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*Original Article*

# Formulation and Evalution of Cold Cream

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## ABSTRACT

The objective of this study was to formulate and evaluate a stable and effective cold cream intended for topical application to moisturize and protect the skin. Cold creams are oil-in-water emulsions commonly used for their emollient properties, especially in dry and cold climates. In this formulation, ingredients such as beeswax, mineral oil, borax, and water were used to prepare the emulsion using the fusion method. The prepared cold cream was subjected to various evaluation parameters, including pH, spreadability, stability, viscosity, and skin irritation tests, to assess its safety and effectiveness. The results demonstrated that the formulation possessed acceptable physicochemical characteristics, with a smooth texture, stable emulsion, and no signs of phase separation or microbial growth over a specified observation period. The pH was found to be within the skin-compatible range (5.5–6.5), and the cream showed good spreadability and no skin irritation upon application. The study concludes that the formulated cold cream is safe, stable, and suitable for cosmetic use, providing effective moisturization and skin protection.

**Keywords:** Cold cream, Emulsion, Skin care, Moisturizer,Spreadability

## INTRODUCTION

Cold creams are semi-solid oil-in-water (O/W) emulsions widely used in cosmetic and dermatological formulations due to their moisturizing, cleansing, and protective properties. Traditionally composed of fats, waxes, and water, cold creams serve as emollients that hydrate the skin by preventing transepidermal water loss, particularly in cold or dry environments (Pillai et al., 2010). Their application is especially beneficial in restoring the lipid barrier function of the skin, making them popular in personal care and therapeutic formulations. The formulation of an effective cold cream involves the careful selection of excipients such as emulsifying agents (e.g., borax), emollients (e.g., mineral oil, lanolin), and stabilizers to ensure product consistency, stability, and efficacy. The quality and performance of a topical cream depend significantly on physicochemical parameters like pH, viscosity, spreadability, and microbial stability, all of which influence user acceptability and safety (Barel et al., 2014). With increasing consumer preference for multifunctional and dermatologically safe cosmetics, it is essential to evaluate the formulated product not only for its aesthetic properties but also for its therapeutic potential and skin compatibility. Thus, this study aims to develop a stable cold cream formulation using the fusion method and to evaluate its physicochemical characteristics and dermatological safety.

**Profile of Formulation Ingredients[4]:**

- **Liquid Paraffin**
  - Quantity: 50 g (for 100 g), 12.5 g (for 25 g)
  - Role: Acts as an emollient and moisturizer; forms a protective barrier on the skin to prevent moisture loss.
- **Beeswax**
  - Quantity: 16 g (for 100 g), 4 g (for 25 g)
  - Role: Functions as a thickening agent; provides structure and consistency to the cream.
- **Borax**

**Relevant conflicts of interest/financial disclosures**: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

- Quantity: 0.8 g (for 100 g), 0.2 g (for 25 g)
- Role: Serves as an emulsifying agent; helps in stabilizing the oil and water phases.

- **Methyl Paraben**

- Quantity: 0.18 g (for 100 g), 0.045 g (for 25 g)
- Role: Preservative; prevents microbial growth and enhances product shelf life.

- **Propyl Paraben**

- Quantity: 0.02 g (for 100 g), 0.005 g (for 25 g)
- Role: Provides antimicrobial activity; works synergistically with methyl paraben for preservation.

- **Rose Water**

- Quantity: q.s (quantum satis/as required)
- Role: Used as a fragrance; gives a pleasant aroma to the cream.

- **Purified Water**

- Quantity: 33 g (for 100 g), 8.25 g (for 25 g)
- Role: Forms the aqueous phase; hydrates the skin and aids in emulsification.

**Experimental Work:**

**A) Diclofenac Sodium Gel:**

**1. Materials Required**

| Ingredient | Quantity For 100 g | Quantity for 25 g | Role |
|---|---|---|---|
| Liquid Paraffin | 50 g | 12.5g | Emollient and moisturizer |
| Beeswax | 16 g | 4g | Thickening agent |
| Borax | 0.8g | 0.2g | Emulsifying agent |
| Methyl Parabean | 0.18g | 0.045g | Preservative |
| Propyl Parabean | 0.02g | 0.005g | Antimicrobial activity |
| Rose Water | q.s | q.s | Fragrance |
| Purified water | 33g | 8.25g | Aqueous phase |

**2. Method of Preparation *(Fusion Method)***

**1. Oil Phase Preparation:**

- Weigh and melt beeswax and liquid paraffin in a beaker using a water bath (~70–75°C).
- Add methyl paraben and propyl paraben to this oil phase and stir until completely dissolved.

**2. Aqueous Phase Preparation:**

- In a separate beaker, dissolve borax in purified water and heat it to the same temperature (~70–75°C).
- Add rose water in sufficient quantity (q.s) for fragrance.

**3. Emulsion Formation:**

- Slowly add the hot aqueous phase to the oil phase with continuous stirring.
- Continue stirring until a uniform emulsion forms.
- Allow the cream to cool gradually at room temperature with gentle stirring to avoid air entrapment.

**4. Final Product:**

- Transfer the cooled cream into a suitable container and label.

**3. Evaluation Parameters**

**a. Physical Appearance**

- Checked visually for color, consistency, and homogeneity.

**b. pH Measurement**


**Fig No – 1 (pH meter)**

- 1 g of cream was dispersed in 10 mL distilled water and measured using a calibrated digital pH meter.
- 6.5 is the pH of formulation of cold cream

**c. Spreadability**

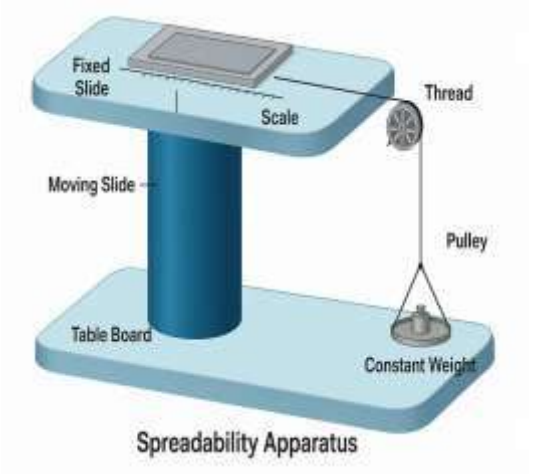


**Fig No – 2 (Spreadability Apparatus)**

- Determined by placing 1 g of cream between two glass slides and applying a standard weight. Time taken to spread was recorded.

**d. Viscosity**


**Fig No – 3 (Brookfield Viscometer)**

- Measured using a Brookfield viscometer at room temperature.
- 49000 cp is the viscosity of cold cream.

**e. Stability Test**

- The cream was stored at different temperatures (4°C, room temp, and 40°C) for 2–4 weeks and observed for phase separation, color change, or microbial growth.

**f. Skin Irritation Test**

- A patch test was conducted on human volunteers (with ethical approval) to observe any signs of redness or irritation over 24 hours.

## OBSERVATIONS AND RESULTS

**(Sample Format)**

| Parameter | Observation/Result |
|---|---|
| Appearance | Smooth, white, semi-solid cream; no lumps |
| Odor | Pleasant fragrance; no foul smell |
| pH | 6.5 (within the skin-friendly range of 5–7) |
| Spreadability | Good; spreads easily on the skin |
| Viscosity | Moderately high (49000). |
| Washability | Easily washable with water |
| Stability Test | No phase separation, discoloration, or odor change after 21 days at room temperature and elevated temperature (40°C) |
| Skin Irritation Test | No irritation or redness observed after application on a small area of skin |

## SUMMARY AND CONCLUSION:

### SUMMARY:

Cold cream is a type of oil-in-water (O/W) emulsion widely used in cosmetics for its moisturizing, cleansing, and soothing properties. It primarily serves to hydrate the skin, protect against dryness, and improve skin texture. The formulation of cold cream involves both an oil phase and an aqueous phase. Key ingredients typically include beeswax, which acts as a natural emulsifying and consistency-enhancing agent; liquid paraffin and mineral oil, which function as emollients to soften and smoothen the skin; and borax (sodium borate), which reacts with fatty acids in beeswax to stabilize the emulsion. Water forms the base of the aqueous phase, providing hydration, while fragrances and preservatives are added to enhance the sensory appeal and prolong shelf life.

### CONCLUSION:

The formulation and evaluation of cold cream demonstrate the importance of selecting appropriate ingredients and following a controlled preparation method to produce a stable, effective, and skin-friendly product. The use of emulsifying agents like beeswax and borax ensures the formation of a stable oil-in-water emulsion, while emollients such as mineral oil and liquid paraffin provide moisturizing benefits. The evaluation parameters—including pH, spreadability, viscosity, appearance, and stability—confirm the product's suitability for topical application. Overall, the developed cold cream exhibits desirable cosmetic properties and meets the essential criteria for quality, safety, and user acceptability, making it a viable product for skin care use.

### FUTURE SCOPE:

- **Incorporation of Natural Ingredients**: Future formulations can include herbal extracts, essential oils, and bioactive compounds with added benefits like anti-aging, anti-inflammatory, and antioxidant properties.
- **Use of Natural Emulsifiers and Preservatives**: To cater to the demand for organic and skin-friendly products, natural alternatives to synthetic additives can be explored.
- **Development of Targeted Formulations**: Customized creams for specific skin types (e.g., oily, dry, sensitive, acne-prone) can be developed to enhance user satisfaction.

- **Application of Advanced Delivery Systems**: Techniques such as nanoemulsions, liposomes, and microencapsulation can improve the absorption, stability, and effectiveness of active ingredients.

- **Extended Stability and Shelf-Life Studies**: Long-term studies under various environmental conditions can ensure product durability and safety over time.

- **Enhanced Sensory and Aesthetic Properties**: Focus can be placed on improving texture, fragrance, and overall user experience to increase consumer appeal.

- **Eco-friendly and Sustainable Formulations**: Future work may involve developing environmentally responsible packaging and formulations using biodegradable ingredients.

- **Scale-up and Commercialization**: Research can be extended to pilot-scale production and commercialization while adhering to cosmetic regulatory standards.

- **Clinical and Dermatological Testing**: Advanced safety and efficacy testing on human volunteers can strengthen the product's credibility and market readiness.

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