Formulation and Evaluation of Herbal-Infused Lip Balm: A Study on Stability, Efficacy, and Consumer Acceptability

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ABSTRACT: Cosmeceuticals are cosmetic products enriched with biologically active components that provide therapeutic or drug-like benefits. This research focused on the formulation, design, and quality evaluation of a lip balm derived entirely from natural ingredients. The formulation incorporated beetroot, almond oil, aloe vera, vitamin E, and rose essence, blended using a uniform mixing technique. The lip balm was assessed for various parameters, including chemical stability, pH, melting point, and spreadability. The product exhibited a pH of 6.0 and a melting point in the range of 63–65°C. Stability studies were conducted under different conditions: ambient temperature (25.0±3.0°C), refrigeration (4.0±2.0°C), and elevated temperature (40.0±2.0°C). The findings revealed that the lip balm maintained its consistency, applied smoothly, and retained its structural integrity across all storage conditions.This study concludes that the natural ingredient-based lip balm offers significant potential as an alternative for managing various lip-related issues.

KEYWORDS: Lip balm, Lips, Beetroot, Formulation, Natural ingredients.

INTRODUCTION

The growing awareness of the hazards posed by synthetic excipients in cosmetic products has led to considerable public concern and a shift towards using organic and natural sources. This change in consumer preferences reflects the desire for safer, eco-friendly alternatives, driven by the potential health risks associated with synthetic ingredients.

Lips, lacking oil glands, require additional hydration and protection to prevent dryness and maintain their health and suppleness. Conventional lip balms often contain harmful substances such as petrolatum, artificial waxes, alumina, parabens, hydrogenated oils, and synthetic fragrances or dyes. These ingredients raise significant health concerns, particularly since lip balm is often ingested, either intentionally or inadvertently.Cosmeceuticals, a category of cosmetic products with therapeutic properties, provide enhanced topical action and protection against degenerative skin conditions. In this study, ingredients were carefully chosen for their minimal adverse effects, ensuring a safer and more health-conscious formulation.

Lip balms, designed primarily to protect lips rather than to serve decorative purposes, form a moisture-resistant, nourishing layer. These products typically avoid artificial dyes and colorants, emphasizing functionality over aesthetics. Beeswax, a natural secretion from female bees, is a key ingredient in many lip balm formulations. It is deeply moisturizing, provides protection from harmful sun rays, and emits a pleasant scent. Additionally, beeswax acts as a natural emulsifier, contributing to the product's stability and texture. Scientific research further highlights its antibacterial properties, enhancing its utility in skincare products.This investigation reinforces the importance of using natural and functional ingredients like beeswax to create safer and more effective lip care formulations.

Vitamin E: A Natural Solution for Healthy Lips
Vitamin E, a powerful antioxidant and natural conditioner, can help maintain the soft, youthful texture of your lips.expand_more It combats signs of aging by promoting cell turnover and regeneration.expand_more This not only reduces the appearance of fine lines, but also brings new, healthier cells to the surface faster.expand_more For dry, chapped lips, vitamin E oil offers a soothing and protective solution.expand_more Its thick, oily consistency forms a barrier, preventing further irritation and promoting healing.expand_more
Additionally, the color of a product can indicate its quality and freshness. Consider this when choosing your lip care products. This revision removes

repetition, clarifies the benefits of vitamin E, and adds a concluding sentence about product selection.

Almond Oil: A Natural Remedy for Soft, Healthy Lips. Almond oil, known for its deep penetration into the skin, effectively moisturizes lips thanks to its rich fatty acids. This nourishing oil also boasts anti-inflammatory properties, which can reduce redness and soothe discomfort associated with chapped and sunburned lips.This revision eliminates the repetition and clarifies the benefits of almond oil for lip care.

Aloe Vera: Nature's Soothing Balm for Lips Soothing and anti-inflammatory, aloe vera gel offers a natural remedy for irritated lips. Its wealth of antioxidants goes beyond simply fighting wrinkles; they help combat various signs of skin damage, keeping lips healthy and youthful. This revision eliminates redundancy and clarifies the benefits of aloe vera for lips.

Beetroot: A Potential Antioxidant for Soft, Supple Lips

Beetroot, rich in antioxidants, may contribute to softer, suppler lips and improved skin elasticity. These antioxidants could potentially help combat dryness and promote overall lip health.

MATERIAL AND METHOD

Ingredients:

- Beeswax (pure white) - Loba Chemical Pvt. Ltd.
- Almond Oil (Bajaj Almond Drops®)
- Aloe Vera Juice (organically extracted from Aloe barbadensis)
- Beetroot Juice (Beta vulgaris subsp. Vulgaris)
- Rose Powder (Marc Flavours)
- Glycerin (98% extra pure) - Loba Chemical Pvt. Ltd.
- Vitamin E (Capsule - Evion® 400)

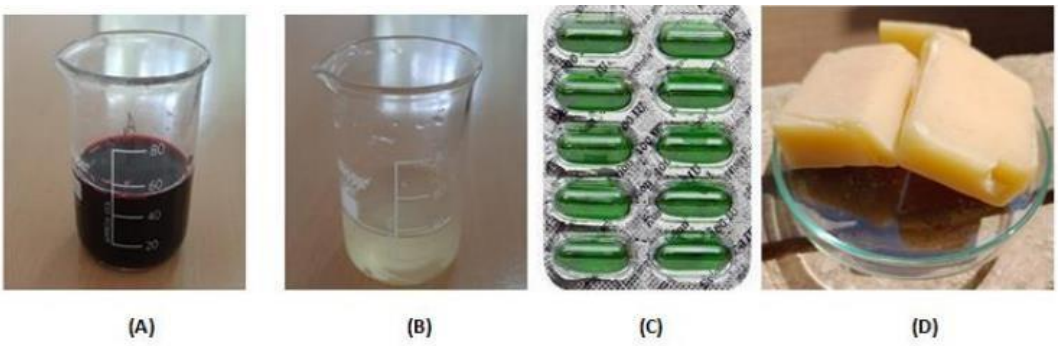

Figure 2:(A)-Beetroot Juice; (B)-Aloe vera Extract; (C) Cap. Evion® 400; (D)Bees Wax PureWhite

MATERIAL TABLE

Sr.	Material
1.	Beet Root
2.	Bees Wax
3.	Almond Oil
4.	Vitamin E
5.	Rose Water
6.	Glycerol

Equipment

Sr.	Equipment's
1.	Autoclave
2.	Centrifuge
3.	Melting Point Apparatus
4.	Weighing Balance
5.	Ice bath
6.	Water Bath
7.	Beaker

Preparation of the ingredients:

Aloe Vera Gel: Aloe vera leaves were collected, washed thoroughly, and peeled to remove the thick epidermis.The inner gel was then carefully separated with a spoon, minced, and homogenized in a mixer.

Beetroot Extract: Washed beetroots were peeled, chopped, and blended well. The resulting mixture was then filtered through a clean muslin cloth to extract the juice.

Rose Water: A 2% rose water solution was prepared by dissolving 2 grams of rose powder (Marc Flavours) in 100 ml of distilled water.

METHOD OF PREPARATION OF LIP BALM :

 Precise Measurement: All ingredients were meticulously weighed using a digital balance with an accuracy of 0.1 gram.

 Melting the Beeswax: The crude beeswax was first grinded into a uniform consistency. Using indirect heat, the beeswax was melted in a 50 ml beaker at a maximum temperature of 90°C.

 Ingredient Combination: Once melted, all other ingredients (vitamin E, beetroot juice, rose essence, and almond oil) were thoroughly mixed and carefully added to the beeswax. The mixture was continuously stirred until a homogenous consistency was achieved.

 Molding and Cooling: Just before pouring the mixture into the lip balm molds, a thin layer of glycerin was applied to the insides using a cotton swab. The filled molds were then set aside in an ice bath for about an hour.

 Solidification and Storage: After cooling, the lip balm was left undisturbed for an additional hour in a cool, dry place, protected from direct sunlight, to allow complete solidification. For optimal stability and to ensure the product meets quality standards, it's recommended to wait 48 hours before using the lip balm after storing it at room temperature.

Composition of lip balm :

SR.NO	INGREDIENTS	QUANTITY	USES
1	Bees wax	12%	Impart Glossiness and hardness
2	Beetroot	11%	Colouring Agent
3	Almond oil	5%	Moisturizing agent
4	Aloe-vera	4%	Antioxidant, anti-inflammatory
5	Vitamin -E	1.5%	Antioxidant, maintain the stability
6	Rose water	2%	Flavouring agent

Evaluation of Lip balm:

Melting Point: This test determines the safe storage temperature for the lip balm.

A capillary tube method was used: The lip balm was filled into a sealed capillary tube attached to a thermometer. The apparatus was heated, and the temperature at which the lip balm melted was recorded. The test was repeated three times, and the average temperature was considered the melting point. The acceptable range for the lip balm's melting point is typically between 66°C and 68°C.

2. Organoleptic Properties: This evaluation focuses on the lip balm's basic sensory characteristics:

- Color
- Odor
- Taste
- Appearance

3. Spreadability Test:

- This test assesses how easily the lip balm spreads when applied.
- The lip balm is applied at room temperature onto a glass slide.
- An analyst observes the uniformity of the layer formed and checks for any fragmentation, deformation, or breakage of the stick during application.
- A rating system is used to grade the spreadability:

Good (G): Uniform layer, perfect application, no fragmentation, and no deformation.

Intermediate (I): Uniform layer, minor fragmentation, acceptable application, slight deformation.

Bad (B): Uneven layer, significant fragmentation, difficult application, and severe deformation.

4. Surface Anomalies:

- This test inspects the lip balm surface for any defects like:
- Crystal formation
- Mold or fungal contamination

5. Aging Stability:

- This test evaluates how well the lip balm maintains its quality over time.

- The lip balm is stored at 40°C for one hour.
- Afterward, it's observed for signs of:
  - Bleeding
  - Crystallization on the surface
  - Difficulty in application

6. Solubility Test:

- This test determines the solvents (like ethanol or chloroform) in which the lip balm can dissolve.

7. pH Level:

- This test measures the lip balm's acidity or alkalinity, which can affect its potential to irritate the lips.
- An ideal pH is close to neutral.
- To measure the pH:
  - 1 gram of the lip balm is dissolved in 100 ml of water.
  - A pH meter is used to obtain the reading.

8. Skin Irritation Test:

This test assesses the potential for skin irritation caused by the lip balm.A small amount is applied to the back of the subject's left hand for a specific period (details omitted for brevity).The same rating system used in the spreadability test (Good, Intermediate, Bad) is used to evaluate the irritation level.

9. Stability Studies:

- The lip balm undergoes further stability testing under various conditions for 30 days:
  - Room temperature (25°C ± 3°C)
  - Refrigeration (4°C ± 2°C)
  - Oven temperature (40°C ± 2°C)
- After 30 days, the lip balm is re-evaluated for:
  - Organoleptic properties
  - Melting point
  - Spreadability
  - Ph

Evaluation of Lip Balm

SR.NO	EVALUATION PARAMETER	OBSERVED VALUE
1.	Melting point	63°C -65°C
2.	Organoleptic properties	-
2.1	Colour	White
2.2	Odour	Pleasant
2.3	appearance	Smooth
3.	Test of spread ability	-
4.	pH measurement	6.0
5.	Skin irritation	No
6.	Breaking point	29gm

CONCLUSION

This study demonstrates the safety and efficacy of the natural ingredient lip balm formulation. This combination of ingredients appears to be superior for lip balm development. Further research could explore modifications to the inactive ingredients (excipients) or explore new ingredient combinations to potentially create even better formulations with enhanced properties. Based on these results, the current lip balm formulation is predicted to have a good shelf life.

REFERENCE

[1] Christopulos A, Mouth anatomy https://emedicine.medscape.com/article/1899122-overviewSep 11, 2018

[2] B.H. Ali, N.A. Wabel, G. Blunden, Phytochemical, pharmacological and toxicological aspects of Hibiscus sabdariffa L.: a review. Phytother Res. 19 (2005) 369-375

[3] 12. M.S. Balsam, E. Sagarin, Cosmetics science and technology, Second ed. Wiley Interscience Publication, NY, USA, 2008, 3, pp. 209-512.

[4] Fernandes AR, Dario MF, Stability evaluation of organic lip balm. Brazilian Journal of Pharmaceutical Sciences, 2013: 49; 293-300.

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

[6] Mayuri Kadu, Dr Suruchi Vishwasrao, and Dr Sonia Singh, A Review on Natural Lip Balm. International Journal of Research in Cosmetic Science. 03 August 2014. ISSN 2277–7172.

[7] A.R. Fernandes, M.F. Dario, C.A.S.O. Pinto, T.M. Kaneko, A.R. Baby, M.V.R. Velasco, Stability evaluation of organic Lip Balm, Braz. J. Pharm. Sci. 2 (2013) 49.

[8] Savalkar M.B. et al. Formulation & Evaluation of Herbal lipstick using Amaranthus dubius,J. Pharm. Res., 2018, 7(6), 96-98.

[9] P. L. Kole, H. R. Jadhav, P. Thakurdesai, A. N. Nagappa, Cosmetic products of herbal extracts, Natural Product Radiance. 4 (2005) 4.

[10] 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

[11] Abdul Wadood Khan, Sabna Kotta, Shahid Hussain Ansari, Rakesh Kumar Sharma, Amit Kumar and Javed Ali, Formulation development, optimization and evaluation of aloe vera gel for wound healing. Pharmacognosy Mag. 2013 Oct-Dec; 9(Supply 1): S6–S10. doi: 10.4103/0973-1296.117849

[12] Mona Patel, Ojash Patel, formulation and evaluation of herbal lipstick using beta vulguris extract. International ayurvedic medical journal. June 2021.

[13] S. Deshmukh, M. Chavan, M. Sutar, S. Singh, Preparation and evaluation of natural lipsticks from bixa orellana seeds, Int J Pharm Bio Sci. 4 (2013) 139-144.

[14] GOUVEA, M.C.B.L.F. Desenvolvimento de base de batons. Cosmet. Toiletries (Portuguese edition), v.5, n.2, p.49-56, 1993.