

## Review on “Formulation and Evaluation of Herbal Shaving Cream”

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### ABSTRACT

The preparations known as herbal cosmetics are cosmetics that contain active, bioactive substances or medications. Utilising phytochemicals from a range of botanicals has two purposes: on the one hand, they are used as cosmetics to take care of the body and its components, and on the other hand, the botanical compounds have an impact on the biological activities of the skin and supply the nutrients required for maintaining healthy skin and hair. Different vitamins, antioxidants, oils, essential oils, colours, tannins, alkaloids, carbohydrates, proteins, terpenoids, and other bioactive compounds are generally found in botanicals. These are also administered topically and are thought to be superior than cosmetics. The personal care industry is currently focusing more on herbal-based cosmetics since this is a rapidly expanding market with enormous potential for growth in the years to come. Herbal cosmetics are not covered by the Food and Drug Administration's preview of drugs and regulations. Similar to cosmetics, they are governed by the laws that are in place in the various nations for their safety. In general, a manufacturer is not required to state how bioactive substances permeate the skin or that they have therapeutic or drug-like effects. The present review article focuses on formulation and evaluation of herbal shaving cream.

**KEYWORDS:** Herbal cosmetics, shaving cream, composition, shaving process, formulation, evaluation

### INTRODUCTION

The idea of cosmetics and beauty has existed since the dawn of human society. Herbal cosmetics are commonly known as natural cosmetics. Herbal cosmetics are made by combining a variety of cosmetic materials as the basis, then adding one or more herbal compounds to treat a range of skin conditions. Plants are heavily utilised in the research and development of novel pharmaceutical and cosmetic medicinal products. Herbs are utilised in the form of extracts or crude forms in herbal cosmetics. Every individual has the desire to appear attractive. They have been employing various kinds of materials

from the beginning of time for this purpose. Early on, religious traditions were connected to cosmetics. This is practically true for all ancient civilizations, including Greek and Egyptian, Chinese, and Indian. In India, the custom of ubtan with flour, turmeric, and vegetable oil before marriage is still followed. Women are still applying Kum Kum. In the beginning, every cosmetic product was created at home. Perfumes were made from natural resources such as aromatic materials, spices, herbs, resins, colours, fats, and oils; also, native people from many counties utilised them. The herbal remedies and

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products are made from vegetable sources, including the root, leaf, flower, fruit, extrude, or entire plant.

The term "Herbal Cosmetics" refers to products that are produced utilising a variety of approved cosmetic components as the foundation, then one or more herbal compounds are added to give specific cosmetic advantages solely. Herbs do not provide quick cures. They provide a means of aligning the body with nature. Recently, a great deal of formulations for toiletries and cosmetics have been created using Indian herbs. Aside from the conventionally recorded uses, some contemporary studies have explored the potential of Indian herbs in personal care products. The lack of adverse effects and skin friendliness of herbal treatments are driving up demand for them. The nicest part about herbal cosmetics is that they have no adverse effects because they are created entirely of herbs and shrubs. The natural ingredients in the herbs give the body nutrition and other beneficial elements without having any negative effects on it. In 1961, Raymond Reed, a founding member of the US Society of Cosmetics Chemist, coined the word "cosmeceuticals." In fact, he briefed the science-based and active cosmetics using that phrase. In 1984, Dr. Albert Kligman expanded on the use of the aforementioned phrase to include drugs with both medicinal and cosmetic effects. Cosmeceuticals are pharmaceutical-cosmetic hybrids whose chemicals affect the biological texture and function of the skin to improve health and attractiveness. Because herbal cosmetics are gentle on the skin and have no negative side effects, their popularity is growing quickly. The newest thing in fashion and beauty is herbal cosmetics. These agents are becoming more and more popular because most women these days choose natural products over chemical ones for personal care to improve their appearance. This is because natural products give the body nutrients, improve health, and satisfy because they don't contain synthetic chemicals and have fewer side effects than synthetic cosmetics. The benefits of utilising natural cosmetics over synthetic ones are as follows, which make them a preferable option: Organic goods By their very name, herbal cosmetics imply that they are all-natural and devoid of synthetic ingredients that may otherwise be damaging to the skin. These products, including aloe-Vera gel and coconut oil, employ various plant components and plant extracts in place of conventional synthetic ones. They also include organic nutrients like vitamin E, which maintains skin radiant and healthy. Aloe Vera, for instance, is a naturally occurring and widely accessible herbal plant species that belongs to the Liliaceae family. A growing number of customers are demanding more natural products with traceable and

natural components, free from dangerous chemicals, and with a focus on the characteristics of botanicals because they are worried about substances like synthetic chemicals and mineral oils. secure to use Natural cosmetics are safer to use than conventional beauty products. Dermatologists have tested and confirmed that they are hypo-allergenic and safe to use at any time or location. People don't have to be concerned about developing skin rashes or experiencing itching on their skin because they are composed of natural substances. For example, butylated hydroxide (BHA) and butylated hydroxide (BHT) are synthetic antioxidants that are employed as preservatives in moisturisers and lipsticks. BHA and BHT have the potential to cause skin allergies. BHA is categorised by the International Agency for Research on Cancer as a potential human carcinogen. Vitamin C and other natural antioxidants are included in herbal cosmetics. suitable for all skin types All skin types can use natural cosmetics. You can get natural makeup that works for any skin tone, including foundation, eye shadow, and lipstick, whether you have light or dark complexion. They are also safe for use by women with sensitive or oily skin, so they never have to worry about aggravating their skin. Coal tar is known to be carcinogenic to humans, and although natural colours generated from herbs are safer, specific coal tar colours whether made from coal tar or synthetically can cause cancer. Coal tar is used extensively in cosmetics.

Cream formulations were semisolid substances meant to be applied topically. Different plant oils, extracts, and excipients were used to create the cream compositions. The two primary forms of cream formulations are the water in oil (W/O) and oil in water (O/W) types of emulsion. The current formulation was an emulsion of the oil in water (O/W) type. The cream formulation was divided into several classes, including disappearing, head and body, night and massage, pain-relieving, cleaning, foundation, and shaving creams (1). One of the most significant medical systems that use herbal plant and extracts for the management of a wide range of illnesses and sick states is the Ayurvedic system (2). *Eugenia caryophyllus* was the fragrant plant, and its flower buds are employed in a variety of ways. *Eugenia caryophyllus* is a member of the Myrtaceae family. The clove tree may reach a height of 8 to 12 metres and is evergreen. The flower buds are first light in colour, becoming green over time, and then dark brown or dusty red. Clove oil is especially used as a pain-relieving element in cream. *Eugenia caryophyllus* was traditionally used as an anti-inflammatory and pain-relieving agent. It was also employed as a dental analgesic and in the

manufacture of different commercial formulations like cream paste. These plants have been shown to have antimicrobial, antifungal, antibacterial, and anticancer effects (3, 4). The traditional medicinal plant known as ginger, *Zingiber officinale*, is a member of the Zingiberaceae family. The area of the plant's rhizomes and roots that has analgesic and analgesic properties. Fresh rhizomes are utilised for the extraction process, and the extracted material is then employed to make cream. Ginger was utilised for its anti-oxidant, anti-cancer, antibacterial, and skin-nourishing qualities, among other uses. Although its main usage is in the treatment of nausea, ginger is also used as an anti-inflammatory, pain reliever, warming agent, and herb that lowers cholesterol (5). Soxhlet extraction was used to complete the extraction procedure. The soxhlet extraction technique was created by Franz von Soxhlet in 1879. A round bottom flask, syphon tube, distillation channel, expansion adapter, condenser, cooling water intake, cooling water exit, heat source, and thimble make up the soxhlet extractor system. This procedure involves placing fresh sample slices within a porous bag, or "thimble," made of cellulose or strong filter paper, which is then placed into the Soxhlet apparatus's thimble chamber. A heating source, such as a heating mantle, was used to warm the extraction solvent in the RBF. The extraction solvent was used to determine the heating temperature. The solvent in the RBF is heated, vaporising in the condenser before returning to the thimble. When the liquid content reaches the syphon arm, the flask bottom is emptied and then filled again; this cycle is repeated until the syphon tube contains a clear solution. Fresh ginger oil was obtained through further distillation and is utilised in the creation of polyherbal cream (6). The oldest holistic, holy, and traditional medicinal plant in the Oleaceae family is *Nyctanthes arbor-tristis*. The herb was referenced in the Vishnu Purana and is very important for treating many different types of ailments, including rheumatoid arthritis, as it relieves inflammation and pain (7).

There are around 100,000–150,000 hairs on an individual human, and each hair develops and sheds according to different cycles in the hair development cycle. The three stages of hair development are anagen, catagen, and telogen. Numerous factors, such as dietary state, medical history, inheritance, physical make-up, hormones, secretion, and ageing, might affect the hair's life cycle (8, 9, 10). The removal of hair from specific body regions appears to garner equal attention to the promotion of hair growth on other body parts. Dealing with hair growth from parts of the body where it is not desirable is an issue that affects both men and women (11).

Therefore, the goal of the current study is to examine and provide scientific validation for the traditional texts' assertion that *Prosopis cineraria*, or the ashes of leaves, has shaving cream properties (12). Significant antihyperglycemic, antihyperlipidemic, and antioxidant properties have also been documented for the plant (13), along with antibacterial, anti-inflammatory, analgesic, and anticancer properties (14), analgesic, and antipyretic properties (15). According to Susruta and Yogaratnakara, the herb is traditionally advised for the treatment of snake bites. Bark is sharp-tasting, dry, acrid, and bitter. It is cooling, anthelmintic, tonic, and treats leprosy, dysentery, bronchitis, asthma, leucoderma, piles, muscular spasms, and wandering thoughts. In the central provinces, bark is also used as a rheumatism medicine (16).

The hair follicle is a cylindrical invagination of the epidermis from which a thin, flexible shaft of cornified cells arises. The majority of the amino acids found in hair include cystine, which is the most prevalent amino acid in hair, and sulphur (17). It is common to refer to these acids as keratin. Shaving cream is the general term for products used to remove undesired hair. A shaving cream needs to meet certain criteria: it needs to be non-irritating, safe, effective, and either odourless or have a pleasing scent (18). Teenage girls and women are reported to find facial hair development to be a concerning factor during these periods. In general, women do not grow facial hair as males do, but today's women are more likely to have facial hair because of poor eating choices and hormone imbalances. Since hair is a tough substance that is difficult to dissolve or remove, its removal must be done carefully. It grows and regains its form if it is plucked out. Since the tissues are negatively impacted if it is damaged by an X-ray, this procedure is no longer used. Although slow and expensive, electrolysis is an effective permanent eradication technique (19). The use of chemical removal carries a risk of irritation. Therefore, the primary goal of our research is to locate herbal shaving cream that is safe to use and doesn't have any negative side effects. In the past, women would apply turmeric to their baths on a daily basis. However, in today's hectic world, this is not feasible, and most of them avoid it because of its staining properties. In addition to turmeric, there are numerous other herbs and essential oils that are important in slowing down the growth of hair. (20).

**Herbal Cosmetics:** The term 'Herbal cosmetic' is as the natural cosmetic which is formulated, using different cosmetic ingredients, to form the base in which one or more herbs or their extracts are added to enhance the effect.



- **Shaving preparation properties:**

- Easy and rapid production of a copious lather
- Resistance to rapid drying
- Freedom from the possibility of skin irritation (mucosa of eye, nose etc)
- Rapid softening of beard and sufficient viscosity to hold the hair erect to facilitate cutting the individual hair
- Lubrication to make the razor glide over the face more easily and painlessly

- **Properties of shaving preparations:**

- Non-irritant to skin
- Retain moisture during the period it remains on the face
- Soften the beard so that hair cuts easily
- Provide sufficient lubricity so that razor glides along the face
- Sufficient viscosity
- Stable over wide temperature range
- Non-corrosive to the containers
- If used with brush, able to produce sufficient lather rapidly.

- **Qualities of good shaving cream:**

- Non-toxic
- Non-irritating
- Smooth and soft
- Free from lumps
- Produce rich lather
- Good wetting properties
- Economical
- The lather produces should not dry on face so rapidly
- Satisfactory consistency according to temperature
- Non corrosive to razor blade and easily rinsed from razor and face

- **Advantages:**

- Source of nutrients, antioxidants, vitamins and minerals.
- Free from all the harmful synthetic chemicals.
- Safe to use.
- Possess desirable physiological activities, such as appearance, skin healing, smoothening, enhancing and conditioning properties.
- Suitable for all skin types.
- Availability of wide range of products for selection and choice.
- Easily available in affordable price range.
- It can arrest bleeding caused by shaving and helps your facial skin heal faster.
- It has a soothing effect on the skin.

- **Disadvantages:**

- It cannot protect the skin against malignancy growth

- It kills the cell of the skin.
- Causes rapid growth of hairs even after been shaved.

### **Herbal Plants with Shaving Action:**

Curcuma longa belongs to the Zingiberaceae ginger family and is a rhizomatous herbaceous perennial plant native to tropical South Asia. Turmeric's volatile oil contains turmerone along with additional colouring chemicals called curcuminoids. Natural antioxidants, curcuminoids include curcumin demethoxycurcumin, 5'-methoxycurcumin, and dihydrocurcumin (21,22). Spices like turmeric are used to treat skin cancer, smallpox, rheumatoid arthritis, chronic anterior uveitis, and conjunctivitis. In addition, it is utilised to treat liver issues, chicken pox, wound healing, and UTIs (23). Along with stomach discomfort and distension, it is also used to treat colic, menstrual difficulties, flatulence, jaundice, and digestive disorders (24).

#### **1. Thorowax root-**



**Fig 1. Thorowax root**

The root of *Bupleurum falcatum* L., a member of the Umbelliferae family, is known as the "Bupleuri Radix". Both "Bei chaihu," or Northern Chinese Thorowax Root, and "Nan chaihu," or dried *Bupleurum scorzonerifolium* roots, are utilised in traditional medicine. Radix bupleuri has long been used in Chinese medicine to treat ptosis, soothe the liver, and reduce fever (25).

The United States patent claims that thorowax root exhibits shaving cream activity (26).

#### **2. Neem-**



**Fig 2. Neem**

Neem (*Azadirachta indica*) is an evergreen tree native to India. Neem extract has long been used in Ayurvedic medicine to treat conditions including diabetes, asthma, constipation, coughing, stomach ulcers, indigestion, periodontal disease, and urinary tract infections. Neem is said to help with inflammation, liver health, pain relief, eye health, immune system stimulation, and heart disease prevention. You may get neem as a tablet, tincture, powder, cream, oil, or mouthwash. On the scalp, neem oil is used to treat dandruff and acne. It also promotes collagen synthesis, lessens scars, heals wounds, and helps cure dry skin and wrinkles. One takes neem leaf extract orally. In some situations, the neem tree's bark, flowers, and fruit are all utilised medicinally (27).

### 3. Indian nettle-



**Fig 3. Indian nettle**

In Tamil, the herb is called Kuppaimeni. The scientific name for Kuppaimeni, a plant of the *Acalypha* genus of the Euphorbiaceae family, is *Acalypha Indica*. Other names for this plant include Haritamanjari in Sanskrit, Kuppameni in Malayalam, Kuppi Chettu in Telugu, Khajoti in Marathi, Herbechate in French, Kuppameniya in Sinhalese, and Mukhtajhuri in Bengali. The plant's bioactive components, such as 9-tricosene, Phytol, MOME inositol, Dihydroactinidiolide, Loliolide, Docosanol, 1-Eicosanal, 1-Triacontanol, Octocosanal, and Tricosanal, are responsible for many of the remarkable medical uses of kuppaimeni. Kuppaimeni is rich in phenolic chemicals, alkaloids, catechols, flavonoids, phenolic chemicals, saponins, and steroids. Among them are loliolide, dihydroactinidiolide, and phytol. Indian nettle has traditionally been used as a shaving cream (28).

### 4. Tanner's cassia-



**Fig 4. Tanner's cassia**

The leguminous tree *Senna auriculata* is a member of the subfamily Caesalpinioideae. Along with the English name avaram *Senna*, other local names for this plant include matura tea tree, avaram, and ranawara. It is the state flower of Telangana. It grows in the dry areas of Sri Lanka and India. It is typical in the dry zone and along the coast of Sri Lanka. Avaram, also known as *Senna*, is a shrub with numerous branches and 8.8 to 12.5 cm long, dull-green leaves that alternately occur in large, tightly spaced clusters, accompanied with cinnamon-brown bark. It bears large, bisexual blooms that are about 5 cm long and have a vivid yellow colour. The fruit is around 7.5 to 11 cm long and 1.5 cm diameter, and it looks like a bean with 20–25 seeds within. It's thin and flat, with a hint of brown colour. Leprosy, asthma, joint discomfort, diabetes, eye disorders, skin infections, gonorrhoea, diabetes, and gout are among the conditions for which it has therapeutic uses. *Senna auriculata* contains flavonoids, proanthocyanisidin, butanol, anthraquinones, and tannins. In terms of appearance, it evens out skin tone and enhances complexion. Regular use of Tanner's cassia eliminates black spots and leaves skin flawless (29).

#### Composition of Herbal Shaving Cream:

**A. pH stabilizer-** When choosing cosmetics, the pH scale and a substance's acidity or alkalinity are crucial considerations. Our skin can only function at its peak when its pH level is at 5.5. The skin becomes less acidic as a result of this shift in pH (30).

#### Examples:

1. *Aloe vera (Aloe barbadensis)*: Family: *Asphodelaceae(Liliaceae)*



**Fig 5. Aloe vera**

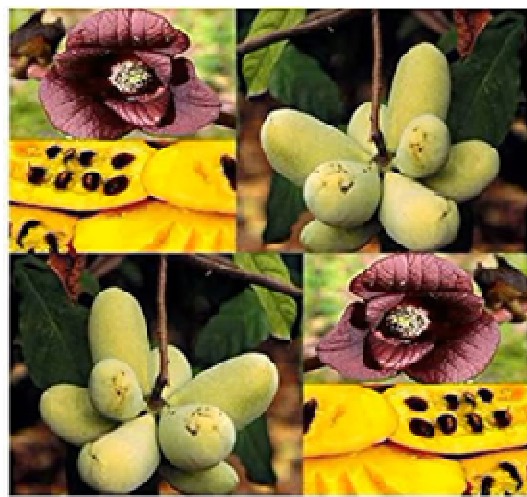
2. *Vitamin C (Ascorbic Acid)*: A water soluble vitamin found in citrus fruits and green vegetables.
3. Cider vinegar, or apple cider vinegar.

It is a fermented vinegar made from apple juice. Crushing apples and then pressing out the juice is how it's made. Yeast and bacteria are added to the liquid to start the alcoholic fermentation process, which turns the sugar into alcohol. In a second fermentation step, the alcohol is converted to vinegar by acetic acid-forming bacteria (*Acetobacter* species). Acetic and malic acids combine to give vinegar its sour taste (31).

**B. Enzymes as anti-free radicals:** Skin protection is one area where topical enzyme treatment has demonstrated substantial advantages. A variety of materials exhibit remarkable stability in terms of appearance. These are enzymes with the capacity to bind free radicals, so averting skin damage brought on by germs, smoke, radiation, pollution, and other potentially dangerous substances. Here, the skin's surface can be effectively treated by the enzyme (32).

**Examples:**

1. *Paw paw extract (Asimina triloba)*; Family: *Annonaceae*



**Fig 6. Asimina triloba**

2. *Passion fruit extract (Passiflora edulis)*; Family: *Passifloraceae*

**C. Humectants-** Chemicals known as humectants are frequently used in the food and cosmetics industries to increase the moisture content of final goods, such as packaged, baked cakes and face moisturisers. For instance, glycerin's humectant qualities are utilised by both sectors (33).

**Examples:** 1. *Honey (Apis mellifera)*; Family: *Apidae*



**Fig 7. Honey**

**D. Perfumes-** Complex chemicals known as natural scents are created when natural aromatics from plants are extracted without changing their chemical makeup. Naturally produced perfumes contain a variety of ingredients, including distillates, fractions, oleoresins, essential oils, and isolates (34).

**Examples:** 1. *Rose oil (Rosa Pisocarpa)*; Family: *Rosaceae*.



**Fig 8. Rose oil**

2. *Rosemary (Salvia rosmarinus)*; Family: *Lamiaceae*
3. *Lavender (Lavandula)*; Family: *Lamiaceae*



**E. Thickening agents-** In cosmetic formulation, thickening agents are often the most crucial component since they maximise the stability of the product's rheological qualities while simultaneously controlling its viscosity (35).

**Examples:** 1. Corn Starch (*Foeniculum Vulgare*); Family: *Poaceae*



**Fig 9. Corn starch**

2. Guar gum (*Cyamopsis tetragonoloba*); Family: *Fabaceae*

3. Gelatin Gelatin is a product obtained by the partial hydrolysis of collagen, derived from the skin, white connective tissue, tendons, ligament and bones of ox (*Bos taurus Linn.*), sheep (*Ovisaries Linn.*), etc. Family: *Bovidae* (36).

**Traditional Healer's Treatment-** Non-codified medications state that Indian nettle leaf powder or extract, neem leaf powder or extract, and turmeric powder are combined to make a paste, which is applied as a mask for ten to fifteen minutes every day before taking a bath. When this therapy is administered consistently for 30 to 45 days, the hair naturally weakens at the root and begins to come out; however, early initiation of the treatment yields better results. Therefore, mature hairs in the hands, armpits, and legs do not significantly affect this paste (37).

**Hair Removal Processes Five types of hair removal processes:**

1. **Epilation:** The process of epilation involves shaving off all hair, including the hair under the skin. It has been demonstrated that successful epilation techniques include waxing, sugaring, lasers, threading, epilation devices, and plucking with tweezers.
  2. **Waxing:** Waxing is sometimes called semipermanent hair removal since it removes hair at the root. Almost any area of the body, including the brows, face, arms, legs, back, belly, and feet, can be waxed.
- **Soft warm wax:** Soft warm waxing is another name for cream- or resin-based strip waxing.

Before applying, it is gently warmed, then a tiny coating is applied to the skin, pushed in place with a cotton strip, and finally removed, leaving the hairs in place. Broader regions, such the arms and legs, are typically coated with spreadable wax. Soft wax ought to be applied once per region as it sticks to the skin's cells.

- **Hard wax:** Since solidified wax has the same properties as a strip, it is also referred to as strip-free wax. Hard wax works effectively on areas where hair is finer and thinner as well as thicker. Wax is applied warm and hardens as it cools. A little amount of pre-epilation oil is applied to the skin to protect it. While soft wax clings to the skin, shrink-wraps the hairs as it hardens, making it suitable for smaller, more delicate regions like the lip, nose, and underarms. On larger areas, however, it might cause hair breaking towards the end of the draw. (38)
- **Cold soft wax:** Cold wax is a kind of wax that comes in strips and is applied directly to the skin. While cold soft wax is less effective and leaves fewer hairs on the skin than hot wax, it has the advantage of not burning the skin. It has also been shown that removing cold wax is more uncomfortable than wax that has been heated.
- **Wax strips with the right amount of cold soft wax:** Ready-to-use wax strips already have the proper quantity of cool, soft wax adhered to them. This approach is the easiest to use and least messy, thus it's advised for novices. Using more than one strip per location is possible, contingent on the amount of hair being removed. Because it requires less preparation and has fewer moving components during manufacturing, this is a more convenient option for travelling.
- **Fruit wax:** It's less like hard wax since it contains fruit extracts and enzymes from papaya, strawberry, pomegranate, cranberry, and plum, which all have additional skin benefits. The gentle wax provides vitamins and antioxidants to the skin while eliminating hair. Fruit wax doesn't leave lumps, rashes, or markings on delicate skin, therefore it's better for that. However, before using fruit wax, be sure to check the contents because some fruits may cause allergic responses. Therefore, it's crucial to verify the ingredients one more time before usage.
- **Chocolate wax:** Chocolate wax is regarded as one of the least painful varieties and is gentle on the skin. It has a calming effect in addition to hydrating the skin. Nutritious components including glycerin, vitamin E, sunflower, soybean, and almond oils, as well as other

minerals, are also included. Naturally, cocoa has a high antioxidant content and functions as an emollient in wax. Because almond oil contains anti-inflammatory properties, it adds even more benefits to the wax. There are two types of chocolate wax: soft and firm. Both should be applied warm. Given its low melting point, burns are unlikely to result from it.

3. **Threading:** When threading, unwanted hair is pulled out from the root by twisting and rolling a thin cotton or polyester thread over the affected region. Threading is superior to tweezing because it can remove small rows of hair at a time, while tweezing can only remove a single hair at a time, which results in more pain and irritability. (39)
4. **Shaving:** Shaving is the process of shaving off body hair to the level of the skin using a razor or other bladed tool. Shaving is a common method used by men to get rid of facial hair and by women to get rid of hair on their legs and underarms. (40).

**Shaving cream:** Shaving creams are treatments that remove hair through a chemical breakdown process. Shaving creams work by breaking down the disulphide bonds that hold hair's protein chains together and give it strength. Creams that remove hair from the skin without causing irritation are known as shaving creams.

**Mechanism of Shaving Cream:** Disulfide linkages are broken down by hair removal treatments; calcium thioglycolate is frequently utilised in this procedure. The thioglycolate salt breaks down the disulfide bonds in keratin, which results in the disintegration of the hair's structure. Once these ties are dissolved, the hair becomes fragile and is easily rubbed and cleaned off the skin. Thioglycolate, the key ingredient in hair removal creams, is often present in amounts of 5% along with a variety of other compounds. Creams often contain metal hydroxides such as NaOH and Ca(OH)<sub>2</sub> to assist adjust pH levels so the active acid can react with cysteine residues in the hair. A large quantity of water is also present in hair removal creams; this water is utilised as a solvent to dilute and dissolve all of the ingredients, creating a smooth, application-friendly cream. The cream also contains emollients to help calm the skin after application and shield it from the harsher chemicals in the product. The most common emollients are oils and silicones, which aid in skin healing following chemical hair removal.

#### Method for preparation of cream:

##### 1. Trituration method-

- Used for finely divided insoluble powder particles or liquids

- Insoluble powders are added by geometric dilution
- Liquids are added by making well in centre
- Air pocket formation avoided
- Mortar and pestle used when we have large quantities.
- Involved use of glass slab when small quantities are used

##### 2. Levigation-

- Incorporation of insoluble coarse particles
- Insoluble coarse powder is rubbed with molten base or liquid or semisolid base
- Also known as wet grinding

##### 3. Fusion method-

- The fusion method is followed when the drugs and other solid are soluble in the ointment bases.
- The base is liquefied and the soluble components are dissolved in the molten base.
- The congeal mixture is then speculated or triturated to obtain a smooth texture.
- Care is taken to avoid thermal degradation of the base or other components during the fusion process.

**Evaluation of cream:** The evaluation of herbal cream was following.

**1. Physical evaluation-** The following physical characteristics were used to assess the herbal cream formulation further. Colour, smell, consistency, and formulation state (41).

- A. **Color:** The color of the cream was observed by visual examination.
- B. **Odor:** The odor of cream was determined qualitatively.
- C. **Consistency:** The formulation was tested by physically rubbing cream on the hand. The cream's consistency is silky. After using the cream, the skin's surface did not get oily.
- D. **State:** The state of cream was examined visually. The cream having a semisolid state.

**2. Particle Size and Density:** Particle measurements, including diameter, area, and spherical volume, were made using a microscope equipped with a camera and software, and the observations were made with naked eyes on a white background. (42)

**3. Viscosity:** The Brookfield Viscometer was utilised to determine the viscosity of the cream formulation. The viscometer's matching dial reading was recorded when a spindle speed of 10 rpm at 25°C was used.



4. **Adhesion force:** Mechanical parameters were determined by Texture Analyzer.
5. **pH:** A digital pH metre was used to measure the produced herbal cream's pH. After making the cream solution with 100 millilitres of distilled water, it was left for two hours. The electrode was submerged in cream solution, and the pH metre was used to record the data. The solution's pH was measured three times, and the average result was computed.
6. **Spreadability:** The cream's spreadability was assessed by sandwiching a sample between two slides and compressing it to a consistent thickness using a certain weight for a predetermined amount of time. Spreadability was defined as the amount of time needed to divide the two slides into independent halves. Better spreadability was demonstrated by a shorter separation period between the two slides. Spreadability was calculated by the following formula,

$$\text{Spreadability}(S) = \frac{\text{weight tide to upper slide}(M) \times \text{Length of glass slide}(L)}{\text{Time taken to separate the slides}(T)}$$

Where S= Spreadability M= Weight tide to the upper slide L= Length of glass slide T= Time taken to separate the slides (43).

7. **Saponification value:** 2gm of substance refluxed with 25ml of 0.5 N alcoholic KOH for 30min, to this 1ml of phenolphthalein added and titrated immediately, with 0.5N HCL, note the reading as 'a'. Repeat the operation omitting the substance being examined. Note the reading as 'b'.

$$\text{Saponification value} = \frac{(B - A) \times 28.05}{W}$$

Were,

B = ml of HCL used in blank titration

A = ml of 0.5N HCL solution used for titration

w = weight of substance in gram.

8. **Acid value:** Accurately weigh out 50ml of equal parts alcohol and solvent ether, dissolve 10g of the material in it. The flask is then connected to a reflux condenser and heated gradually until the material is completely dissolved. 1ml of phenolphthalein is then added and titrated with 0.1N NaOH until a faint pink colour appears after 30 seconds of shaking.

$$\text{Acid value} = \frac{n \times 5.61}{w}$$

Were,

n = the no. of ml of 0.1 N KOH solution.

w = the weight of substance in gram.

9. **Homogeneity:** Both touch and visual inspection were used to assess the uniformity of the formulation.
  10. **Removal:** By using tap water to wash the area where the creams were applied, the creams' ease of removal was evaluated.
  11. **Dye test:** The cream is combined with the scarlet dye. Under a microscope, observe a drop of cream that has been placed on a slide and covered with a cover slip. It is an o/w type if the dispersed globule appears red and the ground appears colourless; w/o type creams exhibit the opposite characteristic.
  12. **After feel:** Following the application of a predetermined amount of cream, the degree of emolliency, slipperiness, and residue were assessed.
  13. **Type of smear:** Following cream application, the kind of film or smear that developed on the skin was examined.
  14. **Irritancy study:** On the left dorsal surface, mark a 1 square centimetre region. The designated area was covered with the cream, and the time was recorded. Checks for erythema, edoema, and irritability were made at regular intervals for up to 24 hours. (44, 45)
  15. **Washability:** After applying the formulation to the skin, the ease of washing with water was examined.
  16. **Stability Study:** Stability study is conducted for formulation according to ICH guidelines.
- Stability testing of cosmetics-** The goal of the stability test is to make sure that, under the right

storage circumstances, the new or changed product satisfies the specified requirements for physical, chemical, and microbiological quality as well as functionality and aesthetics. Due to the relatively short development cycle of cosmetic goods, it is necessary for each company to create a stability testing programme that both makes financial sense and efficiently completes the necessary tests. It is not possible to recommend "standard" stability testing due to the vast range of cosmetic goods. In order to evaluate the stability of their goods, manufacturers need to have the freedom to modify test procedures and a solid scientific foundation. As a result, unique testing might be created to handle novel or uncommon technologies or to modify them for longer-lasting goods. Stability testing should cover the stability of the product under suitable storage, transit, and usage settings. It can be done in real-time or at a faster pace. There are essentially three types of stability testing: microbiological stability tests, which determine the extent of bacterial, mould, and yeast contamination; physical and chemical integrity tests, which assess colour, smell/odor, pH, viscosity, texture, flow, and emulsion stability (signs of separation); and package durability tests, which determine the impact of packaging on the product contained in the package. (46)

**A. Physical / chemical stability tests:** - They outline methods for forecasting how well makeup will endure typical conditions like intense heat and light. Manufacturers often base their decision to carry out these specific tests on the anticipated delivery, storage, and usage conditions of a certain cosmetic product as well as its susceptibility. Typical test techniques consist of:

- **Fluctuations in temperature** - The majority of businesses test at temperatures between 45°C (113F) and 37°C (98F). The product should last two years at room temperature if it is kept at 45°C for three months and its stability is adequate. The product must, of course, be kept in storage for a year at 25°C (77 f). Most goods have great stability at 4°C (39F), which is an appropriate control temperature. Additionally, the product needs to be kept for three months at -10°C (14F).
- **Cycle testing**- Three cycles of temperature testing between -10°C (14°F) and 25°C (77°F) are required of the product. For two days, place the product between -10°C and room temperature (25°C). One cycle is finished with this. In the event that the product undergoes three cycles, its stability may be guaranteed. The five-cycle test, which runs from -10°C to 45°C, is considerably more rigorous. This makes the emulsions tighter,

and if the test is successful, it demonstrates that your product is indeed stable.

- **Centrifuge testing**- A layer of oil droplets forms at the top of the emulsion when the dispersed phase, or oil-in-water emulsion, separates and rises to the top. We term this phenomena triumph. One of the earliest indicators of approaching emulsion instability is foaming, which needs to be addressed carefully. Centrifugation is a useful test technique to forecast the development of cream. After warming the emulsion to 50°C (122°F), centrifuge it for 30 minutes at 3000 rpm. Next, look for indications of cream forming in the final product. For items like liquid or cream cosmetics that include any powder, this test is a must.
  - **Light exposure testing** - Packaging and mixtures can both be UV radiation sensitive. Every product needs to be arranged in a window, ideally in a broad-spectrum light box, with the actual package and glasses on display. As a control, place a second glass jar in the window that is wrapped with aluminium foil. We notice significant colour changes in products and even in packaging far too frequently. Sensitive chemicals or fragrances may be the cause of this discolouration. Typically, one UV absorber is sufficient.
  - **Mechanical impact test** - Mechanical impact studies are frequently carried out to ascertain whether or not conveyors might harm cosmetic products and their packaging. It is possible to ascertain if powdered or granular items are mixing (dispersing) using vibration testing, such as with a pallet shaker.
- B. Microbiological stability tests:** - Microbial contamination often arises from two sources: the consumer's usage of cosmetics during use and during manufacture and filling. As soon as the customer opens the cosmetic unit, their hands and body come into continual touch with the cosmetic product, causing microbial contamination. In order to preserve product quality, provide sanitary and superior processing, and guarantee the microbiological safety of cosmetics for consumers, microbial preservation of cosmetics is crucial. Microbiological contamination of cosmetic items can cause harm or drastically lower the intended quality, even though cases of microbial illnesses in customers have not been documented. As such, before a batch of completed product is released into the market, a standard microbiological analysis must be performed. As far as possible pathogens go, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, and *Candida albicans* are thought to be the most

significant. There cannot be any traces of these particular possible pathogens in 0.1 grammes or 0.1 ml of cosmetic product. Records must be kept of the parameters examined, the standards and procedures applied, and the outcomes unique to each batch.

- **Screening tests-** Several simple test kits (such as dip glasses or plate counters) are available on the market that yield fast, semi-quantitative findings without requiring substantial contamination of the cosmetic product. Simple sample procedures and outcome evaluation techniques make them suitable for staff members without formal expertise in microbiology.
- **Quantitative testing-** The precise concentration of germs, mould, and yeast in a cosmetic product is ascertained by quantitative testing. These tests are limited to use in specialised microbiological testing facilities due to their complexity and labor-intensive nature. The most common techniques for separating microorganisms from cosmetics are enrichment and direct colonisation.
- C. Packaging stability tests:** - The interaction between the product, the packaging, and the external environment can have a direct impact on the stability of the final product. For instance, product components could chemically react with the container or be absorbed into it. Furthermore, the product may not be completely shielded by the container from the harmful effects of ambient oxygen and/or water vapour, or the product's volatile chemicals (such as fragrances) may seep through the container.
- **Glass tests-** The most inert substance is glass, which has no reaction whatsoever with makeup. As a result, every test needs to be carried out inside the container in vitro. In this manner, you may ascertain if the product's failure stems from the packaging or the recipe.
- **Weight loss tests-** One of the most crucial tests to carry out is evaluating weight loss in order to calculate evaporation (water loss via the tank wall or sluices). This test is conducted for three months at room temperature and 45°C (113 F), with the cap tightened to 100% of the intended torque (in the actual packing). For the package to be accepted, the amount of weight lost every month cannot be more than 1%.
- **Leaking tests-** It would be wise to examine the box in various orientations (upright, sideways, upside down, etc.) to check for leaks, particularly when shipment.

## Evaluation of Pharmacological Activity of Shaving cream: (47)

- 1. Hair Growth inhibition test using Mice:** The animals in this model will be split into two groups, each consisting of five individuals. To prevent skin irritation, each mice back shall be shaved by 2×4 cm using shaving cream. The test ingredient (polyherbal shaving cream) will be administered to the shaven area starting the next day and left there for three weeks. For the control group, only 50% methanol will be used as a solvent. Two weeks later, a fixed magnification photo of the shaved area will be taken in order to track the recovery of hair.
- 2. Evaluation of test on hair removal resistance on the back of mice:** The animals in this model will be split into two groups, each consisting of five individuals. To prevent skin irritation, each mice back shall be shaved by 2×4 cm using shaving cream. One week prior to shaving, each test material (polyherbal shaving cream) will be administered to the shaven area.

**Toxicity studies:** Shaving cream was applied topically to the animals. Until the trials were over, the animals were constantly monitored. The characteristics that were noted were redness, swelling, itching, and/or topical damage.

### Conclusion:

The capacity to use plants and herbal remedies in daily life has significantly increased. Phytoconstituents found in herbal plants may have therapeutic and anti-shaving cream effects. One benefit of herbal shaving creams is that people can get them without a prescription from a doctor. Compared to other chemically pricey lotions, these creams are also more affordable. When used in the shower, they need very little cleanup. Shaving creams don't always smell like harsh chemicals, but these days, the majority of high-quality hair removal solutions have pleasant scents. These lotions exfoliate the skin, remove hair and dead skin cells, and lessen the chance of ingrown hairs. The main disadvantage of chemical shaving creams is their chemical makeup, which is one of their many negative aspects. Shaving cream lotions can irritate skin since they include chemicals that break down hair. Because shaving creams don't get rid of undesirable hair at its source, they also cause it to come back much faster than other hair removal methods. Therefore, it is preferable to use natural herbal shaving cream rather than chemical shaving cream because the former has no negative effects on the skin. There are several herbs that may remove hair from the root without irritating the skin. More investigation and optimisation studies are



needed for herbal shaving cream in order to maximise its market share and maintain environmental friendliness.

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