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# A Research on Development and Evaluation of Polyherbal Cold Cream

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**Abstract:** *Herbal cosmetics are products intended to enhance and beautify human appearances. In order to nourish and moisturize the skin, the current study set out to formulate and evaluate herbal cold creams that contained plant extracts, liquid paraffin as a lubricating agent, bees Cetyl alcohol, stearic acid and distilled water paraben as a antibacterial agent by using the water in oil method. The cold cream is prepared by using the neem oil and almond oil. After preparation of cream, cream was evaluated for different parameters like appearance, PH, viscosity, stability test, dye test, spread ability & Test for microbial growth. From evaluation study it was concluded that it is a very good attempt to formulate the herbal face pack containing naturally available ingredients like Gudhal, Gauva and Tea plant. It was also concluded that the prepared formulation was physio-chemically and microbiologically stable, and possessed characteristics of a standard cosmeceutical's formulation for skincare..*

**Keywords:** Herbal cosmetics

## I. INTRODUCTION

Cold creams have been a staple in skincare routines for centuries, revered for their ability to moisturize and protect the skin, particularly during harsh weather conditions. Traditionally, these creams were formulated using simple ingredients such as water, oils, and waxes. However, with the growing interest in herbal medicine and natural skincare, there has been a shift towards incorporating botanical extracts known for their therapeutic properties into cosmetic formulations.

Cosmetics are the products which are generally used to beautify the skin and also to purify the skin. The cosmetics are the word derived from Greek word – 'kosmesticos' which means to adorn. Cold cream is the water in oil emulsion. Cold cream gives the prolonged contact time in the site of application as compared to the other semisolid dosage form or formulation. They give elegancy to the skin and it is not that much greasy. Due to the oil phase, it gives an emollience to the skin. The function of the cold cream is for restoring moisture to dry skin, it allows to eliminate the waste materials from the pores and also cools the body. It is easily watered washable and easy to wash away. They are non-irritating when applied on the skin.[1]

Polyherbal formulations, which combine multiple herbal extracts, have gained popularity due to their potential to synergistically enhance the efficacy and benefits of individual ingredients. In the realm of cold creams, polyherbal formulations offer the promise of not only providing hydration and protection but also delivering additional skin-nourishing and therapeutic effects. [2,3]

The development and evaluation of polyherbal cold creams represent an intersection of traditional knowledge, modern science, and consumer demand for natural skincare solutions. By harnessing the power of various botanical extracts, these formulations aim to address a range of skincare concerns, including dryness, inflammation, and premature aging, while minimizing the use of synthetic ingredients and potential side effects. [3,4]

This paper explores the process of developing and evaluating a polyherbal cold cream enriched with selected botanical extracts renowned for their moisturizing, anti-inflammatory, antioxidant, and soothing properties. Through a systematic approach involving formulation optimization, physicochemical characterization, stability assessment, and skin compatibility testing, the aim is to create a safe, effective, and aesthetically pleasing product that meets the evolving needs and preferences of consumers. [2,5]

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Polyherbal cold cream is a type of skincare product formulated with a combination of multiple herbal ingredients. It's designed to provide moisturization and relief to dry, chapped, or irritated skin, particularly during cold weather conditions. The herbal components are often chosen for their soothing, nourishing, and protective properties, offering a natural alternative for skincare. Cold cream is a water - in - oil emulsion (emulsion of small amount of water in a larger amount of oil), unlike the oil in water emulsion of vanishing cream, so - called because it seems to disappear when applied on skin. The name " cold cream " derives from the cooling feeling that the cream leaves on the skin. cold cream doesn't readily absorb into the skin upon application. Instead, it leaves a protective layer of oil on the skin's surface, providing a barrier against moisture loss and environmental irritants. This characteristic gives a cooling sensation upon application, hence the name "cold cream." [1,2]

Furthermore, the development of polyherbal cold creams holds promise not only for the cosmetic industry but also for the field of herbal medicine, as it provides an avenue for showcasing the therapeutic potential of plant-derived ingredients in skincare. As such, this research contributes to the ongoing discourse on natural skincare and underscores the importance of integrating traditional wisdom with scientific innovation to promote holistic well-being.[5,6]

**Anatomy of the Skin**

Understanding the anatomy of the skin is crucial in the development and evaluation of skincare products such as polyherbal cold creams. The skin is the largest organ of the human body and serves as a protective barrier against environmental aggressors, pathogens, and moisture loss. Its complex structure consists of multiple layers, each with distinct functions and characteristics that influence the formulation and effectiveness of topical products. [8,9,11]

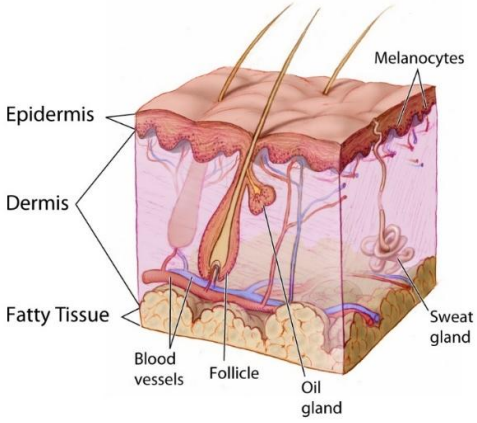


**Fig. 1 – Anatomy of skin**

**1. Epidermis:**

- The outermost layer of the skin, primarily composed of epithelial cells called keratinocytes.
- Functions as a barrier to prevent water loss and protect against external insults.
- Contains melanocytes, which produce melanin, the pigment responsible for skin color.
- Polyherbal cold creams often target the epidermis to provide hydration, nourishment, and protection against environmental stressors.

**The outermost layer is classified into five sub layers and these are**

Stratum corneum
Stratum lucidium
Stratum granulosum
Stratum spinosum
Stratum Basale

**Stratum corneum:** The exterior sublayer of the epidermis is called as stratum corneum. It is also referred as the horny cell layer having thickness of about 8-15µm. The layer is of hexagonal shaped and is helpful for prevention of skin

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from the large amount of dehydration. It contains main component "ceramide", which having important role in water retention

**Stratum lucidum:** Stratum lucidum is composed as thin clear layer of dead skin cells. It is found only in areas of thick skin on the palms of the hands and soles of the feet.

**Stratum granulosum:** The layer is also called as granular cell layer having thickness of 3µm. It contains 2-4 layers of granular cell. The shape of the cells is flatter because the keratin fibers are increasingly filled up into the cells.

**Stratum spinosum:** It is also called prickle cell layer having thickness ranges from 50- 150µm. It consists of number of cells, which may differ in shape and structure.

**Stratum basale:** Stratum Basale is composed as single layer and is the deepest and sublayer of epidermis. In stratum basale, keratinocytes are produced and shows their movement upward to the outer surface. The process of movement of keratinocytes is known as turnover. For one cycle of this process takes days and keratinocytes also changes their functions and structure. This is also called as basal cell layer and holds 8% of water in epidermis.

**2. Dermis:**

- Located beneath the epidermis, the dermis is composed of connective tissue containing collagen, elastin, and fibroblasts.
- Provides structural support and elasticity to the skin.
- Contains blood vessels, nerves, hair follicles, and sweat glands.
- Herbal extracts in cold creams may penetrate the dermis, where they can exert antioxidant, anti-inflammatory, and collagen-stimulating effects.

**3. Hypodermis (Subcutaneous Tissue):**

- The deepest layer of the skin, composed of adipose tissue and connective tissue.
- Acts as a cushioning layer, providing insulation and energy storage.
- Polyherbal cold creams typically do not penetrate the hypodermis but may indirectly influence its health through their effects on the epidermis and dermis.

In the context of polyherbal cold cream development and evaluation, understanding the anatomy of the skin informs formulation strategies and efficacy assessments. Ingredients selected for their ability to penetrate the epidermis and dermis, such as botanical extracts rich in antioxidants, vitamins, and moisturizing agents, can support skin health and function. Additionally, evaluations of skin hydration, barrier integrity, and inflammatory responses provide insights into the effectiveness and safety of polyherbal cold creams in maintaining skin health and addressing specific skincare concerns.

**ADVANTAGES OF POLYHERBAL COLD CREAM:**

1. Synergistic Effects: Polyherbal formulations can harness the synergistic interactions between different herbal extracts, enhancing their combined therapeutic benefits. This synergy may result in improved efficacy compared to single-herb formulations.
2. Diverse Therapeutic Properties: By incorporating multiple herbal extracts, polyherbal cold creams can offer a wide range of therapeutic properties, including moisturizing, anti-inflammatory, antioxidant, and soothing effects. This diversity allows for a holistic approach to skincare, addressing various skin concerns simultaneously.
3. Natural Ingredients: Polyherbal cold creams typically utilize natural ingredients derived from plants, minimizing the use of synthetic chemicals and potential adverse effects. This aligns with consumer preferences for clean and natural skincare products.
4. Customization and Flexibility: Formulators have the flexibility to customize polyherbal cold cream formulations based on specific skin types, preferences, and target outcomes. This adaptability allows for the development of personalized skincare solutions tailored to individual needs.
5. Market Appeal: Polyherbal cold creams cater to the growing demand for natural and herbal-based skincare products among consumers who prioritize sustainability, efficacy, and safety. Their unique formulations offer differentiation in a competitive market landscape.

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**DISADVANTAGES OF POLYHERBAL COLD CREAM:**

1. Complex Formulation: Developing polyherbal cold creams requires careful selection and combination of multiple herbal extracts, as well as optimization of formulation parameters such as concentration, compatibility, and stability. This complexity can pose challenges in formulation development and manufacturing scale-up.
2. Standardization and Quality Control: Ensuring consistency in the composition and potency of herbal extracts across batches is essential for the efficacy and safety of polyherbal cold creams. However, achieving standardization and quality control may be challenging due to variations in plant sources, extraction methods, and processing techniques.
3. Allergenic Potential: Although herbal ingredients are generally considered safe, certain individuals may have allergies or sensitivities to specific botanical extracts. Formulators must consider the allergenic potential of herbal ingredients and conduct appropriate safety assessments to minimize the risk of adverse reactions.
4. Limited Scientific Evidence: While many herbal extracts have been traditionally used in skincare, scientific evidence supporting their efficacy and safety in polyherbal formulations may be limited. Further research, including clinical trials and mechanistic studies, is needed to validate the therapeutic claims and establish the benefits of polyherbal cold creams.
5. Regulatory Considerations: Regulatory requirements for polyherbal cold creams may vary depending on the jurisdiction and intended market. Formulators must navigate regulatory challenges related to ingredient safety, labeling claims, and product registration to ensure compliance with applicable regulations.

**Ideal Properties of Polyherbal Cold Cream:**

1. Moisturization: An ideal polyherbal cold cream should provide effective moisturization to the skin, replenishing moisture and preventing dehydration. Ingredients such as herbal extracts, glycerin, and hyaluronic acid can enhance the cream's moisturizing properties, leaving the skin soft, supple, and hydrated.
2. Nourishment: The cold cream should nourish the skin with essential nutrients, vitamins, and antioxidants derived from botanical extracts. These ingredients promote skin health, repair damaged cells, and protect against environmental stressors, imparting a healthy and radiant complexion.
3. Skin Barrier Protection: Maintaining the integrity of the skin barrier is crucial for preventing moisture loss and protecting against external irritants. Polyherbal cold creams enriched with emollients, occlusives, and herbal extracts with anti-inflammatory properties help strengthen the skin barrier, reducing trans epidermal water loss (TEWL) and enhancing skin resilience.
4. Soothing and Calming: Polyherbal cold creams should possess soothing and calming properties to alleviate skin irritation, redness, and inflammation. Herbal extracts such as chamomile, calendula, and aloe vera have anti-inflammatory and soothing effects, providing relief to sensitive or irritated skin.
5. Non-Greasy Texture: An ideal polyherbal cold cream should have a lightweight, non-greasy texture that spreads easily and absorbs quickly into the skin without leaving a heavy residue. This ensures comfortable wear and facilitates application, making it suitable for use during the day or night.
6. Compatibility: The cold cream should be compatible with all skin types, including sensitive, dry, oily, and combination skin. Formulations should be dermatologist-tested and free from common allergens and irritants to minimize the risk of adverse reactions.
7. Long-lasting Hydration: The effects of the polyherbal cold cream should be long-lasting, providing continuous hydration and protection throughout the day or night. Ingredients that lock in moisture, such as natural oils, shea butter, and ceramides, help maintain skin hydration levels for extended periods.
8. Pleasant Fragrance: A subtle and pleasing fragrance enhances the sensory experience of using the cold cream, promoting a sense of well-being and relaxation. Natural fragrances derived from botanical extracts or essential oils add an aromatherapeutic element to the formulation, enhancing user satisfaction.
9. Stability: Polyherbal cold creams should demonstrate stability under various environmental conditions, including temperature fluctuations, light exposure, and microbial contamination. Robust formulation and packaging strategies ensure product integrity and efficacy throughout its shelf life.

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10. Efficacy: Ultimately, the polyherbal cold cream should deliver tangible skincare benefits, such as improved skin texture, tone, and radiance. Clinical studies and user evaluations can validate the efficacy of the formulation, demonstrating its ability to address specific skincare concerns and meet consumer expectations.

**APPLICATION OF POLYHERBAL COLD CREAM TO THE SKIN:**

1. Cleansing: Before applying the polyherbal cold cream, it's important to start with clean skin. Use a gentle cleanser suitable for your skin type to remove dirt, oil, and impurities from the skin's surface. Pat the skin dry with a soft towel.
2. Dispensing: Dispense a small amount of the polyherbal cold cream onto your fingertips. The amount may vary depending on your skin's moisture needs and coverage preferences. Start with a pea-sized amount and adjust as needed.
3. Warmth: Rub the cold cream between your fingertips to warm it slightly. This helps to soften the cream and facilitate easier application onto the skin.
4. Application: Gently apply the polyherbal cold cream onto your face and neck using upward, circular motions. Ensure even coverage, focusing on areas prone to dryness or irritation. Avoid getting the cream too close to the eyes.
5. Massage: Use light massage movements to encourage absorption and promote relaxation. Massaging the cream into the skin also improves circulation and enhances the delivery of nutrients and herbal extracts.
6. Absorption: Allow the polyherbal cold cream to absorb fully into the skin. Depending on the formulation, this may take a few minutes. Avoid touching your face or applying other products until the cream has been absorbed.
7. Reapplication: For best results, reapply the polyherbal cold cream as needed throughout the day, especially in dry or cold environments. Pay attention to any areas of the skin that feel tight or dry, and apply additional cream as necessary.
8. Nighttime Use: Polyherbal cold creams can also be used as part of your nighttime skincare routine. Apply a slightly thicker layer before bedtime to provide intensive hydration and nourishment while you sleep.
9. Sun Protection: If using the polyherbal cold cream during the day, follow up with a broad-spectrum sunscreen to protect your skin from harmful UV rays. Apply sunscreen as the final step in your skincare routine, after the cold cream has been fully absorbed.
10. Evaluation: After regular use of the polyherbal cold cream, evaluate its effects on your skin. Note any improvements in hydration, texture, and overall appearance. Consider factors such as fragrance, texture, and compatibility with your skin type when assessing the cream's efficacy and suitability for long-term use.

**Herbal Ingredients in Cold Cream Formulations**

Numerous herbal ingredients have been incorporated into cold cream formulations for their potential skin benefits. These ingredients often include plant extracts, essential oils, and natural emollients. Common herbal ingredients used in cold creams include aloe vera, chamomile, green tea, lavender, and calendula. Each of these herbs possesses unique properties such as anti-inflammatory, antioxidant, and moisturizing effects, which contribute to the overall efficacy of the cold cream.

**Formulation Techniques**

Formulation techniques for herbal cold creams typically involve blending herbal extracts or oils with emulsifiers, stabilizers, and water to create stable emulsions. Various emulsification methods such as high-shear mixing, ultrasonication, and homogenization are employed to ensure uniform dispersion of herbal ingredients within the cream base. The choice of emulsifier and stabilizer plays a crucial role in determining the stability and rheological properties of the cold cream.

**Evaluation Parameters**

The evaluation of herbal cold creams encompasses several parameters to assess their quality, efficacy, and safety. Common evaluation parameters include:

1. Physical Characteristics: This includes appearance, colour, odor, texture, and consistency of the cold cream, which are indicative of its sensory properties and consumer acceptance.
2. Physicochemical Properties: pH, viscosity, spreadability, and stability are essential physicochemical parameters that determine the overall performance and shelf-life of the cold cream.

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3. Moisturizing Efficacy: Instrumental techniques such as corneometry and TEWL (Trans-epidermal Water Loss) measurements are used to assess the moisturizing effect of herbal cold creams by evaluating their ability to hydrate the skin and prevent water loss.
4. Skin Compatibility: Skin irritation, sensitization, and allergic reactions are evaluated through patch testing and dermatological assessments to ensure the safety of herbal cold creams for prolonged use.
5. Antioxidant Activity: Herbal ingredients with antioxidant properties are evaluated for their ability to scavenge free radicals and protect the skin from oxidative damage using in vitro assays such as DPPH (2,2-diphenyl-1-picrylhydrazyl) and ABTS (2,2'-azino-bis(3-ethylbenzothiazoline-6-sulfonic acid)) assays.

## II. LITERATURE REVIEW

**Dhakane A. E. et al., (2023) -** The formulated cream showed good consistency and spread ability, pH, no evidence of phase separation during study periodof research. Stability parameters like visual appearance, nature, viscosity and fragrance ofthe formulated cream showed that therewas no significant variation during the study period of research. The herbal extract containing cold cream gives the cooling and soothing effect due to slow evaporation of water present in the emulsion.

**Yadav R. et al., (2023)** - The products used to enhance and beautify human appearances are known as herbal cosmetics. The current study's objective was to design and assess herbal cold creams that contained plant extracts made utilizing the water in oil method for the goal of moisturizing and nourishing the skin. Neem oil and turmeric extract are used to make the cold cream. Utilizing several evaluations.

**Gupta S. K. et at.,(2023)** - We develop three formulation F1, F2, F3 but F3 showed good appearance, pH, adequate viscosity and no phase separation was observed. Additionally, the F3 formulations were simple to wash and exhibited no erythema, redness, or irritation during the irritancy tests. The optimum formula is F3, which is stable at room temperature. F3 formulation herbal ingredients showed best bacterial activities. Based on the results, we can suggest that the F3formulations were stable and can be safely used on the skin.

**Ugale P. B. et al., (2023) -** The formulated cream showed good consistency and spread ability, pH, no evidence of phase separation during study period of research. Stability parameters like visual appearance, nature, viscosity and fragrance of the formulated cream showed that there was no significant variation during the study period of research. The herbal extract containing cold cream gives the cooling and soothing effect due to slow evaporation of water present in the emulsion.

**Sharma A. et al., (2023) -** In order to nourish andmoisturize the skin, the current study set out to formulated and evaluated herbal cold creams that contained plantextracts, liquid paraffin as a lubricating agent, bees wax as stabilizer, methyl paraben as a antibacterial agent byusing the water in oil method. The cold cream was prepared by using the neem oil and almond oil. After preparation ofcream, cream was evaluated for different parameters like appearance, PH, viscosity, stability test, dye test, spreadability & Test for microbial growth. From evaluation study it was concluded that it is a very good attempt to formulate the herbal face pack containing naturally available in gredients like neem and almond. It was also concluded that the prepared formulation was physico-chemically and microbiologically stable, and possessed characteristics of a standard cosmeceutical's formulation for skincare.

**Ghogare H. et al., (2022)** - The cream was prepared by using the cream base that is bee's wax, liquid paraffin, borax, distilled water, rose oil. The cream was prepared by using the slab technique/extemporaneous method for geometric and homogenous mixing of all the excipients and the herbal extracts. Cream Was prepared & evaluated for different parameters like appearance, PH, viscosity, stability test, patch test, test for homogeneity, spread ability, smear test, evaluation of Emolliency& Test for microbial growth.The cream showed good appearance, PH, adequate viscosity and no phase separation was observed. Also, the formulation showed no redness, erythema and irritation during patch study and they were easily washable was stable at room temperature.

**Manisha S. et al., (2022)-** Cream was formulated and evaluated by different evaluation parameters such as pH, viscosity, spreadbility physical appearance and irritancy test. Stability testing for prepared formulation was performed by stirring it at different temperature condition for time period 24th for 1 week. To know parameters like odour, pH, smoothness of lotion.

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techniques, the created product's quality was evaluated. The physical characteristics of the cream formulation did not alter. During the research study period, the cream formulation demonstrated good consistency and spreadability, homogeneity, pH, non-greasy properties, and no signs of phase separatio

**OBJECTIVE**

- To evaluate safety, efficacy and quality of Herbal cold cream.
- They are non-irritant when applied on the skin.
- To explore the many aspects of the rich traditional Indian herbal medicine.
- To formulate and evaluate a cosmetic herbal cold cream for glowing skin by using natural herbal ingredients.
- To apply knowledge gained during the course in evaluating the usefulness of herbal formulas.
- To synthesize a cold cream ideal for all skin types.
- To find the useful benefits of cold cream on human use as cosmetic product.

**PLAN OF WORK**

**Literature Review**

**Selection of plants and their parts**

Like leaves of hibiscus, Gauva and Tea plant

**Collection and processing of plant material**

Collection
Transportation
Cleaning and Sorting
Drying
Grinding or Milling

**Extraction Method**

- Soxhletion with the help of soxhlet apparatus
- Evaporation of solvent
- Selection of Formulation method

**Evaluation Parameter**

- Washability
- pH
- Viscosity
- Spread ability test
- Irritancy test
- Test for microbial growth
- Dye test
- Patch Test
- Morphological Evaluation

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**Result and Discussion**
**Conclusion**
**MATERIAL AND METHOD**
**Plants used in the study**
**1) Gudhal (hibiscus):-**

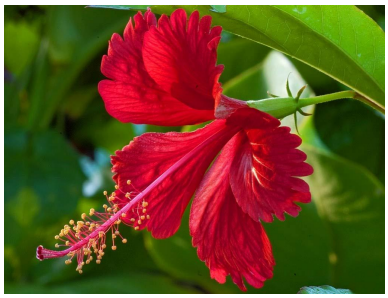

Fig.2Gudhal

Hibiscus, also known as Gudhal is indeed rich in antioxidants, vitamins, and minerals, making it beneficial for skin health. Here's some detailed information:

**Antioxidant Properties**: Hibiscus contains antioxidants like vitamin C and anthocyanins, which help protect the skin from damage caused by free radicals, thus promoting a youthful appearance and preventing premature aging.

**Skin Brightening**: The natural acids present in hibiscus help exfoliate the skin, removing dead skin cells and promoting cell turnover, which can result in a brighter complexion over time. Hydration: Hibiscus has natural moisturizing properties that help keep the skin hydrated and supple, reducing dryness and flakiness.

**Vitamin C:** This vitamin found in hibiscus helps boost collagen production, which is essential for maintaining skin elasticity and firmness. Collagen also aids in reducing the appearance of fine lines and wrinkles.

**Anti-inflammatory:** Hibiscus has anti-inflammatory properties that can help soothe irritated skin and reduce redness or inflammation caused by conditions like acne or eczema.

**Natural Astringent**: The natural astringent properties of hibiscus can help tighten pores, giving the skin a smoother appearance and reducing the risk of acne breakouts. [3,4]

**Sun Protection:** While not a substitute for sunscreen, hibiscus may offer some degree of protection against UV damage due to its antioxidant content. However, it's essential to use proper sun protection when spending time outdoors.[3,4]

**2) Gauva Psidium :-**

Fig .3 Gauva

Guava (Psidiumguajava) extract is often utilized in cold cream formulations due to its antioxidant, antimicrobial, and skin-nourishing properties. The extract is typically obtained from guava leaves, which are rich in vitamins, flavonoids, and polyphenols. In cold cream formulations, guava extract can serve several purposes:

**Antioxidant Protection:** Guava extract contains high levels of vitamin C and other antioxidants, which help protect the skin from oxidative stress caused by free radicals. This can help prevent premature aging and maintain skin health. [4,5]

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**Antimicrobial Properties:** Guava extract has been shown to possess antimicrobial properties, making it effective against bacteria, fungi, and other microbes. This can help prevent infections and keep the skin clear and healthy.

**Skin Conditioning:** The vitamins, minerals, and other nutrients present in guava extract can nourish and hydrate the skin, leaving it soft, smooth, and supple. This makes it a valuable ingredient in cold creams designed to moisturize and condition the skin.[5,6]

**Soothing Effects:** Guava extract has anti-inflammatory properties, which can help calm irritation, redness, and inflammation in the skin. This makes it beneficial for individuals with sensitive or reactive skin. When formulating a cold cream with guava extract, it's important to consider its concentration, compatibility with other ingredients, and stability over time. It's typically incorporated into the water phase of the formulation, but depending on the specific product and formulation, it can also be added at different stages. Overall, guava extract can be a valuable addition to cold cream formulations, providing antioxidant protection, antimicrobial benefits, skin conditioning properties, and soothing effects for healthier, more radiant skin.[5,7]

**3) Tea Plant (Camilliapsinensis)**

Fig. No. 4 Tea plant

Camellia sinensis, commonly known as the tea plant, is widely used in cosmetic formulations, including cold creams. Here's detailed information on its use in cold cream formulations

**Moisturizing Properties:** Camellia sinensis extract, often derived from green tea leaves, is rich in antioxidants and polyphenols, which can help hydrate and moisturize the skin. In cold cream formulations, it acts as a natural emollient, providing nourishment and moisture to the skin.

**Antioxidant Benefits:** The polyphenols present in Camellia sinensis extract have antioxidant properties, helping to protect the skin from damage caused by free radicals and environmental stressors. This can contribute to anti-aging effects and overall skin health.[7,8]

**Anti-inflammatory Effects:** Tea plant extracts contain compounds such as catechins, which have anti-inflammatory properties. In cold creams, these ingredients can help soothe and calm irritated or inflamed skin, making the formulation suitable for sensitive skin types.

**Improves Skin Tone and Texture:** Regular use of cold creams containing Camellia sinensis extract may help improve the overall tone and texture of the skin. The antioxidants present in the extract can promote skin renewal and repair, resulting in a smoother and more radiant complexion.

**Enhances Absorption of Other Ingredients:** Camellia sinensis extract has been found to enhance the absorption of other active ingredients in skincare formulations. In cold creams, it can help improve the efficacy of moisturizing agents and other beneficial compounds, ensuring better results for the skin.

**Natural and Safe:** Extracts from Camellia sinensis are generally considered safe for topical use and are well-tolerated by most skin types. They provide a natural alternative to synthetic ingredients, making cold creams containing tea plant extracts appealing to consumers looking for plant-based skincare options.[7,8]

Overall, incorporating Camellia sinensis extract into cold cream formulations can offer a range of benefits, including moisturization, antioxidant protection, anti-inflammatory effects, and improvements in skin tone and texture. It's a versatile ingredient suitable for various skin types, making it a popular choice in skincare products

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**1) Collection and processing of plant material**

In the formulation of cold cream, the collection and processing of plant materials are crucial steps to ensure the quality and efficacy of the final product. Here's a detailed overview of the process:

**Selection of Plant Materials:** Choose plant materials known for their beneficial properties in skincare, such as Gudhal, Guava, Tea Plant. Ensure that the plants are healthy, free from pests and diseases, and harvested at the appropriate stage of growth to maximize their potency.[9,10]

Collection: Harvest the plant materials in the morning when their essential oils and active compounds are most concentrated. Use clean, sharp tools to minimize damage to the plants.

**Transportation:** Transport the harvested plant materials to the processing facility promptly to prevent degradation of their active components. Keep the materials protected from heat, sunlight, and moisture during transit.

Cleaning and Sorting: Upon arrival at the processing facility, clean the plant materials to remove dirt, debris, and any contaminants. Sort them carefully to discard any damaged or spoiled parts.

Drying: Depending on the plant species and its moisture content, dry the materials using appropriate methods such as air-drying, oven-drying, or freeze-drying. It's essential to preserve the plants' active compounds during the drying process by maintaining optimal temperature and humidity levels.

Grinding or Milling: Once dried, grind or mill the plant materials into a fine powder to increase their surface area and facilitate extraction of active compounds during formulation.

**2) Extraction**:

Extract the desired components from the powdered plant materials using suitable solvents or extraction methods, such as maceration, percolation, or steam distillation. This step helps concentrate the plant's beneficial compounds, which will contribute to the effectiveness of the cold cream.

**Filtration:** Filter the extracted solution to remove any remaining solid particles or impurities, ensuring a clean and pure extract for incorporation into the cold cream formulation.

**Formulation**: Incorporate the plant extracts along with other key ingredients such as water, emulsifiers, oils, and preservatives to create the cold cream formulation. Follow a precise recipe and manufacturing process to achieve the desired texture, consistency, and stability of the final product.

**Quality Control:** Conduct rigorous quality control tests on the finished cold cream to ensure its safety, efficacy, and compliance with regulatory standards. Test for factors such as pH, viscosity, microbial contamination, and stability under various storage conditions.

By following these detailed steps for the collection and processing of plant materials, you can create a high-quality cold cream formulation enriched with natural botanical extracts for optimal skincare benefits.

**Formulation of cream base**

**Emollients:** Rose oil, coconut oil, Rose water and other natural oils that moisturize and soften the skin.

**Humectants**: Glycerine, propylene glycol, are honey-like ingredients that attract moisture and keep the skin hydrated.

**Thickeners**: stearic acid, Acetyl alcohol, beeswax, and other thickening agents that maintain the consistency of the cream and make it easy.

**Preservatives**: Parabens, phenoxyethanol, or natural preservatives such as grape seed extract that inhibit microbial growth and increase product shelf life.

**Water**: The base contains water which blends all the ingredients of the formulation to create a creamy texture.

**Fragrance**: Optional, but essential oils are used to scent the cream.

These ingredients are combined to form a polyherbal cold cream that moisturizes and soothes dry and chapped skin.[16,17]

## III. FORMULATION OF CREAM

**Formulation Steps:**

1) Heat the water phase (water and herbal extracts) and oil phase (oils, emulsifiers, and thickeners) separately in double boilers until they reach around 70-75°C.

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2) Slowly add the water phase to the oil phase while stirring continuously to emulsify the mixture. Continue stirring until the mixture cools down to around 40-45°C.
3) Add any essential oils or fragrance oils, ensuring they are well blended into the cream.
4) Finally, add the preservative according to the manufacturer's instructions and mix thoroughly.
5) Allow the cream to cool completely before transferring it to sterilized jars or containers.
6) Test the pH of the cream and adjust if necessary, to ensure it falls within the appropriate range for skin compatibility.
7) Conduct stability and microbial testing to ensure the cream meets safety standards. Remember to keep detailed records of your formulation and testing process for future reference and regulatory compliance. Additionally, always perform a patch test before widespread use to check for any allergic reactions or skin sensitivities.[18,19]

**Evaluation test:**

Physical properties: The cream was observed for the colour, odour and appearance.

Physicochemical Evaluation

**Washability**: Wash ability test was carried out by applying a small amount of cream on the hand and then washing it with tap water.

**pH**: Herbal cold cream was evaluated for physicochemical parameters showed in the Table 3. The pH of the cream was found to be in range of 5.6 to 6.8 which is good for skin Ph. The herbal formulation was shown pH nearer to skin required i.e. pH 6.65

**Viscosity**: Viscosity of cream was done by using Brooke field viscometer at a temperature of 25 °C using spindle No. 63 at 2.5 RPM. According to the results all the formulations showed adequate viscosity.

**Spread ability test:** The cream sample was applied between the two glass slides and was compressed between the two-glass slide to uniform thickness by placing 100 gm, of weight for 5 minutes then weight was added to the weighing pan. The time in which the upper glass slide moved over the lower slide was taken as a measure of spread ability Spread ability=ml/A Where M =weight tight to upper slide L=length moved on the glass slide

**Irritancy test:** Mark an area (1 sq.cm) on the left-hand dorsal surface. The cream was applied to the specified area and time was noted. Irritancy, erythema, oedema, was checked if any for regular intervals up to 24 hrs, and reported. [25,261T =time take

**Test for microbial growth:** Agar media was prepared then the formulated cream was inoculated on the plate's agar media by steak plate method and a controlled is prepared by omitting the cream. The plates. Were placed in the incubator and are incubated in 37 0 C for 24 hours. After the incubation period, the plates were taken out and the microbial growth were checked and compared with the control.

**Dye test**: The scarlet red dye is mixed with the cream. Place a drop of the cream on a microscopic slide then covers it with a cover slip, and examines it under a microscope. If the disperse globules appear red the ground colourless. The cream is o/w type. The reverse condition occurs in w/o type cream. The disperse Globules appear colourless.[19,20]

**Homogeneity**: Homogeneity was tested via the visual appearance and test. Determination of type of smear: This test was conducted by the application of cream on the skin surface of a human volunteer for its greasiness. After application, the type of smear was observed. Dilution test: In this test type of emulsion is determined by diluting the emulsion either with water or oil. The emulsion is completely miscible with water if it is o/w type, as the dispersion medium is water and separates out if it is w/o type of emulsion. Similarly, w/o type of emulsion is miscible, if the emulsion is dissolved in oil but o/w type of emulsion is immiscible in oily liquid.

**Patch test:** About 1-3 gm of the formulated creams was evenly applied on sensitive region of the skin surface such as the skin under the lower jaw. The cream for testing was applied on an area of 1 sq. m of the skin surface and the site was inspected after 24 hours of application.

**Morphological Evaluation**: Herbal cold cream was evaluated for morphological parameters showed in the colour of formulation was yellowish. The odour of prepared formulations was pleasant and good acceptable which is desirable to cosmetic formulations.

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## IV. RESULT AND DISCUSSION

Following evaluation parameters were performed to ensure superiority of prepared cold cream

**Morphological Evaluation**

Herbal cold cream was evaluated for morphological parameters showed in the Table 2. The color of formulation was yellowish. The odor of prepared formulations was pleasant and good acceptable which is desirable to cosmetic formulations. Texture and smoothness were acceptable as per requirement of cosmetic formulations.

**Table No. 1: Morphological Evaluation**

| Sr. No | Parameters | Observations |
|---|---|---|
| 1 | Color | Whitish green |
| 2 | Odor | Pleasant |
| 3 | Texture | Smooth |

**PHYSICOCHEMICAL EVALUATION**

**pH**: Herbal cold cream was evaluated for physicochemical parameters showed in the Table 3. The pH of the cream was found to be in range of 5.6 to 6.8 which is good for skin pH. The herbal formulation was shown pH nearer to skin required i.e. **pH 6.65**

**Washability**: Washability test was carried out by applying a small amount of cream on the hand and then washing it with tap water.

**Viscosity**: Viscosity of cream was done by using Brooke field viscometer at a temperature of 25 ℃ using spindle No. 63 at 2.5 RPM. According to the results all the formulations showed adequate viscosity.

**Test for microbial growth**: There was no signs of microbial growth after 24 hrs. of incubation a 37ºC and it was comparable with the control.

**Spread ability test**: The spread ability test showed that the formulated cream has good spread able property. The separate in the description of evaluation test lesser the time taken for separation of the two slides better the spread ability.

**Dye test**: The scarlet red dye is mixed with the cream. Place a drop of the cream on a microscopic slidecovers it with a cover slip, and examines it under a microscope. The disperse globules appearscolourless in the red ground i.e. w/o type cream.

**Homogeneity**: The homogeneity of the formulated cream was judged by the visual appearance and touch. The appearance and touch of the cream were good.

**Irritancy Test:** The table below displays the results of the irritancy test. During irritancy trials, the formulation displayed absence of irritation, redness, and edema. This formulation is skin safe for usage.

**Table No. 2 Result of Irritancy Test**

| S. No. | Irritancy Test | Result |
|---|---|---|
| 1 | Irritation | No |
| 2 | Edema | No |
| 3 | Redness | No |
| 4 | Swelling | No |

## V. CONCLUSION

Formulation and evaluation of herbal cold cream offer a promising avenue for skincare innovation. By leveraging the benefits of natural ingredients, such as herbs and plant extracts, these creams aim to provide nourishment, hydration, and protection to the skin, especially during harsh weather conditions.

Herbal formulations have growing demand in the world market. Herbal cold cream is considered as sustaining and productive way to advance the appearance of skin. Herbal cold cream is used to stimulate blood circulation, rejuvenates those muscles and help to maintain the elasticity of the skin and remove dirt from skin pores.Thus, in the present work, it is a very good attempt to formulate the herbal cold cream containing naturally available ingredients like Gudhal,

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Guava and Tea leaves. Evaluation of herbal cold creams encompasses various parameters including physical characteristics, sensory attributes, and performance on the skin. Tests such as viscosity measurement, pH determination, spreadability assessment, and microbial analysis are essential to gauge the product's suitability for consumer use and possessed characteristics of a standard cosmeceutical's formulation for skincare.

In conclusion, the formulation and evaluation of herbal cold creams represent a harmonious blend of nature and science in skincare. With meticulous formulation techniques and comprehensive evaluation protocols, these products have the potential to offer safe, effective, and sustainable skincare solutions for diverse consumer needs.

## VI. FUTURE PROSPECTS AND INNOVATIONS FOR HERBAL COLD CREAM

**Incorporation of Advanced Botanical Extracts**:

Future herbal cold cream formulations may feature advanced botanical extracts with enhanced efficacy and targeted skincare benefits. Research into the therapeutic properties of lesser-known herbs and plants may lead to the development of novel formulations for addressing specific skin concerns such as hyperpigmentation, inflammation, and aging. [21,22]

**Integration of Biotechnology and Green Chemistry**:

Advances in biotechnology and green chemistry may revolutionize the production of herbal cold creams, allowing for the sustainable extraction and synthesis of plant-derived ingredients. Biotechnological processes such as cell culture and fermentation may be employed to produce bioactive compounds with potent skincare properties, reducing the reliance on traditional extraction methods. [21,22]

**Personalized Formulations and Customization Options**:

With the rise of personalized skincare solutions, future herbal cold creams may offer customization options tailored to individual skin types, concerns, and preference. Skincare brands may leverage technology such as artificial intelligence and machine learning algorithms to analyse skin data and recommend personalized formulations for optimal results. [22,23]

**Sustainable Packaging and Eco-Friendly Initiatives**:

The demand for sustainable packaging solutions will drive innovations in eco-friendly packaging for herbal cold creams. Biodegradable materials, compostable packaging, and refillable containers may become standard features, reducing environmental impact and promoting circularity in the skincare industry [23,25]

**Integration of Digital Technologies**:

Digital technologies such as augmented reality (AR) and virtual reality (VR) may be used to enhance the consumer experience and engagement with herbal cold creams.AR-enabled skincare apps could allow consumers to virtually try different formulations, visualize skin improvements, and receive personalized skincare advice. [24,25]

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