



POLY-HERBAL HAIR REMOVAL CREAM: AN EFFECTIVE AND NATURAL APPROACH TO HAIR REMOVAL

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ABSTRACT

In the pursuit of effective and natural solutions for hair removal, this study introduces a polyherbal hair removal cream that offers a novel approach to the age-old challenge of unwanted hair. The formulation draws upon a meticulously selected blend of herbal extracts known for their hair inhibitory properties, combining their synergistic effects to create a powerful and gentle alternative to conventional methods. The cream's unique composition capitalizes on the inherent qualities of these botanicals, effectively impeding hair growth while minimizing skin irritation and discomfort. Through comprehensive testing and analysis, this study demonstrates the cream's remarkable potential for safe and efficient hair removal across various skin types. The findings highlight the cream's potential to revolutionize the landscape of hair removal, providing a natural and viable solution that aligns with modern demands for holistic and sustainable personal care practices.

Keywords: *Carcia papaya* (papaya), herbal formulation, depilatory

INTRODUCTION

Most among the 100,000–150,000 follicles on the average human being develop and shed over several stages of the hair development process [1]. The 3 stages of hair formation are anagen, catagen, and

telogen. Keratin, for instance, is the primary protein found in hair, which is a filamentous biomaterial [2]. There are many different hair removal and reduction treatments. Possibly the most popular techniques are the

non-permanent or the temporary ones, which include Bleaching, Shaving, Trimming, Tweezing, Waxing and Chemical depilatories. Whereas the permanent methods include lasers, Electrolysis and Thermolysis and Photo dynamics. In any situation, there are crucial variables to consider, including hair and skin types, removal frequency, skin issues, physical dexterity, affordability and convenience, and personal preferences [3]. The issue of coping with hair emerging in places on the person wherever it appears undesirable affects both men and women [4]. Cosmetics manufacturing is making an attempt to create goods utilizing natural assets or to replace unsustainable raw ingredients [5]. Advancing to make polyherbal hair removal cream *Cymbopogon citratus*, *Carica papaya*, and *Calendula* extract were chosen because they have antibacterial and antiseptic properties and also function as hair growth inhibitors. Vitamin C, provitamin A carotenoids, vitamin B complex, and other nutrients are abundant in papaya fruit [6]. Consequently, it appears that *C. papaya's* conventional usage is well documented. This has several immediate effects, among which is that there is growing intellectual curiosity about determining the plant's and its constituents' pharmacologic and medicinal benefits [7].

MATERIALS AND METHODS

Plant materials:

As samples, *Carica papaya*, *Cymbopogon citratus*, and *Flower of Calendula* were yielded from farms and gardens. Other chemicals which were required for the formulation of cream were procured from a chemical store.

Preparation of Hair Removal Cream

(KC-01):

To prepare Hair Removal Cream (KC-01), 5.4 g of calcium thioglycolate, 10 g of calcium hydroxide, and 3.4 g of strontium hydroxide were mixed in 50 ml of water. Then, 1.20 ml of Brij35, 10 g of calcium carbonate, and 4.30 g of Cetyl alcohol were added and mixed. A cream base was created by combining 3 g of pure beeswax with 7 ml of oil-based paraffin. After heating the cream base, it was added to the chemical mixture along with 0.56 g of stearic acid as a preservative. The composite was heated for 15-20 minutes while stirring to prevent lumps, resulting in a creamy product. Finally, 5 ml of Eau de Cologne perfume was added for fragrance, and the product was stored in a collapsible plastic container. Weight of Hair Removal Cream: 84.60 gm

Preparation of Poly-Herbal Hair

Removal Cream (KC-02):

The formulation of Poly-Herbal Hair Removal Cream (KC-02) was prepared by mixing 5.4 g of calcium thioglycolate, 10 g of calcium hydroxide, and 3.4 g of strontium hydroxide in 50 ml of water. Additional ingredients included 1.20 ml of Brij35, 10 g

of calcium carbonate, and 4.30 g of Cetyl alcohol. 0.56 g of stearic acid served as a preservative. A cream base was established by adding 3 g of pure beeswax and 7 ml of emulsified paraffin, and heated until the beeswax melted. Botanical extracts (6 g of papaya, 2 ml of Cymbopogon citratus, and 1 ml of calendula flower) were incorporated.

The mixture was cooled while being continuously whipped and then scented with 5 ml of Eau de Cologne. The final product was stored in a collapsible plastic container for convenience.

Weight of Poly Herbal Hair Removal Cream: 95.01 gm

Table 1: Costing of the formulated Hair removal cream and Polyherbal hair removal cream:

Sr no	Raw Material	Quantity	Price	KC-01	Rs.	KC-02	Rs.
1	<i>Carica papaya</i> extract	50 gm	4.5 Rs	-	-	6 gm	0.54 Rs
2	<i>Cymbopogon citratus</i> extract	-	-	-	-	2 ml	-
3	<i>Calendula</i> flower extract	-	-	-	-	1 ml	-
4	Calcium Thioglycolate	50 gm	65 Rs	5.4 gm	7.02 Rs	5.4 gm	7.02 Rs
5	Calcium Hydroxide	50 gm	10 Rs	10 gm	2 Rs	10 gm	2 Rs
6	Strontium Hydroxide	50 gm	30 Rs	3.40 gm	2.04 Rs	3.40 gm	2.04 Rs
7	Calcium Carbonate	50 gm	17 Rs	10 gm	3.4 Rs	10 gm	3.4 Rs
8	Cetyl Alcohol	50 ml	20 Rs	4.30 gm	1.72 Rs	4.30 gm	1.72 Rs
9	Brij 35	50ml	72 Rs	1.20 ml	1.73 Rs	1.20 ml	1.73 Rs
10	Water	-	-	50 ml	-	50 ml	-
11	Eau de cologne	50 ml	110 Rs	5 ml	11 Rs	5 ml	11 Rs
	Total				28.91 Rs		29.45 Rs

Table 2: Comparison of final costs of Formulated creams and the creams available in the market:

Formulated cream	Wt. obtained	Costing	Costing per kg
KC-01	84.60 gm	28.91 Rs	341.72 Rs
KC-02	95.01 gm	29.45 Rs	309.96 Rs
Veet Hair removal cream	30 gm	88 Rs	2933 Rs
Everteen (Crème Hair Remover-Bikini line)	100 gm	288 Rs	2880 Rs.
Mamaearth Ubtan Nourishing Hair Removal Cream	100 gm	391 Rs.	3910 Rs.
L'avenour Hair Removal Cream	100 gm	268 Rs.	2680 Rs.
The Man Company – Hair Removal Cream	100 gm	250 Rs.	2500 Rs.

The cost analysis of KC-02 reveals its comparative advantage over existing market hair removal creams. Additionally, the Poly-Herbal Hair Removal Cream proves to be a cost-effective alternative to the previously formulated KC-01 when produced in large quantities. As a result, the executed experiment has demonstrated the success of

the Poly-Herbal Hair Removal Cream in terms of cost efficiency.

RESULTS:

Evaluation there of personal traits (8):

1. Determination of pH: A sufficient quantity of the composition dissolved with an appropriate solvent in an appropriate beaker is used to evaluate the pH of the product at ambient

conditions using the typical digital pH meter (Table 3).

2. **Spreadability:** A sufficient quantity of material is divided into two glass slides, and those slides are then subjected to a 100g weight for five minutes (Table 4). Spreadability is formally defined as,

$$S = m \times \frac{l}{t}$$

Where, m = applied force to the top slide.

l = length moved on the glass slide.

t = time taken.

3. **Saponification:** A small quantity of sample or fat (1 gm) was weighed, and 3 ml of ethanol was then incorporated. The subsequent filtering of the solution and collection of the residue took place. Following that, 25 ml of alcoholic KOH was added to the residue in one Round Bottom Flask, whereas in the other, just 25 ml of alcoholic KOH was added for a blank reading. The solution was allowed to settle until it reached room temperature after refluxing each RBF separately for around 30 minutes. Then, both RBFs underwent the addition of phenolphthalein, which was titrated against a solution of 0.5 N HCl. The solution changes color from pink to colorless reaching the end point (Table 5).

$$\text{Saponification} = \frac{2 \text{ RBF} - 1 \text{ RBF} \times \text{molecular weight of KOH}}{\text{molecular weight of KOH}}$$

4. **Viscosity:** By means of the RV version for the Brookfield Viscometer, the

viscosity of the product formulation was assessed. At 29.9°C, spindle number 4 was utilized at a speed of 1.5 rpm, and the matching scale value displayed by the viscometer was recorded (Table 6).

5. **Anti-bacterial Activity:** The antibacterial activity of the bacteria was tested using organism cultures that had developed for 24 hours. To create the nutrient agar medium plates, utilized 90 cm of sterile petri dishes and 15 to 20 ml of nutrient agar medium per plate. The dishes were left to solidify for five to ten minutes before being administered with 0.1 per cent bacteria. Agar discs with a diameter of 5 mm were produced using the agar disc diffusion method and autoclaved with No. 1 Whatman filter paper or newspaper to sterilize them. The discs then received applications of various plant extract concentrations. A 24-hour time frame for incubation at 37 °C followed on the plates. The plates were left to stand for 30 minutes before being incubated for 24 hours at 37 °C. Antibacterial activity was assessed by calculating the width of the inhibitory zone in millimeters (Table 7).

6. **Patch Test:** A small area of skin was chosen and then little amount of cream was applied to the chosen area. The cream was left for 5-10 min then the cream was wiped off gently and rinsed, thoroughly with water. After 24 hours

the patch test area was observed for any signs of irritation, redness, itching, swelling or discomfort (Figure 1A, 1B; Figure 2A, 2B).

and the particle measurements were calculated and analyzed using ImageJ software (Figure 3A, 3B; Figure 4A, 4B).

7. **Particle size:** The particle size was observed under Fluid Imaging Station

Table 3: Determination of pH

Sr no	Formulation	pH
1	Hair removal cream (KC-01)	12.8
2	Poly-herbal hair removal cream (KC-02)	12.5

Table 4: Determination of Spreadability

Sr no	Formulation	Spreadability
1	Hair removal cream (KC-01)	10.02 g.cm/s
2	Poly-herbal hair removal cream (KC-02)	18.14 g.cm/s

Table 5: Determination of Saponification Value

Sr no	Formulation	Saponification Value
1	Hair removal cream (KC-01)	84.157
2	Poly-herbal hair removal cream (KC-02)	89.760

Table 6: Determination of Viscosity

Sr no	Formulation	Viscosity
1	Hair removal cream (KC-01)	2.508 x 10 ⁵ cp
2	Poly-herbal hair removal cream (KC-02)	2.4866 x 10 ⁵ cp

cp = centipoise

Table 7: Determination of Antibacterial activity

Compound no.	Conc. (mg/mL)	Microorganisms and zone of inhibition			
		Gram-Negative bacteria		Gram-Positive Bacteria	
		<i>Pseudomonas aeruginosa</i>	<i>Escherichia coli</i>	<i>Staphylococcus aureus</i>	<i>Bacillus subtilis</i>
KC-01	10	12 mm	9 mm	19 mm	16 mm
KC-02	10	13 mm	9 mm	10 mm	12 mm
Standard (penicillin)	10	10 mm	18 mm	10 mm	19 mm

mm= millimeter

Patch test results:



1 [A]



1 [B]

Figure 1[A] and [B]: Before and after applying Hair removal cream (KC-01)



2[A] 2[B]
 Figure 2 [A] and [B]: Before applying Poly-herbal Hair removal cream (KC-02)

Determination of Particle size

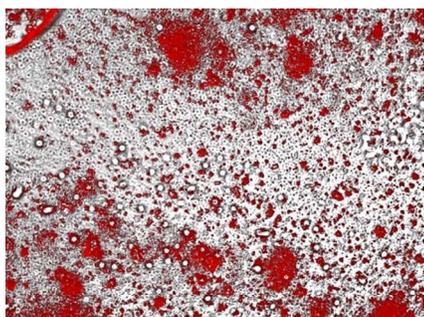


Figure 3[A]: Particles of Hair removal cream (KC-01)

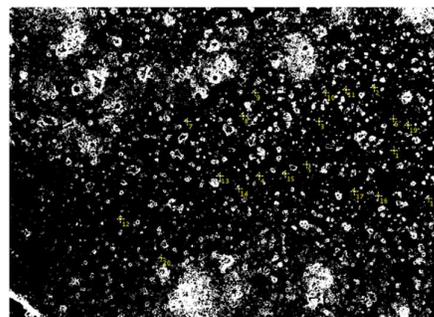


Figure 3[B]: Particle Measurement of hair removal cream (KC-01)

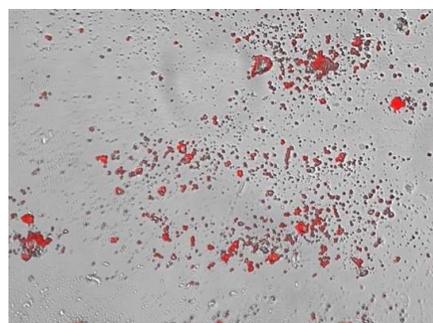


Figure 4[A]: Particles of Poly-herbal Hair removal cream (KC-02)

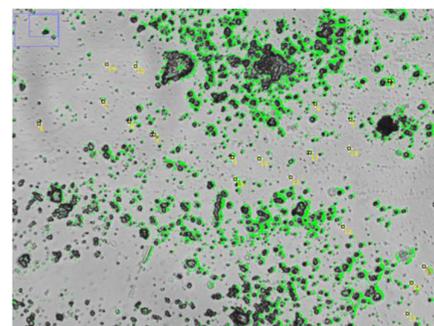


Figure 4[B]: Particle Measurement of poly-herbal hair cream (KC-02)

Sr No	Parameters	Results
1	Particle Size Measurements of Synthetic Hair Removal Cream (KC-01)	
a	Area	$20.79 \times 10^{-4} \text{ cm}^2$
b	Diameter	$4.56 \times 10^{-2} \text{ cm}^2$
c	Sphere Volume	$4.8 \times 10^{-5} \text{ cm}^3$
d	Radius	$2.28 \times 10^{-2} \text{ cm}$
2	Particle Size Measurements of Poly Herbal Hair Removal Cream (KC-02)	
a	Area	$12.76 \times 10^{-4} \text{ cm}^2$
b	Diameter	$6.362 \times 10^{-2} \text{ cm}^2$
c	Sphere Volume	$1.213 \times 10^{-3} \text{ cm}^3$
d	Radius	$3.181 \times 10^{-2} \text{ cm}$

DISCUSSION

The poly-herbal cream, featuring *Carica papaya*, *Cymbopogon citratus*, *Calendula* extract, and Calcium Thioglycolate, proved highly effective in reducing unwanted hair growth, offering a promising alternative to traditional depilation methods. Natural ingredients in the cream contributed to its efficacy and provided antiseptic benefits, appealing to users with sensitive skin. Positive user feedback, including ease of application and a pleasant scent, suggests high acceptability. Future research, including clinical trials, is needed to validate long-term effectiveness and safety. The development of herbal-based depilatory creams aligns with consumer preferences for natural and sustainable skincare options.

CONCLUSION

Based on the aforementioned investigation, it has been established that organic cream possesses depilatory attributes that lead to a reduction in both the quantity and quality of undesired hair. This subsequently diminishes the need for depilation treatments. Consequently, *Carica papaya* puree was successfully employed in formulating a poly-herbal depilatory cream. Throughout the developmental and evaluative phases, this poly-herbal hair removal cream demonstrated its efficacy in eliminating unwanted hair while maintaining the skin's well-being. The inclusion of natural constituents also aids in

skin hydration and nourishment, promoting a more seamless and healthier complexion.

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