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Quality Evaluation of Shaving Cream: A Review

Vyavahare Prathamesh Vitthal[1], Khole Nikhil Santosh[2],
Fand Varun Sanjay[3], Asst. Prof. Ashwini More[4]
Students, Department of Pharmacy[1,2,3]
Guide, Department of Pharmacy[4]
Mrs. Saraswati Wani College of Pharmacy, Ganegaon, Maharashtra
Affiliated to Dr Babasaheb Aambedkar Technological University, Lonore, Raigad

Abstract: *The main aim of this review is to study the quality control tests of shaving cream. Shaving cream is a cosmetic product used to soften facial or body hair and to lubricate the skin before shaving. It comes in different forms, such as traditional creams in tubes, gels in pressurized cans, and lathering soaps. Its basic function is to create a thin protective layer on the skin, which helps reduce razor burns and irritation. By lowering friction between the razor blade and the skin, it allows smoother and more comfortable strokes.*

This review focuses on the evaluation of shaving creams to promote smoother shaving. The practice of shaving or grooming facial hair goes back thousands of years, even before written records. With population growth and increasing focus on personal care, grooming has become more important in recent decades. For example, American men now shave far more often than they did a century ago.

Therefore, this review mainly summarizes existing knowledge about quality testing techniques to be use in evaluation of shaving cream, while also pointing out research gaps and suggesting future directions..

Keywords*:* Shaving cream, Lather

I. INTRODUCTION

Shaving cream is a cosmetic product available in the form of cream, foam, or gel. It is applied to the skin before shaving to soften hair and make the razor glide smoothly. Its main roles are to moisturize the hair, create a protective layer between the blade and skin, and reduce problems like irritation, cuts, and razor burn. Many formulations also include cooling, soothing, or antiseptic ingredients to improve comfort.

Synthetic shaving creams are those prepared mainly with man-made ingredients such as surfactants, emollients, humectants, and stabilizers, rather than traditional soap-based mixtures. Today, these are the most common shaving products, available as aerosol foams, gels, and tubes.

Over time, people have worked to make shaving easier, smoother, and more comfortable. With increasing attention to grooming and appearance, the demand for shaving creams has grown steadily.[1]

Fig.1:- Shaving cream

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History

Shaving and beard grooming have been part of human hygiene and culture since prehistoric times. Early humans used sharp stones, shells, and primitive tools to remove facial hair, often softening it with water, animal fats, or oils. By 400 B.C., professional barbers were established in ancient Greece, where grooming became a symbol of cleanliness and civilization. In the 19th century, the development of shaving soaps marked a major advancement. These soaps were produced by saponifying fats with potash or soda lye, creating a rich foam that eased razor movement and reduced skin irritation. With industrialization in the 20th century, shaving products evolved rapidly. Hard soaps were replaced by creams and foams, which offered smoother application and convenience. The introduction of brushless shaving creams in the early 1900s, such as Barbasol in 1919, revolutionized shaving by removing the need for a brush.

By the mid-1900s, the invention of aerosol technology led to pressurized shaving foams and later shaving gels, making the process faster and more hygienic. These innovations helped popularize daily shaving routines, especially among men in urban areas. In modern times, shaving creams are formulated not only for lubrication but also for skin care benefits. They include moisturizers, emollients, humectants, essential oils, and herbal extracts to soothe and hydrate the skin. There is also a rising demand for organic, chemical-free, and eco-friendly shaving products due to consumer awareness of skin health and environmental sustainability.

Scientific studies have contributed to improving shaving comfort and efficiency. Research by Hollander, Casselman, Valko, and Barnett revealed that soaking the beard in hot water (around 120°F) for 2–3 minutes significantly softens hair, making shaving easier and reducing irritation. Ross and Miles later developed methods to evaluate foam quality and stability, which became standard in testing shaving creams and foams. Overall, the evolution of shaving—from crude tools to scientifically formulated creams—reflects advancements in both cosmetic technology and personal care science. [1]

Quality Control Tests for Shaving Cream

Shaving cream is a cosmetic preparation used to soften hair and lubricate the skin before shaving, helping reduce friction and irritation. To ensure that shaving cream is safe, effective, and stable, various quality control (QC) tests are performed during and after manufacturing. These tests confirm the product's physical appearance, chemical composition, microbiological safety, and stability. Quality control ensures the product meets regulatory standards and provides a consistent user experience with every batch. It also helps detect contamination, instability, or improper formulation early in production.[2] The tests are as follows :-

Determination of Physical Parameters

Physical evaluation helps to assess the appearance, texture, and uniformity of a cream, which are key indicators of its quality, stability, and consumer acceptability. The product was examined for its color, luster (pearl-like shine), smoothness, and overall homogeneity using both visual observation and touch.

Color and Appearance

The prepared cream was inspected visually to ensure a uniform color and smooth appearance. It was checked for the absence of lumps, phase separation, or discoloration, which could indicate poor mixing or instability.

Texture and Smoothness

A small amount of cream was rubbed gently between the fingers to evaluate its feel on the skin. A good-quality cream should be smooth, soft, and easily spreadable, without any grittiness or greasiness.

Viscosity Measurement

Viscosity indicates the thickness and flow properties of the cream, affecting its ease of application and spreadability.

Instrument Used:

Brookfield Viscometer.

Procedure:

The viscosity was measured using a Brookfield viscometer operated at 100 rpm with spindle number 7 at room temperature. Results were noted in centipoise (cP).

A proper viscosity value ensures that the cream remains stable and easy to apply.

Homogeneity

Uniformity of the cream was checked visually and by touch to confirm an even distribution of all ingredients. The product should appear consistent, with no visible particles or signs of phase separation.[3,4]

Determination of pH of Cream

Purpose: The pH of a cream is measured to ensure it is compatible with the skin. Most topical creams, including shaving creams, are slightly acidic to match the natural pH of human skin (typically 4.5–6.5). This helps prevent irritation, maintain skin barrier function, and ensure product stability.

Apparatus/Materials Needed:

Digital pH meter (calibrated)

Beaker (50–100 mL, glass or plastic)

Distilled water or suitable solvent (e.g., phosphate buffer)

Glass/stirring rod

Cream sample

Procedure:

1. Preparation of Sample:

Weigh an adequate amount of the cream (typically 1–2 g).

Dilute it with a suitable solvent (usually distilled water) in a clean beaker. The dilution helps the pH electrode contact the aqueous phase of the cream effectively.

Stir the mixture gently until a homogeneous solution or dispersion is obtained.

2. Calibration of pH Meter:

Before measurement, calibrate the digital pH meter using standard buffer solutions (pH 4.0 and pH 7.0).

Rinse the electrode with distilled water and blot dry.

3. Measurement:

Immerse the pH electrode in the cream solution.

Wait until the reading stabilizes.

Record the pH value.

4. Repeatability:

Take 2–3 readings to ensure accuracy.

Report the average pH value.[5]

Fig. pH determination

3. Spreadability Test of Cream

Objective: To determine how easily and uniformly a cream spreads, indicating its ease of application.

Materials:

Transparent glass plates

Millimeter block paper

Cream sample (0.5 g)

Weights (50 g to 250 g)

Procedure:

1. Place a transparent glass plate on a sheet of millimeter block paper.
2. Take 0.5 g of the cream sample and place it in the center of the glass plate.
3. Cover the cream with another glass plate.
4. Let the setup stand for 1 minute to allow the cream to settle and form an initial spread.
5. Apply a weight ranging from 50 g to 250 g on the top glass

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Formula :-

$$\text{Spreadability (S)} = \frac{\text{Mass of the weight} \times \text{Length of glass slide moved}}{\text{Time taken to spread}}$$

Where:
Mass of the weight (M) is in grams (g)
Length of glass slide moved (L) is in centimeters (cm)
Time taken to spread (T) is in seconds (s) [6,7]

4. Saponification Value of Cream

Objective: To determine the saponification value, which indicates the amount of alkali required to saponify the fats or oils present in the cream.

Materials:
Cream sample (2 g)
0.5 N alcoholic KOH (25 mL)
0.5 N HCl
Phenolphthalein indicator (1 mL)
Burette, conical flask, and heating setup

Procedure:
1. Weigh 2 g of the cream and dilute it as necessary.
2. Add 25 mL of 0.5 N alcoholic KOH to the sample.
3. Heat the mixture under reflux for 30 minutes.
4. Add 1 mL of phenolphthalein and titrate instantly with 0.5 N HCl. Record the volume as 'a'.
5. Perform a blank titration (without the sample) under the same conditions. Record the volume as 'b'.

The saponification value (SV) of cream can be expressed as :

$$\text{Saponification Value (SV)} = \frac{(b - a) \times 28.05}{w}$$

Where:
b = volume of 0.5 N HCl used in blank titration (mL)
a = volume of 0.5 N HCl used in sample titration (mL)
w = weight of the cream sample (g)
28.05 = equivalent weight factor of KOH
This value indicates the amount of alkali required to saponify the fats or oils present in 1 gram of the cream.[8,9]

Tackiness and Adhesion Test

Objective: To evaluate the tackiness (stickiness) and adhesive properties of the cream, which influence its spreadability, retention, and user feel on the skin.

Apparatus Used:
Kinexus Rotational Rheometer (equipped with Peltier plate cartridge)
Matched Upper and Lower Plates (20 mm diameter)
Kinexus rSpace Software
Test Conditions:
Temperature: 25 °C
Working Gap: 0.2 mm
Gapping Speed: 0.1 mm/s

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Procedure:
1. The sample of cream is placed between the upper and lower plates of the rheometer.
2. A standard loading sequence is applied using Kinexus-rSpace software to ensure uniform sample placement and consistent test conditions.
3. The sample is trimmed flush with the edge of the plates to maintain uniform geometry.
4. Before measurement, the rheometer automatically adjusts the gap to achieve zero applied force, ensuring accurate baseline conditions.
5. The pull-away test is then performed — the upper plate is moved away from the lower plate at a controlled gapping speed of 0.1 mm/s.
6. The instrument measures the force required to separate the plates, which corresponds to the adhesion strength and tackiness of the cream.

Interpretation
Higher tackiness value indicates a stronger adhesive nature of the cream.
Moderate tackiness is desirable for topical creams, ensuring good skin adherence without an overly sticky feel.[10,11]

Droplet Size Analysis
The droplet size of the cream formulations was assessed after one week of preparation at ambient temperature using two complementary techniques.
1. Microscopic Examination:
Samples were observed with a Nikon Eclipse Ci optical microscope (Japan) fitted with a USB video camera (Nikon Y-TV55, Japan). The examination was performed at 25 °C under bright-field illumination using a 40× objective lens. Micrographs were used to visualize the emulsion structure and evaluate droplet uniformity.

2. Laser Diffraction Method:
Particle size distribution was further analyzed with a Malvern Mastersizer 2000 (Malvern Instruments, UK) equipped with a Hydro S dispersion unit. The formulation sample (1.5 mg) was dispersed in 20 mL of distilled water and stirred at 110 rpm prior to testing. The dispersion was added gradually into the instrument's chamber until the laser obscuration reached about 15%.
The chamber contained 150 mL of distilled water, continuously agitated at 1,750 rpm to maintain a homogeneous suspension during measurement.
The data were presented as volume-based droplet size distribution, expressed in terms of D(10), D(50), and D(90) values, along with the span and specific surface area. Results were reported as mean ± standard deviation (n = 3).[12]

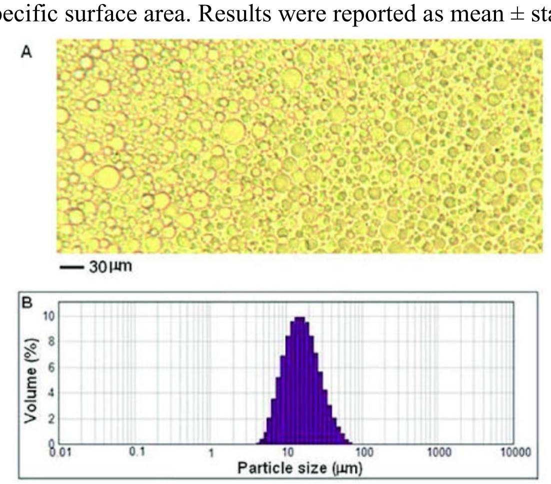

Fig. Droplet size analysis

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II. CONCLUSION

The quality evaluation of shaving creams is essential to ensure product safety, stability, and consumer satisfaction. Various physicochemical parameters such as pH, viscosity, spreadability, foamability, and skin compatibility play a crucial role in determining performance and user acceptability. Modern formulations increasingly focus on incorporating mild surfactants, natural emollients, and moisturizing agents to enhance shaving comfort and minimize irritation. Comprehensive quality control not only assures consistency and efficacy but also supports regulatory compliance and consumer trust. Continuous innovation and scientific evaluation will further improve the functionality and dermatological safety of shaving creams in the personal care industry.

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