

Formulation And Evaluation of Giloy Lip Balm

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Abstract— Cosmetics are high demand products worldwide. Majority of people use cosmetics on daily basis. Consumers are focusing on all natural products and turning towards natural cosmetics as they are environment friendly and safe. Lip balm is a cosmetic product used for lip care. It helps to prevent chapped lips, lip tanning, lip acne, dry lip etc^[1]. In the present work, herbal lip balm is formulated using *Tinospora cordifolia* as the main ingredient. The pH of the lip balm was found to be 5.0 and the melting point was 56°C - 57°C. After performing stability studies at room temperature (25.0°C ± 3.0°C), refrigerated condition (4.0°C ± 2.0°C) and oven temperature (40.0°C ± 2.0°C), it proved that prepared lip balm was uniform in nature, without any deformation at room temperature and refrigeration. The prepared lip balm was evaluated for the parameters such as colour, appearance, odour, pH, patch test, spreadability, aging, stability & melting point.

Indexed Terms- Giloy, Beeswax, Petroleum jelly, Coconut oil, Saffron, Honey

I. INTRODUCTION

Cosmetics help in presenting and increasing the beauty and personality aspects of human beings^[1]. Herbal cosmetic is growing rapidly as most women prefer natural products rather than chemicals products for their personal care. Herbal cosmetic contains natural nutrients to improve and provide consumers satisfaction due to relatively fewer side effects compared to synthetic cosmetics^[2]. Lip care products are an integral part of a day-to-day lifestyle. These impart the colour and protect the lips from the external environment. The major function of lip balm is to protect and moisturize the lips. A variety of lip care products are available in the market. The main concern with this product is that these contain synthetic colourant and flavouring agents that may have adverse effects such as darkening of lips^[3]. Synthetic colouring agents used in cosmetics have been found carcinogenic^[4]. Hence, in the present work a lip balm comprising of herbal ingredients has been formulated and evaluated.

1.1 Introduction of Lips

1.1.1. Difference between lip and regular skin structure:

The lips are more attractive than the regular skin. The top corneum layer of the lip contains about only 3 to 4 layers in comparison to regular skin which has 15 to 16 layers. As very few melanin cells are present in the lip skin, the blood vessels are more clearly seen through the skin of the lips giving a lovely pinkish color to the lips. The lip skin shows no hair follicle or sweat glands. Thus, it lacks the sweat and body oil for protecting the lip from outside environment^[5,6].

1.1.2. Anatomy of lips

The lips serve as organs of prehension, suction and speech. It is composed of the skin, superficial fascia, orbicularis oris muscle and the muscles inserted around it. The margins of the lips are covered with dry, red mucous membrane, continuous with the skin and containing numerous vascular papillae and touch corpuscles. The mucous membrane internally is reflected from the upper and lower lip upon the gums, and in the median line forms two folds of superioris and inferioris. The areolar tissue or submucous layer contains the coronary vessels which completely encircle the buccal orifice near the free margin of the lips. The superior coronary is larger than the inferior, and anastomoses with its fellow of the opposite side and gives off a small artery to the septum arteria septi nasi. Compression of this artery will sometimes control nasal hemorrhage.

The labial glands are in the submucous layer of the lips around the orifice of the mouth. They secrete a mucous fluid. Mucous retention cysts develop when the ducts of these glands become occluded.^[7]

1.1.3 Problems associated with Lip

1.1.3.1 Swelling



Fig 1: Swelling

An allergic reaction can make the lip swell. The reaction may be caused by sensitivity to certain foods, beverages, lipstick, drugs or airborne irritants^[8].

1.1.3.2 Sun Damage:

Lips are more vulnerable to the sun's rays than other areas of skin. The skin on your lips is thinner and contains less pigment to protect cells from the sun's damaging rays. Repeated long term exposure of your lips to solar ultraviolet radiation causes actinic cheilitis. This type of damage can be reduced by covering the lips with a lip balm containing sunscreen^[8].

1.1.3.3 Inflammation:



fig 2: Inflammation

An inflammatory condition of the lips, chapped lips (cheilitis sicca) in atopic eczema, may be the only manifestation of a skin disease or appear as part of a generalized dermatosis. Inflammatory changes to the lips also occur in the context of systemic disorders such as lupus erythematosus or in allergic diseases^[9].

1.1.3.4 Discoloration:



Fig 3: Discoloration

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. Freckles and irregularly shaped brownish areas (melanotic macules) are common around the lips and may last for many years^[8].

1.1.3.5 Sores



fig 4: 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^[10].

1.1.3.6 Lip acne:



fig 5: Lip acne

It occurs on lip line because of excess oil production, bacteria, and hair follicles that are clogged by oil, dead skin and debris.

1.1.3.7 Chapped lips:



Fig 6: Chapped lip

Chapped lips refer to a common condition in which the lips become dry, cracked and sore. If marked, this can lead to bleeding and secondary infection. These include over exposure to the sun or cold wind, dehydration particularly associated with alcohol intake, and drugs which cause oral dryness including codeine, opiates, anti cholinergics and aromatase inhibitors^[11].

1.2 Introduction of Lip Balm

Lip balm or Lip salve is a wax-like substance applied typically to the lips to moisturize and relieve chapped or dry lips, angular cheilitis, stomatitis, or cold sores. Lip balm often contains beeswax and carnauba wax, camphor, cetyl alcohol, lanolin, paraffin, and petroleum among other ingredients. Some varieties contain dyes, flavor, fragrance, phenol, salicylic acid, and sunscreen.

1.2.1 Purpose

The primary purpose of lip balm is to provide an occlusive layer on the lip surface to seal moisture in lips and protect them from external exposure like dry air, cold temperatures and wind all have a drying effect on skin by drawing moisture away from the body. Lips are particularly vulnerable as the skin is so thin. Thus, they are often the first to present signs of dryness. Occlusive materials like waxes and petroleum jelly prevent moisture loss and maintain lip comfort while flavorings, colorants, sunscreens, and various medicaments can provide additional, specific benefits. Lip balm can be applied by a finger to the lips, or in a lipstick-style tube from which can be applied directly.

1.2.2 Types of lip balms

The lip balms are divided into different types by their ingredients:

UV filter lip balm: It can be applied all the year round, especially in summer or when staying in a place with an increased solar activity.

Nourishing lip balm: It works best in winter.

Moisturizing lip balm: It is good for dry lips. Moisturizing lip balm can be worn year-round.

Medicated lip balm: It should be applied with care. It acts as a softening and antiseptic medication.

Tinted lip balm: It can be applied all the year-round.

1.2.3 Advantages of Lip balm

- Moisturization of lips.
- Protection against harsh UV Rays.
- Take away dryness of lips, brighten lips and add a glossy look.
- Make lipstick glide smoothly.
- Works as a lip mask.

1.3 Introduction of Natural Lip balm

In today's fastly growing civilization demand for natural products whose production is safe to the environment and human being has increased the production of natural cosmetics. Lip balm is a cosmetic product similar to lipstick which is used to prevent lip dryness and protect against hazardous environmental factors. This work involves the production of a lip balm formulated with natural or herbal raw materials and the checking of stability tests: Melting point, evaluation of organoleptic characteristics (colour, odor and appearance) and functionality evaluation (spreadability test). Natural Lip balms are preparations applied on the lips to avoid dryness and protect against adverse environmental pollutant. Natural Lip balm helps to maintain and promote healthy lips^[12].

1.3.1 Application of natural Lip balm

Natural Lip balms are products applied onto the lips to avoid dryness and protect against adverse environmental factors.

Numerous lip balms of chemical origin are currently available in the market from companies like the Body Shop, Nivea, Himalaya, Blistex, Babylip etc.

Natural Lip balm is a product intended for use by both men and women.

To produce lip balms, it is necessary to balance the concentration of the main ingredients including butters, oils and waxes and other excipients.

Lip balms are often eaten away by the user and hence it is imperative that health regulators have a microscopic look at the ingredients that go in to the lip balm^[8].

1.3.2 Advantages of natural Lip balm

Natural Lip balms helps to care the natural health and

beauty of the lips. The Natural lip balm can be used by both men and women.

Natural Lip balm products help to protect lips affected by cold sores, chapping and dryness. The use of natural lip balm is to treat the appearance of the face and condition of the lips^[8].

1.4 INTRODUCTION OF INGREDIENTS

1.4.1 Beeswax

Scientific name: *Cera alba* Family: Apidae



Fig 7: Bees wax

Biological source: Beeswax is a naturally occurring wax produced in the bee's hives by honeybees.

Beeswax is a product made from the honeycomb of the honeybee and other bees. The mixing of pollen oils into honeycomb wax turns the white wax into a yellow or brown. It can be obtained straight from a bee farm or bought from another company in a form of solid pellets^[13].

Constituents: Acid esters, Acid polyesters, Free fatty acids, Hydrocarbons.

Benefits: Treats Diaper Dermatitis, Psoriasis, Eczema and other skin conditions, Moisturizes skin and lips, Protects the liver, Helps balance cholesterol levels, Relieves pain, Anti-Inflammatory, Helps clear acne, Treats dry and chapped lips, Reduces stretchmarks.

1.4.2 Giloy

Scientific name: *Tinospora cordifolia*

Family: Menispermaceae



Fig 8: Giloy

Biological Source: Giloy is climbing shrub native to the tropical Regions of the Indian subcontinent and china.

Country: Giloy is a climbing shrub native to tropical regions of India, Myanmar and Sri Lanka. It can also found I China and tropical areas of Australia and Africa.

Giloy is a medicinal plant used in folk and Ayurvedic medicines throughout India since ancient times^[14].

Constituents: Alkaloids, Glycosides, Steroids, Flavonoids, Phenols, Tannins, Terpenoids, Polysaccharides, Essential Oils, Fatty acids.

Benefits: "Giloy is a universal herb that helps boost immunity". It is a powerhouse of antioxidants which fight free-radicals, keep your cells healthy and get rid of diseases.

Giloy has been used in Ayurveda to treat various disorders and is also used in the food industry.

1.4.3 Petroleum Jelly

Scientific name: Petrolatum



Fig 9: Petroleum Jelly

Biological Source: It is derived from the waxy material that forms on oils rigs and is then refined to create the familiar jelly-like substance.

Constituents: It is insoluble in water. It is soluble in dichloromethane, chloroform, benzene, diethyl ether, carbon disulfide and turpentine.

Benefits: Relieving dry skin: It can relieve dry skin, including lips eyelids.

Protecting: It helps shield the lips from the sun and cold weather, as well as keep the lips from drying out and cracking.

These waxes must be removed from lubricant base oils through a dewaxing process to avoid affecting oil performance at low temperatures. Hydrogenation of local waxes to obtain medicinal macro- and microcrystalline waxes suitable for use in petroleum jelly blends that meet medicinal specifications.

1.4.4 Coconut Oil

Scientific name: Cocos nucifera L.

Family: Arecaceae (Palm family)



Fig 10: Coconut Oil

Biological Source: Coconut Oil is the oil expressed from the dried solid part of endosperm of Coconut, *Cocos Nucifera L.*

Country: Coconut oils are mostly manufactured in India, Indonesia and Philippines.

Constituents: Coconut oil is an edible oil derived from the kernels, meat and milk of the Coconut palm fruit. Coconut oils is a white solid fat below around 25°C (77°F), and a clear thin liquid oil in warmer climates.

Benefits: The primary benefits of coconut oil is it's moisturizing effects. This makes it ideal for chapped lips.

Some people use coconut oil as a wrinkle treatment. When oil is used for lips, it may help the surrounding skin look smoother and more radiant.

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 include coconut oil^[8]. Vitamin E is an antioxidant that helps protect the lips from damage caused by free radicals^[7].

1.4.5 Saffron

Scientific name: Crocus sativus

Family: Iridaceae



Fig 11: Saffron

Biological Source: Saffron is the dried stigma and style tops of *Crocus Sativus Linn.*

Constituent: Water, nitrogenous matter, anthocyanins, glycosides, monoterpenes, aldehydes, flavonoids, vitamins, volatile oil, proteins, amino acids, carbohydrates, minerals, row fibers and gums.

Country: Kashmir, Iran, Greece.

Benefits: Protection: It helps shield the lips from the sun and cold weather, as well as keep the lips from drying out or cracking.

Modern pharmacological studies have demonstrated that saffron extracts have anti tumour effects, radical scavenger properties or hypolipidemic effects^[15].

1.4.6 Honey

Scientific name: Apis mellifera

Family: Apidae



Fig 12: Honey

Biological source: Honey is a natural product formed from the nectar of flowers by honeybees. Honey is a sweet and viscous substance made by several bees, the best-known of which are honeybees. Honey is made and stored to nourish bee colonies. Bees produce honey by gathering and then refining the sugary secretions of plants or the secretions of other insects, like honeydew of aphids. Honey has anti-bacterial, anti-fungal and natural oxidant properties that are suitable to be added in the formulation of lip balm^[16].
Constituents: Carbohydrates, water, proteins, ashes and minor quantities of amino acids, phenols, pigments and vitamins.

Benefits: Helps with wounds and burns, Antibiotic, Reduce cough, Honey may be useful for controlling side effects of radiation therapy or chemotherapy used to treat cancer, Treat seasonal allergies due to pollen, Mild laxative relieves constipation, Honey is natural humectant which means it attracts and retains moisture keeping your lips hydrated throughout the day, Honey also has anti-inflammatory properties to help soothe chapped lips, Honey's antibacterial properties also help to prevent infection if the lips become cracked.

II. FORMULATION OF LIP BALM

2.1.1 List of Ingredients used in formulation and its function

- 2.1.1.1 Bees wax: as base
- 2.1.1.2 Giloy: as base
- 2.1.1.3 Petroleum Jelly: For Nourishing and Moisturizing properties
- 2.1.1.4 Coconut oil: for SPF properties
- 2.1.1.5 Honey: as preservative and humectant
- 2.1.1.6 Saffron: Colouring agent

Sr.no	Ingredients	Formulation A	Formulation B
1.	Beeswax	1.5gm	1gm
2.	Giloy	5.0gm	5.0gm
3.	Coconut Oil	4.0ml	2.0ml
4.	Petroleum Jelly	1.0gm	0.5gm
5.	Honey	0.3gm	0.6gm
6.	Saffron	1 slice	1 slice

Table 1: Formulation of Giloy Lip Balm A & B

2.1.2 Procedure

The herbal lip balm was formulated as per general method of formulation^[16] in which the bees wax and petroleum jelly were melted in porcelain dish on water bath with the decreasing order of melting point: coconut oil with honey & saffron were heated in other porcelain dish then both the phases were mixed in the same temperature. Fresh Giloy extract was heated in another porcelain dish (just before mixing). All the contents were mixed at 400°C with continuous stirring. The mixture was transferred from water bath to ice-bath and was allowed to solidify and then taken out of the ice-bath for further homogenization in mortar-pestle to get the desired texture. The homogenized herbal lip balm was kept in mold and kept under refrigeration condition, kept aside to cool. Once cooled, a smooth lip balm is obtained.



Fig 23: F1



Fig 24: F2

III. EVALUATION OF GILOY LIP BALM

3.1. Determination of color:

Color of lip balm was examined visually.

3.2. Determination of appearance:

Appearance of lip balm was examined.

3.3. Determination of odour:

odour of lip balm was examined by its smell.

3.4. Determination of pH:

The pH of lip balm was determined in order to investigate the possibility of side effect. As an acidic or alkaline pH may cause irritation of lips, it was determined to keep the pH formulation as neutral as possible.

The pH study was carried out by dissolving 1gm of sample in 100 ml water. The pH measurement was done by using pH meter.

3.5. Patch Test:

It was determined by applying lip balm on skin of human volunteer for 10 minutes to examine any inflammation, irritation, rash on the skin.

3.6. Determination of perfume stability:

After 30 days, the herbal lip balm was tested to record its fragrance.

3.7. Determination of spreadability:

Sample (about 1gm) was applied in between two glass slides and they were pressed together to obtain a film of uniform thickness.

$$S = m \times \frac{L}{T}$$

Where,

S = spreadability

m = mass of lip balm

L = length of spread by glass slidet = time taken to spread

G = Good = consistent, doesn't cause lip balm to deform
I = Intermediate = consistent, minimal lip balm deform
B = Bad = lip balm is severely deformed

3.8. Determination of aging stability:

The stability of product was evaluated by storing in chiller and 40°C for 4 weeks. Then various parameters such as pH, color and texture test of the lip balm were conducted.

3.9. Determination of melting point:

Melting point test was carried out in melting point apparatus.

3.10. Determination of SPF in lip balm for Formulation A, B.

0.5 gm of sample was mixed with appropriate amount of distilled water to obtain a final concentration of 0.2×10^{-4} gm/ml. Samples were dispersed in 100 ml distilled water and were homogenized by ultra sonication for 5 min. the obtained dispersion was filtered with a filter paper and the first 10 ml was rejected. The absorbance of each sample was determined by spectrophotometry in the range of 290-320 nm (UVB) with 5 nm intervals, using distilled water as blank.

The following results were observed with the ideal (maximum) absorbance observed at 290nm.

Wavelength	Absorbance
290 nm	0.019

295 nm	0.007
300 nm	0.010
305 nm	0.013
310 nm	0.014
315nm	0.007
320 nm	0.003

Table 3: Reading of UV absorbance for SPF test

IV. RESULTS OF EVALUATION
PARAMETER

Evaluation Parameter	Formulation A	Formulation B
1.colour	Dark Yellow	Light Yellow
2.Appearance	Rough	Smooth
3.Odour	Unpleasant	Pleasant
4.pH	5	5
5.Patch test	No irritation	No irritation
6.Spreadability	Bad	Good
7.Aging stability	Rough	Smooth
8.Melting point	56°C	57°C
9.SPF test	---	Positive (UVB)

Table 4: Evaluation of Formulation A & B

CONCLUSION

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

REFERENCES

[1] Bijauliya RK, Alok S, Kumar M, Chanchal DK, Yadav S. A comprehensive review on herbal cosmetics. International Journal of Pharmaceutical Sciences and Research. 2017

Dec 1;8(12):4930-49.

[2] Bijauliya RK, Alok S, Kumar M, Chanchal DK, Yadav S. A comprehensive review on herbal cosmetics. International Journal of Pharmaceutical Sciences and Research. 2017 Dec 1;8(12):4930-49.

[3] Pawar JC, Kandekar UY, Vichare VS, Ghavane PN. Production and Analysis of Lip Balm using Herbal Resources. Journal of Pharmaceutical Research International. 2021 Dec 16;33(59A):540-6.

[4] Rasheed N, Rahman SA, Hafsa S. Formulation and evaluation of herbal lipsticks. Research Journal of Pharmacy and Technology. 2020;13(4):1693-700.

[5] Anuj N Nahata, Nazma A Ansari, Shivami Nahar, Sanjay G Walode, Vibhavari M Chatur. "Formulation and Evaluation of Lip balm prepared by using various Herbal Entities." Article from International Journal of Creative Research Thoughts. (IJCRT)

[6] Wathoni NA, Haerani A, Yuniarsih N, Haryanti RE. A review on herbal cosmetics in Indonesia. International Journal of Applied Pharmaceutics. 2018;10(5):13-6.

[7] Waykule N, Bagewadikar P, Kale S. Formulation and evaluation of lip balm by using honey and sesame oil to lighten the dark lips.

[8] Kadu M, Vishwasrao S, Singh S. Review on natural lip balm. International Journal of Research in Cosmetic Science. 2015;5(1):1-7.

[9] Hitz Lindenmüller I, Itin PH, Fistarol SK. Dermatology of the lips: Inflammatory diseases. Quintessence International. 2014 Nov 1;45(10).

[10] Lip Disorders Lip and Tongue Disorders Merck Manual Home Edition.mht http://www.merckmanuals.com/home/mouth_and_dental_disorders/lip_and_tongue_disorders/lip_disorders.html (assessed on 30 November 2014)

[11] Thomas RJ, Williams MM. A survey of the incidence of chapped lips and cold sores during cytotoxic chemotherapy, and the perceived effectiveness of self-medicated lip salves.

[12] Sankpal RM, Kadam SR, Aswale NS, Navale SS. Natural Lip Balm. International Journal Of

Advanced Research In Science, Communication
And Technology. 2022:450-3.

- [13] Fadhullah H, Megantika A, Alifia KC, Nugroho P, Gofara TZ. Durable Moisturizing Herbal Lip Balm with Honey, Hyaluronic Acid, and SPF. UI Proceedings on Science and Technology. 2019; 2:67-72.
- [14] Kumar P, Kamle M, Mahato DK, Bora H, Sharma B, Rasane P, Bajpai VK. *Tinospora cordifolia* (Giloy): phytochemistry, ethnopharmacology, clinical application and conservation strategies. Current pharmaceutical biotechnology. 2020 Oct 1;21(12):1165-75.
- [15] Abe K, Saito H. Effects of saffron extract and its constituent crocin on learning behaviour and long-term potentiation. Phytotherapy Research. 2000 May;14(3):149-52.
- [16] YUSOF AA, Ajit AB, Sulaiman AZ, Naila A. Production of lip balm from stingless bee honey. The Maldives National Journal of Research. 2018 Jun 1;6(1):57-72.