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Formulations and evaluations of beetroot lip balm

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Abstract

The lip-care products for everyday basis contains harmful heavy metals and preservatives. Other than leaching through the pores on your lips, these heavy metals and other chemicals can also be accidentally ingested. Lip balm formulations are most widely used to enhance the beauty of lips and add glamour touch to the make-up. Lip balms offer a natural way to maintain and promote healthy lips. Current cosmetic lip products are based on use of enormous chemical ingredients which has a various side-effect. Hence, an attempt has made to study the natural ingredients which is used to formulate the natural lip balm. The starting point, oils, colours, adding agents, and other ingredients may be found natively. Organic moisturiser hydrates, nourishes, and protects lips that have been damaged by dryness. A better option for treating a variety of lips ailments may be healthy lip gloss. It was discovered that beetroot lip balm has antioxidant properties.

Keywords: Beetroot, Organic lip balm, natural ingredients, antioxidants, hydrated, cosmetics, nourishment

Introduction

1. Origin: Sea Beet (*Beta vulgaris* subsp.)

While having several layers of the epidermis the dermis on the lips is quite thin relative to the skin on the face. Lips are subject to disorders whereby pain and swelling of the lips may occur fast. Lips must thus be moisturised with a lip product like lip balm. Lip care products are substances that are placed to the lip to stop dryness and shield them from harmful environmental pollutants. Lip balms are items that are mainly utilised to moisturise lips instead of to adorn it. These create an oil-based layer that is adaptable, adherent, and waterproof. It is necessary to balance the concentration of 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.



2. Bees wax

Bees wax is incredibly moisturizing, has a lovely scent, and may shield the lips against UV rays that harm them. A natural emulsifier is beeswax. Beeswax includes just a little of substances with antibiotics, according to study.

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This is especially beneficial for people who have lips that are very dry and cracked. These anti-bacterial medications can lessen the discomfort of the inflammation that follows an infection. Oxidation found in abundance in beets root boost the suppleness of the epidermis and leave lips feel smooth and soft.



3. Almond oil

Almond oil's lipids aid to moisturise the lips by deeply into the skin tissues. Olive oil's soothing effects lessen the discomfort of cracked and sunburned lips. To combat inflammation, aloe Vera extract possesses anti-inflammatory effects. Antioxidants that prevent wrinkles and other types of skin damage are infused into the lips.



4. Vitamin E

Oxidant and environmental conditioner, folic acid. Vitamin E slows down the ageing process, keeping the lips' delicate, young texture. Dry, chapped lips can be treated with topical vitamin E oil. Utilising vitamin E on dry lips speeds up the appearance of newly formed cells because it encourages cell repair and cycle. The vitamin E oil's thick and greasy texture can also prevent further irritation. The extent of the freshness of a product can also be determined by its hue. Nature colours, however, are less hazardous than manufactured ones. For appealing colours, synthetic dyes were used commercially. However, it is harmful to the environment and skin. Lip balm's usage guarantees that dry, cracked lips quickly repair. Your lips' epidermis is a lot thinner than the skin of your face. Therefore, utilising a lip balm can ensure that the lips remain well-hydrated and that they recover more quickly if you have cracked and dry lips. The current study project intends to develop and assess herbal lip balm for the preservation of lips utilising readily available materials. Additionally, it will give lips a more appealing and glossy aspect. The goal of this endeavour was to thoroughly study natural lip balm. This study relied on a thorough review of the research on excipients, composition and lip gloss evaluation.

Beeswax serves as a base, oil serves as a solvent, and natural colouring agents are all included in the creation of natural lip balm. Any vegetation, including *Beta vulgaris*, also known as beetroot and can serve as an organic colouring source. Beetroot is a food that is perish and

because of the loss of water during storage before use, the amount of mineral such as iron and calcium could rise. The water-soluble and nitrogen-containing dye known as beta lain, a reddish pigment, is found in beetroot.



The reddish-violet betacyanin, an and the yellow betaxanthins make up the complex. In addition to the colouring agent, beetroot has a number of useful active substances for the body, including carotenoids and anthocyanins. Beetroot's carotenoid has anti-inflammatory, antimicrobial, anti-fungal, and nutritional properties, whilst anthocyanin's have strong antibacterial, anti-inflammatory, and cardiovascular protection. Red colour can also be made from these pigments. However, betalains, or have three times larger colour intensity than the pigments and are further water soluble than anthocyanin's. Although battalions are commonly employed in industries, they are more stable to pH and temperature than anthocyanins. Due to its high fructose content, beets are also an excellent source of fibre from food, which also contains vitamins, minerals, and high nutrient content.

1. Bees wax

Synonym: Paraffin-wax, Carnauba

Biological source: It is a product made from the honeycomb of the honeybee and other bees.

Family: Apidae

Chemical constituents: The main chemical constituents are carbon (73.3%), hydrogen (13.2%) and oxygen (7.5%).

Uses: - It offers a moisturizer that protects your lips from becoming dry and developing Cracks. It is also used in lip-balm, lip-gloss, etc.

2. Castor oil

Synonym: Linseed oil, Ricinus oil

Biological source: - It is non-volatile fatty oil obtained from the seeds of the castor bean, *Ricinus communis*.

Family: - Spurges

Chemical constituents: It is mainly composed of fatty acids and neutral lipids.

Uses: - It is used as a laxative. It is used as a moisturizer. It may promote the healing of Cracked lips. It promotes hydration

3. Olive oil

Synonym: - Vegetable oil

Biological source: It is a liquid fat obtained from olives (the fruit of *Olea europaea*), a Traditional tree crop of the Mediterranean basin, produced by pressing whole olives and Extracting the oil.

Family: Oleaceae

Chemical constituents: It is composed mainly of triacylglycerols and contains small Quantities of free fatty acids, glycerol, phosphatides, pigments, and sterols.

Uses: - It is used as superior hydration. Its relief from cracked and chapped lips. It gives Natural SPF protection. It helps to keep your lips hydrated. It used to remove dead skin from Lips and rejuvenate your skin. It nourishes the lips.

4. Coconut oil

Synonym: - Copra oil, Coconut palm oil, Cocos nucifera oil

Biological source: - It is the oil expressed from the dried solid part of the endosperm of Coconut, *Cocos nucifera*.

Family: Palmae

Chemical constituents: It is composed of the fatty acids, caprylic acid C-8:0 (8%), capric

Acid C-10:0 (7%), lauric acid C-12:0 (49%), myristic acid C-14:0 (8%), palmitic acid C-16:0 (8%), stearic acid C-18:0 (2%), oleic acid C-18:1 (6%) and 2% of C-18:2 linoleic acid. Uses: - It protects skin from UV Rays. It relieves irritation. It is used as a moisturizer

5. Beetroot

Synonym: *Beta vulgaris* rubra, Chukandar

Biological source: It consists of fresh root of *Beta vulgaris*.

Family: Amaranthaceae

Chemical constituents: It consist of multiple biologically active phytochemicals including betalains, flavonoids, polyphenols, saponins and inorganic nitrate, it is a rich source of Diverse minerals such as potassium, sodium, phosphorous, calcium, magnesium, copper, iron, Zinc.

Uses: - It is used as colouring agent. It is used as a binder. It gives glossy appearance to lips.

It also provides emollient action on lips. It also prevents cracking of lips.

6. Vitamin E

Synonym: - Tocopherol

Biological source: - It is a group of compounds found in a wide variety of foods.

Chemical constituents: - It refers to a group of eight different compounds: α -, β -, γ -, and δ tocopherols and the corresponding four tocotrienols.

Uses: - It is used as a preservative and treating fine lines and wrinkles. It makes lips softer.

7. Rose oil

Synonym: - Rose Otto, Attar of rose

Biological source: It is obtained from the petals of different Rosa species especially Rosa centifolia and Rosa damascena mill.

Family: Rosaceae

Chemical constituents: The most common chemical compounds present in rose oil are:

citronellol, geraniol, nerol, linalool, phenyl ethyl alcohol, farnesol, stearoptene, limonene and eugenol, etc.

Uses: It is used as fragrance. It is used to create a more natural aroma.

Ideal characteristics of herbal Lipbalm

1. It is smooth and easy to apply.
2. It is non-irritant and non-toxic.

3. it's have required plasticity, different odour, colour, texture and packaging etc.
4. It is stable in shelf-life time and it is free from bloom and sweating during storage of Lip balm
5. It should be free from contamination.
6. It should be free from gritty particles.
7. It should be long lasting.
8. It should not melt or harden within a reasonable variation of climatic temperature.

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 colds, flu and allergies.
- The use of natural lip cosmetic to treat the appearance of the face and condition of the skin

Disadvantages of Natural Lip Balm

1. Lip balms made of low-quality ingredients can harm the lips seriously. Such lip balms may dry out the lips instead moisturizing it.
2. Compared to commercially-prepared lip balms, homemade lip balms tend to stay on the lips for a shorter duration of time. Thus, need to reapply often.
3. Some companies manufacture lip balms considering only the beauty aspect, ignoring the health benefits and soft character of the skin. Such Products will gradually damage the natural colour, softness and glow of the lips.
4. The naturally derived colours and flavours are more difficult to obtain and also have issues related to stability in the products.
5. Natural oils have other disadvantages such as greasier, comedogenic, and less spread ability.

Review of literature**1. Lip balm**

Women frequently use lip balm to give their lips a lovely colour and protection. Lip balm is a cosmetic product with added benefits. Oil, colorant, and other chemicals are the basic components of a lip stick. Beeswax is the typical wax used in lip balm. In lip Lick composition 10, camellias are wax and c camellias are wax are combined to create strength and strike true colour in the lip balm. The composition of lip uses a variety of plant-based oils, including jojoba seed oil, the oil of sweet almonds, and castor seed oil. Oils serve as a moisturising agent in lip balm and help to combine the substance to create a smooth and flawlessly flexible substance. Shea Butter works as a moisturiser to create stable lip balm mixtures that are rigid at ambient

temperature yet glide and melt over the lips once applied.

2. Global Lip balm Demand

The quick urbanisation. Consumers' purchasing power is increased by 11ion in developing nations. The global demand for lip balm is driven by the trend of increased internet usage. According to Alana from Thai advertising tactics, consumer appetite for lip balm will increase over the course of the upcoming year as they advertise their products on social media platforms like YouTube, YouTube, Facebook, and Instagram.

Based to a company analysis, worldwide sales for lipbalm peaked in 2016 at \$7.15 billion and is expected to reach \$9.2 billion in 2018. The Lipbalm market is predicted to produce \$13.4 billion in sales by the year 2021. The market's rise is mostly attributed to the increase in demand from young adults who work women globally. In the near future, the demand for lip balm will progressively rise. A negative impact of synthetic colours on the health of people has increased along with the population. The current study's goal is to produce natural lip balm colouring. Give the most effective answer to this problem.

3. Self-Decoration

Mankind have long decorated themselves to draw attention to the other gender. Anthropologists contend that women utilise cosmetics to mimic an orgasmic condition in their bodies. Doune Ackerman living in Pallington in 1999. Because the lips resemble the genitals. The consciously and unconsciously causes why women constantly make them look even redder using lipbalm are that they blush red and swell while around. Despondent animal behaviourist these assertions are supported by Moates, who sees makeup as a trick used by con artists to divert focus from the rest of the body including the head. He believes that the red lipbalm lips stand in for the arrogantly engorged labia. The detailed pupfish of Exposition 1999 is checked at a distance by the skating state of the light and the darkened eyes. According to evolutionary psychologists, our plasticene ancestors evolved behaviours like self-decorrelation through natural selection processes, which then entered our genetic code (Cary 2000). The triple 2000 and gad. Rose and Rose 2000, Goode 2000. Women's use of self-decoration has changed significantly in recent years. Pleiss. From the 1950's big, lush-lashed eyes. With the new specialised lipbalm firms that sprang up over the years, minoring lipbalm has undermined & n revival in popularity to become a daily product. As a result of the black and blue lipbalm of the gothic and shock bands in the nineties, the lipbalm environment continues to alter today.

4. Women and beauty

Helman (1998) highlighted society's commercialisation of young girls as they attempt to achieve the unrealistic lanky model image portrayed in popular culture. According to Thompson and Hirschman (1995), who also looked at how the body came to be seen as the ideal form, women normalise their bodies to preserve an appearance that is regarded as the cultural standard through the practise of self-care. Additionally, studies have looked closely at the impact that these signals have on women's aspirations for their physical appearance.

Similar to other study, society gives greater significance to physically attractive persons. According to studies, those

who are seen to be more beautiful typically have greater social standing than those who are less attractive. Richens and Mc Nell, 1991. It is understandable that there are complaints about cosmetics given how well they are promoted to achieve a goal and how they are used to enhance female appearance. Due to the widespread belief that a woman's look and her perception of her own value are linked, Witham was famous colure has been aggressively abused and lipbalm is a crucial component of the appearance that many women work so hard to achieve.

Table 1: Methodology adopted

Sr. No	Ingredients	Quantity taken	Quantity given	Uses
1	Beet root extraction	0.8 ml	0.6 ml	Colouring Agent
2	Bees Wax	9.0 gm.	5.0 gm.	Impart glossiness and hardness
3	Almond Oil	0.6 ml	0.4 ml	Moisturizing Agent
4	Vitamin E	0.5 ml	0.3 ml	Anti-oxidant, Maintain the stability
5	Rose Water	Q.S	Q.S	Flavouring Agent
6	Glycerol	Q.S	Q.S	Glossy Effect

Formulation:

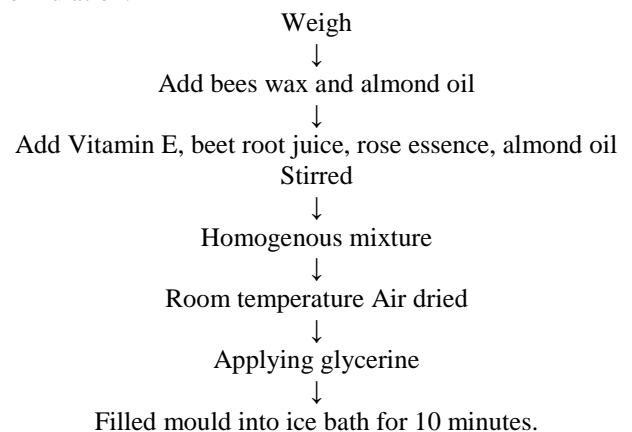


Fig 1: Formulation of hearbal lip balm.

i) weigh all the excipients. ii) Add bees wax and almond oil in a beaker and melt it in water bath at 55-600C3 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. 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 minutes.

Experimental work

Evaluation

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.

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.

Measurement of pH

The pH of lip balm was determined in order to investigate the possibility of any side effects. The pH study was carried out by dissolving 1 gm of sample into 100 ml water. The pH measurement was done using pH meter. PH of lip was near to neutral.

Skin Irritation test

It is carried out by applying lip balm on the skin for 10 min

Test of spread ability

The test of spread ability consisted of applying the product repeatedly onto a glass slide to visually observe the uniformity in the formation of the protective layer and whether the stick fragmented, deformed or broke during application. Prepared lip balm, initially has shown G- Good: uniform, no fragmentation, perfect application, with any deformation At room temperature.

Stability studies

Prepared lip balm was placed for accelerated stability studies at room temperature (25.0+3.0 °C), refrigeration (4+2.0 °C) and oven temperature (40.0+-2.0 °C) for 30 days. After 30 days it was again characterized for organoleptic properties, Melting point, spreadability and pH.

Effectiveness test on papers

Finally, after taking out the lip balm from chiller, it was tested by applying the lip balm on a piece of paper. This process is important to determine colour obtained from different sources. It also can determine the effectiveness of the colour product.

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.

Results and Discussions

1. Melting point

Melting point of lip balm was found to be in the range of 68 °C – 69 °C which matches the appropriate melting point of between 65 °C -75 °C.

2. Organoleptic Properties

Table 2: Prepared lip balm has shown cream colour with pleasant odour.

Sr. No	Parameter	Observation
1	Colour	Cream
2	Appearance	Excellent, smooth
3	Odour	Pleasant

3. Test of Spread ability

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

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

A medicine is said to be stable if, by the time it reaches the predetermined level of potency listed on the label and its chemistry or biologic activity has not decreased significantly, it has been manufactured and packaged. The goal of stability analysis is to demonstrate how a drug substance's or product's quality changes over time with the effect of various environmental factors, including temperature, humidity, and light, allowing for the establishment of appropriate storage conditions and shelf-lives. At the room temperature (25.0+3.0 °C), refrigeration (4+2.0 °C), and oven temperatures (40.0 +2.0 °C), tests of stability were conducted for one month or 30 days.

It was noted that the generated lip balm exhibits I - Medium uniformity, leaves few pieces, is applied properly, deforms minimally at the room temperature (25.0+3.0 °C), in the refrigerator (4+2.0 °C), and in the oven (40.0+ 2.0 °C).

While many lip balm sticks provide full protection with only one rub, others require several. While some sticks appear to endure forever, others are consumed swiftly. These are significant lip balm qualities that are challenging to measure using household tools. Why is it so challenging to measure them with science? They rely on how you use your lip balm, such as whether you push down firmly or gently, or if you rub your lips quickly or gently. In the present study, what yields at various pressures will be evaluated. Try your best to maintain a steady rubbing pace as well.

Each lip balm's physicochemical characteristics were examined, and the top formulas were determined. There have been studies on the interactions among variables (ingredients) and the outcomes (physicochemical characteristics). It demonstrated how the chemical and physical features of the balm's lips are impacted by all of the components. Additionally, a 4-week stability assessment of the best formulas was done to spot any alterations that might have happened to the lip balm. Comparing the three best formulations to the commercial lip balm, the hardness, colour, pH, and greasiness values were practically identical. The greatest lip bombs were in the same ballpark as store lip balms in terms of colour, pH, and grease content.

All lip balms kept at room temperature during the stability testing for 4 weeks had good spread ability and were uniform in terms of hardness, pH, and colour.

Conclusion

The present study aimed to create a lip balm with as many natural elements as feasible. The main colouring and flavouring ingredients were beetroot extract, rose water, vitamin E capsules, and almond oil. Almond oil served as the moisturizing agent. Researchers looked examined how these components affected the formulation's physical features, including spreadability, uniformity, and organoleptic characteristics. It may be said that using these natural components helped create a great lip balm composition. Findings of numerous studies suggested that the recipe was safe to use and cleared various physical tests. According to stability information, the mixture should be stored at room temperature. In the future, natural bases like Sheabutter, paraffin wax, etc. could take the place of the beeswax that was employed as a base for the existing formulation.

References

- Ithape D, Pooja M. A Review on Recent Scenario of Cosmetics. *International Journal of Pharmaceutical Sciences Review and Research*. 2021;XX(X):190–197. Available from: <https://doi.org/10.47583/ijpsrr.2021.v68i01.030>.
- Kamlesh MD. Formulation and Evaluation of Herbal Lip Rouge. *International Journal of Pharmaceutical Sciences Review and Research*. 2019;55(1):13–17.
- Gaikwad S. Extraction and Isolation of Fruit Pigment of Dragon Fruit (*Halocereus polyrhizus*), Beet Root (*Beta vulgaris*), Lemon Fruit (*Citrus limon*) and Formulation of Herbal Lipstick. *International Journal Research and Analytical Reviews*. 2021 Mar; 8(1): 92–99.
- Kadu M. Review on Natural Lip Balm. *International Journal of Research in Cosmetic Science*. 2014;5(1):1–7.
- Kotekar D. Formulation and Evaluation of Herbal Lipstick Using Natural Colorants. *World Journal of Pharmaceutical Research*. 2022, 11(4).
- Rushikesh SM. Natural Lip Balm. *International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)*. 2022, 2(1). Available from: <https://doi.org/10.48175/IJARSCT-4617>.
- Mawarn D. Formulation and Characterization of Lip Balm Made from Beeswax, Almond Oil, Virgin Coconut Oil and Honey. 2020, 2255(1). Available from: <https://doi.org/10.1063/5.0014367>.
- Paithankar S. Formulation of Natural Lip Balm. *International Research Journal of Engineering and Technology (IRJET)*. 2023;10(1):1009–1014.
- Panchal C. Formulation and Evaluation of Herbal Lip Jelly Using Pigments of *Butea monosperma* Flower. *International Journal of Institutional Pharmacy and Life Sciences*. 2015, 5(1).
- Permatananda PAK. Lip Balm Formulation Based on Balinese Grape Seed Oil. *International Journal of Current Science Research and Review*. 2021;4(7):633–639. Available from: <https://doi.org/10.47191/ijcsrr/V4-i7-03>.
- Kore S, Prathamesh M. Formulation and Evaluation of Natural Lip Balm by Using Rose Petals. *International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)*. 2022; 2(2).
- Vitnor S, Shubham. A Review on Herbal Lip Balm. *Ijariie*. 2022, 8(22).
- Sudha Rani. Formulation and Evaluation of Herbal Lipstick from Beetroot (*Beta vulgaris*) Extract. *Research Journal of Pharmacognosy and Phytochemistry*; c2019. Available from: <https://doi.org/10.5958/0975-4385.2019.00034.7>.
- Deshmukh S, SWATI. Formulation and Evaluation of Natural Lipsticks Prepared from *Bixa orellana* Seeds and *Beta vulgaris* Root Extract and Their Comparative Study. *International Journal of Pharmacy and Pharmaceutical Sciences*; c2013.
- Vinodkumar J. Formulation and Evaluation of Organic Lip Balm. *Indo American Journal of Pharmaceutical Research*. 2019, 9(4).
- Christopulos A. Mouth anatomy [Internet]. [cited 2018 Sep 11]. Available from: <https://emedicine.medscape.com/article/1899122-overview>
- Ali BH, Wabel NA, Blunden G. Phytochemical, pharmacological and toxicological aspects of *Hibiscus sabdariffa* L. A review. *Phytother Res*. 2005;19:369–375.
- Balsam MS, Sagarin E. *Cosmetics science and technology*. 2nd ed. Wiley Inter science Publication, NY, USA; c2008. p. 209-512.
- Fernandes AR, Dario MF. Stability evaluation of organic lip balm. *Braz J Pharm Sci*. 2013;49:293-300.
- Kadu M, Singh V. Review on natural lip balm. *Int J Res Cosmet Sci*. 2015;(1):1-7.
- Kadu M, Vishwasrao S, Singh S. A Review on Natural Lip Balm. *Int J Res Cosmet Sci*; c2014. ISSN 2277–7172.
- Fernandes AR, Dario MF, Pinto CASO, Kaneko TM, Baby AR, Velasco MVR. Stability evaluation of organic Lip Balm. *Braz J Pharm Sci*. 2013;2:49.
- Savalkar MB. Formulation & Evaluation of Herbal lipstick using *Amaranthus dubius*. *J Pharm Res*. 2018;7(6):96-98.
- Kole PL, Jadhav HR, Thakurdesai P, Nagappa AN. Cosmetic products of herbal extracts. *Nat Prod Radiance*. 2005, 4(4).
- Grindlay D, Reynolds T. The *Aloe vera* phenomenon: A review of the properties and modern uses of the leaf parenchyma gel. *J Ethnopharmacol*. 1986;16:117–51.
- Kokate CK, Purohit AP, Gokhale SB. *Textbook of Pharmacognosy*. 49th ed. Pune: Nirali Prakashan; 2014.
- Khan AW, Kotta S, Ansari SH, Sharma RK, Kumar A, Ali J. Formulation development, optimization and evaluation of *Aloe vera* gel for wound healing. *Pharmacogn Mag*. 2013 Oct-Dec;9(Suppl 1):S6–S10. doi: 10.4103/0973-1296.117849.
- Patel M, Patel O. Formulation and evaluation of herbal lipstick using *Beta vulgaris* extract. *Int Ayurvedic Med J*; c2021.
- Deshmukh S, Chavan M, Sutar M, Singh S. Preparation and evaluation of natural lipsticks from *Bixa orellana* seeds. *Int J Pharm Bio Sci*. 2013;4:139-144.
- Gouvea MCBLF. *Desenvolvimento de base de batons. Cosmet Toiletries (Portuguese edition)*. 1993;5(2):49-56.
- Sharma PP. *Cosmetics- Formulation, manufacturing and quality control*. 5th ed. Delhi: Vandana publications; c2008. p. 297-313.
- Ratih H, Titta H, Ratna CP. Formulation of *Cananga* Oil Lip Balm as Emolient. In: *Prosiding Simposium Penelitian Bahan Obat Alami (SPBOA) XIV dan Mukthamar XII PERHIPBA* 2014. Yogyakarta: Leutikaprio; c2014. p. 3.
- Sharma PP. *Cosmetics-Formulation, manufacturing and quality control*. 4th ed. Vandana Publications Pvt. Ltd.; c2008.
- Nasution HIN. Formulation of Lip Balm using Combination of Palm Kernel Oil (PKO) and Red Palm Oil (RPO) as Lip Moisturizer [Final project]. Universitas Sumatera Utara; c2018.
- Brasil. Ministério da Saúde. Agência Nacional de Vigilância Sanitária. *Séries Temáticas: Qualidade 1. Guia de Estabilidade de produtos cosméticos*. Brasília; c2004. p. 45.
- Oliveira FO. Contribuição da análise térmica no desenvolvimento de formulações de batons.