



## **A Review on Formulation and Evaluation of Shaving Cream**

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### **Introduction**

The competitive fashionable trends bring new look and demand every sunrise. To reduce the trauma of shaving, a wide range of preparations is now available that prepare the face and beard for shaving. The choice of the shaving preparation is highly individualistic; however, it is generally recognized that different forms of beard preparation are required for 'wet' (razor blade) and 'dry' (electric razor) shaving. Wet shaving preparations includes-beard softening cream, lather shaving cream and lather shaving stick, aerosol shaving foam brushless or non-lathering cream brushless shaving stick, shave gel. Dry shaving preparations includes pre-electric shave lotion collapsible foam pre-electric shave lotion, pre-electric shave gel stick, pre-electric shave talc stick, pre-electric shave powder.<sup>1,2,3</sup> Gels, which include gels and jellies, are a type, which produce a uniform appearance, range from transparent to semi-transparent and give a moist feeling. Aqueous gels have been used in many cosmetics because they give moist and light feelings<sup>2</sup>

### **Definition**

- **Shaving cream:**

Shaving cream is applied to the skin to facilitate removal of hair. Shaving cream softens and moistens the skin and the hair thus making shaving more comfortable and contributing to smoother skin. Shaving cream is formulated to soften stubble and protect your skin against any nicks or cuts from your razor. If you're looking for a product to use after shaving to soothe skin, we recommend using an after shave product.



**Fig.1: Shaving cream**

Shaving cream is a cosmetic product used to apply to hair removal, often made of wax and oil. Different pigments are used to produce colour, and minerals

### **History Of Shaving Cream :**

A rudimentary form of shaving cream was documented in Sumer around 3000 BC. This substance combined wood alkali and animal fat and was applied to a beard as a shaving preparation. Until the early 20th century, bars or sticks of hard shaving soap were used. Later, tubes containing compounds of oils and soft soap were sold.

In 1919 Frank Shields, a former MIT professor developed the first shaving cream. The innovative product appeared on the American market under the name Barbasol and offered men an alternative to using a brush to work soap into lather. When it was first produced, Barbasol was filled and packed entirely by hand in Indianapolis. The brand still exists and is currently available worldwide.

The first can of pressurized shaving cream was Rise shaving cream, introduced in 1949. By the following decade this format attained two-third of the American market. Chlorofluorocarbons (CFCs) were used as propellants until they were banned in the late 1990s for destroying the ozone layer. Gaseous hydrocarbons such as mixtures of pentane, propane, butane and isobutane took their place.

In the 1970s, shaving gel was developed. In 1993, The Procter & Gamble Company patented a post-foaming gel composition, which turns the gel into a foam after application to the skin, combining properties of both foams and gels.

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**Ideal Characteristics of Good shaving cream:**

1. It should not be gritty.
2. It should be non toxic and non irritant to the skin..
3. It should make skin soft.
4. It should have stability towards environmental conditions.
5. It should completely free from grittiness.
6. The container should operate easily.
7. It should possess required plasticity and be able to maintain all the properties throughout the storage period.
8. Non-irritating
9. Stable over wide rang of temperature
10. Non corrosive to razor blade
11. Resistance to rapid drying and collapse
12. Easy to remove and rinse

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**Advantage:**

- Protect and moisturize your skin.
- Shaving cream make look healthy and well.
- Shaving cream provide beauty to your skin.
- Keep the lip same even at the time of eating.
- Gives protection to your skin from climatic changes
- Enhances hydration to the skin.
- It softens and lifts the beard for a close and comfortable shave.
- It protects the skin from irritation and razor burn.
- It leaves the skin feeling ultra smooth and conditioned.
- Shaving cream is a perfect moisturising solution for those with dry skin.

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**Disadvantage:**

- It is not easy to remove.
- It may damage your skin.
- You spend good amount on it.
- It may make the skin more sensitive.
- The users may get habituated
- Harmful to the Environment

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## Raw materials used in shaving cream:

The goal of any shaving preparation is to wet and soften the hair to be shaved, cushion the effect of the razor, and provide a residual film to soothe the skin. This film should be of the proper pH value: neither excessively alkaline nor overly acidic, it should correspond to the skin's pH level.

Many manufacturers would have us believe that the recipes for shaving cream are carefully guarded secrets. However, the secrecy revolves mostly around the quantities in which standard ingredients are used, and the choice of substitutes for the few ingredients that are variable. By law, ingredients are listed right on the container, except for perfumes. Actual recipes are easily found in industrial chemistry textbooks available at many libraries. A standard recipe contains approximately 8.2 percent stearic acid, 3.7 percent triethanolamine, 5 percent lanolin, 2 percent glycerin, 6 percent polyoxyethylene sorbitan monostearate, and 79.6 percent water.

Two major ingredients in this formula are common in many of today's preparations. Stearic acid is one of the main ingredients in soap making, and triethanolamine is a surfactant, or surface-acting agent, which does the job of soap, albeit much better. While one end of a surfactant molecule attracts dirt and grease, the other end attracts water. Lanolin and polyoxyethylene sorbitan monostearate are both emulsifiers which hold water to the skin, while glycerin, a solvent and an emollient, renders skin softer and more supple.

Common substitutes for the third, fourth, and fifth ingredients listed above include laureth 23 and lauryl sulfate (both sudsing and foaming agents), waxes, cocamides (which cleanse and aid foaming), and lanolin derivatives. Most ingredients are powdered or flaked, although lanolin, lanolin derivatives, and cocamides are liquids.

The differences between one brand of shaving cream and another amount to adjustments in the proportions of ingredients and in the processing method (longer or shorter heating times, storage of the finished product, and so on), and choice of ingredients such as emulsifiers or perfumes. Also important is the choice of aerosol propellant. Some mixtures contain more than one propellant; most common are butane, isobutane, and propane. Though the wide range of choices for ingredients is well known, the exact combinations of ingredients represent the highest level of "magic" in modern chemistry.

### The raw material used in shaving cream are :

1. Oils and fats
2. Alkalis
3. Glycerin
4. Electrolytes
5. Perfume and additives

#### 1. Oils and fat

The fat charge consists of mainly stearic acid and coconut oil or coconut oil fatty acids. Total fatty matter varies from 33 to 40%.

#### 2. Alkalis

It is a mixture of potassium and sodium hydroxide either in the form of flakes or solutions.

#### 3. Glycerin or Sorbitol

Forms an essential part of shaving cream about 20 to 30% of these humectants are added to shaving cream. The addition of this material aids in giving creamy consistency to shaving cream.

#### 4. Electrolytes

Normal electrolytes used are potassium chloride, Boric acid, Sodium Silicate etc., Judicious quantities of these electrolytes are necessary to give right consistency to the product.

#### 5. Perfume and other additives

Most shaving cream consist of 0.5 to 1.5% perfumes. Carboxy methyl cellulose and other gums are used for giving consistency. Menthol is usually added to give cool feeling. Super-fatting agents like Lanolin, fatty alcohols are included in some creams. Antiseptic agents are also incl

#### 6. Preservation

Parabens and formaldehyde-releasing preservatives are commonly used preservatives in cosmetic and personal care products. Parabens are not water-soluble and can penetrate the skin. Natural preservatives are preservative ingredients formed from naturally occurring substances. There are several natural sources containing ingredients with antimicrobial properties, such as benzoic acid

#### 7. Antioxidant-

Antioxidants are substances that may protect your cells against free radicals, which may play a role in heart disease, cancer and other diseases. The inclusion of antioxidants in a formulation is still the main approach to avoiding the oxidation of cosmetic products.

Antioxidants fight the free radicals that cause oxidative damage to your ingredients.

#### 8.Surfactant-

Surfactants are a category of chemical compounds that are used in lowering the surface tension (or interfacial tension) between different compounds, such as two liquids or between a gas and a liquid, or it can also be between a liquid and a solid.

#### 9.Colouring agents-

color additive is any dye, pigment or substance which when added to a food, drug or cosmetic, or to the human body will impart a color. The Colouring Agents : Carmine, dyestuff stain, pigmented stain, lakes etc.

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### Equipment

**1.Steam Jacketed Kettle**– A steam jacketed kettle has double boiler container with steam heating and stirring capability. Easy in filling and emptying the vessel for handling. Steam-jacketed kettles are often used to rapidly and uniformly heat food and agricultural products



**Fig.2: Steam Jacketed Kettle**

to processing temperatures. Steam is injected into a thin jacket that surrounds the bowl of the kettle. The steam condenses on the product-surface of the kettle jacket and transfers its latent heat of vaporization to the product. Condensed steam (condensate or water) is removed from the jacket of the kettle to allow more steam to enter and continue the heating process. The purpose of this fact sheet is to describe the hookup requirements for steam-jacketed kettles.

- 1. Agitator** – The purpose of Agitator is to rotate the water at desired rpm so that calcium hypochlorite is thoroughly mixed in the water. An Agitator is used for mixing different process media – liquids, gases and solids in chemical addition or Pharmaceutical Ingredients. The agitator imparts energy through mechanical means by rotating a shaft on which there is an impeller designed specifically for the duty. This could be axial pumping, gas induction, flocculating, high viscosity products, high & low shear mixing etc. An agitator is also used in the Water Industry for adding various chemicals to bring the source water up to drinking water standards



**Fig.3: Agitator**

**3.Homogenizer** –This machine is used to make the uniform concentration of gel by reducing it's viscosity



**Fig.4: Homogenizer**

A homogenizer is a mixer used to create a uniform and even mixture by forcing material through a narrow, confined space. Multiple forces such as turbulence and cavitation, in addition to high pressure, are used to distribute the contents of a solution evenly. Homogenizers have a positive displacement pump and homogenizing valve assembly. The pump forces the material to be processed under pressure through a small gap between the valve seat and the valve. The force of the pressure and the movement through the valve causes turbulence and mixing. Multiple industries rely on homogenizers to produce stable, uniform, and consistent products. Aside from mixing, homogenizers are used for emulsifying, suspending, grinding, dispersing, and dissolving. The pharmaceutical, beverage, and chemical industries rely on homogenizers for the production and quality of their products.

Homogenizers are used with high shear mixers, batch mixers, and paddle mixers and are installed downstream to create finer mixtures. However, some homogenizers cannot accept products with highly coarse components due to the risk of high energy consumption, decreased flow rate, heat generation, and increased material wear. Upstream of the homogenizer, mixers condition and prepare materials by premixing them.

**4. Paste Filling and Sealing Machine**– This machine is used to fill the paste and seal the tube as per required quantity.



**Fig.5: Paste Filling and sealing Machine**

Filling and sealing machines are packaging equipment that uses flexible, heat-sealable, plastic film to form packages that can be filled with a product and then sealed, and cut.

There are many types of filling and sealing machines. Filling machines load previously formed packages with a specific product quantity, but do not provide closing or sealing action. Seal-only equipment wraps or secures products, but does not form packages or fill them. Equipment that combines form, fill and seal functions is also available.

Filling and sealing machines are used to process liquids, granules, powders, and sprays for consumer, bulk and original equipment manufacturer.

**5. Storage Tank**–The tanks are used to store the paste during processing phase.



**Fig.6: Storage Tank**

Storage tanks are used to hold crude oil, produced water, and gas condensate for brief periods to stabilize flow between continuously producing wells and periodic pipeline or trucking transportation. These storage tanks are typically fixed roof design and operate at or near atmospheric pressure. Upon being introduced into a storage tank at above atmospheric pressure, crude oil and condensate experience pressure drops which cause gases dissolved in the liquid to vaporize or 'flash' out of the liquid phase and collect in the vapor space between the liquid and the fixed roof of the storage tank. These vapors, rich in methane, may be vented to the atmosphere to maintain atmospheric pressure in the storage tank. Filling and sealing machinery are capable of packing different kinds of liquids, pastes, granules, powders categorized as shampoo, ketchup, oil, lube, petroleum jelly (cream), spices, tea coffee, liquor and other related products.

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## MATERIAL AND METHODS

### 1. Composition

#### 1. Herbal extract

An Herbal Extract is a substance made by extracting a part of an herbal raw material, often by using a solvent such as methanol or water. The process of Herbal Extraction is usually designed to maximize a certain portion of the original chemical compounds found in the plant, many of which have a therapeutic action. The herbal extract used in the formulation are manjistha extract and lemon extract.

#### 2. Depilatory active

An alkaline reducing agent as their active component. These agents will cause the hair fibers to swell and cleave the cysteine bridges between adjacent polypeptide chain; causing degradation of the hair.

The depilatory active present in the compositions of the invention may be any compound which provides for the removal of hair by a chemical reaction, such as by degrading the keratin present in the hair. It is preferred that the depilatory active contains a thiol group and most especially that the depilatory active which contains a thiol group is selected from one or more of the group consisting of thiohlycolic acid.

#### 3. Alkali metal hydroxide

Calcium hydroxide is a compound that helps boost the action of thioglycolates in dissolving hairs at their roots. It may irritate the skin, as lime's corrosive chemical action can do the same thing to the proteins of your skin as it does to the proteins of your hair shaft.

The compositions of the present invention further comprise an alkali metal hydroxide selected from sodium hydroxide and/or calcium hydroxide as a source of alkalinity.

The amount of the alkali metal hydroxide added will depend upon the desired pH of the depilatory composition and other formulation considerations. However it has been found that good hair removal properties and acceptable contact times combined with the compositions being well tolerated by the skin are achieved with compositions according to the invention which contain the above amounts of the alkali metal hydroxide.

#### 4. Diluents

Depilatories also need something to help dilute other ingredients in the products. Water is used most often as a diluent. It's inexpensive, doesn't irritate skin and is compatible with a wide range of other ingredients.

#### 5. Humectant

Humectant is a common moisturizing agent found in beauty products used for your hair and skin. They're known for their ability to retain moisture while also preserving the overall properties of the product.

The most common humectant in cosmetics is glycerin or glycerol. This is a molecule that has three -OH groups on it. It is an odorless, clear liquid that can be derived from natural sources. While it can be found in nature it is primarily manufactured as a bi-product of chemical reactions with fats and oils.

#### 6. Emollients:

Emollients are included in hair removal creams and lotions to help reduce the harshness of chemicals in the products and make them feel better on the skin.

Emollients are refatting agents added to a cosmetic formulation to provide the skin with the fat it needs. They increase the moisture content of the skin by reducing evaporation, providing a soft, smooth and non-greasy feel to the skin and thus, are often referred as moisturizers. The common emollients used includes mineral oils or paraffin.

#### 7. Thickening agents:

Thickening agents generally plays most important role in cosmetic formulation, not only to regulate the product viscosity but also the rheological properties of stability. The main thickening agents used in cream are titanium dioxide, cetosteryl alcohol, sorbitol, a suitable combination of these to make a paste of requisite consistency.

#### 8. Perfumes:

Most of the alkaline reducing agents, including salts of thioglycolic acid, have usually an odor of their own. While many others, particularly sulphides. Generate the odor of hydrogen sulphides on application or on storage. Hence, the use of perfumes is almost a necessity in depilatory products. The perfume materials used are aromatic alcohols, ketones, anise, safrol, and rose. The perfume used in this preparation is lemon perfume

## METHOD OF PREPARATION

Weight all oil phase ingredients in vessel then weigh all water phase ingredients then add oil phase into water phase .. Then add herbal extract, perfume and colour. Pack cream with suitable packing

- **Preparation of slurry:**

Measure the accurate weight of sodium hydroxide and calcium Hydroxide and dissolved into distilled water. Then add the thioglycolic acid dropwise with continuous stirring. Then cool the solution



**Fig.7: Preparation Of Slurry**

- **Preparation of oil phase:**



**Fig.8: Preparation Of Oil Phase**

The oil soluble ingredients such as cetostearyl alcohol, cetomacragol 1000, cetyl alcohol, hard paraffin, light liquid paraffin, and glycerol monosterate are put into one beaker and the mixture is melted



- **Preparation of aqueous phase**

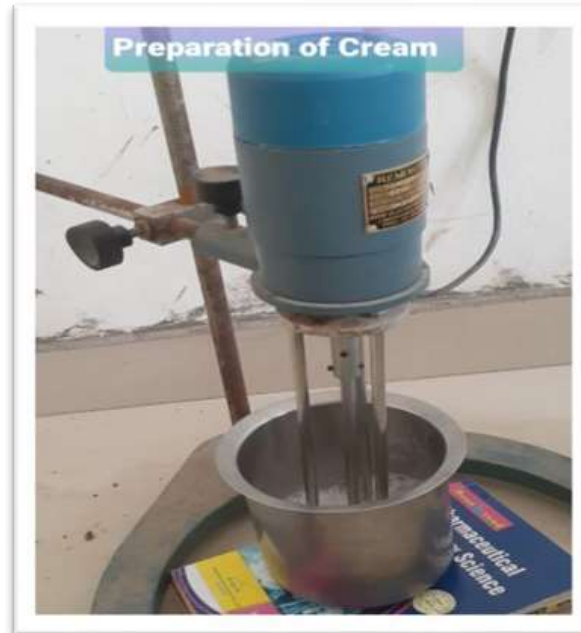


**Fig.9:Preparation Of Aqueous Phase**

The aqueous soluble ingredients from the formula, namely glycerin, sorbitol, and sodium silicate, are transferred to another beaker and heated to 70 °C.

**Preparation of shaving cream** Add oil phase to the aqueous phase with continuous stirring at 70 °C. Slowly add the slurry with continuous stirring by an electric stirrer. Add the extract, perfume, and colour. Once the transfer is complete, allow it to come to room temperature while stirring transferred cream into a suitable container.

**Fig.10: Preparation Of Cream**



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## EVALUATION PARAMETERS OF CREAMS

**1.Determination of pH:** Dissolve 1 gram of formulation in 9 ml of water and check by pH paper.

**2.Spreadability:** Take Adequate amount of sample between two glass slides and apply weight of 100gm is on the slides for 5 minutes. Spreadability can be expressed as,

S= ml/t

Where, m = weight applied to upper slide. L = length moved on the glass slide. T = time taken.

**3.Washability-** This test was performed directly on skin, apply preparation on skin and wash with normal water.

**4.Homogeneity:** Test formulation for the homogeneity by visual appearance and by touch. Or, it was test by pressing a small quantity of the formulated cream between the thumb and index finger.

**5.Irritancy study:** Mark an area of 1sq.cm on the left hand dorsal surface. Apply cream to the specified area and time check the. Irritancy, erythema, edema, if any, for regular intervals upto 24hrs

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### Summary:

In the present work a shaving gel has been prepared using chitosan as a gelling agent. Some formulations were prepared using fatty acids like stearic acid palmitic acid, myristic acid and a blend of palmitic acid and myristic acid. The soap was formed in situ. Sodium and ammonium lauryl sulphate were added to get foam in different formulations. It has been found that ammonium lauryl sulphate made chitosan precipitate out giving its particles while sodium lauryl sulphate was compatible with chitosan and other formulation additives. Looking at the importance of gellents in cosmetics gel based products; it is worthy to explore the possibility of employing successful cosmeceutical agent. To sum- up, use of chitosan in cosmetic as a gelling agent is a substitute to the traditional gellent used till date. Thus the Chitosan will be an alternative choice to develop the gel cosmetic in near future.

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