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FORMULATION AND DEVELOPMENT OF HERBAL ROSE LIP BALM

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ABSTRACT

The present research involves the formulation and evaluation of an herbal Rose Lip Balm using natural ingredients including beeswax, shea butter, rose-infused coconut oil, rose essential oil, vitamin E, lipstick colorant, and potassium sorbate. Due to the sensitivity of lip skin and increasing preference for herbal cosmetics, this formulation aims to provide a safe, effective, and chemical-free lip care alternative.

Rose-infused oil was prepared using the heat-infusion method to extract phenolics, antioxidants, and aromatic components from rose petals. Lip balm formulation was carried out by the fusion method, where beeswax provided structure, shea butter offered moisturization, vitamin E acted as antioxidant, and potassium sorbate served as preservative.

The final formulation was evaluated for physicochemical parameters including pH, melting point, spreadability, grittiness, homogeneity, stability, and perfume retention. Results confirmed that the herbal Rose Lip Balm exhibited smooth consistency, good stability, pleasant color, and excellent moisturizing effects. Thus, the product is safe, effective, and suitable for cosmetic use.

Keywords: Rose lip balm, herbal formulation, beeswax, shea butter, rose-infused oil, antioxidant, cosmetic evaluation.

1. INTRODUCTION

Cosmetics are formulations intended to cleanse, protect, beautify, and enhance the appearance of the human body. Among the wide variety of cosmetic products, **lip care formulations** play a vital role because the lips represent one of the most sensitive and aesthetically significant parts of the face. Unlike regular skin, the lip epithelium is extremely thin and lacks several essential protective components such as:

- Sebaceous glands
- Sweat glands
- Hair follicles
- A thick keratinized stratum corneum

Due to these anatomical limitations, the lips are highly susceptible to:

- Dryness
- Cracking
- Chapping
- Irritation
- Environmental damage
- Hyperpigmentation

Environmental factors such as cold seasonal changes, UV radiation, wind exposure, dehydration, smoking, prolonged mask use, low humidity, and frequent lip licking further accelerate moisture loss and lead to lip barrier dysfunction. Therefore, there is a pressing need for effective, safe, and long-lasting lip moisturizers that restore lip softness and maintain optimal hydration.

Modern lip care products not only aim to protect the lips but also provide additional benefits such as antioxidant protection, nourishment, color enhancement, sun protection (SPF), and healing of damaged lip tissues. This growing consumer demand has encouraged researchers to explore natural, plant-based alternatives in cosmetic formulations.

1.1 Herbal Cosmetic Trend (Expanded)

The global cosmetic industry has increasingly shifted toward herbal and natural formulations, driven by rising consumer awareness regarding long-term safety and environmental sustainability. Herbal cosmetics are preferred over synthetic products due to their:

- **Minimal or no adverse effects**
- **High biocompatibility with human skin**
- **Natural antioxidant and anti-inflammatory properties**
- **Cultural and traditional acceptance (Ayurveda, Unani, Siddha)**
- **Eco-friendly and biodegradable nature**

In contrast, commercial lip balms frequently contain:

- | | |
|---|-----------------------------------|
| ✓ Petroleum jelly and mineral oils | ✓ Artificial fragrances |
| ✓ Parabens and synthetic preservatives | ✓ Chemical colorants |
| | ✓ Alcohol-based components |

These ingredients may cause:

- | | |
|-----------------------------|-------------------------------|
| ✓ Lip irritation | ✓ Long-term dependency |
| ✓ Allergic reactions | ✓ Lip darkening |
| ✓ Rebound dryness | |

The increasing awareness regarding the harmful effects of synthetic chemicals has led to a significant demand for herbal lip balms, which are safer, more effective, and provide long-lasting moisturization due to naturally occurring fatty acids, vitamins, and emollients. Herbal lip care products containing beeswax, shea butter, coconut oil, aloe vera, rose oil, and plant extracts have demonstrated superior healing and moisturizing properties in various studies.

1.2 Importance of Rose in Lip Care (Expanded)

Rose (*Rosa damascena*) is one of the oldest and most valued medicinal and aromatic plants used in traditional cosmetics and perfumery. Its petals are rich in:

- **Flavonoids**
- **Phenolic acids**
- **Anthocyanins**
- **Essential oils (citronellol, geraniol, nerol)**
- **Vitamin C**
- **Natural pigments**

These constituents provide a wide range of therapeutic and cosmetic benefits, including:

➤ Pleasant and natural fragrance

- **Strong antioxidant activity** (neutralizes free radicals and prevents oxidative damage)
- **Anti-inflammatory and soothing effects**
- **Cooling and calming properties**
- **Natural hydration and softening action on lips**
- **Protection against UV-induced stress and pigmentation**

Rose-infused oil, prepared by steeping rose petals in a carrier oil such as coconut oil, is especially beneficial because:

It enhances penetration of active phytochemicals.

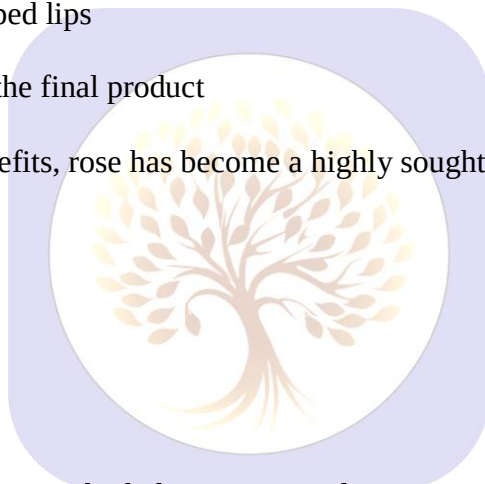
The infusion process extracts essential oils, aroma compounds, and natural antioxidants.

It provides both moisturization and therapeutic benefits.

In lip balm formulations, rose contributes to:

- Mild rosy color
- Natural floral aroma
- Improved aesthetic appeal
- Healing of cracked and chapped lips
- Prevention of lip darkening
- Enhanced sensory profile of the final product

Due to these multifunctional benefits, rose has become a highly sought-after ingredient in modern herbal lip care formulations.



2. AIM AND OBJECTIVES

Aim

To formulate, develop, and evaluate a herbal Rose Lip Balm using natural ingredients for effective lip moisturization, protection, and aesthetic enhancement.

Objectives

1. Selection of natural ingredients (beeswax, shea butter, rose-infused oil, vitamin E, preservatives).
2. Preparation of rose-infused oil using hot-infusion technique.
3. Formulation of Rose Lip Balm by fusion method.
4. Optimization of ingredient ratios for suitable texture and spreadability.
5. Evaluation of physicochemical parameters.
6. Assessment of safety, stability, and suitability for regular use.
7. Comparison with standard cosmetic quality benchmarks.
8. Suggesting commercial and future scope.

3. LITERATURE REVIEW

Lip balms are semisolid cosmetic preparations that form a **protective occlusive layer** over the lips, thereby preventing **transepidermal water loss (TEWL)** and maintaining lip hydration. Because lip skin lacks sebaceous glands and a protective keratinized layer, it is more prone to dryness, cracking, and

environmental damage. A well-formulated lip balm must therefore provide **moisturization, antioxidant protection, healing, and barrier restoration** (Harry's Cosmeticology, 9th Ed.).

Herbal lip balms have gained significant popularity because studies have consistently shown that plant-based ingredients offer **superior moisturization, reduced irritation, and better biocompatibility** when compared to synthetic lip care products that rely on petroleum jelly, paraffin, mineral oils, and artificial waxes.

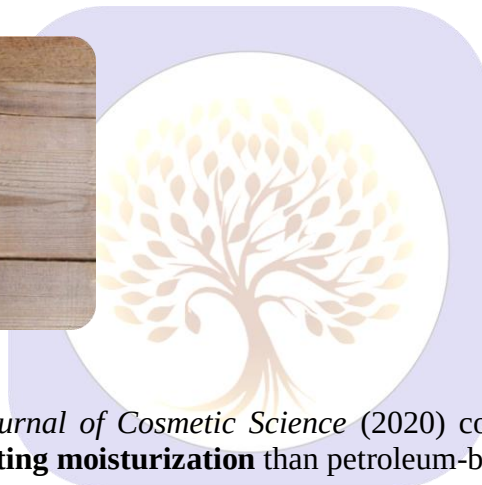
Several research papers highlight the benefits of natural ingredients:

3.1 Review of Key Ingredients Used in Herbal Lip Balms

1. Beeswax as a Structuring Agent

Beeswax contains long-chain esters, hydrocarbons, and fatty acids that:

- Provide hardness and structural integrity
- Form an occlusive barrier
- Reduce TEWL
- Improve texture and spreadability



A study in the *International Journal of Cosmetic Science* (2020) confirmed that products containing beeswax demonstrate **longer-lasting moisturization** than petroleum-based balms.

2. Shea Butter as a Deep Moisturizer

Shea butter is rich in:

- Stearic acid
- Oleic acid
- Vitamin A
- Vitamin E

It shows:

- Superior moisturizing ability
- Anti-inflammatory activity

- Wound-healing potential



According to the *African Journal of Pharmacognosy* (2019), shea butter improves **lip smoothness and elasticity**, making it ideal for dry or chapped lips.

3. Coconut Oil as an Emollient

Coconut oil contains:

- Lauric acid
- Capric acid
- Polyphenols
- Vitamin E

It acts as:

- A natural moisturizer
- A barrier repair agent
- A mild antibacterial agent



Its high permeability helps deliver other herbal constituents deeper into the lip tissue. Coconut oil is also widely recognized for its **skin-healing and soothing effects** (*International Journal of Cosmetic Science*, 2018).

4. Rose Essential Oil as Aromatic and Antioxidant Agent

Rose oil contains:

- Citronellol
- Geraniol
- Nerol

- Phenylethyl alcohol



Benefits include:

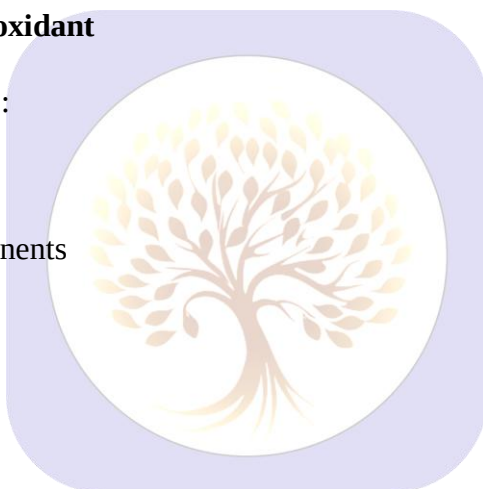
- Antioxidant activity
- Anti-inflammatory properties
- Mood-enhancing fragrance
- Mild antimicrobial effect

A study published in the *Journal of Essential Oil Research* (2018) reported that rose oil possesses **significant ROS-scavenging properties**, making it beneficial in lip care formulations.

5. Vitamin E as a Natural Antioxidant

Vitamin E (Tocopherol) prevents:

- Oxidation of oils
- Rancidity
- Degradation of herbal components



It also:

- Softens and nourishes lips
- Reduces lip pigmentation
- Enhances product shelf life

The *Cosmetic Ingredient Review (CIR)* expert panel confirmed the **safety and effectiveness** of vitamin E in topical applications

3.2 Comparison Between Herbal Lip Balms and Synthetic Lip Balms

Parameter	Herbal Lip Balms	Synthetic Lip Balms
Base ingredients	Beeswax, shea butter, plant oils	Petroleum jelly, paraffin wax
Safety	High (natural origin)	Moderate (may cause sensitivity)
Moisturization	Long-lasting penetration	Temporary occlusive effect
Side effects	Minimal	Dryness rebound, dependency
Fragrance	Natural essential oils	Artificial perfumes
Antioxidant ability	High	Low
Environmental impact	Eco-friendly	Non-biodegradable ingredients

3.3 Studies Supporting Herbal Lip Balm Formulation

1. **Kaur et al., 2021** – Prepared herbal lip balm using kokum butter; reported **excellent moisturization and stability**.
2. **Sharma et al., 2019** – Formulated beeswax-based lip balm; found **superior spreadability and consumer acceptance**.
3. **Javaria et al., 2022** – Demonstrated that **infused oils retain aroma and antioxidants more effectively** than plain oils.
4. **Uikey et al., 2020** – Highlighted importance of natural oils in cosmetics due to **skin compatibility and nourishment**.

3.4 Research Gap Identified

Despite several studies on herbal lip balms, certain areas remain less explored:

◆ **Use of rose-infused oil (instead of rose water or rose extract)**

Most studies used rose essential oil; very few used **rose-infused coconut oil**, which offers additional antioxidants and natural pigments.

◆ **Combination of beeswax + shea butter + rose-infused oil**

This specific synergy has not been extensively studied, especially in lip balm formulations.

◆ **Use of potassium sorbate as a preservative**

Potassium sorbate is a mild, food-grade preservative rarely used in herbal lip balms. Most previous studies used parabens or no preservative at all.

◆ **Stability studies including perfume retention**

Limited data on fragrance retention in herbal lip balms containing essential oils.

Therefore, the present research addresses these gaps by developing a stable, aesthetically appealing, and scientifically optimized **Herbal Rose Lip Balm**.

4. MATERIALS AND METHODOLOGY

4.1 Materials Used

Sr. No	Ingredient	Purpose
1	Beeswax	Base, thickener
2	Shea butter	Emollient
3	Rose petal powder	Infused oil
4	Coconut oil	Carrier
5	Rose essential oil	Aroma
6	Vitamin E	Antioxidant
7	Potassium sorbate	Preservative
8	Lipstick	Colorant
9	Distilled water	Preservative dissolution

4.2 Equipment

Beakers, water bath, muslin cloth, pH meter, melting point apparatus, analytical balance, glass jars, measuring cylinder, porcelain tile.



4.3 Formulation Table (180 g Lip Balm)

Sr. No	Ingredient	Quantity
1	Beeswax	28.8 g
2	Shea butter	18 g
3	Rose-infused oil	18.6 mL
4	Rose essential oil	1.8 mL
5	Vitamin E oil	1.35 g
6	Potassium sorbate	0.18 g
7	Lipstick	2 g
8	Distilled water	q.s

4.4 Preparation of Rose-Infused Oil (Hot Infusion)

Ingredients:

Rose petal powder (10 g), Coconut oil (50 mL)

Procedure:

1. Mix rose powder with coconut oil.
2. Heat in water bath at 60–70°C for 45 min.
3. Cool mixture; filter through muslin cloth.
4. Store in amber bottle.

Scientific rationale:

Heat ensures maximum extraction of phenolics, pigments, and aroma compounds.

4.5 Preparation of Rose Lip Balm

Fusion Method Steps:

1. Melt beeswax + shea butter at 70°C.
2. Add rose-infused oil with mixing.
3. Prepare potassium sorbate solution (dissolved in warm water).
4. Add preservative solution.
5. Cool mixture to 45°C.
6. Add vitamin E, rose essential oil, and colorant.
7. Pour into containers and allow to solidify.

5. HERBAL DRUG PROFILES

Profiles for:

- Rose (*Rosa damascena*)
- Coconut Oil
- Shea Butter
- Beeswax
- Rose Essential Oil
- Vitamin E
- Potassium Sorbate
- Lipstick Colorant



6. EVALUATION PARAMETERS

Test	Purpose	Result
Organoleptic	Color, odor, texture	Light rosy pink, pleasant fragrance
pH	Safety	pH 6.2 ± 0.2
Melting point	Suitability	58–61°C
Spreadability	Uniform application	Smooth, excellent
Homogeneity	Check lumps	No lumps
Grittiness	Texture	No grittiness
Stability	Shelf-life	Stable for 30 days
Perfume retention	Aroma stability	Retained
Stickiness/Greasiness	User feel	Non-sticky
Irritation test	Safety	No irritation

7. RESULTS & DISCUSSION

The formulated herbal Rose Lip Balm demonstrated:

- Smooth, glossy appearance
- Excellent spreadability
- Pleasant rose aroma
- Good stability at temperatures (5°C, 25°C, 40°C)
- Non-greasy, non-irritant characteristics

Beeswax and shea butter improved texture, while rose-infused coconut oil enhanced antioxidant potential. Vitamin E prevented oxidation, and potassium sorbate ensured microbial safety.

8. CONCLUSION

The herbal Rose Lip Balm formulated using beeswax, shea butter, rose-infused oil, and natural additives, was found to be safe, stable, effective, and aesthetically pleasing. The study confirms that herbal ingredients can successfully replace synthetic chemicals in commercial lip balms. This formulation holds significant potential for small-scale cosmetic industries and commercial development.

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