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Prepration and Evaluation of Beetrrot Lip Balm

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Abstract

Beetroot lip balm is a natural cosmetic formulation developed to provide moisturization, nourishment, and a subtle tint to the lips using plant-based ingredients. The key active component, *Beta vulgaris* (beetroot) extract, is rich in antioxidants, vitamins, and natural pigments, making it an ideal agent for enhancing lip colour while promoting lip health. This study/formulation explores the incorporation of beetroot extract into a lip balm base composed such as beeswax, White soft Paraffin , Castor oil , Vitamin E. The final product aims to address common issues like lip dryness, cracking, and dullness while offering a chemical-free alternative to synthetic lip products. Evaluation criteria included texture, spreadability, stability, and user satisfaction. Results indicated that the beetroot lip balm delivers effective hydration and imparts a natural rosy tint, making it a functional and appealing product for regular use.

Introduction

use of herbal cosmetics in personal care products is becoming increasingly popular. This shift is largely due to the potential health risks and side effects associated with synthetic chemicals and their by-products. Additionally, these synthetic substances can negatively impact the environment and contribute to pollution. As a result, consumers are becoming more cautious in their selection of cosmetic products. To promote better health and well-being, there is a growing demand for herbal alternatives. Current trends in cosmetics and cosmeceuticals show a strong preference for natural or plant-based formulations. Herbal ingredients are now widely used in a variety of skin and care products due to their beneficial properties[1-3]

And Lip balm is a cosmetic product used to protect and moisturize the lips, especially in dry or cold climates. It forms a protective layer on the surface of the lips to seal in moisture and shield them from external exposure.[4] With growing awareness of the harmful effects of synthetic ingredients, there is an increasing demand for natural and herbal alternatives in personal care products. Beetroot (Beta vulgaris) is a natural source of pigments, antioxidants, and vitamins such as vitamin C, as well the Ascorbic acid acts on pigmented lips, it reduce the darkness of lips . The ascorbic acid which are beneficial for skin health. Its deep red color makes it an excellent natural colorant, and its antioxidant properties help nourish and protect the lips. The use of beetroot in lip balm not only provides a natural tint but also enhances the therapeutic and aesthetic value of the product.[5,6]

This study focuses on the preparation of a natural lip balm using beetroot extract, beeswax, rose, Castor oil, and other natural ingredients. The formulation aims to provide moisturizing, healing, and mild tinting properties. Additionally, the final product is evaluated for its physical characteristics such as texture, spreadability, colour, P^H, and stability to ensure its effectiveness and safety for use.

Aim- Novel Prepration and Evaluation of herbal Lipbalm

The goal of the current study was to create and assess lipbalm that contained natural pigments.

Objevtives –

1. To do the formulation of natural lipbalm using natural colouring agents the vitamin C fights to pigmentation and Vitamin e gives the emollient action.
2. To evaluate the Natural lipbalm

Advantages of natural beetroot lipbalms over synthetic ones-

- It provides protection against dryness, chapping, and the formation of cold sores.
- Natural lip balm enhances skin health and contributes to facial beauty.
- It effectively moisturizes and soothes dry, dehydrated lips.[7,8]

Materials and methods- Fresh beetroot was procured from the local market and thoroughly washed with clean water to remove any dirt or impurities. The cleaned beetroot was then peeled and sliced into uniformly small pieces to ensure consistent blending. The sliced beetroot was transferred into a clean blender jar, and a small quantity of distilled water was added to facilitate smooth blending. The mixture was blended continuously for 4–5 minutes to obtain a fine pulp. The resulting juice was then filtered using a clean muslin cloth to separate the liquid extract from the solid residues. The filtered beetroot juice was collected.

Ascorbic acid, sodium citrate dihydrate, acacia, castor oil, rose oil, beeswax, and white soft paraffin were procured from Loba Chemie Pvt. Ltd., a certified supplier of laboratory-grade chemicals. Vitamin E capsules were purchased from a local pharmacy located in Tasgaon, Maharashtra.

Concentrated pigment- For the concentrated colour or pigment heated the juice in a beaker using Water bath , kept it for cooling[9]

Prepration of buffer –The required amount of sodium citrate dihydrate was calculated as follows: For a 0.1 M solution in 1 liter: Mass=Molarity×Molar Mass=0.1×294.10=29.41 A total of **29.41 g** of sodium citrate dihydrate was weighed using an analytical balance. The weighed compound was then dissolved in approximately 800 mL of distilled water in a beaker.The resulting solution was transferred to a 1-liter volumetric flask, and the volume was made up to 1000 mL with distilled water.

Formulation of lipbalm - The conventional method of lipbalm preparation is used for formulation. Additionally, the ingredients are listed in the table below.

1. Cosmetic-grade beeswax , castor oil and white soft paraffin was melted in a china dish at 70 ^{0}C over an water bath to create lipbalm base.[10]
2. In another beaker in a filtrate added the ascorbic acid and added the sodium citrate dehydrate buffer for balancing the p^{H} after that added the rose water.
3. Added the Acacia gum for binding the formulation
4. Add both the mixtures in another beaker and add the vitamin E[11]
5. Set this to magnetic stirrer with heating set rpms And add dropwise the concentrated beetroot juice keep it for 5 mins[12]
6. Add the rose water for fragrance
7. Finally fill the lipbalm mold with this mixture. After an hour, lipbalm is ready

Formulation table-

Sr.no	Ingrediant	Role	Wt. ml / gm.
1	Beetroot juice	Coloring Agent	10 ml
2	Ascorbic acid	Vit. C And skin glow	0.5 ml
3	Vitamin E	Emolient	5 ml
4	Sodium citrate dihydrate buffer	P^H balance	1 ml
5	White soft paraffin	Base/ Softness	5 gm
6	Beeswax	Hardness/ base	5 gm
7	Acacia	Binder	2 gm
8	Castor oil	Moisturizing agent	3 ml
9	Rose oil	Perfume	2 ml
10	Distilled Water	Buffer solution	q.s.

Evaluation test –

Organoleptic Characters –

Organoleptic characters of beetroot lipbalm as follows :-

Parametrs	Observation
Colour	Deep Reddish
Odour	Plesant
Apperance	Smooth
Aroma	Rosy , Earthy

P^H: The P^H of the formulated beetroot lip balm was determined using a calibrated digital pH meter and was found to be **6.5**. This P^H value lies within the physiological pH range of human skin (approximately 5.5 to 6.5), indicating that the formulation is mildly acidic and thus dermatologically compatible mainly on lips[12]

Skin irritation test: The test was performed by applying the formulation to the skin and allowing it to remain for 15 minutes. Upon observation, no signs of skin irritation such as redness, itching, or inflammation were detected, indicating that the product is safe for topical application[13]

Spredability test: A small amount of beetroot lip balm (0.5 gm) was placed between two clean glass slides. A 500 g weight was applied on top for 1 minute. After removing the weight, the diameter of the spread was measured. The lip balm spread smoothly, indicating good spreadability and easy application[14]

Spredability(S)= $M \times l / T$

= 0.5 x 5 / 1

= 2.5

Melting Point: The melting point of the lip balm formulation was assessed using a melting point apparatus. A capillary tube was partially filled with the sample and sealed. The tube was placed in the apparatus, and heat was applied gradually. The temperature at which the sample melted was recorded as its melting point. And it was found to between 60^0 c- 65^0c[15]

Hardness test: The hardness of the beetroot lip balm was assessed to determine its structural strength and its ability to withstand pressure without deformation. A basic manual pressure test was performed by gently pressing the surface of the lip balm stick with the thumb at room temperat. The formulation was examined for any signs of bending, breaking, or softening. The lip balm demonstrated adequate hardness, retained its form without any visible damage, and indicated good mechanical stability and suitability for regular application[16]

Stability (perfume stability): The fragrance stability of the medicated lip balm was evaluated by storing the formulation for 30 days and monitoring any changes in scent over the storage period[17]

Greasiness: The greasiness test was conducted to assess the oil content in the lip balm formulation. In this test, 2 grams of the lip balm were placed on a piece of filter paper and left at room temperature for 24 hours. The diameter of the greasy ring formed around the sample was then measured[18]

Moisture analysis test: The lip balm's level of moisture determined how hydrated it was. The lip balm was weighed, and the sample's moist weight was noted. Next, the wet sample was dried in an oven set to 70 °C for an hour. The sample was then left in the desiccator for an hour to cool to room temperature. The sample was weighed one more time to find its dry weight The weight percentage (W%) formula were used to determine the sample's moisture content: [19]

W%= A – B / A x 100

Where:

- **A** = Initial weight of the sample (before drying)
- **B** = Final weight of the sample (after drying)

= 30.200-30.199/ 30.221 x 100

= 0.1

UV-

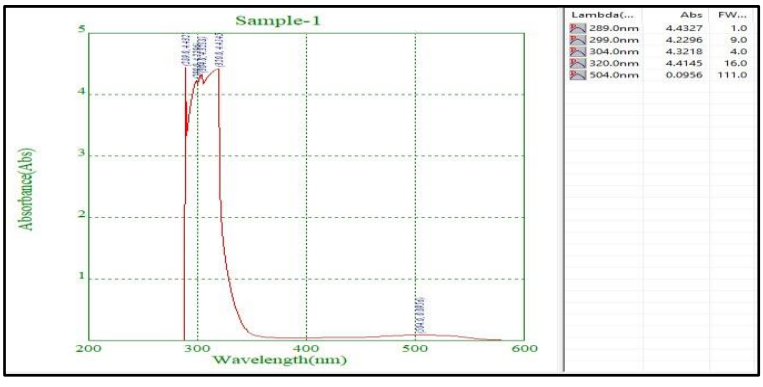
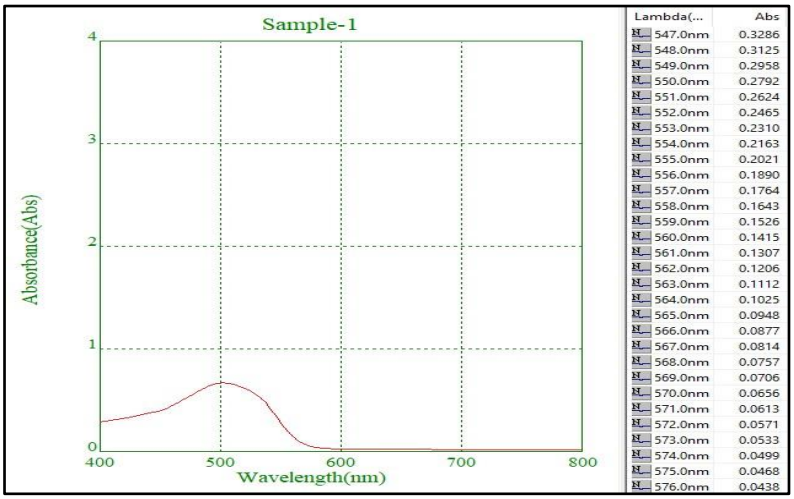


Fig. Uv curve of castor oil



Lambda(...	Abs
547.0nm	0.3286
548.0nm	0.3125
549.0nm	0.2958
550.0nm	0.2792
551.0nm	0.2624
552.0nm	0.2465
553.0nm	0.2310
554.0nm	0.2163
555.0nm	0.2021
556.0nm	0.1890
557.0nm	0.1764
558.0nm	0.1643
559.0nm	0.1526
560.0nm	0.1415
561.0nm	0.1307
562.0nm	0.1206
563.0nm	0.1112
564.0nm	0.1025
565.0nm	0.0948
566.0nm	0.0877
567.0nm	0.0814
568.0nm	0.0757
569.0nm	0.0706
570.0nm	0.0656
571.0nm	0.0613
572.0nm	0.0571
573.0nm	0.0533
574.0nm	0.0499
575.0nm	0.0468
576.0nm	0.0438

Fig. UV curve of Betacynins

Result

The evaluation of beetroot-based lip balm with ascorbic acid confirms its smooth texture, natural tint, and moisturizing properties. pH tests ensure safety, while stability trials verify durability under various conditions. The uv analysis confirms the functional group betacynins and betalins as well as castor oil , and lip pigmentation studies show gradual lightening effects. Microbial and irritancy tests validate safety, making the formulation effective, long-lasting, and beneficial for lip care.

Conclusion

The objective of the ongoing research was to develop a lip balm utilizing the highest possible proportion of natural ingredients. Beetroot extract was primarily selected as the coloring agent. Beetroot-based lip balm provides both functional and skin-nourishing benefits. Its smooth spreadability ensures easy application, while vitamin E offers antioxidant protection, hydration, and repair, making it a promising natural lip care .

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