



FORMULATION AND EVALUATION OF HAIR REMOVAL CREAM BY USING AN HERBAL BASE

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ABSTRACT : Hair is one of the distinguishing characteristics of mammals, and it serves a variety of functions including protection from external forces, production of sebum, apocrine sweat, and pheromones. The cosmetics and personal care industry's hair removal market is growing in importance. The current study highlights the importance of choosing herbal depilatories over pharmaceutical depilatory because of their high efficacy, safety, and lack of adverse side effects. Depilatories are the cosmetic preparation which is used to remove the hair from skin, in chemical depilatories the main active ingredients are salts of thioglycolic acids, sulphides and stannites . herbal depilatories include active ingredients in Making the hair removal cream requires the following ingredients: Glycyrrizhic acid, cetyl alcohol, turmeric powder, neem and tulsi extract, ginger and papaya powder, liquid paraffin, and the necessary amount of orange oil. The pH, viscosity, spreadability, and homogeneity of the hair removal cream formulation were all evaluated. The results showed off the F3 formulation's outstanding properties.ke Turmeric, Neem, Tulsi, Ginger etc.

Key words: Hair, Depilatories, Glycyrrizhic Acid, cetyl alcohol, turmeric ,Neem, tulsi, ginger, pappya

INTRODUCTION:

Hair is a thin, flexible shaft of cornified cells that grows from the hair follicle, which is a cylindrical invagination of the epidermis.[1] Hair is mostly made up of amino acids, some of which contain sulphur and cystine, which is the most abundant amino acid in hair . About (88%) percent of hair is made up of proteins. These kinds of proteins are of the hard, fibrous

keratin type. Proteins are made up of lengthy chains of amino acids. The keratin proteins found in hair fiber primarily consist of the amino acid cysteine. The bonds of chemicals called disulfides hold the sulphur atoms in the cysteine molecules together.[2]

4	Exogen (Shedding phase)	The exogen phase is essentially an extension or a part of the telogen stage of hair growth. During the exogen phase, hair is shed from the scalp, often helped along by washing and brushing. During the exogen phase, which can last about 2 to 5 months, new hairs are growing in the follicles as old hairs fall away.[4]
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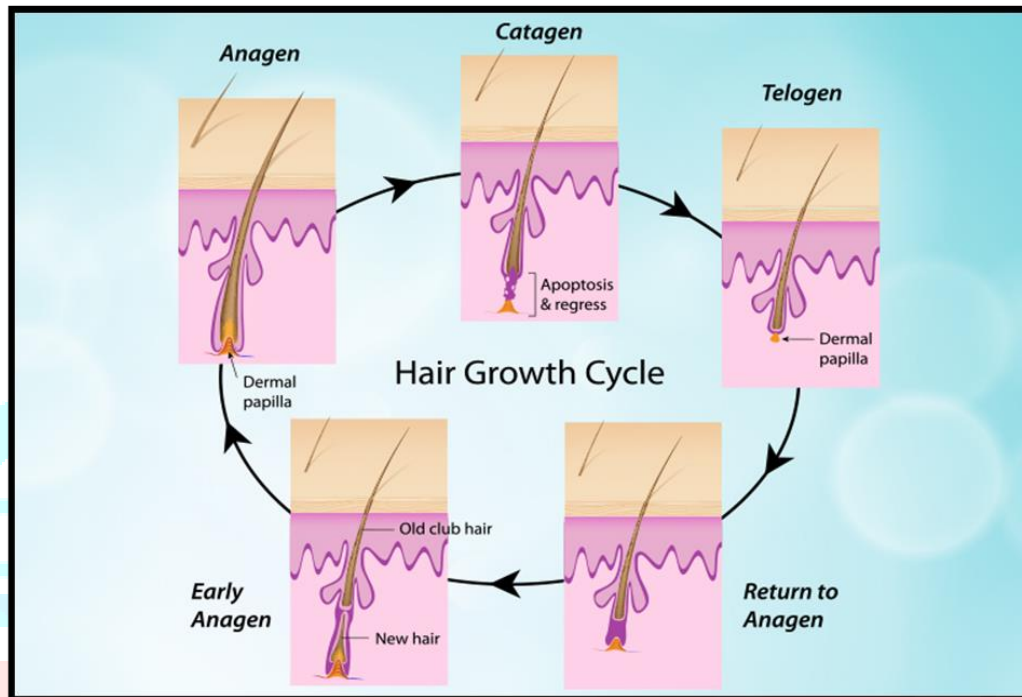


fig.2 hair growth cycle[5]

Methods Of Hair Removal Process

1. Shaving
2. Plucking
3. Depilatory creams
4. Hot waxing
5. Threading
6. Laser hair removal
7. Electrolysis
8. Certain medications
9. Tweezing
10. Trimming

HAIR REMOVAL CREAM:

Hair removal cream known as Depilatory creams. The main ingredient in hair removal cream is thioglycolic acid. The hair is removed by causing instability the keratin structure with depilatory creams.. These are the proteins in the hair. The hair is first thinned and then dissolved into a jelly-like consistency, and it can be broken off and wiped away.[6]

Mechanism of Hair Removal Cream:

Hair removal creams work by breaking down disulfide bonds, and calcium thioglycolate is commonly used in this process. The thioglycolate salt disrupts the disulfide bonds in keratin, causing the hair's structure to break down. Hair removal creams usually contain approximately 5% of the active component thioglycolate, along with a number of additional chemicals. Metal hydroxides like NaOH and Ca(OH)₂ are commonly found in creams to help modify pH levels so that the active acid can react with cysteine residues in the hair.[7]

Emollients are also included in the cream to soothe the skin after application and prevent any reactions to the product's harsher chemicals. Oils and silicones are the most popular emollients, and they help to heal the skin after chemical hair removal.[8]

Glycyrrhizic Acid:

Glycyrrhizic acid, a triterpenoid saponin glycoside found in the roots and rhizomes of licorice plant (*Glycyrrhiza glabra*) is one of the most widely known medicines since ancient times. Glycyrrhizin (glycyrrhizic acid or glycyrrhizinic acid) is the chief sweet-tasting constituent of *Glycyrrhiza glabra* (licorice) root. Its aglycone is enoxolone. A study using glycyrrhizic acid, the herbal extract from licorice, proves to be effective in halting hair growth in rats. This topical approach appears to be promising for future epilation. The hydro-alcoholic extract of *Glycyrrhiza* possesses good hair growth-promoting activity. In treating alopecia, *Glycyrrhiza glabra* has long been used as herbal medicine.[9]

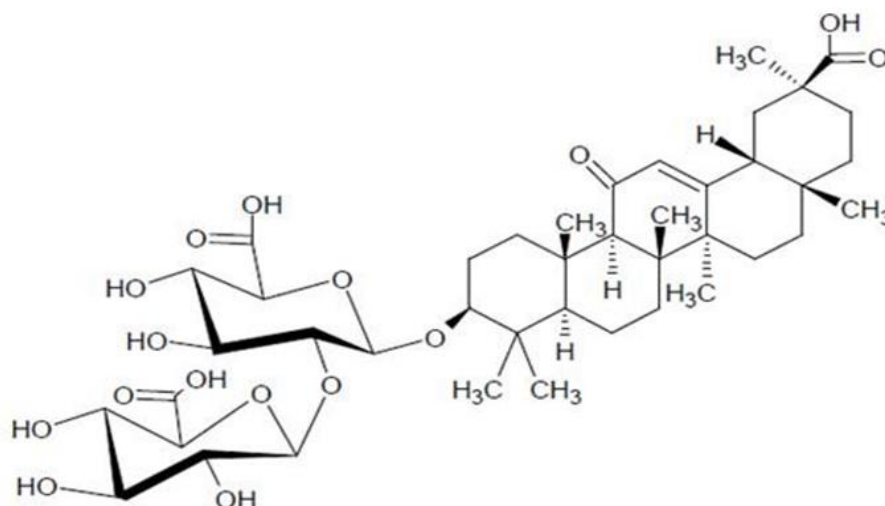


fig. 3 structure of glycyrrhizic acid

ADVANTAGES:[11,12]

1. Easy to use and commonly available.
2. They offer painless hair removal, as compared to threading, plucking, waxing or shaving.
3. It is an inexpensive method of hair removal.
4. The cream don't damage the skin or cause cuts.

IDEAL PROPERTIES OF HAIR REMOVAL CREAM:[13,14]

1. It should be not produced any toxic effect on application
2. They should be optimum particles size.
3. They should produce emollient effect.
4. Thicker than a lotion, maintaining its shape, for example, a 50/50 emulsion of oil and water.
5. They should spread uniformly on the skin surface.
6. Requires preservative to extend shelf life.
7. They should be compatible with skin Ph

Monograph of ingredients:**1.Tulsi:**

Family: Lamiaceae

Biological Source: fresh and dried leaves of *Ocimum* species like *Ocimum sanctum* L. and *Ocimum basilicum* L., etc.

Biological Name: *Ocimum tenuiflorum*

Medicinal Use of Tulsi:

1. Tulsi helps to cure fever.
2. It helps to cure skin problems like blackheads, premature aging, acne, etc.
3. Tulsi used to treat heart disease.



fig.4 tulsi[15]

2.Neem:

Family: Mellaceae

Biological Source: It consists of the leaves and other aerial parts of *Aza cardia Indica*

Biological Name: *Azadirachta indica*

Medicinal Use of Neem:

1. Use to treat inflammation.
2. Use to cure skin problems like acne.
3. Used as an antiseptic.



fig.5 neem[16]

3.Turmeric:

Family: Zingiberaceae

Biological Source: Turmeric is a product of *Curcuma longa*, a rhizomatous herbaceous perennial plant belonging to the ginger family Zingiberaceae, which is native to tropical South Asia.

Biological Name: *Curcuma longa*

Medicinal Use:

1. Use to treat disorders of the skin.
2. Use to treat respiratory tract infection.
3. Use to treat problems in the digestive system.



fig.6 turmeric[17]

4.Ginger:

Family: Zingiberaceae

Biological source: It is obtained from rhizomes of plant

Biological name : *zingiber officinale*

Medicinal Use:

1. Remedy for asthma, cough etc.
2. Anti-inflammatory
3. Antibacterial



fig.7 ginger[18]

5.Papaya:

Family:Caricaceae

Biological Source: It is a succulent fruit of plant family caricaceae

Biological Name: Carica Papaya Linn.

Medicinal Use:

1. It is used to manage diabetes mellitus
2. It help to prevent constipation



fig.8 pappya[19]

table no.2 herbal plants with depilatory action:

list herbal plants with depilatory activity

Sr No.	Plant/Comman Name	Botanical Name	Parts Used
1	Turmeric	Curcuma longa	Rhizome
2	Wild turmeric	Curcuma aromatica	Rhizome
3	Thorowax root	Bupleuri radix	Root
4	Neem	Azadirachta indica	Leaf
5	Indian neetle	Acalypha indica	Leaf
6	Tanner's cassia	Senna auriculata	Leaf

Material And Methods:

Materials:-

Chemicals: Thioglycolic acid, Cetyl Alcohol, Bees waxes, Herbal ingredients(Tulsi, Neem, Papaya and Turmeric).

table no. 3-excipients and herbal ingredients with their

INGREDIENTS	ROLES
Glycyrrhizic acid	Active ingredient break the disulfide bonds in keratin and remove hair.
Cetyl alcohol	Emulsifying agent helps prevent creams from separating into oil and liquid.
Liquid paraffin	Lubricating agent
Tulsi	Antibacterial, add glow on skin
Neem	Antioxidants, reduces the dark spots, blemishes, and redness.
Papaya	Moisture the skin and breaking down the hair follicles thus preventing the hair from regrowing.
Turmeric	Natural chemical stop hair growth or slow hair growth.
Bees wax	Emulsifying agent, stabilizer and give thickness to the cream.
Orange oil	Fragrance

EXPERIMENTAL WORK:

Extraction of Neem Turmeric and Tulsi Leaves:

The plant materials were collected from the source. 10 g (dry weight) of each plant material (plant leaves) was added separately in 100 solution of methanol. The mixture was heated at 60°C in water and incubated for an hour. The mixture was filtered and used as a methanolic extract for further use.

Plant material where collected



10 gm of each plant material was added separately in 100ml of water.



Mixture was heated at 100 degree celsius



Mixture was filter and extracted for the further use.



fig. 9 neem extract



fig. 10 tulsi extract



fig.11 turmeric extract

PREPARATION OF HAIR REMOVAL CREAM:

Heat liquid paraffin, beeswax and cetyl alcohol in a borosilicate glass beaker at 75° c and maintain that heating temperature (oil phase). Take mortal pestle and mix well turmeric powder, ginger powder, papaya powder. After that add mixed Powder slowly in the oil phase and stir continuously. Then add measured amount of neem and tulsi extract and stir vigorously until it forms a smooth cream. Then add a active ingredient thioglycolic acid in cream and stir continuously upto it mix well in cream. Then add some orange oil as a fragrance. Stir it properly until proper cream was formed.

table no: 4 formula for preparation of cream

INGREDIENTS	F1	F2	F3
Glycyrrhizic acid	1.5 ml	3 ml	2.5 ml
Cetyl alcohol	1.5 gm	2 gm	1.5 gm
Turmeric powder	1 gm	1 gm	1.5 gm
Neem Extract	0.5 ml	0.5 ml	1 ml
Tulsi Extract	0.5 ml	0.5 ml	1 ml
Papaya powder	1.5 gm	1 gm	2 gm
Beeswax	3 gm	2.8 gm	3.5 gm
Liquid paraffin	6 ml	8 ml	10 ml
Orange oil	Q.S	Q.S	Q.S

**fig.12 formulation of hair removal cream**

EVALUATION OF CREAM:

1. Determination organoleptic characteristics:

Evaluation aimed to saw physical appearance of cream which involves color, odour , texture

a) Colour :

On a white background, the formulation's colour was examined.

b) Odour :

The odour of cream checked by taking a smell.

c) Texture :

The texture was assisted by application on the skin.

2. Determination of Viscosity:

Viscosity of the formulated cream was determined using Brookfield Viscometer Spindle no. 5 and spindle speed 10 rpm at 25°C was used for cream , the corresponding dial reading on the viscometer was noted.

3. Determination of pH:

PH was measured by using pH paper.

4. Determination of Washability :

After applying the formulation to the skin, the extent and simplicity of water washing were manually assessed.

5. Determination of Homogeneity:

Whenever the gel-like substances have been set in the container, all created creams are visually inspected to determine their homogeneity. They are examined to look for aggregates and assess their appearance.

6. Spreadability:

On the wooden block a ground glass slide was mounted. On this ground slide, 2 gram of the prepared gel was put. Thereafter, a second glass slide with the same dimensions as the fixed ground slide was sandwiched between this slide and the gel preparation. The hook is provided on the second glass slide. For five minutes, a weight of 500 mg was placed on top of the two slides to remove air and produce a homogenous gel film between them. A specified amount of weight was added to the pan, which was connected to the pulley. The top slide's time (in sec) needed to travel a distance of 5 cm was recorded. Spreadability was calculated by using the following formula

$$S=M \times L / T$$

Where,

S - Spreadability

M - Weight tied to the upper slide (11gm).

L - Length of the glass (6.5cm).

T - Time in sec.

7. Determination Of Pharmacological Activity :

- The goat skin was collected from freshly scarified animals from slaughter house and used within one hours wherein the tissue remains viable
- The skin was observed after depilation it didn't show any redness

RESULT AND DISCUSSION:**Evaluation of Depilatory Cream :****Organoleptic Properties-**

Physical evaluation such as color, odor, texture was checked.

table no.5 - physical evaluation of depilatory cream:

parameters	F1	F2	F3
Color	Dark Green	Dark Green	Light Green
Odor	Pleasant	Pleasant	Pleasant
Texture	Smooth	Smooth	Smooth

Viscosity:

Viscosity of the formulated cream was determined using Brookfield Viscometer at temperature of 25 degree Celsius using spindle no. 63 at 2.5 RPM.

table no.6 - determination of viscosity:

Formulation	Viscosity (Centipoise)
F1	21020
F2	11810
F3	18400

PH:-

The pH was measured using pH paper.

table no.7 -determination of ph:

Formulation	PH
F1 Batch	10.85
F2 Batch	12.2
F3 Batch	11.7

Normally, products having a pH of 11.5 will be slow acting, and products having a pH of 12.7 will irritate the skin when we used.

Washability:-

Formulation applied on skin and washed with water and efficiency of simple water wash was observed .

table no.8 - determination of washability :

Formulation	F1	F2	F3
washability	Good	Good	Good

Homogeneity:-

By touch and visual inspection, the uniformity of the formulation was evaluated.

table no.9 -determination of homogeneity :

Formulation	Appearance
F1	Smoot, glossy on application
F2	Smoot, glossy on application
F3	Smoot, glossy on application

Spreadability:

table no.10 - determination of spreadability:

Formulation	Time (sec) (cm/sec)	Spreadability
F1	7	30.40
F2	15	15.18
F3	11	19.6

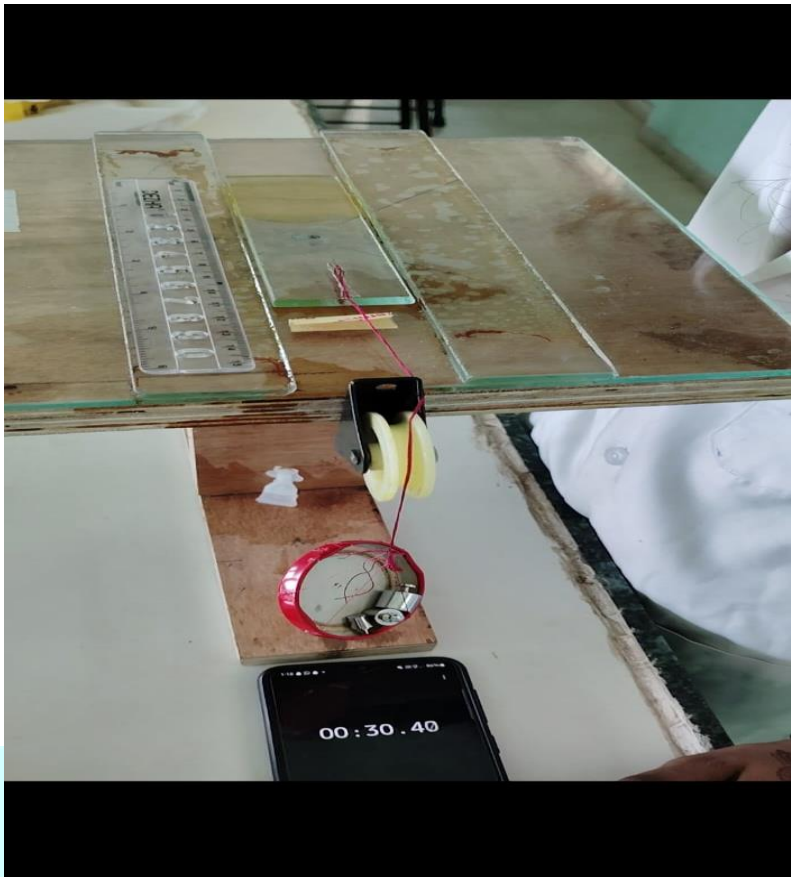


fig.13 spreadability apparatus

table no.11 - determination pharmacological activity:-

The each formulated cream was checked on discarded goat skin obtained from local slaughter house then the cream was applied that area and the time at which hairs were removed by wiping was noted.

Formulation	Side Effect	Hair process removal	Time taken
F1	No side effect	Slow	20-25 min
F2	Redness, itching	Fast	3-5 min
F3	No side effect	Fast	5-7 min



fig.14 before



fig.15 after



fig.16 after 25 minutes

CONCLUSION:

The herbal substances and plants in everyday life has greatly improved. Herbal plants contain phytoconstituents that have potential medicinal and hair depilatory properties. All the formulations were evaluated for their physiochemical characteristics and Ex-vivo Pharmacological activity. From the above results, it is concluded that the hair removal cream by using herbal base is prepared by combination of chemical ingredients and herbs i.e thioglycolic acid, turmeric, Neem etc. where showed acceptable properties such as colour, pH, Spreadability study, since no redness and irritation was observed after depletion the formulation appear to be safe for application. F3 formulation has best characteristics from other.

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