

FORMULATION AND EVALUATION OF HERBAL COLD CREAM USING BANANA ROOT EXTRACT

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Article Received on
06 June 2025,

Revised on 27 June 2025,
Accepted on 17 July 2025

DOI: 10.20959/wjpr202515-37360



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ABSTRACT

The formulation and evaluation of a herbal cold cream incorporating banana root extract aim to develop a natural skincare product with moisturizing and therapeutic properties. Banana root (*Musa spp.*) is rich in bioactive compounds such as flavonoids, tannins, and alkaloids, known for their antioxidant, anti-inflammatory, and antimicrobial effects. These properties make banana root an ideal candidate for topical applications targeting dry, irritated, or aging skin. In this study, a cold cream was formulated using a water-in-oil emulsion method, incorporating banana root extract as the active ingredient. The formulation process involved selecting appropriate emulsifiers, stabilizers, and preservatives to ensure the cream's stability, spreadability, and skin compatibility. The cream was subjected to various evaluation tests, including organoleptic assessment, pH measurement, spreadability, viscosity, and stability under different temperature conditions. The results indicated that the banana root

extract cream exhibited favorable physical characteristics, with a pH within the skin's natural range and good spreadability. Stability tests confirmed that the cream maintained its consistency and efficacy over time. Furthermore, the cream demonstrated significant antioxidant and antimicrobial activities, suggesting its potential in protecting the skin from oxidative stress and microbial infections. In conclusion, the banana root extract-based herbal cold cream presents a promising natural alternative for skincare, offering moisturizing and

therapeutic benefits. Further clinical studies are recommended to assess its long-term efficacy and safety for diverse skin types.

KEYWORD: Cold cream, Moisturizing, Nourishing, Banana root extract, Evaluation.

INTRODUCTION

The increasing demand for natural and effective skincare products has led to the exploration of herbal alternatives in cosmetic formulations. Cold creams, traditionally used for their soothing and moisturizing properties, have evolved to incorporate various natural ingredients to enhance their efficacy. Among these, the banana plant, particularly its root, has garnered attention for its potential dermatological benefits.

1. Significance of Cold Creams

Cold creams are semisolid emulsions of water and oil, designed to hydrate and protect the skin. Their primary function is to restore moisture to dry skin, eliminate waste materials from pores, and provide a cooling effect. The oil phase imparts emollience, while the water phase offers additional skin conservation. These creams are non-irritating, easy to wash off, and provide prolonged contact time at the application site, making them effective for various skin conditions.

2. Therapeutic Potential of Banana Root

The banana plant, particularly the root, is rich in essential nutrients, antioxidants, and vitamins. banana peels, for instance, contain vitamins A, B, C, and E, along with minerals like potassium, zinc, iron, and manganese. These nutrients contribute to the banana root's skin-enhancing properties, including anti-inflammatory effects, acne treatment, and antiaging benefits.

3. Rationale for Incorporating Banana Root Extract

Incorporating banana root extract into cold cream formulations can enhance the product's therapeutic profile. The extract's antioxidant and anti-inflammatory properties can aid in reducing skin irritation, promoting healing, and providing a natural alternative to synthetic additives. Additionally, the banana root's moisturizing effects can complement the hydrating properties of traditional cold cream ingredients.

4. Objectives of the Study

The primary objectives of this project are:

- **Formulation:** To develop a herbal cold cream incorporating banana root extract, aiming to Combine the traditional benefits of cold creams with the therapeutic properties of the banana root.
- **Evaluation:** To assess the formulated cream for various parameters, including pH, viscosity, spreadability, stability, and antimicrobial activity, ensuring its safety and efficacy for topical use.

5. Scope and Significance

This study aims to contribute to the growing field of herbal cosmetics by exploring the potential of banana root extract in skincare formulations. The successful development of such a product could offer consumers a natural, effective alternative to conventional skincare products, aligning with the increasing preference for herbal and sustainable cosmetic solutions.

Need for the Study

1. **Rising Demand for Natural Skincare Solutions** There is a growing trend towards the use of herbal cosmetics due to their perceived safety, minimal side effects, and therapeutic benefits. Consumers are increasingly seeking products that incorporate natural ingredients, aligning with the global shift towards sustainable and holistic skincare approaches.
2. **Utilization of Underexplored Plant Resources** while banana peel has been studied for its antioxidant and anti-aging properties, the banana root remains underexplored in cosmetic formulations. This study seeks to tap into the potential of banana root extract, which is rich in bioactive compounds such as flavonoids and alkaloids, known for their antioxidant, antiinflammatory, and antimicrobial effects.
3. **Development of Multifunctional Skincare Products**
Cold creams are widely used for their moisturizing and soothing properties. Incorporating banana root extract into cold cream formulations aims to enhance their efficacy by adding antioxidant and antimicrobial benefits, thereby addressing multiple skin concerns with a single product.

4. Contribution to Sustainable Cosmetic Practices

Utilizing banana root, a part of the banana plant often discarded, promotes sustainability in cosmetic product development. This approach aligns with the growing emphasis on ecofriendly practices in the cosmetic industry, reducing waste and making use of renewable natural resources.

5. Enhancement of Skin Health and Protection

The bioactive compounds present in banana root extract can provide antioxidant protection, reduce inflammation, and combat microbial infections. These properties contribute to overall skin health, making the formulated cold cream beneficial for individuals with various skin conditions.

Benefits of Formulating and Evaluating a Herbal Cold Cream Using Banana Root Extract:

The development of a herbal cold cream incorporating banana root extract offers a multitude of benefits, both from a cosmetic and therapeutic perspective. Below are the key advantages:

1. Natural Moisturization

Banana root extract is rich in essential nutrients and antioxidants, which can help hydrate and nourish dry skin, leaving it soft and smooth. The potassium content in banana roots aids in moisture retention, making it an effective natural moisturizer for the skin.

2. Anti-Inflammatory Properties

The extract possesses anti-inflammatory properties, which can help reduce redness and swelling associated with skin conditions like acne or eczema. Regular application may soothe irritated skin and promote a healthier complexion.

3. Antioxidant Protection

Rich in antioxidants such as vitamins A, C, and E, banana root extract helps combat oxidative stress, a significant factor in premature aging. These antioxidants neutralize free radicals, thereby reducing the appearance of fine lines and wrinkles.

4. Skin Brightening and Even Tone

The natural enzymes and antioxidants in banana root extract can help lighten scars and blemishes over time. Regular application may promote an even skin tone, enhancing the skin's radiance and overall appearance.

5. Antimicrobial Benefits

Banana root extract exhibits antimicrobial properties, which can help protect the skin from irritation caused by conditions like acne or rashes. This makes it a valuable ingredient in skincare formulations aimed at maintaining clear and healthy skin.

6. Eco-Friendly and Sustainable

Utilizing banana root extract in skincare products promotes sustainability by making use of parts of the banana plant that are often discarded. This approach aligns with the growing consumer preference for eco-friendly and sustainable cosmetic products.

7. Safe and Gentle for Sensitive Skin

Being a natural ingredient, banana root extract is generally safe and gentle on the skin, making it suitable for individuals with sensitive skin. However, as with any new skincare product, a patch test is recommended to ensure compatibility.

Types of Cold Cream

1. **Water-in-Oil (W/O) Emulsion Cold Creams** These creams have a higher oil content, providing a rich, occlusive layer that locks in moisture and offers prolonged hydration. The banana root extract's antioxidants can help protect the skin from environmental stressors, while its anti-inflammatory properties soothe irritated skin.
2. **Oil-in-Water (O/W) Emulsion Cold Creams** Featuring a lighter texture, these creams are easily absorbed and provide a cooling effect upon application. Banana root extract can contribute to skin brightening and even tone, enhancing the cream's efficacy in daily skincare routines.
3. **Polyherbal Cold Creams:** Combining multiple herbal extracts, these creams aim to address various skin concerns simultaneously. Incorporating banana root extract alongside other botanicals can create a synergistic effect, offering comprehensive skin benefits.
4. **Anti-Aging Cold Creams:** Formulated with ingredients targeting signs of aging, these creams aim to reduce wrinkles and promote skin elasticity. The antioxidant-rich banana root extract can play a pivotal role in combating oxidative stress, a major contributor to skin aging.

Advantages of Herbal Cold Cream:

1. It Prevents ageing and dehydration of skin.
2. As cold creams contain enough amount of water and oil, they keep skin safe from the rough environments.
3. They also keep skin moisturized and safe
4. Cold creams are designed to remove makeup and smooth the skin
5. Medicated cold cream is mainly used as topical pharmaceutical dosage form for the treatment of skin.
6. To help in the maintenance of moisture balance of skin and avoid rough skin co uses of cold cream (non medicated).
7. As a cleansing preparation to remove make.
8. To provide an emollient effect and oily protective layer on the skin.
9. Also, provide a chemical harrier as with san block ingredients.

Ideal Properties of Herbal Cold Cream:

1. It should not normally be diluted.
2. Its consistency should be optimum so that it can be easily put out from the container and apply easily. Should give a cooling effect on the skin after external application.
3. It must provide a thin waxy protective layer on the skin to protect the water evaporation from the skin surface.
4. Should give a faster emollients effect, we that very dry skin can swell up and become soft within a short time.
5. Less s greasy than ointment and Easily spread on the skin.
6. It should be physically and chemically stable throughout its shelf-life
7. The excipients should be compatible with each other. It should be sterile.

INGREDIENTS (MATERIALS) USED IN FORMULATION

1. Banana root

Synonym: Banana plants, Kanaha Beach, Maui

Biological source: The biological source of bananas is the plant species *Musa Paradisiaca* L.

Family: Musaceae chemical constituents: flavonoids, alkaloids, terpenoids, and other bioactive compounds, along with essential nutrients like potassium, calcium, and phosphorus



Fig. 1: Banana root.

Banana plants have a rhizomatous root system, characterized by thick, fleshy, underground stems called rhizomes. These rhizomes produce numerous lateral roots and shoots, allowing the plant to spread and reproduce vegetatively.

Because of its high vitamin C content, banana roots can remedy skin problems such as itching, pimples and other skin problems. This is because vitamin C content is effective in overcoming skin disorders.

Uses

Skin problem

Hydration and nourishment

Acne and blemishes

Wrinkles and fine lines

Skin tone

2. Bees wax



It is used as a stabilizing agent.

It contains strong healing, anti-septic and Anti-inflammatory properties.

It repairs damage, promotes the skin's Regeneration and creates hydration.

3. Liquid paraffin



It is used as a moisturizing agent to prevent dry, rough scaly, itchy skin and minor skin Irritation.

4. Borax



It is used as emulsifier agent.

It is added to remove skin bacteria, and Dead skin cells.

5. Glycerin

Attract and retain moisture from the environment into the skin, ensuring



6. Methylparaben



It is used as preservative.

They prevent harmful mold, bacteria, and fungi from infecting your products.

7. Propylparaben



Propyl paraben is a synthetic preservative used in various products like cosmetics, pharmaceuticals, and foods to prevent the growth of microorganisms and extend shelf life.

8. Rose water



Rose water is especially hydrating when combined with other moisturizing ingredients, such as ceramides or glycerin. “These help to moisturize the skin, protect the skin barrier and prevent further water loss for the skin,” says Allawh. However, it shouldn’t replace your current moisturizer.

AIM AND OBJECTIVE

AIM: Formulation and Evaluation of Herbal Cold Cream Using Banana Root Extract.

OBJECTIVE

1. Extraction and Characterization of Banana Root Extract
2. Formulation of Herbal Cold Cream
3. Evaluation of Formulated Cream
4. Clinical Assessment of Efficacy
5. Sustainability and Cost Analysis

PLAN OF WORK

1. Introduction
2. literature survey
3. Aim and Objective
4. Procurement and Preparation
5. Formulation Development
6. Evaluation and Testing
7. Result
8. References

PLANT PROFILE**AUTHENTICATION OF PLANT**

Synonym: Banana plants, Kanaha Beach, Maui

Classification of Banana plant: Banana belongs to plantae Kingdom.


Kingdom: Plantae

Division: Angiosperms

Order: Zingiberales


Family: Musaceae

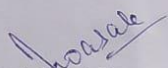
Genus: Musa

 **LOKNETE DR. BALASAHEB VIKHE PATIL**
(PADMA BHUSHAN AWARDEE)
PRAVARA RURAL EDUCATION SOCIETY'S
**PADMASHRI VIKHE PATIL COLLEGE OF ARTS,
SCIENCE AND COMMERCE,**
PRAVARANAGAR A/P-LONI KD. TAL-RAHATA, DIST-AHILYANAGAR (MS)
POST GRADUATE DEPARTMENT OF BOTANY AND RESEARCH CENTRE


Authentication Certificate

This is to certify that the plant specimen collected by **Miss. Khemnaar Pooja Ashok, Miss. Jondhale Akanksha Vitthal and Miss. Shinde Akanksha Kaushiram,** Students of B. Pharmacy of **Ashvin College of Pharmacy, Manchi Hill, Ashvi Bk. Tal. Sangamner, Dist. Ahilyanagar** is ***Musa paradisiaca* L.** and belongs to family **Musaceae** with local name **Banana, Kela, Keli. Etc.**

Identified by 
Dr. S. P. Giri
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Verified by 
Dr. A. S. Wabale
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Dept. of Botany and Research Centre
PVP College, Loni

Date: 6th Feb. 2025
Place: Pravaranagar
Ref. No./PVPC/Bot./2024-25/379



Methods of Preparation

Formulation table for Herbal Cold Cream (For 50 gm):

Ingredient	Quantity	Purpose
Banana root extract	2.0	Active ingredient with antioxidant properties
Beeswax	5.0	Emulsifying agent
Liquid paraffin	8.0	Emollient
Cetyl alcohol	1.5	Emulsifier and thickening agent
Glycerin	4.0	Humectant
Methylparaben	0.2	Preservative
Propylparaben	0.1	Preservative
Distilled water	Q. S.	Solvent and vehicle
Rose water	10.0	Fragrance

1. Extraction of Banana Root

Material: Fresh banana roots (*Musa* spp.) Procedure:

1. Clean the banana roots thoroughly to remove soil and impurities.
2. Chop the cleaned roots into small pieces to increase surface area.
3. Dry the chopped roots under shade or in a dehydrator to prevent degradation of bioactive compounds.
4. Grind the dried roots into a fine powder using a mechanical grinder
5. Perform solvent extraction using ethanol (70%) by macerating the powdered root in the solvent for 7 days, with occasional stirring.
6. Filter the mixture to remove solid residues.
7. Concentrate the filtrate under reduced pressure using a rotary evaporator to obtain the banana root extract.
8. Store the concentrated extract in a desiccator until use.





2. Preparation of Oil Phase

- **Materials**

Beeswax

Liquid paraffin

- **Procedure**

1. In a heat-resistant beaker, melt beeswax at 70–75°C using a hot plate.
2. Add liquid paraffin to the melted beeswax and continue heating until both are completely melted and homogeneous.
3. Maintain the temperature of the oil phase at 70–75°C.

3. Preparation of Aqueous Phase

- **Materials**

Borax (Sodium Borate)

Distilled water

- **Procedure**

1. In a separate beaker, dissolve borax in distilled water.
2. Heat the borax solution to 70–75°C using a hot plate.

4. Emulsion Formation

- **Procedure**

1. Once both the oil and aqueous phases reach 70–75°C, slowly add the aqueous phase to the oil phase with continuous stirring.
2. Use a mechanical stirrer to mix the phases until a uniform emulsion is formed.
3. Continue stirring until the mixture cools to room temperature, ensuring the emulsion remains stable.

5. Incorporation of Active Ingredients

• Materials

Banana root extract

Rose water

• Procedure

1. Add the prepared banana root extract to the cooled emulsion.
2. Incorporate rose water into the mixture for fragrance and additional skin benefits.
3. Stir the mixture thoroughly to ensure even distribution of the active ingredients.

6. Addition of Preservatives

• Materials

Methylparaben

Propylparaben

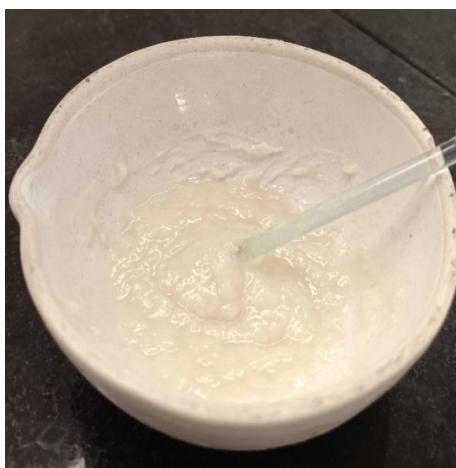
• Procedure

1. Add methylparaben and propylparaben to the formulation to prevent microbial growth and enhance shelf-life.
2. Ensure complete dissolution of the preservatives by stirring the mixture.

7. Final Homogenization

• Procedure

1. Transfer the formulation to a homogenizer.
2. Homogenize the mixture at a suitable speed until a smooth and uniform cream is obtained.



9. Packaging

• Procedure

1. Fill the prepared cream into sterilized containers.
2. Seal the containers to prevent contamination.
3. Label the containers with relevant information, including batch number and manufacturing date.
4. Store the packaged cream under recommended conditions to maintain stability and efficacy

Evaluation of Herbal Cold Cream

Morphological Evaluation

The prepared herbal cold cream exhibited the following sensory characteristics:

Parameter	Observation
Color	White
Odor	Pleasant
Texture	Smooth

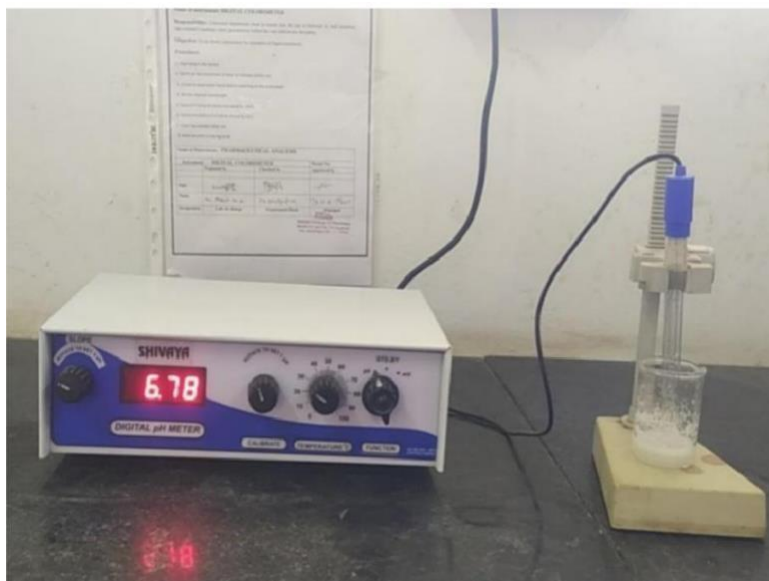
These attributes are desirable in cosmetic formulations, as they contribute to user acceptability and aesthetic appeal. The pleasant odor and smooth texture enhance the overall sensory experience, aligning with findings from similar studies on herbal cold creams.

Physicochemical Evaluation

The physicochemical properties of the cream were assessed as follows:

Parameter	Observation
pH	5.6–7.0
Viscosity	21661 cp
Washability	Easily washable
Spreadability	Good
Homogeneity	Uniform
Microbial Growth	None observed
Irritancy	No
Phase separation	No

1. The pH range indicates compatibility with skin's natural acidity, minimizing potential irritation. The viscosity value suggests the cream has a suitable consistency for application. Ease of Washability and good spreadability enhance user experience. The absence of microbial growth after 24 hours of incubation at 37°C indicates effective preservation, ensuring product safety.



2. Stability Studies

The cream maintained its physical appearance, texture, odour, and pH over time, demonstrating stability under standard storage conditions. These results are consistent with other herbal cold cream formulations, which also reported no significant changes during stability testing.

3. Active Ingredient Efficacy

While the banana root extract's specific effects were not quantitatively assessed in this study, literature suggests that banana extract possesses antioxidant, anti-inflammatory, and hydrating properties. These properties are beneficial for skin health and support the inclusion of banana root extract in the cream formulation.

4. Comparative Analysis

Compared to synthetic cold creams, the herbal formulation offers the advantage of natural ingredients, potentially reducing the risk of adverse reactions. Studies on herbal cold creams have highlighted their safety and efficacy, reinforcing the benefits of using natural components in skincare products.

Preliminary Irritation Study (Patch Test)

Objective-To evaluate the skin irritation potential of the formulated herbal cold cream containing banana root extract through controlled patch testing.



METHODOLOGY

1. Patch Test Procedure

Selection of Subjects: Healthy human volunteers with no known allergies to the ingredients were chosen.

Application Site: The dorsal surface of the forearm was cleaned and marked with a 1 cm² area.

Cream Application: Approximately 0.5 g of the herbal cold cream was applied to the marked area.

Occlusion: The application site was covered with a sterile bandage to prevent contamination.

Observation Period: The patch was left in place for 24 hours, after which the site was observed for any signs of irritation.

2. Parameters Assessed

Erythema: Redness of the skin indicating inflammation.

Edema: Swelling of the skin.

Pruritus: Itching sensation.

Other Reactions: Any other signs of irritation such as rash or blistering.

RESULTS

The preliminary irritation study yielded the following observations:

Parameter	Observation
Erythema	None
Edema	None

Pruritus	None
Other Reactions	None

DISCUSSION

The absence of erythema, edema, pruritus, or other adverse reactions indicates that the formulated cream is well-tolerated by the skin. This aligns with similar studies on herbal cold creams, where formulations demonstrated negligible irritation potential.

The non-irritant nature of the cream can be attributed to the careful selection of ingredients, including the banana root extract, which is known for its soothing properties. Additionally, the formulation process likely contributed to the cream's skin compatibility.

CONCLUSION

The herbal cold cream formulated with banana root extract and other natural ingredients demonstrated promising results in terms of moisturizing, soothing, and skin-nourishing properties. The product maintained stability and exhibited desirable physical characteristics throughout the evaluation period. Given its natural composition and effectiveness, the cream holds potential as a viable alternative to synthetic cosmetic products, offering a safe and therapeutic option for skincare. Further research and clinical trials are recommended to validate its efficacy and safety for broader consumer use.

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