifestyle improvements, and the trend of publishing images on social media all encourage the usage of cosmetic items. An increase in the number of working women and time spent on social media has increased people's awareness of their appearance (Bellis, 2017). The growing young population in emerging countries, combined with rising disposable money, leads to a growth in the sale of cosmetic products, especially lip cosmetics (P&S Market Research, 2018). The inclusion of hazardous compounds in cosmetics poses a threat to industry expansion. Consumers are increasingly concerned when it comes to selecting cosmetic items. Manufacturers compete to create cosmetics that are both safe to use and good to the environment. Because of rising demand for organic and natural lip care products, increased awareness of the need to protect the lips from overexposure to the sun, and new product innovations, Global Industry Analysts, Inc. (GIA) has launched the global market for lip care products, forecasting it to reach US\$2 billion by 2020. (Global Industry Analysts, 2015)/(Global Industry Analysts, 2015)/(Global Industry Analysts, 2015). Lip colouring has been done since ancient times, and the use of lipsticks has grown in popularity. Shades of colour, texture, and sheen options have also evolved and expanded. Lip jelly, lip balm, and other similar products are examples. The structure of the lips differs from that of the skin. The top corneum layer of the skin has 15-16 layers in general, primarily for protection. In comparison to regular face skin, the top corneum layer of the lips comprises only 3-4 layer and is quite thin. There aren't many melanin cells in the skin of the lips. Blood vessels visible more clearly through the skin of the lips as a result, giving the lips a gorgeous pinkish tint. There are no hair follicles or sweat glands on the surface of the lips.

As a result, it lacks the sweat and body oils that protect it from the elements (Kudu et al., 2015). Lip balm is one sort of lip product. Its major purpose is to keep the skin from drying out and to protect it from harmful environmental influences. Some lip balms, however, have negative side effects. Lip balms containing phenol, menthol, and other low-quality chemicals, for example, might be harmful to the lips. Lipsticks, lip balms, lip jellies, lip salves, lip gloss, and lip rouge are some of the cosmetic compositions used on the lips. These formulas give the lips a lovely colour and a glossy finish. Lip rouge is a lipstick substitute. In nature, they are almost semisolid or liquid. They can be made by mixing pigments with a base that contains the appropriate proportion of aqueous phase. This formulation is ideal for integrating pharmaceuticals encapsulated in niosome. This type of formulation's consistency makes it simple to apply with the help of a brush attached to the container's lid. It also aids in improving the active medicament's penetration through the lip membrane. The cosmetic formulation has a good aesthetic appeal and is simple to apply. The more precisely the active substance is applied to the affected location, the more successful the illness treatment becomes. When compared to the current formulation, the cosmetic formulation will be more patient-acceptable, which may improve patient compliance. The study's goal was to create a medicated lip rouge containing niosome acyclovir to treat recurrent herpes labialis. This study was an attempt to design a formulation capable of delivering a higher concentration of the medicine in the dermal tissue for effective cold sore therapy. Because the medicine is encapsulated inside a lipophilic niosomal carrier, the formulation may be able to penetrate deep into the lip membrane and release the drug at the site of action. ^[1-2]

Anatomy of Lips :-

The 5 major zones are vermilion/white roll, subvermilion, peristomal, philtral column, and commissural. The subvermilion corresponds to the

dry mucosal lip, and the peristomal at the junction of dry and wet mucosal lip. The vermilion/white roll can be divided on the upper lip to include the lateral, apical cupid's bow and central filtral zones, while the vermilion lower lip is divided into medial and lateral zones. The subvermillion is divided into medial and lateral zones, and the peristomal into medial and lateral zones. Lips: The surface of the lips consists of four zones: hairy skin, vermilion rim, vermilion and oral mucosa. The normal shape of the lips varies with age and is greatly influenced by ethnicity. Vermilion: The red part of the lips.

It is covered by a specialized stratified squamous epithelium. Cinnabar Border: The border of lighter skin that separates the vermilion from the surrounding skin. Cupid's bow: the outline of the line formed by the vermilion border of the upper lip. Mouth: The opening is delimited by the upper and lower cinnabar. Corner of the mouth: The place where the lateral vermilion aspects of the upper and lower lips meet.

The upper and lower lips are known as the labium superioris oris and labium inferius oris, respectively. Both the upper and lower lips contain mucosa, vermilion, and skin surfaces. This article provides a brief overview of anatomy, neurovasculature, and musculature of the lips, as well as important surgical and clinical considerations regarding lip pathology. While considerations of the lips are often centered on the vermilion zone, the upper lip extends from the nasolabial folds to the inferior margin of the nose, and the lower lip encompasses the region between the lateral commissures and the labiomentale crease of the chin. The upper and lower lips intersect at the mouth angle, referred to as the commissure. This is the point at which several muscles involved in lip movement attach.

Lateral subunits and the lower lip, 1 subunit. The cutaneous and mucosal portions of the lip meet at the vermilion that has a variable prominence called the white roll. The major zones are vermilion/white roll, subvermillion, peristomal, philtral column, and commissural. The edges of the lips are covered with reddish skin, sometimes called the vermilion border, and abundantly provided with sensitive nerve endings. The reddish skin is a transition layer between the outer, hair-bearing tissue and the inner mucous membrane. The interior surface of the lips is lined with a moist mucous membrane. In newborn infants the inner surface is much thicker, with sebaceous glands and minute projections called papillae. These structural

adaptations seem to aid the process of sucking. Most of the substance of each lip is supplied by the orbicularis oris muscle, which encircles the opening. This muscle and others that radiate out into the cheeks make possible the lips' many variations in shape and expression. The lips are pretension, suction, and speech organs. The skin, superficial fascia, orbicularis muscle, and muscles inserted around it make up this structure (areolar tissue & mucous membrane). Dry, red mucous membrane covers the lips' edges, which is continuous with the skin and contains numerous vascular papillae and touch corpuscles. Internally, the mucous membrane reflects from the upper and lower lip onto the gums, forming two superior and inferior folds in the middle line.^[6]

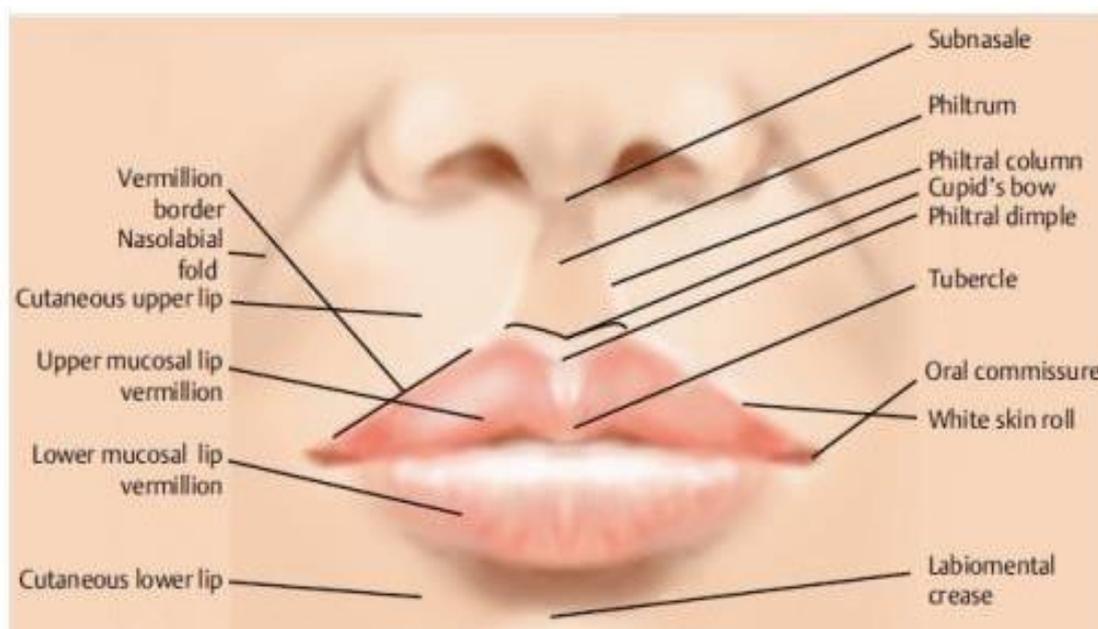
Lip Disorders^[4] :-

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. When a cause 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.

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

Discoloration: Freckles and irregularly shaped brownish areas (melanotic macules) are common around the lips and may last for many years. These marks are not cause for concern. Multiple, small, scattered brownish black spots may be a sign of a hereditary disease called Peutz-Jeghers syndrome, in which polyps form in the stomach and intestines. 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.

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.^[4]



{Anatomy of lip^[5]}Fig. 01

Lip Balm:

Lip balms are moisturizers that are applied to the lips to keep them from drying out and to protect them from the elements. Although analogies to lipstick apply because it is a cosmetic form akin to lip balm, the cosmetic literature has minimal data on this sort of formulation (stick form). This resemblance extends to organoleptic and stability needs such as temperature resistance, agreeable taste, innocuousness, smoothness during application, adhesion, and purposeful removal ease (DE Navarre, 1975; Gouvea, 2007). Lip balm and lip gloss are not interchangeable, with the former being a product that may be used by both men and women. Fatty acids, such as waxes, oils, and butters, are the key constituents of lipstick, providing consistency and acting as emollients. Castor oil, beeswax, carnauba wax, candelilla wax, paraffin, and cocoa butter are some of the most common. However, there are a few key distinctions between lipstick and lip balm, particularly in terms of functionality: lipstick is intended to colour the lips, whereas lip balm protects them. Furthermore, lipstick formulations are more complex than lip balm formulations due to the increasing number of components. To make lip balms, the concentration of the key ingredients, such as butters, oils, and waxes, must be balanced such that the final product has a fusion point of 65 to 75 degrees Celsius (Gouvea, 1993, Bonadeo, 1982). The formulation will have varying qualities depending on the

proportions of wax, oils, and colors. A high percentage of wax and pigment can be used to create a long-lasting product, while the inverse can result in a smoother lipstick or lip balm (Cunningham, 1996). The chemicals in a lip balm formulation can have an adverse effect on softening and rupture points, which are two separate features. Two formulations with the same fusion point but different consistencies can exist. To correct these problems, the formulator may have to put in a lot of effort. In order for the formulation to have appropriate fusion, softening, and rupture points, a balance between the constituents must be reached.^[8-9]

Lips are a part of the human body that is very thin as compared to face skin (Kadu et al., 2015) even though it consists of three to four layers of the skin. Lips are susceptible where lips disorder such as inflammation and swelling of lips can quickly occur. Inflammation occurs when the corner of lips become painful, cracked and irritated (Kadu et al., 2015) while swelling happens when some people may have an allergic to certain foods such as seafood and causing the lips to become swelling. Besides, a hereditary condition also can lead to lip swelling (Chaudhari et al., 2018). Therefore, lips must be moisturised using any lip product such as lip balm when the lips disorder appears. The use of tested lip balm is essential to prevent any disease happens.

Currently, lip products made from

enormous chemical ingredients have been grown in the market even though it will bring adverse side effects to the users (Kadu et al., 2015). People nowadays are demanding on the naturally derived ingredients as they believed that the natural ingredients could contribute to sound effects on their lips. However, most of the home-made lip balm products (purposely to sell the product) have not tested for their physicochemical properties to make sure the suitability of the product to human lips. The tested lip balm will help in preventing any adverse side effects that could bring any lips disorder to the users.

Formulation of natural lip balm consists of natural ingredients such as beeswax (acts as a base), oil (acts as a solvent) and also natural colouring agent. The natural colouring agent can be varied from any plant, including *Beta vulgaris* or commonly known as beetroot. Beetroot is a perishable vegetable which the minerals content such as iron and calcium may increase because of the reduction of water mass during storage before it is used (Dhawan et al., 2019). Beetroot contains purplish-red pigment, termed as betalain (Emerton, 2008), a water-soluble and nitrogen- containing dye. The compound comprises the red-violet betacyanin and the yellow betaxanthins (Merreddy et al., 2017). Apart from the colouring agent, there are several active ingredients in beetroot that are beneficial to the human body such as carotenoids (Singh et al., 2014) and anthocyanins (Gengatharan et al., 2015). Carotenoid in beetroot acts as anti-inflammatory, anti- microbial, anti-fungal and rich in nutrients (Kale et al., 2018) while anthocyanins functions as a potent antioxidant, anti-inflammatory and cardio protective activity (Ahmed et al., 2013; Gerardi et al., 2018; Kong et al., 2003). Anthocyanins can also be a source of red pigment. However, betalains are more water-soluble than anthocyanins, and they have three times higher colouring strength than anthocyanins (Merreddy et al., 2017). Besides, betalains are more stable to pH and temperature than anthocyanins even though it has been widely used in industries. Beetroot is also a good source of dietary fibre that contains vitamins, minerals, and high nutritional because it contains high glucose content (Da Silva et al., 2019).

Therefore, the use of beetroot in the formulation of lip balm can be profitable to the lips. The most important reason is it will be used as a colouring agent due to non-toxic effects on the human and have a natural and safe alternative to be used as red dyes (Elbandy & Abdelfadeil, 2008). In

this study, all-natural ingredients were utilized in the lip balm formulation to find the best concentration of base, oil and beetroot. Virgin coconut oil was used as oil because it contains natural vitamin E that acts as an antioxidant and helps to increase the shelf life of oilbased products (Rizvi et al., 2014). Beeswax was used as a base for the lip balm formulation because it is more stable due to the higher melting point (Kadu et al., 2015) as compared to another base like cocoa butter. This study focuses on the determination of the best ratio for all ingredients to formulate lip balm from beetroot. It is an important step to balance the concentration of all ingredients used to develop a lip balm to make sure the stability of the product (Ribeiro Fernandes et al., 2013). Besides, this study emphasized the analysis of physicochemical properties of the formulated lip balms before these products are tested in sensory evaluation.

Now a days, people increasing interest in natural products, as the public becomes aware of ecological and environmental effects related to the use of abundant chemicals in the daily products. Cosmetics made from natural sources as raw material considered as organic cosmetics which are believed as safe and sometimes may act as health cure. Furthermore, no or mild chemical reactions are involved in the preparation of the product and it claims as harmonized with nature. Organic cosmetics refer to the cosmetics that made by 95% of the raw materials comes from natural sources, while natural products contain at least 5% organics raw materials as an ingredient (Fernandes et al., 2013). One of the main source of raw materials in cosmetic is dye or colourant. Natural dyes refer to the colorants produced from the natural sources such as plant, animal, insect or minerals. The dyes also can be used widely in the colouration of textiles, foods, medicine and craft products as well as in cosmetics. Although, some processing was required in the process to obtain the dyes but essentially the dye itself was obtained from natural sources. The greatest sources of dyes were been the Kingdom Plantae, notably fruits and leaves. Lip balm refers to the formulations that can be applied onto the lips to prevent drying and protects lips against adverse environmental factors (Kadu et al., 2014). There are many established companies produce lip balm in the market such as The Body Shop, Nivea, Mentholatum etc which may contains chemical origin. However, it is necessary to balance the concentration of the main ingredients to formulate lip balms including the base, oils, colouring agents and flavouring agents. Natural lip

balms offer a natural way to maintain and promote healthy lips (Fernandes et al., 2013). Lip balms are also often eaten away by the user and it is imperative that the ingredients are not dangerous to humans on consumption. There are four main components as key formulations ingredients for natural lip balm (Kadu et al., 2014). Basically, waxes are used as base to give the more stable structure and make it easier to form desirable shape of lip balm. Oils are required to blend properly to the waxes, so that provide a suitable film on the applied lip skin to protect and moisturizes the lip. Colouring agents or dyes is mainly used to impart a distinctive appearance to the products. Dye is an important ingredient of cosmetic formulations as user desire controlled by three senses namely sight, touch and smell (Kadu et al., 2014). Dyes used is cosmetic should not affected by oxidizing or reducing agents as well as pH changes and it also should not interferes with the tests and assays. The usage of synthetic dyes was done commercially for attractive colours but it is hazardous to skin and environment (Devi et al., 2013).

The natural dyes have not commercially succeeded as synthetic dyes due to lack of the botanical knowledge and precise technical knowledge on the extraction methods and dyeing procedure (Devi et al., 2013). Flavoring agents is required to mask the four basic taste sensations namely salt, bitter, sweet and acid from the other ingredients. This is optional to give a value added in the products. In this research, natural dyes from the plant roselle, dragon fruit, betel leaf, beetroot and red cabbage was extracted to produce a high

quality of desirable natural dyes mainly because of the quality of colour that can be created with them.

Application of Lip Balm:-

Lip balms are formulations applied onto the lips to prevent drying 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, etc. The cosmetic literature reports limited data on this type of formulation, although references related to lipstick apply because it is a cosmetic form similar to lip balm. This similarity extends to include organoleptic and stability requirements such as resistance to temperature variations, pleasant taste, innocuousness, smoothness during application, adherence and easy intentional removal. Lip balm should not be considered equivalent to the lip gloss, with the former being a product intended for use by both men and women.

To formulate lip balms, it is necessary to balance concentration of the main ingredients including butters and waxes and other excipients. Many people weekly facials, daily skin scrubs, anti-aging lotions, many other products to ensure they have healthy and glow skin. But with all the attention being given to healthy skin care is largely forgotten. Natural lip balms offer a natural to maintain and promote healthy lips. Lip balm often eaten away by the user and hence it is imperative health regulators have a microscopic look at the ingredient that go in to the lip balm. The dyes that contribute to the of the lip balm are dangerous to humans on consume.^[7-8-9]

BOTNICAL IDENTIFICATION OF BEET ROOT :-

Plant : -



Fig no. 02^[3]

Taxonomy :-

- 1) Biological name :- Beta vulgaris
- 2) Family :- Amaranthaceae
- 3) Subfamily :- Betoideal
- 4) Kingdom :- Plantae
- 5) Order :- caryophyllales
- 6) Genus :- Beta
- 7) Clade :- Angiosperms
- 8) Species :- B. Vulgaris

Synonyms :-

Bengali : Bita gacha Malayalam : Bit Marathi : Bita Punjabi : Beet

Tamil : Carkkarai vali kilanku ceti Telegu :

Dumpamokka

Gujarati : Salada Kannada : Gajarugadde

Biological source :- Beet root it consists of fresh root of Beta vulgaris belong to Family Chenopodiaceae.

Etiology:-Beets are a food plant for the larvae of a number of Lepidoptera species .

Geographical Source :- Beetroot was domesticated in the ancient Middle East, primarily for their greens, and were grown by the Ancient Egyptians, Greeks and Romans. By the Roman era, it is thought that they were cultivated for their roots as

well.

Cultivation Collection :-

Cultivars : The choice of cultivar is influenced by days to maturity, root size and shape, foliage size, exterior surface smoothness, interior colour and degree of zoning. The hybrid (F1) cultivars available for summer production offer many advantages. Although these beets are expensive, they are worth growing because they are better quality, more adaptable to extreme high temperatures and so are more uniform in shape, produce greater yields and have better internal colour. Hybrids also taste better, especially out of season.^[10-11]

Planting A soil pH above 5.5–6 is a good amount to plant the beetroot, otherwise growth will be stunted. You need to till in aged manure before planting. Beets need especially good nutrition and a high phosphorus level to germinate. Nitrogen is very helpful however, an excess will cause sprawling greens and tiny bulbs beneath the soil which is not good. In areas with low moisture, you have to soak the seed for 24 hours. The seed has to be at 50 degrees before planting.

LEAVES :-

Beet greens are an excellent source of vitamin K, vitamin A (in the form of carotenoids), vitamin C, copper, potassium, manganese, vitamin B2, magnesium, vitamin E, fiber and calcium. They are a very good source of iron, vitamins B1, B6, and pantothenic acid, as well as phosphorus and protein.



Fig no. 03

BARK : They improve blood structure which in turn improves the health of the circulatory system, digestive system and large intestine. Beetroots contain betaine, a compound that works together with choline (a B-complex vitamin also found in beets), to prevent build up of homocysteine levels in the blood.



Fig no. 04

FLOWERS :-

The garden beet is a biennial plant and is primarily grown for the thick fleshy taproot that forms during the first season. In the second season a tall, branched, leafy stem arises to bear clusters of minute green flowers that develop into brown corky fruits commonly called seed balls.



Fig no. 05

FRUIT :-

Beets are rich in folate (vitamin B9) which helps cells grow and function. Folate plays a key role in controlling damage to blood vessels, which can reduce the risk of heart disease and stroke. Beets are naturally high in nitrates, which are turned into nitric oxide in the body.



Fig no.06

Role in ingredient :-

1. Beetroot:



Fig. no. 07

The beetroot extracts present in the lip balm moisturize and hydrate your lips to restore balance and good health for your lips. Vitamin-E & essential oils present in the lips form a protective base for your lips to avoid damaged lips.

2. Coconut oil:-



Fig.no. 08

The primary benefit of coconut oil is its moisturizing effects. This makes it ideal for chapped lips. Your lips are particularly sensitive to moisture loss because the skin is thin, and they're exposed to the elements more so than other parts of your skin.

3. Beeswax:



Fig.no.09

Beeswax is perhaps the most essential ingredient in our lip balms. This is because it contains natural moisturizers that lock in moisture from the air and help keep the skin looking firm and plump.

4. vitamin E:



Fig.no.10

Vitamin E can also help to close up those painful cracks in the skin that are caused by dryness and cold weather. By applying the award-winning AM/PM Tinted Lip Balm with Vitamin E, you can seal up these cracks and keep the skin of your lips soft, supple.

5. **Cocoa butter:**



Fig.no.11

Cocoa butter is an emollient that is a great source of natural antioxidants. It adds a protective hydrating layer to lips, helping protect them from extreme temperatures and indoor heat that can leave your lips dried out. Vitamin E is known for its restorative skin properties and healing ability.

6. **Petroleum Jelly**



Fig.no.12

Helps soothe and heal dry lips by locking in moisture, resulting in beautiful, visibly healthy lips. Made with Vaseline Jelly and designed to protect the skin on your lips, it provides the long-lasting moisturization your lips need. Adds a sheer pink tint to your lips and leaves behind a light rosy fragrance.

8. **Rose water :-**



Fig.no.13

Rose water moisturises your lips and makes them pink and plump. All you need to do is take some rose water on a cotton pad and dab it over your lips. Then, apply a good layer of lip balm. Voila, you have your soft pink lips.

9. Glycerol



Fig.no.14

Glycerin being a natural humectant does an excellent job of absorbing and retaining moisture. It can seal any cracks or flaky skin on your lips and make them super soft and plump. If your lips are naturally dark, pigmented or dis-coloured, then glycerin is going to transform them into super plush, pink lips.^[16-17-18]



Fig.no.15^[16-17-18]

LIST OF INGREDIENT :-

| BASE | OIL | COLOURINGAGENT | FLAVORINGAGENT |
|-----------------|-------------|----------------|----------------|
| Cocoa butter | Coconut oil | Beet root | Honey |
| Bees wax | Almond oil | Honey | Rose water |
| Petroleum jelly | Vitamin-E | Watermelon | Orange |
| White bees wax | Lemon oil | Rose | Lemon |

Table no. 01

Base :-

Waxes form an important group of ingredients for the manufacture of personal care products and decorative cosmetics. Waxes are used in different industries and products. They are predominately used in candles, but also find important applications in food, cosmetics and pharmaceutical industries as thickeners/emulsifiers. Chemically, waxes are complex mixtures of hydrocarbons and fatty acids combined with esters. Waxes are harder, less greasy and more brittle than fats. They are very resistant to moisture, oxidization and bacteria. There are four categories of waxes as: (a) Animal Waxes: Beeswax, lanolin, spermaceti; (b) Plant Waxes: Carnauba, Mineral Waxes: Ozokerite, paraffin, microcrystalline ceresin; (d) Synthetic Waxes: Polyethylene, carbowax, stearon. The most widely used waxes for cosmetic products are beeswax, carnauba and candelilla wax. Waxes are esters of a fatty acid and a fatty alcohol. Jojoba is therefore a wax, not oil. Physically, waxes are characterized by a high melting point (50-100°C). The used wax is beeswax which is a good emollient thickener. Two other natural waxes often used in cosmetics are carnauba and candelilla wax. Both are harder and have a higher melting point making them more stable and suitable for dry products e.g. lip balm.

Cocoa butter is a natural fat that comes from cocoa bean and it gives a creamy softness to the lip balm. It will nourish and moisturize lips and help heal chapped and dry lips because it contains antioxidants^[17&18]. Another important and useful component of lip balm is white beeswax with melting point 62°-64°C. It usefully binds oils and high melting point waxes. It is used in 3 to 10% of the total formula. It shrinks on cooling and thus helps preparation of molded products. At higher concentration it produces a dull appearance

and causes the balm to crumble during use. Candelilla wax has a melting point 65°-69°C and can be used in 5-10% of formulation. A mixture of candelilla wax and beeswax is very good for making lip balm. If candelilla wax is used to a little in excess than beeswax the product gets a smooth and glossy appearance. On the other side carnauba wax increases the melting point of the base and hardens the lip balm therefore used in very small amounts. It brings an attractive luster to the products.

Beeswax:

Beeswax is used as an emollient and thickener to achieve lip balm consistency. The wax is insoluble in water but can be dissolved in organic solvents, such as acetone, chloroform, and benzene. It can be obtained straight from a bee farm or bought from another company in a form of solid pellets. Beeswax is chosen in a form of solid pellets from PT Sumber Berlian Kimia and delivered from Jakarta, Indonesia. One package of this product contains 1 kg of beeswax, and the required amount is 4 kg of beeswax per day.

Honey :-

Honey functions as a natural humectant and emollient, serves as a source of vitamins B1 and B6 (nourishment), stimulates new skin cell formation (softening lips), elicits an anti-inflammatory effect on chapped lips, protects the lips from the damaging effect of free radicals, exhibits antibacterial and antiseptic properties to prevent bacterial infection, and provides relief to symptoms of chapped lips because of its vitamin C content. Raw honey is obtained by pressing beehives and then purifying it into pure honey.^[8]

Petroleum jelly :-

Chapstick moisturizes dry lips, and Vaseline helps in sealing the moisture in and keeping the skin barrier intact. While you can get away with using just chapstick, there is no point in using Vaseline without applying chapstick first.

Oil:

Oils and fats are differing in their physical forms; generally the latter are solid at room temperature. Both fats and oils are chemically glycerol esters composed of glycerol and fatty acids and are also called as triglycerides. Fatty acids can be saturated or unsaturated, thereby determining the stability and property of the oil. Oils with a high degree of saturated fatty acids (lauric, myristic, palmitic and stearic acids) include coconut oil, cottonseed oil, and palm oil. Oils with a high degree of unsaturated fatty acids (oleic, arachidonic, linoleic acid) are canola oil, olive oil, corn oil, almond oil, safflower oil, castor oil and avocado oil. Saturated oils are more stable and do not become rancid as quickly as unsaturated oils. However, unsaturated oils are smoother, more precious, less greasy, and better absorbed by the skin. Natural butters like shea butter, avocado butter or cocoa butter are not true butters but natural fats. In general, natural butters are excellent emollients and thickeners and dependent on the type may have various additional properties (e.g. Antioxidant & and soothing properties in shea and avocado butter due to phenolic compounds). The oil mixture is required to blend properly with the waxes to provide a suitable film on the applied lip skin. An ideal mixture is one which enables the product to spread easily and produces a thin film with good covering power. Sunflower or olive oil, both oils will give a great gloss to lips. Castor oil is used in many lip balm because of its good qualities, though now days some other oils or solvents are being used. A refined grade castor oil is of good color and is odorless and tasteless. Castor oil is a very good plasticizing agent. An antioxidant is to be added to the castor oil against rancidification though it is not as prone to rancidification as other vegetable oils like olive oil or almond oil. Jojoba oil is known for its skin-softening properties which can prevent lips from dehydrating. While wolfberry seed oil is renowned for its moisturizing and skin conditioning properties. Rosehip oil is excellent for maintaining then natural moisture balance in skin. Vitamin E is a well-known antioxidant that plays an essential role in the lip balm base. Peppermint essential oil energizes and revitalizes skin.

Cinnamon essential oil is an excellent antioxidant. Lavender essential oil is soothing and nourishing to skin. And grapefruit essential oil is light and refreshing for dry lips. Almond oil is pale yellow oil with slight characteristic odour. It consists of glycerides chiefly of oleic acid with smaller amounts of other acids namely, linoleic, myristic and palmitic. It has emollient properties.^[15-16]

Oils and fats are differing in their physical forms; generally the latter are solid at room temperature. Both fats and oils determining the stability and property of the oil. Oils with a high degree of saturated fatty acids (lauric, myristic, palmitic and stearic acids) include coconut oil, cottonseed oil, and palm oil. Oils with a high degree of unsaturated fatty acids (oleic, arachidonic, linoleic acid) are canola oil, olive oil, corn oil, almond oil, safflower oil, castor oil and avocado oil. Saturated oils are more stable and do not become rancid as quickly as unsaturated oils. However, unsaturated oils are smoother, more precious, less greasy, and better absorbed by the skin. Natural butters like shea butter, avocado butter or cocoa butter are not true butters but natural fats. In general, natural butters are excellent emollients and thickeners and dependent on the type may have various additional properties (e.g. antioxidant & and soothing properties in shea and avocado butter due to phenolic compounds). The oil mixture is required to blend properly with the waxes to provide a suitable film on the applied lip skin. An ideal mixture is one which enables the product to spread easily and produces a thin film with good covering power. Sunflower or olive oil, both oils will give a great gloss to lips. Castor oil is used in many lip balm because of its good qualities, though now days some other oils or solvents are being used. A refined grade castor oil is of good color and is odorless and tasteless. Grape fruit essential oil is light and refreshing for dry lips. Almond oil is pale yellow oil with slight character odour.

Colouring Agents: -

Colorants or coloring agents are mainly used to impart a one of a kind looks to the Cosmetic products. Color has been utilized in cosmetics on the grounds that early times. Basically, a desire to buy a beauty product is controlled with the aid of using 3 senses particularly sight, contact and smell. As such as, shadeation is a critical aspect of beauty formulations. The satiation is imparted to the lips in ways; (a) By staining the pores and skin with an

answer of dyestuff which can penetrate the outer layer of the lip pores and skin, (b) By masking the lips with a coloured layer which serves to hide any pores and skin roughness and supply a clean look. The first requirement is met with the aid of using soluble dyes and the second is met is insoluble dyes and pigments which make the movie greater or much less opaque. Modern lip balms comprise both to achieve the blended effect. The colours must be from the listing of licensed dyes beneath the medicine and cosmetics act. The naturally going on colours.^[15-16-17-18]

Flavoring agent:-

To hide the four basic taste sensations, flavor's or flavouring agents are frequently required. Flavors is a multisensory experience involving taste, touch, smell, sight, and sound, all of which are influenced by a mixture of physiochemical and physiological processes. Many artificial or imitation flavour's have been created as technology in the flavors industry has advanced. It's more of an art than a science to create a suitable flavour . Flavorants are

chosen based on the drug's flavors profile, or other substances may be required. The following Table 3 depicts the masking flavors in relation to various tastes. Lip balm flavors should not contain any ingredients that are irritating or harmful. These should have a pleasant flavour and be able to hide the base's greasy odours. Flavoring chemicals are necessary to hide the odors of the fatty or wax basis while also imparting a pleasing flavour. They're usually employed at a concentration of 2-4 percent of the final product. The flavour of the lip balm should be steady and suitable with the other ingredients. The flavors should not be so strong that they clash or overshadow other flavor's that may be utilised with the lipbalm at the same time. Perfumes with a fruity scent have also been recommended. It's also possible to use something edible. Apricot, strawberry, raspberry, cherry, honey, and other flavors are common. Honey has the ability to act as a natural preservative for food. Product intended for use by both men and women.^[17-18]

Flavoring agent:-

| Taste | Masking Flavouring |
|--------|--|
| Salt | Butterscotch, maple |
| Bitter | Bitter Wild cherry, walnut, chocolate-mint, licorice |
| Sweat | Fruit, berry, vanilla |
| Acid | Citrus |

Table no.02

CHEMICAL COMPOSITION OF BEET ROOT :-

Betalains are unique nitrogen-containing pigments found exclusively in families of Caryophyllales order and some higher order fungi, where they replace anthocyanin pigments . Beta vulgaris betalains include two classes of compounds: betacyanins, which are red violet and betaxanthins (predominantly, vulgaxanthin-I), which are yellow. The major betalain in red beet is betanin, which is betanidin-5-O-beta-glucoside, containing phenolic and cyclic amine groups, acting as antioxidants . Betanin, the major betalain in red beetroot, showed poor bioavailability . Commonly betalains are used as food colorants.

The five examined Beta vulgaris cultivars from Hungary showed no significant differences in

the content of red-violet pigments . However, studying commercial beetroot products and beetroot juice prepared from seven red beet varieties grown in Upper Austria, it was found, that total betalain content is variety- specific. In comparison to other vegetables, the antioxidant capacity of beets is very high. A highly significant correlation was demonstrated between antioxidant capacity and the contents of red pigments, whereas a remarkably less tangible relationship was found between antioxidant capacity and content of yellow pigments. Betalain's other biological effects are uncertain. Betaine (trimethylglycine) is found naturally in most living organisms and rich dietary sources include seafood, especially marine invertebrates (~1%), wheat germ or bran (~1%) and spinach (~0.75%).^[12-16]

| Beet | | |
|---------------------------|----------------|-----------|
| Nutrition Facts | | |
| Serving size | 100 g | DV |
| Calories | 43 kcal | 2% |
| Total Carbohydrate | 9.6 g | 3% |
| Dietary Fiber | 2.8 g | 11% |
| Sugars | 6.8 g | |
| Total Fat | 0.2 g | 0% |
| Protein | 1.6 g | 3% |
| Vitamin C | 4.9 mg | 8% |
| Niacin | 0.3 mg | 2% |
| Vitamin B6 | 0.1 mg | 3% |
| Folate | 109 µg | 27% |
| Pantothenic Acid | 0.2 mg | 2% |
| Betaine | 129 mg | |
| Calcium | 16 mg | 2% |
| Iron | 0.8 mg | 4% |
| Magnesium | 23 mg | 6% |
| Phosphorus | 40 mg | 4% |
| Potassium | 325 mg | 9% |
| Sodium | 78 mg | 3% |
| Zinc | 0.4 gm | 2% |
| Copper | 0.1 mg | 4% |
| Manganese | 0.3 mg | 16% |

% Daily values (DV) are based on a 2000 calories Diet.
 DV may be higher or lower depending on your calorie needs.

II. MATERIAL AND EQUIPMENT :-

Material^[1-8-9] :-

| Sr.no. | Material |
|--------|-----------------|
| 1. | Beet root |
| 2. | Bees wax |
| 3. | Almond oil |
| 4. | Vitamin E |
| 5. | Petroleum jelly |
| 6. | Cocoa butter |
| 7. | Coconut oil |
| 8. | Honey |
| 9. | Glycerol |
| | |

| | |
|-----|------------|
| 10. | Rose water |
|-----|------------|

Equipment :-

| Sr.no. | Equipment |
|--------|------------------|
| 1. | Autoclave |
| 2. | Centrifuge |
| 3. | Melting point |
| 4. | Apparatus |
| 5. | Weighing balance |
| 6. | Ice bath |
| 7. | Water bath |
| 8. | Beaker |

Table no.05

Formulation :-

1. Lip balm (F1) :-

| Sr.no. | Ingredient | Quantity % |
|--------|--------------|------------|
| 1. | Beet root | 0.60 ml |
| 2. | Cocoa butter | 5 mg |
| 3. | Bees wax | 3 mg |
| 4. | Almond oil | 0.50 ml |
| 5. | Vitamin-E | 0.03 ml |
| 6. | Glycerol | Q.S |
| 7. | Rose water | Q.S |
| 8. | Lemon oil | 0.20 ml |

Table no. 06

Lip Balm (F2) :-

| Sr.no. | Ingredient | Quantity % |
|--------|-----------------|------------|
| 1. | Beet root | 0.60 ml. |
| 2. | Petroleum jelly | 5 mg. |
| 3. | Coconut oil | 3 ml. |
| 4. | Glycerol | Q.S |
| 5. | Rose water | Q.S |

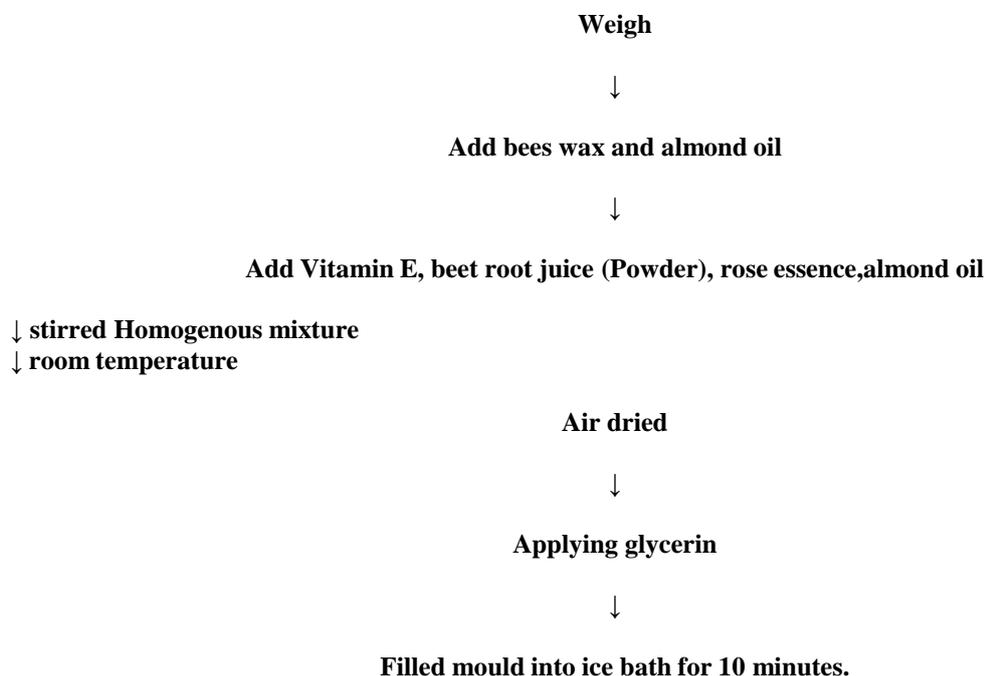
Table no.07

Lip balm (F3) :-

| Sr.no. | Ingredient | Quantity % |
|--------|--------------------|------------|
| 1. | Beet root (Powder) | 0.20 mg. |
| 2. | Petroleum jelly | 5 mg. |
| 3. | Almond oil | 2 ml. |
| 4. | Vitamin-E | 0.30 ml. |
| 5. | Glycerol | Q.S |
| 6. | Rose water | Q.S |

Table no.08

Formulation and Preparation^[1] :-



METHOD OF PREPARATION :-

01] FORMULATION :-

- I. Weigh all the excipients.
- II. Add bees wax and almond oil in a beaker and melt it in water bath at 55-66⁰ c.
- III. Add all other ingredients like vitamin E, beet root juice, rose essence, almond oil were mixed vigorously and add to the mixture and mixture was stirred continuously till homogenous mixture was obtained.^[19-20]
- IV. A mixture was poured into the container and it was let to be air dried at room temperature.^[18]
- V. Before pouring the mixture in lip balm moulds, on the mould applying glycerine with the help of cotton, put the filled moulds into ice bath for 10 min.

2] FORMULATION :-

- I. Weigh all the excipients.
- II. Add coconut oil and beet root juice in a beaker and melt it in water bath at 55-66⁰ c.
- III. Add all other ingredients like vitamin E, rose essence, almond oil were mixed vigorously and add to the mixture and mixture was stirred continuously till homogenous mixture was obtained.
- IV. A mixture was poured into the container and it was let to be air dried at room temperature.

- V. Before pouring the mixture in lip balm moulds, on the mould applying glycerine with the help of cotton, put the filled moulds into ice bath for 10 min.

3] FORMULATION:-

Method of preparation:-

1. To prepare this lip balm we need pure beetroot. Then grate it using a grater with small holes. After grating squeeze out the juice through a cheese cloth.
2. Take 60 ml of beetroot juice. Add 30gm of Coconut oil to the juice. Give flame to the mixture. Make sure to mix occasionally.
3. When we notice that the beetroot juice starts to caramelize, reduce the heat to low so that it does not burn.
4. At this stage, take the flame off. Immediately pour the mixture into a beaker or a heat resistant cup.
5. Add 5.5gm of beeswax and cocoa butter. Then melt the wax and butter using the double boiler method.
6. When the wax and butter is melted, remove from water bath and let it cool a little.
7. When it cools down, add in it vitamin E capsule. Mix for some few seconds.
8. Then keep in the fridge for 30 min for the mixture to solidify.
9. After 30 min, mix well till it get a smooth consistency. When it mixed well, transfer it into a clean container.
10. This can be used as a lip balm and also as a substitute for a lipstick. Make sure your hands are clean when using this lip balm.^[15-18-19]

EVALUATION PARAMETER :-

Texture: -The formulated lip balm sample was placed on the base of the AMETEK Brookfield CT-3 Texture Analyzer. Cylinder probe (TA39) was attached to the load cell since it is the most suitable probe for cosmetic products.

Colour: -The colour analysis of lip balms was evaluated using the Konica Minolta CR-400 chroma meter. This chroma meter has three indicators which contributing to lightness, redness and yellowness of the tested sample.

Measurement of pH :- In this study, the pH meter model HI-2211-01 was used to measure the pH value for all formulated lip balm. The pH meter was calibrated using a buffer solution before continuing the pH measurement of the lip balm. The pH value for the lip balm sample was

measured and recorded.^[18]

Melting Point- The sample of lip balm is taken in a glass capillary whose one end was sealed by flame. The capillary containing drug dipped in liquid paraffin inside the melting point apparatus. Melting was determined and melting point was reported.^[20-21]

Organoleptic properties:- The formulation was studied for physical appearance, colour and odour. The presence of coarse particles and consistency were used to evaluate the texture and homogeneity of the formulations.

Greasiness:- 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.

Stability Testing:- Three best formulations that showed the nearest values of all physicochemical properties with the commercial lip balm were selected and scrutinised for their stability. The stability test for lip balms was conducted for 4 weeks to evaluate the sustainability of them when placed at two different temperatures (chiller, $4 \pm 1^\circ\text{C}$ and room temperature, $27 \pm 1^\circ\text{C}$). The other physicochemical tests, including pH, colour and texture of the lip balm were conducted for every week of the stability test period.^[22]

Skin Irritation test:- It is carried out by applying lip balm on the skin for 10 min.^[21-22]

Test of spreadability:- The test of spreadability consisted of applying the product repeatedly onto a glass slide to visually observe the uniformity in the formation of the projective layer and whether the stick fragmented, deformed or broke during application.⁽¹⁶⁾ Prepared lip balm, initially has shown G- Good: uniform, no fragmentation, perfect application, with any deformation at room temperature.^[18]

Skin Sensitivity- It was carried out by applying the product in the form of a patch on the skin for 30 min and observe the reaction as-
N -No reaction,
R-Redness of the skin,
I- Itching, swelling, inflammation.^[18-20]

Result and discussion :-

1] Formulation :-

1. Melting point :-

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 cream colour with pleasant odour.

| Sr. no. | Parameter | Observation |
|---------|------------|-------------------|
| 1. | Colour | Cream |
| 2 | Appearance | Excellent, Smooth |
| 3. | Odour | Pleasant |

Table no. 09

3. Test of Spreadability:-

Prepared lip balm has initially shown G- Good : uniform , no fragmentation , perfect application , without any deformation at room temperature[Spredability-8 cm.].

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).

4. Measurement of pH:-

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

6. Greasiness: -

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].

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-

2] Formulation :-

1. Melting point :-

Melting point of lip balm was found to be in the range of 65⁰C- 70⁰ C, which matches the appropriate melting point of between 65⁰ -75⁰C.

2. Organoleptic Properties :-

Prepared lip balm has shown cream colour with pleasant odour.

| Sr. no. | Parameter | Observation |
|---------|------------|-------------------|
| 1. | Colour | Red |
| 2 | Appearance | Excellent, Smooth |
| 3. | Odour | Pleasant |

Table no.10

3. Test of Spreadability:-

Prepared lip balm has initially shown G- Good : uniform , no fragmentation , perfect application , without any deformation at room temperature.[Spredability -7cm.]

4. Measurement of pH:-

pH of lip balm was near to neutral pH i.e. 7.0, this would not cause any irritation to 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).

It was observed that prepared lip balm shows I - Intermediate uniform ; leaves few fragments; appropriate application ; little deformation of the lip balm at room temperature (25.0+- 3.00 C) and refrigeration (4+-2.00 C) and little

deformation at oven temperature (40.0+- 2.00 C).

6. Greasiness:-

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. [3 drops].

3] Formulation:-

1. Melting point :-

Melting point of lip balm was found to be in the range of 66⁰C- 72⁰C, which matches the appropriate melting point of between 650 -750C.

2. Organoleptic Properties:-

Prepared lip balm has shown cream colour with pleasant odour.^[8-9]

| Sr. no. | Parameter | Observation |
|---------|------------|-------------------|
| 1. | Colour | Brownish |
| 2 | Appearance | Excellent, Smooth |
| 3. | Odour | Pleasant |

Table no.11

3. Test of Spreadability :-

Prepared lip balm has initially shown G- Good : uniform , no fragmentation , perfect application , without any deformation at room temperature.[Spreadability- 6cm.]

4. Measurement of pH:-

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

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. [4drops].

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.

Step Two: 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.^[6-7-9]



Fig.no.16

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.

III. Conclusion :-

Cosmetics chemists choose from thousands of ingredients when they create new products, but they are always careful to select ones with chemical properties that enhance the look, feel, and use of the product they are making. For instance, no one wants lip balm to be too hard, which is why most homemade lip balm recipes call for some type of oil or butter. Oils are generally thick, viscous liquids at room temperature and are usually emollients, meaning that they soften and smoothen the skin. Butters are another kind of

emollient; they are soft, but not liquid, at room temperature. On the other hand, a super soft, runny lip balm would be too messy, so waxes, like beeswax, which are solids at room temperature, are added to thicken the recipe. The “perfect” product means getting just the right ratio of emollients to waxes.^[7-9-10]

Our product has the following advantages. It is an exclusively patented product. Contains a combination of a humectant, an emollient and an occlusive humectant to lock lips in moisture. By the government Can be used by both men and women. It has additional functions such as nutrition, scar healing and sun protection. Our product concept is a long-lasting moisturizing herbal lip balm with honey, hyaluronic acid and SPF. Our product has a positive impact on consumers’ lips because it is made from 100% botanical ingredients that contain a combination of emollients, humectants and occlusive agents to prolong the duration of our lip balm’s moisturizing

benefits.

The aim of current research work was to prepare lip balm by using maximum possible natural ingredients. Mainly beetroot extract chosen as a colouring agent, rose water used as a flavouring agent, vitamin E capsule used as an antioxidant, almond oil was used as moisturizing agent. The effects of these ingredients on physicochemical properties such as organoleptic characteristics, melting point, consistency and spreadability on formulation were studied. It can be concluded that lip balm formulation was successfully prepared by using these natural additives. Results of various tests implied that the formulation passed various tests physicochemical tests and safe to use. Based on stability data, the storage condition for the formulation is at room temperature. In the current formulation, Beeswax was used as a base, in the future; it can be replaced with a natural base like Shea butter, paraffin wax, etc.

The dye yield resulted from the solvent extraction method and the colour strength produced after formulation of lip balm indicated that dye plants under this study have considerable potential for application as a source of natural dye for cosmetic purpose. Ethanol showed the best solvent in this extraction method. This research results also showed that all the lip balm made from natural dyes were stable and had a good force of application. In addition, after 1 year storage in the room temperature, the condition of the product was still good. Finally yet importantly, this product did not cause irritation to lip. Meanwhile, they were safe to apply as organic cosmetics. In order to produce the high quality of extracted dye for the purposes in the cosmetic; integrated knowledge of the extraction procedures and the treatments of the plant parts that want to apply as a dye are needed. There are broad of procedures that will make the production of dyes are present in many conditions. For instant, the selection of solvents and the adjustment concentration of solvents used will make the yield of dye extracted in a variety of colours are need to be focused.^[18-19-22]

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