



FORMULATION AND EVALUATION HAIR REMOVAL CREAM

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ABSTRACT

The market for hair removal products in the cosmetics and personal care sectors is expanding. Unwanted hair development is a common issue for teenage girls and women and also young boys. Because of their great efficacy, safety, and lack of negative side effects, herbal depilatories are a better option than pharmaceutical ones, as this study emphasizes. Other hair removal techniques are reviewed, along with the content of herbal lotions containing depilatory herbs. Cosmetic products called depilatories are designed to remove hair from the skin. The active ingredients in most chemical depilators are thioglycolic acid salts. Thioglycolic acid, Ceto stearyl alcohol, calcium hydroxide, vitamin E, bees wax, liquid paraffin, and the required amount of coconut oil are needed to make the hair removal cream. The formulation of the hair removal cream was assessed for pH and viscosity. The outcomes highlighted the exceptional qualities of the F3 formulation.

Keywords: - *Hair removal cream, evaluation test, uses of herbal ingredients.*

1. INTRODUCTION

Hair the unique, thread-like protrusions of the epidermis that make up an animal's coat, are called hair and are only seen on mammals. To varied degrees, all mammals have hair. Mature whales, elephants and rhinoceroses only have small bristles for body hair. The bulk of other mammals have enough hair to form thick coats, yet humans are among the mammals with the least amount of hair. Humans have a variety of various hair kinds. Every aspect of the body is covered in vellus, with the exception of a few spots, including the undersides of the fingers and toes, the soles of the feet, and the palms of the hands. The hairs on the scalp, brows, and eyelashes differ from these other types and begin to grow quite early in childhood. The average scalp has between 100,000 and 150,000 hairs, which is where hair is often densest and longest. About 0.5 inches (13 mm) of human hair grow each month.[1]

The formulation of hair removal creams involves a careful balance of active ingredients, stabilizers, and skin-soothing agents to ensure both efficacy and safety. Key components typically include alkaline chemicals like calcium thioglycolate or potassium hydroxide, which facilitate the breakdown of hair. Additionally, the inclusion of moisturizers, fragrances, and anti-irritants aims to enhance user experience and minimize potential side effects such as skin irritation or allergic reactions.

1. LITRATURE REVIEW

Gauri Beldar etal 2024: The market for hair removal products in the cosmetics and personal care sectors is expanding. Unwanted hair development is a common issue for teenage girls and women. Because of their great efficacy, safety, and lack of negative side effects, herbal depilatories are a better option than pharmaceutical ones, as this study emphasizes. Other hair removal techniques are reviewed, along with the content of herbal lotions containing depilatory herbs.

Barbara Buffol etal 2013: Hair is a unique character of mammals and has several functions, from protection of the skin to sexual and social communication. In literature, there are various studies about hair that take into consideration different aspects within many fields of science, including biology, dermatology, cosmetics, forensic sciences, and medicine.

Y. D. Pardeshi etal 2024: This research paper aims to develop a formulation of herbal soap using *Tridax procumbens* extract known for its multipurpose activity. The study includes the preparation of the herbal soap by incorporating different concentrations of *Tridax procumbens* extract and evaluating its physicochemical properties such as pH, foam ability, and stability. Additionally, the antimicrobial and antioxidant properties of the formulated herbal soap were assessed using various microbiological and biochemical assays.

Ms. Samiksha Gupta etal 2023: The aim of this review to understand cosmetics and their associated adverse effect. The word 'cosmetics' is taken from a Greek word "cosmeticos" which means to adorn. Since early days materials used for beautification or improvement of appearance comes under the category of cosmetics. People want to look beautiful and the concept of cosmetics is as old as mankind and civilization.

Olyad Erba Urgessa et al 2019: This study, therefore, aimed to extract papain from papaya fruit latex and use it for transforming raw trimming to gelatin. Extraction and purification were carried out using Three Phase Partitioning (TPP). Protein content and protease activity were determined using lowry and casein hydrolysis method, respectively.

3. AIM AND OBJECTIVES

AIM

The primary aim of this research paper is to investigate the effects and efficacy of hair removal creams, focusing on their chemical composition, user safety, and dermatological impact. The study aims to provide a comprehensive analysis of how these products interact with human skin, the potential side effects, and the overall satisfaction and perception of users.

OBJECTIVES

Chemical Composition Analysis:

- To identify and analyze the key chemical ingredients present in various commercial hair removal creams.

Efficacy Evaluation:

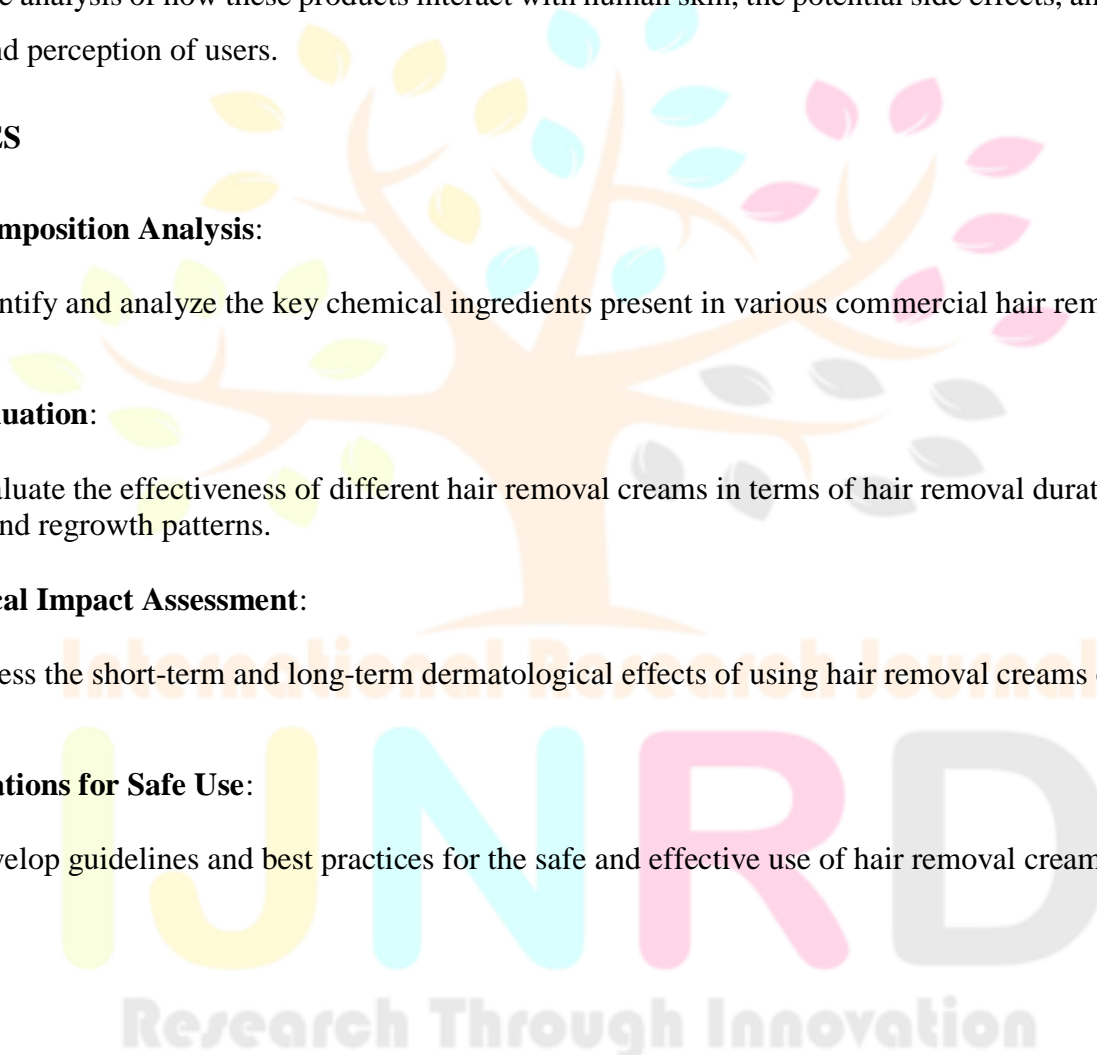
- To evaluate the effectiveness of different hair removal creams in terms of hair removal duration, smoothness, and regrowth patterns.

Dermatological Impact Assessment:

- To assess the short-term and long-term dermatological effects of using hair removal creams on different skin types.

Recommendations for Safe Use:

- To develop guidelines and best practices for the safe and effective use of hair removal creams.



4. PLAN OF WORK

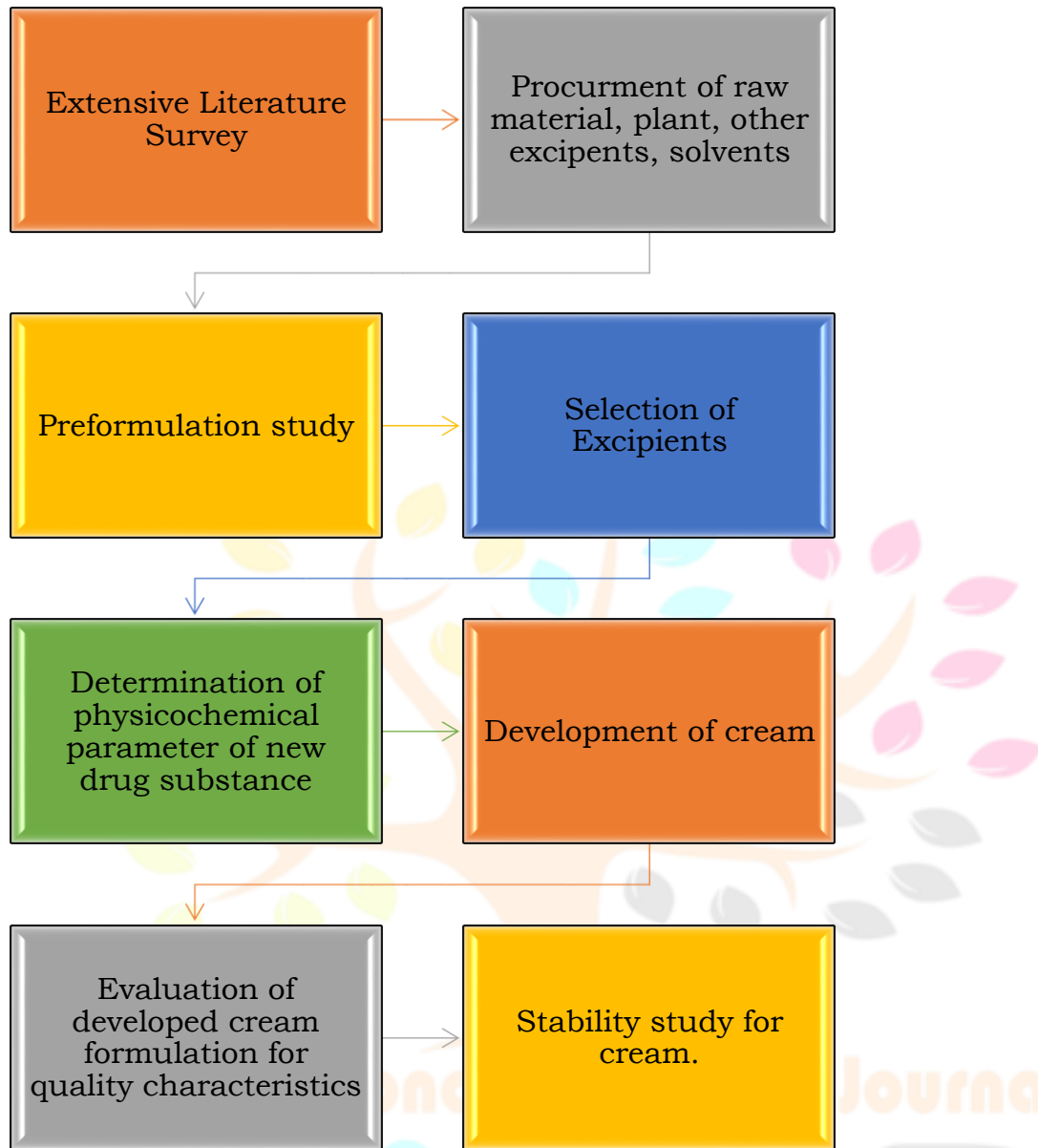


Figure 1: Plan of work.

3. Anatomy Of Skin:

The skin consists of three primary layers: the epidermis, dermis, and hypodermis. Each layer has its own unique structure and function.

Epidermis:

The normal epidermis is a terminally differentiated, stratified squamous epithelium. The major cell, making up 95% of the total, is the keratinocyte, which moves progressively from attachment to the epidermal basement membrane towards the skin surface, forming several well-defined layers during its transit. Thus, on simple morphological grounds, the epidermis can be divided into four distinct layers: stratum basal or stratum germinativum, stratum spinosum, stratum granulosum and stratum corneum. The term Malpighian layer includes both the basal and spinous cells. Other cells resident within the epidermis includes melanocytes, Langerhans' cells and Merkel cells. [2,3]

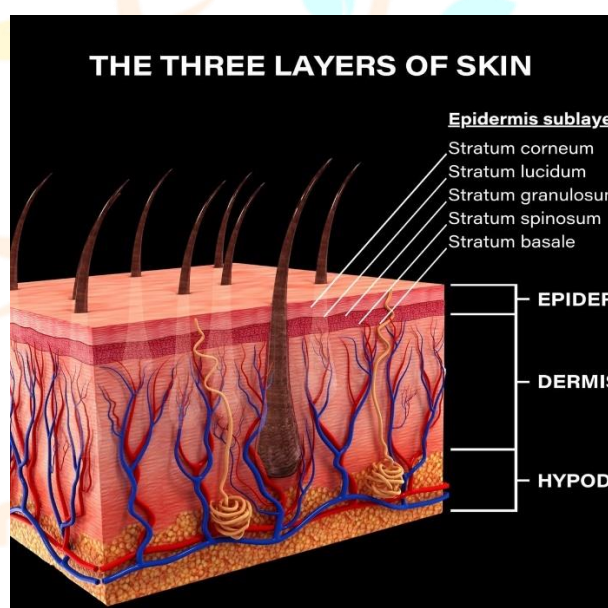


Figure 2: Anatomy Of Skin

Dermis:

It was at one time believed that the mesenchymal cells forming the dermis came from the ventrolateral part of the somite, which for that reason was named the dermatome. Although some cells may migrate from the dermatome and take part in the formation of the skin, most of the dermis is formed by mesenchymal cells that migrate from other mesodermal areas. These mesenchymal cells give rise to the whole range of blood and connective tissue cells, including the fibroblasts and mast cells of the dermis and the fat cells of the subcutis. Nevertheless, a new type of stem cell from the dermis, called skin-derived precursor (SKP) cells, has been identified [4].

Hypodermis: The hypodermis is the deepest layer of the skin and is composed of adipose tissue and connective tissue. It helps to insulate the body and provides a cushion for the underlying tissues.

4. Anatomy of Hair:

Macroscopic and microscopic structures of the hair. Hair is a derivative of the epidermis. Externally, hair is thin, flexible tubes of dead, fully keratinized epithelial cells, whereas inside the skin, it is a part of individual living hair follicles, cylindrical epithelial down growths into the dermis, and subcutaneous fat, which enlarge at the base into the hair bulb surrounding the mesenchymal derived dermal papilla.[5]

From a macrostructural point of view, hair varies in length, diameter, color, and cross-sectional shape among the different ethnic groups and among singular individuals. Hair has two separate structures: the follicle in the skin and the hair shaft, which is visible on the body surface. The hair shaft consists of a cortex and cuticle cells, and in some cases, a medulla in the central region. The medulla is the central part of the hair, whereas the cortex, which represents the majority of the hair fiber composition and plays an important role in the physical and mechanical properties of hair, is the peripheral part and is made up of approximately 50–60% of microfibril's, which consist of rods of microfibrils embedded into a matrix.[6]



Figure3: Hair Anatomy

The hair shaft cuticle covers the hair from the root to the tip of the epidermis and is formed by flat overlapping cells.[7]

Each cuticle cell is generally 0.3 - 0.5 cm thick, and its visible length is about 50 cm; it consists of various sub lamellar structures (the epicuticle, A-layer, exocuticle, endocuticle, and inner layer) and the cell membrane complex.[7]

The integrity and properties of the cuticle layer have an important role in protecting the cortex from physical and chemical in maintaining the hair in a clean and disintegrated state and have a great impact on its appearance.[8]

The follicle is the essential growth structure of hair. From the outermost aspect of the follicle, the histological structures are:

1] The outer root sheath (ORS), which has been identified as a reservoir of multipotent stem cells, i.e., keratinocyte and melanocyte stem cells, and contains keratinocytes. The ORS forms a distinct bulge area between the insertion of the arrector pili muscle and duct of the sebaceous gland.[9]

Adjoining the ORS on the dermal side is a basket-like arrangement of two orthogonally arrayed layers of collagen fibers, the glassy layer¹⁴ known as the dermal sheet.[10]

2] The inner root sheath (IRS) consists of three layers: Henle's layer, Huxley's layer, and cuticle layer. The IRS cuticle layer adjoins the cuticle of the hair shaft, anchoring the hair shaft to the follicle. IRS cells produce keratins and trichohyalin that serve as an intracellular cement giving strength to the IRS to support and mold the growing hair shaft, as well as guide its upward movement. The IRS separates the hair shaft from the ORS.

The hair bulb is the portion of the follicle which actively produces the hair. It encloses the follicular dermal papilla, dermal papilla cells, mucopolysaccharide-rich stroma, nerve fibers, and a single capillary loop. The follicular papilla is believed to be one of the most important drivers to instruct the hair follicle to grow and form a particularly sized and pigmented hair shaft; moreover, it is an essential source of growth factors (keratinocyte growth factor, bone morphogenetic protein, hepatocyte growth factor, insulin-like growth factor, stem cell factor), critical for hair growth and melanogenesis.[11]

The hair bulb can be divided into two regions: a lower region of undifferentiated cells and an upper region in which the cells became differentiated. A line across the widest part of the papilla separates the two regions at the critical level (Auber's line). Below the Auber's line lies the matrix, or germination center of the follicle, where every cell is mitotically active, and the dermal papilla. From the matrix, cells move to the upper part of the bulb, where they increase in volume and become elongated vertically.[5]

The upper bulb can be divided into four parts:

(i) Above the critical level, in the wide portion of the bulb, is the pre-elongation region, where the cells align themselves vertically and become slightly larger; (ii) above this region, where the diameter of the bulb is narrower and the cells become conspicuously elongated, is the cellular elongation region; (iii) immediately above, in the cortical pre-keratinization region, distinct fine fibers or fibrils stainable with basic dyes can be seen; and (iv) further up is the keratogenous zone where the cells become hyalinized and the keratin of the hair is stabilized. Depending upon the length of the follicle, the keratogenous zone terminates at approximately one-third of the way between the tip of the papilla and the surface of the skin.

Above the bulb, the upper hair follicle is composed of two anatomical parts: the infundibulum and the isthmus. The infundibulum is a funnel-shaped structure filled with sebum, a product of the sebaceous gland; it extends from the surface of the skin to the sebaceous duct, serves as a reservoir, and provides an interface for interactions with hair follicle-associated cell populations. In detail, in the upper part, called the Acro infundibulum, the epithelium is continuous with the keratinized epidermis and is covered by an intact, rather impermeable stratum corneum; this barrier is interrupted in the lower follicular infrainfundibulum, as the differentiation pattern switches from epidermal differentiation to a trichilemmal differentiation pattern. Only few differentiated corneocytes remain, and the invagination of the epidermis in the infundibulum must be considered as highly permeable.[12]

The Hair Shaft:

The section of a hair that is visible above the scalp is called a hair shaft. Keratin, a protein, is compressed and bonded together to create it. The protein keratin is exceptionally tough and resistant to deterioration. Disulfide bonds and hydrogen bonds, two different types of bonding, hold it all together. The Hair Bulb: Every hair originates from a distinct hair follicle. At the base of each hair follicle is a hair bulb that contains hair cells that are actively growing. These continue to split and push upward, getting harder over time. There are the three core layers of the hair the cuticle, cortex, and medulla. Certain cells in the hair bulb known as melanocytes produce the pigment called melanin, which gives hair its color. [14]

5. The Hair Growth Cycle:

The hair growth cycle is made up of three phases: anagen, catagen and telogen.

A. The Anagen phase: The active stage of hair development is another name for the anagen phase. Hair grows at an average rate of 1 centimeter every 28 days throughout the anagen phase, which lasts between 2 and 8 years.

B. The catagen phase: the catagen phase, which lasts for 2 to 4 weeks and is characterized by transitional phase in the hair, comes completely deteriorated by this point.

C. The telogen phase: the final phase, telogen, is additionally known as the resting stage. This phase, which lasts for 2-4 months, marks the beginning of hair shedding. Hair either falls out on its own or is pulled out during this time. [15].



Figure No. 4: Hair growth cycle

6. Hair Distribution on Body:

Body hair, also known as androgenic hair, is a type of terminal hair that appears on people during and after puberty. It's distinct from head hair and also from vellus hair, which is less noticeable and much finer and lighter in color. The quantity of androgens (male hormones) and the density of androgen receptors in the dermal papillae are associated to the growth of androgenic hair. Lips, backs of ears, palms of hands, soles of feet, some external genital parts, navel, and scar tissue are examples of exceptions. Individual differences exist in hair density, or the number of hair follicles per square centimeter of skin. When a person reaches puberty, vellus hair-bearing parts of their body frequently start to sprout darker, thicker body hair.

Leg, arm, chest, and back hair all start out as vellus hair, just like most of the hair on the human body. The hair in these areas starts to get thicker and darker as people get older. This development takes place during or after puberty.

Excess body hair:

1. Chest and Abdomen hair:

Both sexes have vellus hair that grows in all phases of development on their chests and abdomens. Men develop a growing amount of terminal hair over their chest and abdomen as adolescence comes to a conclusion and into maturity.[16]. Both boys and girls have extremely fine vellus hair covering their abdomens before to puberty. The skin of the abdomen starts to generate coarser, longer, more pigmented hair (terminal hair) during and after puberty in response to increased levels of androgens, primarily dihydrotestosterone.[17].

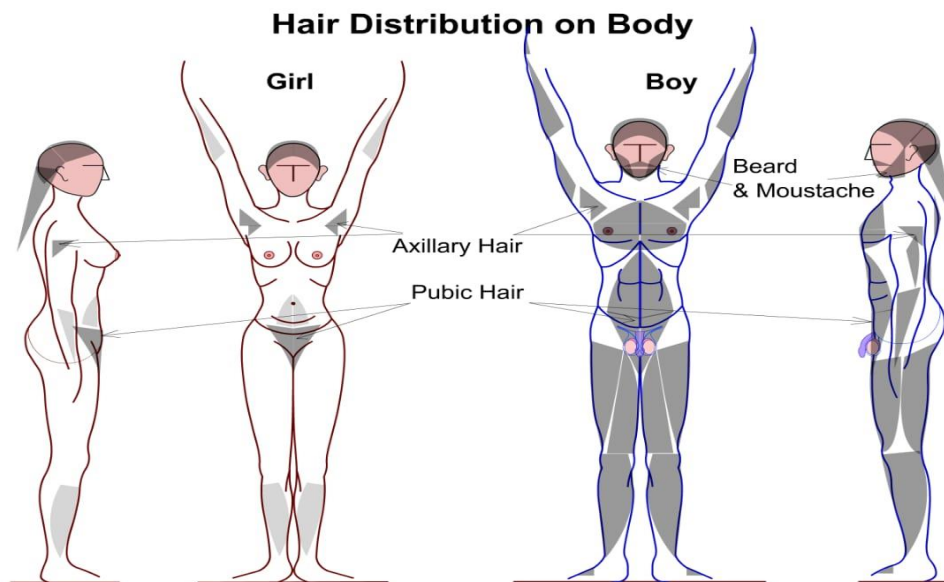


Figure 5: Hair Distribution on Body

2. Arms hair:

The forearm's wrist end has the most terminal arm hair, which also extends over the hand. Teenage guys frequently experience terminal hair growth that is significantly more intense than that of girls, especially if they have dark hair. Women often shave their arms, while this practice is less popular than shaving their legs in some countries. Boys get terminal hair development on their arms during the final stages of puberty, which is a secondary sexual feature.

3. Pubic hair:

The collection of coarse hair known as pubic hair is located in the pubic region. It frequently spreads to the thighs and abdomen as well. According to zoologist Desmond Morris, pubic hair serves as a scent trap, that it evolved to advertise sexual maturity or protect the skin from chafing during copulation. The pituitary gland releases gonadotropin hormones at this time, which cause the generation of testosterone in the testicles and ovaries and encourage the growth of pubic hair.

4. Axillary hair:

The type of hair seen in the underarm area is known as underarm hair, also known as axillary hair or armpit hair. Similar to the majority of other body hair, this hair typically begins to emerge throughout puberty and is fully grown by the end of adolescence [15]. The favorable olfactory reaction in mammals and the subsequent stimulation of sex drive brought on by pheromone production provide helpful hints as to the function and significance of axillary hair in humans. [18].

7. Hair Removal Methods:

There are many different hair removal methods and products on the market today. Temporary techniques can result in hairless skin for 1-3 days or up to 3 weeks, depending on the procedure used and the physiological parameters of the individual. Techniques that involve the use of cosmetic goods are indicated and shaded. The temporary hair removal procedures known as epilation and depilation are two different kinds [19].



Figure 6: Hair removal methods

Depilatory techniques:

Merely a portion of the hair shaft that extends beyond the skin's surface is eliminated by depilatory methods and products. In the event that there is no skin injury, these procedures usually cause little pain. Shaving, trimming, utilizing abrasives, applying chemical depilatories, and bleaching are examples of depilatory methods.[19].

Shaving:

Shaving is a common and affordable method for removing hair from the female underarms and legs and for removing facial hair in men. There are two ways to shave:

- a. **Wet with an electric razor:**
- b. **Dry with a safety razor.**

Shaving (wet or dry) is a temporary hair removal technique that requires constant care because it does not stop the anagen phase. Although shaving is cheap and convenient, it can lead to skin abrasions, and pseudo folliculitis. It is rare for women to remove facial hair because shaving does not alter the thickness or growth rate of hair and leaves a blunt point that seems thicker than uncut hair [20].



Figure 7: Shaving Method

- **Depilatory techniques:**

With its root in the dermis, the entire hair shaft is removed using epilation procedures and materials. Since the hair shaft takes longer to fully renew than it does to regrowth from under the skin, as in the case of shaving, these treatments are more effective and last longer. Using epilators, tweezing, waxing, sugaring, threading, and taking medicine are some epilation techniques.

- **Plucking:**

Using tweezers to pluck hairs in small regions is a temporary solution that works best for eliminating terminal hairs rather than vellus hairs, which tend to break close to the skin's surface. Plucking is easy, cheap, leaves the skin relatively unharmed, and allows for a longer period of time for the skin to recover (2 to 12 weeks). Nevertheless, plucking can be a laborious procedure, making it unsuitable for application across larger regions, and it does not change the rate at which hair grows unless the hairs are in the anagen phase.



Figure 8: Plucking Method

- **Threading:**

To pull and trap hairs, threading is the process of applying a twisted cotton thread loop, held in place by teeth and the fingers, to the skin. Men use threading to get rid of hair on their cheeks, ears, and foreheads, while women use it to get rid of facial hair. Known as fatlah in Egypt, threading is a temporary hair removal method that has been used extensively throughout the middle East and has acquired appeal in Western cultures for its accuracy in eyebrow shape.

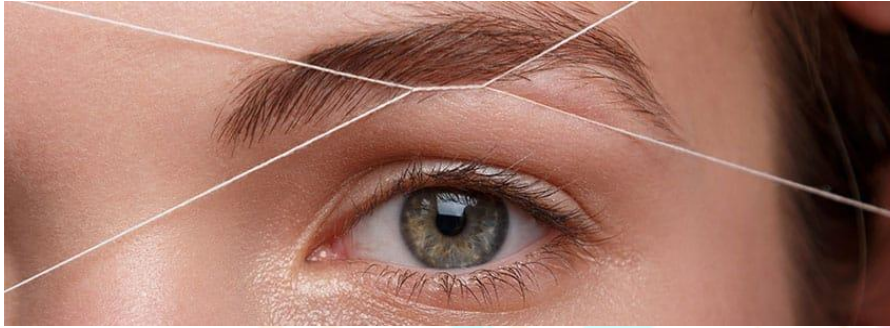


Figure 9: Threading Method

- **Waxing:**

Popular for short-term hair removal, waxing leaves skin hair-free for two to six weeks, depending on the body part and rate of hair development in the individual. For larger regions, waxing is a popular technique. Beeswax and rosin combined with chemicals, preservatives, essential oils, and other ingredients make up wax. In beauty salons, hot wax is preferred over cold wax because the heat dilates the follicular opening, making hair removal easier.



Figure 10: Waxing Method

- **Sugaring:**

Sugaring is an old hair removal method from the Middle East and Egypt that involves applying a paste made of sugar, lemon juice, and water to the skin in the direction that hair grows, then using a towel to remove the paste

in the opposite way. In addition, sugaring is less likely to cause skin trauma, redness, or scarring than heated waxing or shaving because it uses natural substances and is safe, affordable, moisturizing, and painless.



Figure 11: Sugaring Method

• **Lasers:**

For some people, laser hair removal is permanent. It is based on selective photo thermolysis, which produces thermal injury without causing skin damage by emitting light with a particular wavelength (nm), pulse length, and fluence. Melanin in the hair shaft and bulb absorbs light directly, or it can be absorbed by the follicle with the application of an external chromophore topically [20].



Figure 12: Laser Method

Advantages:

1. The greatest thing about depilatory creams is that, in contrast to shaving, threading, plucking, or waxing, they provide painless hair removal.
2. The hair dissolves and is removed with the cream, leaving no trace behind and emptying the drain.

Disadvantages:

1. The lotions chemicals have the potential to irritate and pain users.
2. Due to the chemicals utilized, depilatories are known to have unpleasant scents.

8. MATERIAL AND EQUIPMENTS

Sr. No.	Chemicals
1.	Calcium Hydroxide
2.	Calcium Thioglycolate
3.	Thioglycolic Acid
4.	Ascorbic Acid
5.	Salicylic acid
6.	Zinc Oxide
7.	Aluminum chloride
8.	Liquid Paraffin
9.	Bees Wax
10.	Ceto stearyl alcohol
11.	Aloe vera
12.	Honey
13.	Turmeric Extract
14.	Papain
15.	Vitamin E
16.	Rose Water
17.	Aluminum Sulphate

List of Chemicals

Sr.No.	Instruments
1.	Electronic analytical weighing balance
2..	Electrical water bath
3	pH meter
4.	Viscometer
5.	Heating mantel

Table No 5: List of Instrument

Aloe Vera:

Kingdom: Plantae.

Genus: Aloe Species: A. vera

Botanical Name: Aloe vera

Family: Liliaceae



Figure 13: Aloe Vera

Medicinal Uses of Aloe vera:

- **Skin Healing:** Aloe vera is widely recognized for its healing properties on the skin. It can be used to treat various skin conditions such as burns, cuts, wounds, and insect bites. The gel inside the leaves of Aloe vera contains compounds that help soothe inflammation, reduce pain, and promote tissue regeneration.
- **Sunburn Relief:** Aloe vera gel is commonly used as a natural remedy for sunburn. Its cooling and moisturizing properties can help alleviate the discomfort associated with sunburn, reduce redness, and promote the healing process of damaged skin.
- **Moisturizer:** Aloe vera gel is an excellent natural moisturizer for the skin. It can be used to hydrate and nourish the skin, leaving it soft and supple. Aloe vera is often included in various cosmetic products such as lotions, creams, and soaps due to its moisturizing benefits.
- **Wound Healing:** Aloe vera gel can accelerate the healing process of wounds. It has been found to promote collagen production, enhance tissue regeneration, and reduce the risk of infection. Aloe vera gel can be applied topically to minor wounds, cuts, or abrasions to facilitate healing.
- **Anti-inflammatory Effects:** Aloe vera possesses anti-inflammatory properties that can help reduce inflammation in various conditions. It can be applied topically to alleviate inflammation caused by skin irritations, acne, or inflammatory skin conditions like psoriasis or eczema.

Vitamin E

Vitamin E refers to a group of fat-soluble compounds known as tocopherols and tocotrienols. The most common and biologically active form of vitamin E is alpha-tocopherol.



Figure 14 Vitamin E

Medicinal Uses of Vitamin E:

- **Antioxidant Properties:** Vitamin E is a potent antioxidant that helps protect cells from damage caused by free radicals. It helps neutralize the harmful effects of oxidative stress, which is associated with various chronic diseases such as heart disease, cancer, and age-related macular degeneration.
- **Skin Health:** Vitamin E is known for its beneficial effects on the skin. It helps moisturize and nourish the skin, promoting its health and elasticity. Vitamin E is often used in skincare products to improve the appearance of scars, wrinkles, and dry skin conditions.
- **Wound Healing:** Vitamin E plays a role in promoting wound healing. It helps in the formation of new blood vessels and collagen synthesis, which are essential for tissue repair. Applying vitamin E topically or taking it as a supplement may aid in the healing process of wounds, burns, and surgical incisions.

Honey:

Kingdom: Animalia

Genus Name: Apis Mellifera

Family: Apidae



Figure 15 : Honey

- **Moisturizing:** Honey is a natural humectant, meaning it draws moisture into the skin, making it an excellent ingredient for hydrating creams
- **Antibacterial:** Its antibacterial properties help reduce acne and prevent infections in minor wounds and blemishes.
- **Antioxidant:** Rich in antioxidants, honey helps protect the skin from free radical damage and environmental stressors.
- **Soothing:** It has anti-inflammatory properties that can calm irritated skin, making it useful in creams for sensitive or inflamed skin.
- **Healing:** Honey promotes wound healing and can help with the regeneration of skin tissues, useful in creams designed for cuts, burns, and scars.
- **Anti-Aging:** The enzymes in honey help to smooth the skin, reduce the appearance of fine lines and wrinkles, and improve skin elasticity.
- **Brightening:** Honey can help lighten skin discolorations and even out skin tone when included in brightening creams.
- These properties make honey a versatile and beneficial ingredient in a wide range of skincare products.

Turmeric:

Kingdom: Plantae.

Genus: Curcuma Longa

Family: Gingeraceae



Figure 16 : Turmeric

- **Growth Reduction:** Turmeric is believed to slow down hair growth over time due to its natural properties. Regular application can weaken hair follicles, making hair finer.
- **Anti-inflammatory and Antibacterial Properties:** Turmeric's anti-inflammatory and antibacterial properties help soothe the skin and reduce irritation that can occur after hair removal.
- **Skin Brightening:** Turmeric can help even out skin tone and reduce pigmentation, leaving the skin brighter and smoother after hair removal.
- **Exfoliation:** When used in hair removal creams, turmeric acts as a gentle exfoliant, helping to remove dead skin cells and unclog pores.

Typical brands are available in market:

- Veet hair removal cream
- Natures Essence Soft Touch Gold Hair Removal Cream
- Oxy Herbal Hair Removal Cream
- Olivia Hair Removing Cream
- Urban Gabaru Hair Removal Spray

Side Effects Due to Uses of Harsh Chemicals:

1. Darkness and Irritation:

The majority of hair removal creams contain thioglycolic acid salts and compounds like potassium and calcium hydroxide, which can irritate delicate skin types and result in black spots. Before using hair removal lotion to your entire body, think about conducting a patch test because these are equally important adverse effect.

2. **Skin Damage and Allergic Reactions:**

These lotions include acidic ingredients that can react with your skin to change its pH, resulting in allergic responses and skin damage. For this reason, it's critical to understand before using hair removal cream the potential negative effects on the face and private areas of the body.

3. **Chemical Burns:**

These hair removal creams might even cause varying degrees of chemical burns if you use them on extremely sensitive skin or if you don't use them for the whole recommended duration! Therefore, be sure to follow the directions on the depilatory cream package precisely, and before you start, do a patch test.[21]

4. **Dryness and Peeling:** The chemicals can strip natural oils from the skin, leading to dryness and peeling, which may require moisturizing and healing treatments.

5. **Pigmentation Changes:** Some people may experience hyperpigmentation (darkening of the skin) or hypopigmentation (lightening of the skin) in the treated area, particularly if the skin is damaged or irritated.

6. **Sensitivity to Sunlight:** After using hair removal creams, the skin can become more sensitive to UV rays, increasing the risk of sunburn. It is advisable to use sunscreen and avoid direct sun exposure after treatment.



Figure 17: Chemical Burns

7. **Dryness and Peeling:** The chemicals can strip natural oils from the skin, leading to dryness and peeling, which may require moisturizing and healing treatments.

8. Allergic reactions: Allergic reactions to cosmetics constitute a small but significant portion of the complications associated with the use of cosmetics. Allergic contact dermatitis represents true delayed-type (type IV) hypersensitivity that presents eczematous dermatitis and comprises approximately 10% to 20% of all cases of contact dermatitis. Type IV is hypersensitivity reaction that is T-cell mediated, wherein circulating or resident sensitized T cells are activated by the offending allergen to release pro-inflammatory cytokines. Sensitization depends on several factors including product composition, a concentration of potential allergenic components, amount of product applied, site application, skin barrier integrity, and frequency and duration of application.[22]

9. Redness: The redness of the skin caused by cosmetic products, especially soaps, is associated with the unbalance in cutaneous ph. [23]

To minimize these risks, it's important to:

- Perform a patch test before full application.
- Follow the product instructions carefully.
- Avoid using the cream on broken or irritated skin.
- Moisturize the skin after treatment.
- Use sunscreen to protect the treated area from UV exposure.

9. EXPERIMENTAL METHODS:

11.1 Extractions:

Extraction of Papain from Raw Papaya:

The latex of papaya was collected and extracted as described by Rathi and Gadevar (2007). Unripe matured fruit was tapped early in the morning and finished by mid-late morning. Vertical cut of 1-2 mm deep was made using a stainless-steel knife. A plastic dish was used to collect the latex. The latex was then scraped into a polythene lined box with a close-fitting lid. Latex adhering to the fruit was carefully scraped off and transferred to the collecting box using plastic spoon.[24]

Extraction Of Turmeric:

Tea extraction process was modified from the previous study [25]. Ground turmeric (50 g) was extracted with 500 mL of water, 50% ethanol, or 70% ethanol for 2 h at 100 °C, supernatant was filtered through filter paper.

Preparations of hair removal cream:

1. Heat liquid paraffin, beeswax and cetylalcohol in borosilicate glass beaker at 75⁰
2. Maintain that heating temperature (oil phase).

3. Take mortal pestle and mix well calcium hydroxide, vitamin E.
4. After that add mixture slowly in the oil phase and stir continuously.
5. Then add measured amount turmeric, papain extract.
6. Stir vigorously until it forms a smooth cream
7. Then add an active ingredient thioglycolic acid, calcium thioglycolate, calcium hydroxide, Aluminum Chloride in cream and stir continuously up to it mix well in cream.
8. Add rose water for good smell.

Ingredients	F1	F2	F3
Ascorbic Acid	2gm	2gm	2gm
Salicylic acid	1gm	1gm	1gm
Thioglycolic acid	0.5gm	0.5gm	1gm
Zinc Oxide	1gm	1gm	3gm
Calcium Hydroxide	3gm	1gm	5gm
Calcium Thioglycolate	3gm	4gm	6gm
Aluminum Chloride	1gm	0.5gm	1.5gm
Liquid Paraffin	5ml	5ml	5ml
Bees Wax	3gm	3gm	3gm
Ceto styryl Alcohol	3gm	3gm	3gm
Aloe vera	QS[5gm]	QS[5gm]	Q.S[5gm]
Honey	2gm	2gm	2gm
Papain	1gm	1gm	1gm
Turmeric Extract	2gm	2gm	2gm
Vitamin E	1gm	1gm	1gm
Rose water	3ml	5ml	3.5ml
Aluminum Chloride	5gm	5gm	5gm

11.3.1 Formulation Table: 11.4 Evaluation Test of Cream:

11.4.1 Cream Organoleptic: The evaluation's focus was on the cream's color, texture, and overall odor.

a. Color: The color of the formulation was analyzed against a white background.

b. odor: I sniffed the cream to confirm its odor.

c. Texture: The texture was assisted by application on skin.

11.4.2 Determination of pH: pH paper was used to measure the ph.

11.4.3 Determination of homogeneity: Once the gel-like materials have solidified in the container, each produced cream is examined visually to assess its uniformity

11.4.3 Determination of washability: The strength and simplicity of water washing were measured by hand after the skin had been treated with the formulation.

1	Organoleptic of Cream	
	a. Color	Pale Yellow
	b. odor	Pleasant
	texture	Smooth
2	Determination Of ph.	12.5
3	Determination of homogeneity	Smooth And Glossy
4	Determination of washability	Good

12. RESULT AND DISCUSSION

Parameter	F1	F2	F3
Color	Light yellow	Light yellow	Light yellow
Odor	Pleasant	Pleasant	Pleasant
Texture	Smooth	smooth	smooth
Ph	8.5	13.20	12.5
Homogeneity	Smooth and glossy	Smooth and glossy	Smooth and glossy
Washability	Good	Good	Good

Side effects	No side effect	Itching, redness	No side effect
Time taken	17-22min	3-6 min	4-6 min
Hair removal Process	Slow	Fast	Fast

Physical characteristics like color, texture, and odor were examined. Ph paper was used to measure the pH. Products with a pH of 13 will often irritate skin when applied, whereas those with a pH of 10.5 will typically act slowly. The homogeneity of the formulation was assessed by touch and visual inspection. Skin application of the formulation and water wash were manually inspected. On the hand, every cream formulation was examined. On the right hand, mark the region (3-3cm). After applying the cream to that location, the time was recorded.

12.1 Determination of pharmacological activity:

F1-There are no adverse effects, irritations, reported with the F1 depilatory cream. Because of its pH of 8.5 this batch's hair removal action is slow.

F2-The pH 13.20 of the F2 depilatory cream causes adverse effects such redness, itching, and inflammation. Additionally, this batch's hair removal process is quick.

F3-This batch's normal pH of 12-12.5 makes hair removal very easy and smoothly. It has no adverse effects on the hands.

13. CONCLUSION

The physiochemical properties and pharmacological activity of each formulation were assessed. Based on the a for mentioned findings, it can be inferred that the hair removal cream made with an herbal base is made by combining chemical and herbal substances, such as thioglycolic acid and calcium thioglycolate, turmeric and it has appropriate color, pH, and spread ability testing. Out of all the formulations, F3 offers the best attributes. This cream is effective for hair removing.

hair removal creams represent a convenient and cost-effective method for achieving temporary hair removal. Their popularity is driven by the ease of application and the relatively painless process compared to other methods like waxing or epilation. However, it is essential to consider the potential for skin irritation and allergic reactions, which underscores the importance of conducting patch tests before widespread use.

Hair removal cream with an antiperspirant's activity will gave an combined effects that it helps to decrease the secretion of sebaceous gland, will helps to deodorize the armpits.

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15. **APPENDIX**

16. **PUBLICATIONS**

ERRATA:

