

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 an 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

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}

Objectives

1. To evaluate safety, efficacy and quality of Herbal cold cream.
- 2 They are non-irritant when applied on the skin.
- 3.To explore the many aspects of the rich traditional Indian herbal medicine.
- 4.To formulate and evaluate a cosmetic herbal cold cream for glowing skin by using natural herbal ingredients.
- 5.To apply knowledge gained during the course in evaluating the usefulness of herbal formulas.
6. To synthesize a cold cream ideal for all skin types.
7. To find the useful benefits of cold cream on human use as cosmetic product.^{2,3}

Plants used in the study

1) Gudhal (hibiscus):-



Fig.1 Gudhal

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 .2 Gauva

Guava (*Psidium guajava*) 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}

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 (*Camellia sinensis*)



Fig.3 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.^{8,9}

Plan of Work

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.^{10,11}

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.^{11,12}

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.^{12,14}

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.^{13,15}

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}

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.

- 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: Washability 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 $\text{Spread ability} = \frac{M}{A}$ 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. [25,26] T=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.^{20,21}

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}

Focus on Ethical Sourcing and Fair-Trade Practices:

Skincare brands will increasingly prioritize ethical sourcing of botanical ingredients, ensuring fair trade practices and supporting local communities. Transparency in ingredient sourcing and supply chain traceability will become essential as consumers demand greater accountability and social responsibility from skincare brands.^{25,26}

Emphasis on Holistic Wellness and Mind-Body Connection:

Future herbal cold creams may incorporate ingredients that not only nourish the skin but also promote holistic wellness and emotional well-being. Aroma therapeutic blends of essential oils, adaptogenic herbs, and mood-enhancing botanicals may be integrated into formulations to support the mind-body connection and enhance the overall skincare experience. The future of herbal cold creams is ripe with possibilities for innovation and sustainability. By harnessing advancements in botanical science, technology and ethical practices, skincare brands can develop cutting-edge formulations that deliver superior skincare benefits while promoting environmental and social stewardship. As consumer preferences continue to evolve towards clean, green, and personalized skincare solutions, the herbal cold cream market is poised for exciting growth and transformation.^{26,27}

Ideal properties of herbal cold cream

1. It should not normally be diluted.
2. The pH of the cold cream must be optimum from 4.6-6.0
3. Its consistency should be optimum so that it can be easily put out from the container and apply easily.
4. Should give a cooling effect on the skin after external application
5. It must provide a thin waxy protective layer on the skin to protect the water evaporation from the skin surface
6. Should give a faster emollient effect, so that very dry skin can swell up and become soft within a short time.
6. Less greasy than ointment and Easily spread on the skin.
7. It should be physically and chemically stable throughout its shelf-life.
8. The excipients should be compatible with each other. It should be sterile.^{27,29}

Advantages of cold cream

- Cold cream made from the extracts of Hibiscus, Guava, Tea Plant, Rose Oil, Rose Water, Coconut Oil, Acetyl Alcohol, Stearic Acid, and Distilled Water can offer several benefits for the skin:
- **Moisturization:** Ingredients like Coconut Oil, Acetyl Alcohol, and Stearic Acid are emollients and humectants, helping to retain moisture in the skin and prevent dryness.
- **Anti-aging:** Hibiscus is rich in antioxidants, which can help combat free radical damage and reduce the appearance of wrinkles and fine lines.
- **Skin brightening:** Hibiscus and Rose Water are known for their skin brightening properties, which can help improve skin tone and complexion.
- **Soothing and calming:** Rose Water and Tea Plant extracts can have a soothing effect on the skin, helping to reduce redness and irritation.
- **Antibacterial properties:** Guava extracts may have antibacterial properties, which can help prevent acne and other skin infections.
- **Gentle on the skin:** Cold creams are generally gentle on the skin and can be used for all skin types, including sensitive skin.
- Overall, a cold cream made from these ingredients can provide deep moisturization, anti-aging benefits, skin brightening effects, and soothing properties, making it a comprehensive skincare product.^{27,30}

Disadvantage of cold cream

- **Hibiscus (Gudhal):** Can be beneficial for skin and hair, but some people may be sensitive to it and experience irritation.
- **Guava (Psidium):** Rich in vitamin C and antioxidants, but may cause allergic reactions in some individuals.
- **Tea Plant (Camellia Sinensis):** Green tea extract is often used for its antioxidant properties, but excessive use can lead to skin dryness or irritation.
- **Rose Oil:** Known for its soothing properties, but can be irritating for sensitive skin or if used in high concentrations.
- **Rose Water:** Generally safe for most skin types, but some people may be sensitive to it and experience irritation.
- **Coconut Oil:** Can be moisturizing, but may clog pores and cause breakouts for some individuals, especially on the face.
- **Acetyl Alcohol:** A fatty alcohol used as an emollient and emulsifier, but can be drying for some skin types.
- **Stearic Acid:** A fatty acid used as an emollient and emulsifier, but can be comedogenic (pore-clogging) for some people.
- **Distilled Water:** Generally safe, but some individuals may be sensitive to impurities or additives in the water.
- It's important to patch test products containing these ingredients before using them extensively, especially if you have sensitive skin or known allergies. Additionally, using products with a high concentration of any one ingredient can increase the risk of adverse reactions.^{28,29}

II ONCLUSION

This cold cream provides great moisturizing properties, especially for dry skin. Hibiscus extract will hydrate the skin and lock moisture in it. Guava extract will nourish the skin and provide vitamin C, which is beneficial for the skin. The antioxidant properties of tea plant extract will protect the skin as well. Rose oil and rose water will soothe and moisturize the skin. Coconut oil is a natural moisturizer for the skin. Acetyl alcohol and stearic acid are skin emollients, which help to soften and soften the skin. Distilled water will provide a base that is gentle and safe for the skin. Overall, cold cream can be beneficial for dry skin, but if you have sensitive skin or have an allergic reaction to any ingredient, it is best to do a patch test first.

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