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DEVELOPMENT & EVALUATION OF POLYHERBAL LIPSTICK

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ABSTRACT

The present study focuses on the formulation and evaluation of a polyherbal lipstick using natural ingredients obtained from beetroot, strawberry, and pomegranate. Herbal cosmetics have gained significant attention due to their safety, biocompatibility, and reduced side effects compared to synthetic products. Natural pigments and bioactive compounds present in these fruits provide attractive color, antioxidant activity, and nourishing effects for the lips. The polyherbal lipstick was formulated using natural waxes, oils, and fruit extracts to obtain a stable, smooth, and aesthetically acceptable product. Beetroot extract was used as the primary coloring agent, while strawberry and pomegranate extracts contributed to color enhancement, antioxidant properties, and moisturizing effects. The prepared formulations were evaluated for various physicochemical parameters including color, texture, pH, melting point, spreadability, breaking point, stability, surface anomalies, skin irritation, and perfume stability. The evaluation results indicated that the formulated herbal lipstick possessed good organoleptic characteristics, satisfactory stability, smooth application, and acceptable pH without causing irritation to the skin. The presence of natural antioxidants from the fruit extracts may also help protect the lips from dryness and environmental damage. The study concludes that the developed polyherbal lipstick is a safe, effective, and eco-friendly alternative to synthetic lipsticks and has promising potential in herbal cosmetic applications.

KEYWORDS: Herbal, Beetroot, Pomegranate, Strawberry, Cosmetic, Health, Skin.

INTRODUCTION

Cosmetics are widely used products intended to enhance appearance and maintain personal hygiene. Among cosmetic products, lipstick is one of the most popular and commonly used formulations worldwide. Conventional lipsticks often contain synthetic dyes, preservatives, heavy metals, and chemical additives that may cause allergic reactions, lip irritation, dryness, and other harmful effects after prolonged use. Due to increasing awareness regarding the adverse effects of synthetic cosmetics, consumers are gradually shifting toward herbal and natural cosmetic products that are safer, eco-friendly, and biocompatible. Herbal cosmetics are formulations prepared using natural ingredients such as plant extracts, oils, waxes, pigments, and other bioactive compounds. These products are gaining popularity because they provide therapeutic benefits along with cosmetic value. Natural colorants obtained from fruits and vegetables are considered excellent alternatives to synthetic dyes because of their antioxidant, moisturizing, and nourishing properties.

In the present study, beetroot, strawberry, and pomegranate were selected as the major natural ingredients for the preparation of a polyherbal lipstick. Beetroot (*Beta vulgaris*) contains betalain pigments, which impart a natural red-violet color and possess antioxidant activity. Strawberry (*Fragaria×ananassa*) is rich in anthocyanins, vitamins, and phenolic compounds that contribute to lip nourishment and provide an attractive color. Pomegranate (*Punica granatum*) contains polyphenols, flavonoids, and antioxidants that help in moisturizing and protecting the lips from oxidative damage. The formulation of polyherbal lipstick using these natural ingredients aims to develop a safe, stable, and effective cosmetic product with minimal side effects. The prepared lipstick formulations were evaluated for various physicochemical parameters such as color, texture, pH, melting point, spreadability, breaking point, stability, surface anomalies, and skin irritation. The study emphasizes the importance of natural ingredients in cosmetic preparations and highlights the potential of herbal lipsticks as an alternative to synthetic products in the cosmetic industry.

PLANT PROFILE

Fig. No. 1: Strawberry.

Scientific Name: *Fragaria ananassa*

Kingdom: Plantae

Division: Magnoliophyta

Class: Magnoliopsida

Family: Rosaceae

Genus: Fragaria

Species: *Fragaria ananassa*

Biological Source: Strawberry consist of fresh fruit of *Fragaria ananassa* belongs to the family Rosaceae.

Uses: Natural coloring agent, Skin care use.

Category: Natural coloring agent, Skin care use.

Fig. No. 2: Beetroot.

Scientific Name: *Beta vulgaris*

Kingdom: Plantae

Division: Magnoliophyta

Class: Magnoliopsida

Family: Amaranthaceae

Genus: Beta

Species: *Beta vulgaris*

Biological Source: Beetroot consist of fresh fruit of *Beta vulgaris* Linn. belongs to the family Amaranthaceae.

Uses: Natural coloring agent, Skin care use.

Category: Natural coloring agent, Skin care use.

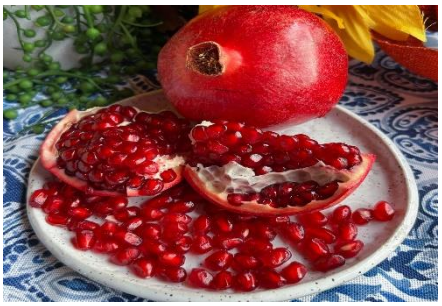

Fig. No. 3: Pomegranate.

Scientific Name: *Punica granatum*

Kingdom: Plantae

Division: Magnoliophyta

Class: Magnoliopsida

Family: Lythraceae

Genus: Punica

Species: *Punica granatum*

Biological Source: Plant *Punica granatum L.* belongs to the family Lythraceae.

Uses: Antioxidant, Skin care, Cosmetic use.

Category: Natural coloring agent, Antioxidant.

MATERIALS AND METHODS

Table No. 1.

Sr. No.	Ingredient	Role
1	Beetroot extract	Natural colorant
2	Strawberry extract	Color enhancer and antioxidant
3	Pomegranate extract	Antioxidant and moisturizer
4	Beeswax	Hardening
5	Cocoa butter	Emollient
6	Castor oil / Coconut oil	Moisturizer

7	Vitamin E	Antioxidant
8	Rosemary	Preservative
9	Orange oil / Vanilla oil	Fragrance
10	Carnauba wax	Thickening agent
11	Almond oil	Shining agent

Extraction Processes

Strawberry Extract

Fresh strawberries were cleaned and crushed to obtain juice. The extract was filtered and concentrated to remove excess water content before use in the formulation.

Beetroot Extract

Fresh beetroot was washed thoroughly, peeled, and cut into small pieces. The pieces were crushed using a blender, and the juice was filtered using muslin cloth followed by filtration through filter paper. The obtained extract was concentrated and stored in a refrigerator for further use.

Pomegranate Extract

Fresh pomegranate seeds were separated, crushed, and filtered to obtain the extract. The filtered extract was concentrated and preserved for further formulation studies.

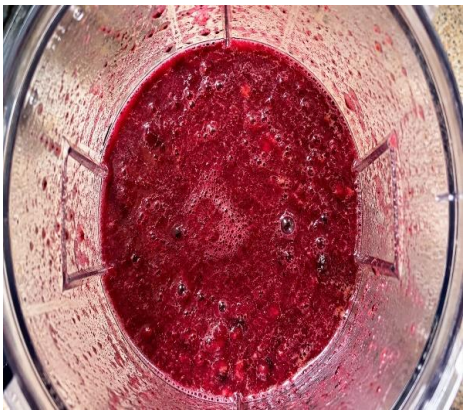

Fig. No. 4: Maceration.

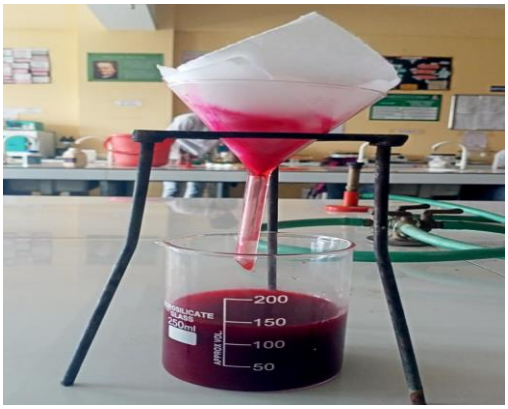

Fig. No. 5: Filtration.

PRELIMINARY PHYTOCHEMICAL SCREENING TEST:

1. Test for Alkaloids

Dragendorff's Reagent Test

A small quantity of the fruit extract was dissolved to few drops of Dragendorff's reagent were added carefully Formation of an orange or reddish-brown precipitate indicated the presence of alkaloids in the extract.

2. Test for Flavonoids

Lead Acetate Test

A small quantity of the extract was treated with a few drops of lead acetate solution. Formation of a yellow-colored precipitate indicated the presence of flavonoids in the extract.

3. Test for Glycosides

Legal's Test

To the extract, pyridine and sodium nitroprusside solution were added, followed by the addition of sodium hydroxide solution.

Formation of a pink to red-colored solution indicated the presence of glycosides in the extract.

4. Test for Carbohydrates

Benedict's Test

A small quantity of the extract was mixed with Benedict's reagent and heated in a boiling water bath for minutes.

Formation of green, yellow, or brick-red precipitate indicated the presence of carbohydrates (reducing sugars) in the extract.

5. Test for Tannins

Feric Chloride Test

Tannins react with ferric chloride ($FeCl_3$) to form colored complexes (blue-black or greenish-black).

6. Test for Saponins

Saponins reduce surface tension of water and form a stable, persistent foam when vigorously shaken.

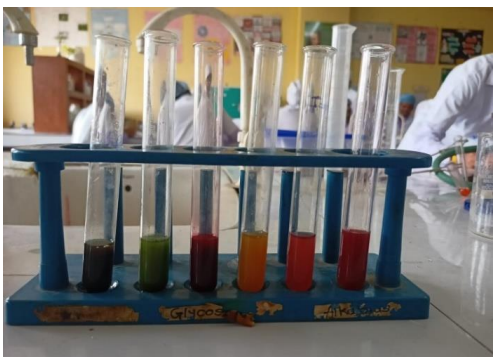

Fig. No. 6: Phytochemical Screening Test.

FORMULATION OF POLYHERBAL LIPSTICK

Collection of ingredients

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Cleaning of apparatus

↓

Weighing of all ingredients accurately

↓

Preparation of Strawberry, Pomegranate, and Beetroot extracts

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Melting of bees wax, carnauba wax, and cocoa butter using water bath

↓

Addition of castor oil/coconut oil and almond oil

↓

Continuous stirring of mixture

↓

Addition of strawberry, pomegranate, and beetroot extracts

↓

Addition of Vitamin E and rosemary extract

↓

Addition of orange oil/vanilla oil for fragrance

↓

Proper mixing to obtain homogeneous mass

↓

Pouring molten mixture into lipstick moulds

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Cooling at room temperature

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Refrigeration for solidification

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Removal of lipstick from moulds

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Packing and labeling

↓

Storage for evaluation tests

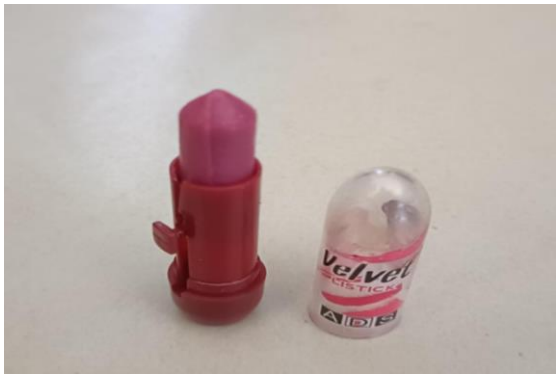

Fig. 7: Formulation polyherbal lipstick.

Table No.:2

Ingredients	F1	F2	F3
Mix fruit Extract	2.4g	2.4g	2.4g
Beeswax	1g	2g	2.5g
Cocoa butter	1.5g	2g	2.5g
Castor oil / Coconut oil	2g	2.5g	2g
Vitamin E	0.2g	0.2g	0.2g
Rosemary	q.s	q.s	q.s
Orange oil / Vanilla oil	1g	2g	2.5g
Carnauba wax	0.5g	0.7g	1g
Almond oil	1g	1g	1g

EVALUATION PARAMETERS OF DEVELOPED FORMULATION:

1. Organoleptic Properties – Organoleptic evaluation involves examining the lipstick by sensory observation.

Parameters observed: 1.Color 2.Odor 3.Appearance 4.Texture 5.Smoothness 6.Gloss

Method: The prepared lipstick is visually inspected and evaluated manually for texture and fragrance.

2. pH Determination

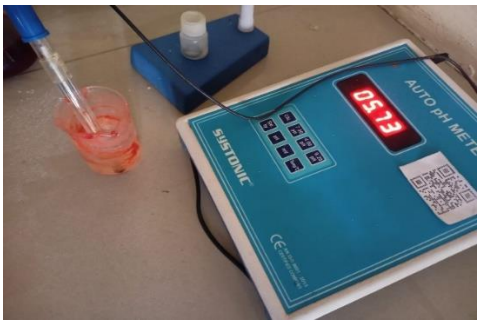

Fig. No. 7: pH meter.

Purpose

To determine the compatibility of the lipstick with skin and lips. **Method:** 1.Dissolve 1 g of lipstick in 100 mL of distilled water. 2.Allow it to stand for 2 hours. 3.Measure the pH using a calibrated digital pH meter. **Ideal Range:** pH should be close to neutral (about 6–7) to avoid irritation

3. Melting Point - Purpose: To determine the temperature at which the lipstick softens or melts **Method:** 1.Fill the lipstick sample into a capillary tube. 2.Place it in a melting point apparatus. 3.Heat gradually and record the temperature at which melting begins. **Significance:** A suitable melting point ensures stability during storage and application.

4. Breaking Point- Purpose

To determine the mechanical strength of the lipstick. **Method:** 1.Place the lipstick horizontally. 2.Apply increasing weight at a fixed distance from the edge at 30-second intervals. 3.Record the weight at which the lipstick breaks. **Significance:** Indicates resistance to breakage during use and handling.

5. Hardness Test- Purpose

To measure the firmness of the lipstick. **Method:** Use a hardness tester or apply a standard weight on the lipstick. Measure the force required to deform or break the sample. **Significance:** Ensures proper consistency and ease of application.

6. Moisturizing Property- Purpose

To evaluate the ability of the lipstick to retain moisture on lips. **Method:** 1.Apply lipstick on the skin or lips. 2.Observe softness, hydration, and smoothness over time. **Observation Parameters:** Dryness reduction Smooth feel Moisture retention

7. Skin Irritation Test - Purpose

To assess safety and compatibility with skin**. Method:** Apply a small amount of lipstick on the inner forearm or behind the ear. Observe for 24 hours.

Observation Parameters

1. Redness 2. Itching 3. Swelling 4.Irritation No irritation indicates the formulation is safe for topical use.

8. Spreadability - Purpose

To determine ease of application on lips. **Method:** 1. Apply the lipstick on a glass slide or skin surface. 2. Evaluate uniformity and smoothness of spreading. **Significance:** Good spreadability provides even coating without fragmentation

9. Solubility Test - Purpose

To determine the solubility behavior of the formulation. **Method:** Test the lipstick in different solvents such as: 1.Water 2.Ethanol 3.Chloroform 4.Ether **Observation:** Record whether the sample is soluble, partially soluble, or insoluble.

RESULTS AND DISCUSSION

The formulated natural polyherbal lipstick containing beetroot, strawberry, and pomegranate showed good cosmetic properties with an attractive natural color, smooth texture, and easy application. The formulation exhibited satisfactory stability, acceptable melting point, and good spreadability without causing irritation. The herbal ingredients provided antioxidant and moisturizing benefits, making the lipstick safe, effective, and suitable as a natural alternative to synthetic lipsticks.

Table No. 3.

Parameters	F1	F2	F3
Color	Light Pink	Reddish Pink	Dark Red
Odor	Pleasant fruity	Pleasant fruity	Pleasant fruity
Appearance	Smooth	Smooth and glossy	Glossy
pH	5.7	5.9	5.73
Texture	Soft	Smooth	Slightly hard
Homogeneity	Good	Excellent	Excellent

Three batches of natural polyherbal lipstick formulations (F1, F2, and F3) containing beetroot, strawberry, and pomegranate extracts were prepared and evaluated for various physicochemical parameters such as color, texture, pH, spreadability, melting point, stability, perfume stability, and skin irritation.

CONCLUSION

In conclusion, the natural polyherbal lipstick formulated using beetroot, strawberry, and pomegranateshowed satisfactory qualityand cosmetic acceptabilit . The formulation provided good color, smooth application, and was found to be safe and non-irritant. The use of natural ingredients offers added antioxidant and nourishing benefits, making it a safer and eco-

friendly alternative to synthetic lipsticks. This study supports the potential of herbal cosmetics in developing effective and consumer-friendly beauty products.

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