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Research Article

FORMULATION AND EVALUATION OF HERBAL LIPBALM BY USING BEETROOT EXTRACT

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Abstract:

Lip balm is a cosmetic preparation used to protect, moisturize, and heal dry or chapped lips. In recent years, there has been increasing interest in herbal cosmetics due to their safety, natural origin, and minimal side effects. This study aims to formulate and evaluate a herbal lip balm using beetroot extract as a natural colouring and antioxidant agent. Beetroot (*Beta Vulgaris*) is rich in betacyanins, flavonoid antioxidant, moisturizing, and skin-protective properties. The lip balm was prepared using natural ingredients such as beeswax, cocoa butter, shea butter, coconut oil, castor oil, vitamin E, and beetroot extract. The formulation was evaluated for various physicochemical parameters, PH, Spreadability, melting point, stability, hardness, skin irritation, and moisturizing effect. The results showed that the formulation lip balm had an attractive, good spreadability suitable under different storage conditions. No skin irritation was observed during the patch test, indicating that the formulation is safe for topical application. The beetroot extract enhanced the aesthetic appeal of the lip balm while also providing antioxidant benefits that help protect the lips from environment damage. In conclusion, the herbal lip balm formulated with beetroot extract proved to be an effective, safe, economical, and eco-friendly cosmetic product. It offers natural color, moisturization and antioxidant protection, making it a promising alternative to synthetic lip balm. **Keywords :** beetroot extract, beta vulgaris, herbal lip balm, natural colorant, betalains, antioxidants, evaluation, herbal cosmetics.

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INTRODUCTION:

Lip balm is a semi-solid cosmetic preparation used to protect, moisturize, and repair the delicate skin of the lips. Lips are more prone to dryness and cracking because they have a thin outer layer and lack sebaceous (oil) glands. Environmental factors such as sunlight, wind, cold weather, pollution, and dehydration can damage the lips, leading to dryness, chapping, and discomfort. Lip balms help maintain moisture, improve softness, and protect the lips from external damage. Vitamin E further enhances the stability of the formulation and protects the lips from free radical damage.

HERBAL LIP BALM

A herbal lip balm is a natural cosmetic product formulated using plant-based ingredients such as herbal extracts, natural oils, waxes, and butters. It is designed to moisturize, protect, nourish, and heal dry, chapped, or cracked lips without relying on synthetic chemicals. Because the skin of the lips is thin and lacks oil glands, it is more susceptible to dryness and environmental damage caused by sunlight, wind, cold weather, and pollution. Herbal lip balms help maintain lip hydration and improve the overall health and appearance of the lips. As the lips are thin and lack oil glands, they are more susceptible to dryness and environmental damage.

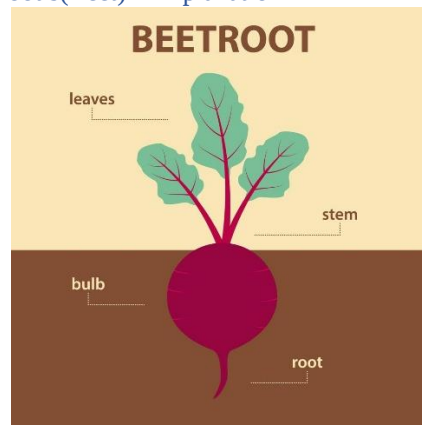
Beetroot is a nutritious root vegetable grown for its swollen taproot. It is commonly red or purple, although yellow and white varieties also exist. Both the root and the leaves are edible and are used in cooking.

Scientific Classification

- **Scientific name:** *Beta vulgaris*
- **Family:** *Amaranthaceae*

Parts of a Beetroot Plant

1. **Leaves** – Green leaves that carry out photosynthesis. They are also edible.
2. **Stem (Crown)** – The short portion connecting the leaves to the root.
3. **Taproot (Beetroot)** – The swollen underground storage root that stores nutrients.
4. **Lateral roots** – Small roots branching from the taproot that absorb water and minerals. Uses
 - Eaten raw in salads or cooked in curries, soups, and roasted dishes.
 - Used to prepare juice and pickles.
 - Serves as a natural food coloring because of its deep red pigment.

Beetroot s(Beet) – Explanation**Nutritional Value**

Beetroot is a good source of:

- Dietary fiber
- Folate (Vitamin B9)
- Vitamin C
- Potassium
- Iron
- Natural antioxidants

Health Benefits

- Supports heart health as part of a balanced diet.

- Helps maintain healthy digestion because it is high in fiber.
- Contains antioxidants that help protect cells from oxidative damage.
- Provides vitamins and minerals that support overall health.

Materials

- Beetroot seeds
- Well-drained, fertile soil
- Garden bed or pots
- Compost or organic manure
- Watering can or irrigation system
- Garden hoe or trowel
- Fertilizer (if needed)
- Mulch (optional)

Methods

1. **Prepare the soil:** Loosen the soil and mix in compost or well-rotted organic
2. **Sow the seeds:** Plant the seeds about **2–3 cm deep** and **5–10 cm apart** in rows spaced **25–30 cm apart**.

PREPARATION OF BEETROOT EXTRACT:

To prepare beetroot extract from fresh beetroot.

Materials Required

- Fresh beetroot
- Knife
- Cutting board
- Blender or mortar and pestle
- Distilled water

- Beaker
- Muslin cloth or filter paper
- Funnel
- Measuring cylinder
- Glass bottle for storage

Procedure

1. Wash the fresh beetroot thoroughly with clean water.
2. Peel the outer skin and cut the beetroot into small pieces.
3. Place the pieces in a blender or crush them using a mortar and pestle.
4. Add a small amount of distilled water (about **50–100 mL** for **100 g** of beetroot).
5. Blend until a smooth mixture is obtained.
6. Filter the mixture through muslin cloth or filter paper into a clean beaker.
7. Collect the filtrate in a clean glass bottle. This filtrate is the **beetroot extract**.
8. Store the extract in a refrigerator if it is not used immediately.

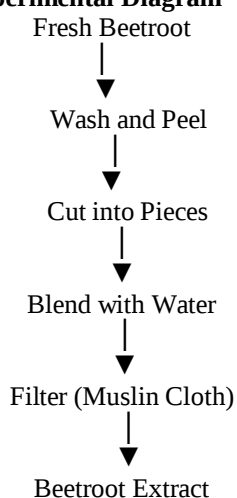
Observation

- The extract is **deep red to purple** in color.
- It has a characteristic earthy smell.
- The liquid is free from large solid particles after filtration.

Result

A clear, red-colored beetroot extract was successfully prepared and is ready for further experimental or laboratory use.

Simple Experimental Diagram



Formulation of Beetroot Extract:**Formulation Table:**

S. No.		Ingredient	Quantity	Purpose
1		Fresh beetroot	100 g	Main source of extract
2		Distilled water	100 mL	Extraction solvent
3		Muslin cloth or filter paper	1 piece	Filtration
4		Glass bottle	1	Storage of extract

Formulation Procedure:

1. Wash and peel **100 g** of fresh beetroot.
2. Cut it into small pieces.
3. Add the beetroot pieces to a blender with **100 mL** of distilled water.
4. Blend until a smooth mixture is formed.
5. Filter the mixture through muslin cloth or filter paper.
6. Collect the filtrate in a clean glass bottle.
7. Label and store the beetroot extract in a refrigerator until use.

Final Formulation:

•	Fresh beetroot: 100 g
•	Distilled water: 100 ml

Evaluation of Beetroot Extract

Evaluation means checking the **quality, properties, and effectiveness** of the prepared beetroot extract.

1. Organoleptic Evaluation (Physical Appearance)

Parameter	Observation
Colour	Deep red / purplish red
Odour	Earthy, natural beet smell
Taste	Slightly sweet and earthy
Appearance	Clear to slightly turbid liquid

2. Physical evaluation:

Parameter	Completely water-soluble extract
Observation	Sedimentation
Consistency	May show slight settling after some time
Thin liquid	Filtration quality
Solubility	Good if properly filtered

3. pH**Evaluation:**

- pH is usually **slightly acidic (around 5.5–6.5)**
- This depends on water quality and beetroot freshness

4. Stability Evaluation:

- Fresh extract is **not highly stable**
- Color may fade on exposure to:
 - Heat
 - Light
 - Air (oxidation)

- Best stored in a **cool, dark place or refrigerator**

5. Chemical/Functional Evaluation:

- Rich in natural pigments called **betalains**
- Contains antioxidants that may reduce oxidation reactions
- Can act as a **natural color indicator** in experiments (pH-sensitive behavior)

6. Overall Result:

The beetroot extract is:

- Properly prepared if it shows a **deep red color**
- Stable for **short-term use**
- Suitable for **laboratory experiments, indicators, and basic studies**

Result and Discussion:

The prepared formulations such as F1, F2 & F3 evaluated for few parameters such as Colour, Odour, Appearance, Texture, Greasiness, and pH & their results were shown in the table no: 2"

Parameter	Observation		
	F1	F2	F3
Colour	Pink	Good Pink	Bright Pink
Odour	Pleasant	Pleasant	Pleasant
Appearance	Slightly Uneven	Slightly Rough	Test Appearance
Texture	Appears Grainy	Appears Coarse And Grainy	Appears Smoother & More Homogeneous
Greasiness	Presence of Gritty Particles	Presence of Gritty Particles	Free From Gritty particles
PH	7.1	7.2	7.2
Spreadability	Poor	Good	Excellent

Stability Studies

PARAMETER	COLOUR	ODOUR	SPREADABILITY	MELTING POINT	PH
25°C	Faint Pink	Pleasant	Good, Uniform	66°C	7.1
5°C	Faint Pink	Pleasant	Good, Uniform	67°C	7.1
40°C	Faint Pink	Pleasant	Intermediate	67°C	7.1



CONCLUSION:

The herbal lip balm F1, F2 and F3 were successfully prepared by using beetroot extract and along with other ingredients such as beeswax, castor oil and rose oil. Evaluation tests were performed. All formulations showed satisfactory physical appearance, acceptable pH, good spreadability, Greasiness, and stability with no signs of irritation. Among all formulations, F3 showed excellent spreadability, stability, and pH, compared to F1 and F2. This may be due to the presence of high concentration of mango butter. Hence, it is the optimized formulation and beetroot extract can be considered as a promising ingredient for formulation of herbal lip balm for skincare applications.

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