Formulation And Evaluation of Moisturizing Cream Containing Sesame Oil

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***Abstract*-The objective of this study was to formulate and evaluate a moisturizing cream incorporating sesame oil, known for its antimicrobial, antioxidant, and skin-nourishing properties. Three different formulations (F1, F2, and F3) were developed using varying concentrations of white beeswax while maintaining a constant sesame oil content. The creams were evaluated for several parameters including physical appearance, pH, spreadability, greasiness, washability, viscosity, type of emulsion, and stability. All formulations exhibited a smooth texture, pleasant odor, whitish color, and acceptable pH range suitable for topical use. Spreadability was found to be best in formulation F1. No signs of irritation or greasiness were observed, and all samples demonstrated good washability and stability with no phase separation over 30 days. Microscopic dye testing confirmed a water-in-oil (W/O) emulsion type. These results indicate that sesame oil-based cream formulations can be effectively used as moisturizing agents for topical application.**

I. INTRODUCTION

Sesame oil, derived from the seeds of Sesamum indicum, is a rich source of nutrients, including unsaturated fatty acids, vitamins, and minerals (Balsam Sagarin & Gershon Strianse). It contains approximately 61.7% fat and 21.9% protein, along with elements such as Fe and Ca, making it an "all-purpose nutrient bank" (1). Native to East Africa and India, sesame oil has become renowned globally, not only as a cooking oil but also for its skin-benefiting properties.

Scientific Classification:
Domain: Eukaryota
Kingdom: Plantae
Phylum: Spermatophyta
Subphylum: Angiospermae
Class: Dicotyledonae
Order: Scrophulariales
Family: Pedaliaceae
Genus: Sesamum
Species: Sesamum indicum

Fig 1. Sesamum indicum

Studies indicate that sesame oil has a low comedogenic rating, making it ideal for acne-prone skin (2). Its phenolic compounds, such as tocopherol, sesamin, and sesamol, contribute to its antioxidant and anti-inflammatory properties. Additionally, the presence of fatty acids such as linoleic and oleic acids enhances its role as a moisturizer (3).

The topical application of sesame oil has shown potential in reducing oxidative stress and providing UV protection. It is also used for treating skin conditions and pain management. These qualities underline the significance of sesame oil in skincare formulations. (4)

II. MATERIAL AND METHODS

Materials

Sesame oil was procured from the local market, while the remaining cosmetic excipients required for the formulation were sourced from the Department of Pharmaceutics, D.S.T.S Mandal's College of Pharmacy, Solapur.

Table 1. Ingredients and Their Roles in Cream Formulation

Sr. No	Ingredient	Role
1	Sesame Oil	Antimicrobial, Antioxidant, and Antibacterial
2	White Beeswax	Thickener, Emulsifier, and Stiffening Agent
3	Borax	Buffering Agent, Preservative, and Emulsifier
4	Methyl Paraben	Preservative
5	Rose Oil (Perfume)	Fragrance
6	Distilled Water	Vehicle

Methods

All required materials and ingredients were accurately weighed using a precision balance to

ensure the formulation meets the specified quantities. Beeswax was melted in a container over a water bath maintained at 70°C. The weighed quantity of sesame oil was gradually added to the melted beeswax, forming Mixture A (Oily phase). Simultaneously, the weighed quantity of distilled water was heated to 70°C in a separate container, and borax was dissolved into the water, creating Mixture B (Aqueous phase). Mixture B was added slowly to Mixture A under continuous stirring to achieve uniform emulsification. Stirring was maintained until a creamy emulsion was formed. The preparation was then cooled to 40°C, at which point the weighed quantity of rose oil (perfume) was added to enhance fragrance. The final cream was thoroughly mixed to ensure consistency and transferred into suitable storage containers for evaluation and use.

Table 2. Formulation Table for Batch F1

Sr. No.	Ingredient	Quantity
1	Sesame Oil	50 gm
2	White Beeswax	20 gm
3	Borax	3.5 gm
4	Methyl Paraben	0.4 gm
5	Rose Oil (Perfume)	10 ml
6	Distilled Water	Q.S

Table 3. Formulation Table for Batch F2

Sr. No.	Ingredient	Quantity
1	Sesame Oil	50 gm
2	White Beeswax	22 gm
3	Borax	3.5 gm
4	Methyl Paraben	0.4 gm
5	Rose Oil (Perfume)	10 ml
6	Distilled Water	Q.S

Table 4. Formulation Table for Batch F2

Sr. No.	Ingredient	Quantity
1	Sesame Oil	50 gm
2	White Beeswax	25 gm
3	Borax	3.5 gm
4	Methyl Paraben	0.4 gm
5	Rose Oil (Perfume)	10 ml
6	Distilled Water	Q.S

III. EVALUATION TESTS

Physical Evaluation

The cream formulations (F1, F2, F3) were assessed for color, odor, texture, and state, revealing consistent results across batches (5).

Irritancy Test

For the non-irritancy test of the herbal cream formulation, a 1 cm^2 area was marked on the dorsal surface of the left hand. The cream was applied to the marked area, and the time of application was recorded. The application site was observed for 6 hours to assess any signs of irritation, such as redness or inflammation. (6)

Washability

A small amount of cream was applied to the hand and subsequently rinsed off with tap water to assess washability. (7)

pH Measurement

A 0.5 g sample of cream was dispersed in 50 ml distilled water, and the pH was measured using a digital pH meter. (8)

Phase Separation

The prepared cream was stored in a closed container at a temperature range of 25–100 °C, protected from light. Phase separation was monitored over a period of 30 days, with observations made every 24 hours to detect any changes. (9)

Spreadability

Spreadability was evaluated by measuring the time (in seconds) required for two glass slides to separate under a specific load, with the cream placed between them. Two glass slides of standard dimensions were used. A fixed amount of cream was applied to one slide, and a second slide was placed on top. A specified weight was applied to ensure uniform spreading, then removed. Excess cream was scraped off, and a weight was attached to the upper slide to allow it to slip. The time taken for the upper slide to detach was recorded. A shorter separation time indicated better spreadability. (9)

Spreadability= m × l/t Where,

m= Standard weight which is tied to or placed over the upper slide (30g) l= length of a glass slide (5 cm) t= time taken in seconds.

Greasiness

The cream was applied to the skin as a thin smear, and its texture was evaluated for any oily or greasy residue. (10)

Viscosity

The viscosity of the cream was measured using a Brookfield Viscometer. The instrument was first

leveled, and the appropriate spindle was attached and immersed in the cream up to the insertion mark. The viscometer was turned on and set to the desired speed. After allowing a few rotations for stabilization, the torque reading was recorded. (10)

Dye Test

A thin layer of the cream was placed on a glass slide, and one drop of amaranth red dye was added. The sample was observed under a microscope. The continuous phase became colored, indicating that the formulation is a water-in-oil (W/O) type emulsion. (11)

IV. RESULTS AND DISCUSSION

Physical Evaluation:

Fig 2. Formulations

Color: All three cream formulations F1, F2, and F3 exhibited a whitish appearance, indicating consistency in visual presentation across the samples.

Odour: Each formulation had a pleasant odor, suggesting that the inclusion of any fragrance components was well balanced and acceptable for topical application.

Texture: The texture of all three formulations was smooth, reflecting uniformity in consistency and desirable application characteristics.

1. Irritation Test: None of the formulations caused any irritation or redness upon application, indicating that all were dermatologically safe for use on the skin.
2. pH: The pH values of the formulations were found to be 5.9 for F1, 5.7 for F2, and 5.4 for F3. These values fall within the acceptable range for topical products and are considered suitable for skin application without causing irritation.
3. Phase Separation: The prepared cream formulations were stored in closed containers at a temperature range of 25–100 °C, protected from light. Phase separation was monitored every 24 hours over a period of 30 days. Based on the observations, no phase separation was detected in any of the three formulations.

Table 5. Results of phase separation study

Sr. No.	Formulation	Phase Separation
1	F1	No phase separation
2	F2	No phase separation
3	F3	No phase separation

4. Spreadability: The spreadability of the three formulations F1, F2, and F3 was evaluated by measuring the time taken for two glass slides to separate under a specific load. Among the formulations, F1 required the least time for the slides to separate, indicating superior spreadability. As per the evaluation criteria, a shorter separation time corresponds to better spreadability. Therefore, formulation F1 demonstrated the best spreadability among the three.
5. Greasiness: To assess greasiness, each cream formulation was applied to the skin surface as a thin smear and evaluated for any oily or greasy residue. Based on the observations, all three formulations F1, F2, and F3 were found to be non-greasy, indicating a pleasant skin feel and suitability for regular topical use.
6. Viscosity: Viscosity measurements using a Brookfield Viscometer showed values of 375 cP for F1, 356 cP for F2, and 364 cP for F3. These results indicate moderate thickness suitable for cream formulations, with slight variations between the samples.
7. Type of Emulsion: Microscopic dye testing revealed that all three formulations were water-in-oil (W/O) type emulsions, as the continuous phase absorbed the dye.

V. CONCLUSION

In this study, moisturizing creams containing sesame oil were successfully formulated and evaluated. All three formulations showed favorable physical characteristics, skin compatibility, and stability over 30 days. Among them, formulation F1 demonstrated superior spreadability without compromising other essential properties. The absence of greasiness, irritation, and phase separation highlights the formulation's suitability for regular cosmetic use. The findings support the potential of sesame oil as a beneficial active ingredient in skin care products due to its moisturizing, antioxidant, and non-comedogenic properties. Future studies may further explore its efficacy in specific dermatological

conditions and extend its application in other topical dosage forms.

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