

REVIEW ON INDUSTRIAL SCALE DEVELOPMENT OF A HERBAL DEPILATORY CREAM**K. Shalini^{*1}, Ashna Vinod², Silpa T. K.², Maneesha O.², Revathy Krishna², Bismida M.², Sujesh M.³, Bindu R.⁴**

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ABSTRACT

Herbal depilatory creams have emerged as a safe and effective alternative to chemical hair removal methods, offering both cosmetic and therapeutic benefits. Formulated with plant-derived ingredients such as papaya, turmeric, aloe vera, and neem, these creams not only facilitate painless hair removal but also nourish and protect the skin. Unlike conventional depilatories, herbal formulations minimize skin irritation, allergic reactions, and chemical exposure, making them suitable for sensitive skin. The use of herbal depilatory creams also contributes to overall skin health, with some ingredients providing antimicrobial, anti-inflammatory, and moisturizing effects. This article highlights the importance of herbal depilatory creams in modern personal care, discussing their mechanisms, benefits, safety considerations, and potential for widespread adoption in dermatological and cosmetic applications.

KEYWORDS: Formulation, Development, Herbal, Depilatory cream.

INTRODUCTION

Herbal depilatory creams are increasingly relevant in modern skincare due to their combination of effective hair removal and skin-nourishing benefits. Unlike conventional depilatories which rely on harsh chemical agents like thioglycolate salts and may cause irritation or burning, herbal formulations incorporate natural ingredients such as neem, turmeric, papaya, Aloe vera. These botanicals not only help loosen hair for painless removal but also soothe the skin, reduce inflammation, and offer antimicrobial protection-qualities especially valuable for sensitive skin types.^[1,2]

Studies have shown that herbal creams can provide similar efficacy with improved safety profiles; for instance, a formulation containing *Cyperus rotundus* oil demonstrated strong depilatory action and pH balance while avoiding harsh side effects. This aligns with research advocating the shift to herbal depilatories due to their efficacy, safety, and reduced adverse reactions, supporting their growing appeal in both consumer markets and research circles.

DEPARTMENTS INVOLVED IN INDUSTRY

- 1. Research & Development (R&D):** Focuses on formulation development, standardization of herbal ingredients and innovations
- 2. Quality control (QC):** Tests raw material, In-process material & finished products to ensure quality and consistency
- 3. Quality Assurance (QA):** Responsible for GMP compliance, SOPs, documentation, and internal audits.
- 4. Production / Manufacturing:** Executes large-scale production following SOPs and batch manufacturing records.
- 5. Regulatory Affairs:** Handles product registration, documentation, labeling regulations, and legal compliance (CDSCO, AYUSH).
- 6. Marketing & Sales:** Manages branding, promotions, and market analysis.
- 7. Supply Chain & Procurement:** Ensures timely purchase and delivery of raw materials and finished goods.
- 8. Human Resources (HR):** Manages staffing, training, and compliance with labor laws.

9. **Finance & Accounts:** Deals with budgeting, payroll, taxation, and expense tracking.
10. **Engineering & Maintenance:** Maintains all manufacturing equipment and utilities like water, electricity, and HVAC systems.
11. **Warehouse & Inventory Management:** Stores raw materials and finished goods, maintains stock levels and material movement records^[3]

EQUIPMENTS USED IN CREAMS

1. **Analytical & Pre-formulation Equipment-** Digital Balance, Mortar and Pestle, Sieve (Mesh #60 or #80).
2. **Mixing & Heating Equipment-** Beakers and Measuring Cylinders, Hot Plate with Magnetic Stirrer, Water Bath, Overhead Stirrer / Mechanical Stirrer.
3. **Cream Formulation Equipment-** Homogenizer / High-Speed Emulsifier, Ointment Slab and Spatula., Viscometer.
4. **Quality Control Instruments-** pH Meter, Texture Analyzer (optional), Centrifuge (optional).^[4,5]

FORMULATION STEPS AND APPROVALS

Formulation Steps

1. **Selection of Herbal Actives** Choose botanicals like Aloe Vera, Neem, Turmeric, Tulasi, Curcumin, etc.
2. **Pre formulation & Extraction**
3. **Cream Preparation.**
4. **Evaluation Parameters**
5. **Stability & Microbiology**
6. **Functional Assays**

Example: Turmeric-ginger-aloe cream tested for anti-inflammatory activity.^[6,7]

Approval and Regulatory process (INDIA)

1. Product Classification^[8]

Decide if it's a cosmetic or Ayurvedic proprietary medicine.

Cosmetic creams follow Drugs & Cosmetics Act, 1940 & Rules 1945.

2. Licensing

- Cosmetics: Apply via Form 31 Form 32 (State Drug Authority).

- Ayurveda: Apply for AYUSH license via Form 24-D.

3. Testing Requirements

Submit microbial, heavy-metal, preservative efficacy, and stability reports from certified labs.

4. Labeling Compliance

As per Rule 148: Ingredients, batch number, Mfg./Exp date, license number, manufacturer address.

5. Dossier & Approval

Submit dossier including formulation, specifications, stability/safety data, and labeling.

6. Post-Marketing Vigilance

Monitor and report any adverse effects or complaints

Evaluation of Environmental Control

Environmental control effectiveness is measured using several microbiological and particulate monitoring techniques

- a) Particle Count Method
- b) Slit to Agar Sampler Method
- c) Rodac Plates Method

Room Design Specifications

-To support the environmental controls.

-walls and ceiling should be smooth, on shedding, and easily cleanable.

-Epoxy or PU flooring is preferred for ease of cleaning.

-Air locks and differential pressure zones prevent cross contamination.

-Lighting and air handling should be flush mounted to avoid dust collection.

FORMULATON OF HERBAL DEPILATORY CREAM^[9,10]

Ingredients	Importance	Quantity
Turmeric powder	Antiseptic\Anti-inflammatory	1gm
Neem extract	Antibacterial	0.5ml
Tulasi extract	Antioxidant\soothing	0.5ml
Papaya powder	Proteolytic enzyme for hair weakening	2gm
Beeswax	Base\emollient	2.5gm
Cetyl alcohol	Emulsifier\stabilizer	1gm
Liquid paraffin	Base\oil phase	3ml
Orange oil	Fragrance	2-3 drops

HERBS USED IN DEPILATORY CREAM

1. TURMERIC POWDER^[11]

Constituents: Curcumin active compound, volatile oils, turmerones, and antioxidants.

Mechanism: Curcumin has anti-inflammatory and antimicrobial properties, which soothe the skin and prevent infections post-hair removal. It may slow hair regrowth by weakening hair follicles over time (follicular inhibition) due to its antioxidant effects.

Significance

*Reduces redness and irritation caused by depilation.

* Acts as a natural antiseptic, protecting the skin from post-depilation infections.

*Also enhances skin tone and provides a mild exfoliating effect.

2. NEEM EXTRACT

Constituents: Azadirachtin, nimbin, nimbidin, and essential oils.

Mechanism: Neem's antibacterial, antifungal, and anti-inflammatory properties help prevent skin infections and reduce irritation after hair removal. It may weaken hair follicles, potentially reducing hair regrowth over time. It also contains several bioactive compounds, such as nimbin, azadirachtin, quercetin and limonoids, which work together to provide multiple skin- protective and healing actions during and after the hair removal process.^[12]

Significance

- *Protects sensitive skin from microbial infections post-depilation.
- *Soothes irritation and prevents folliculitis inflammation of hair follicle
- *Neem extract prevents bacterial and fungal growth, protecting the skin from rashes, pimples, or folliculitis.
- *Hair removal may cause redness, irritation, or minor burns.
- * It has anti-inflammatory properties that help calm and soothe the skin after application.

3. TULASI(Holy Basil) EXTRACT

Constituents: Eugenol, ursolic acid, rosmarinic acid, and volatile oils.

Mechanism: Anti-inflammatory and antimicrobial properties reduce skin irritation and prevent infections. Antioxidant effects protect the skin from oxidative stress caused by chemical depilatory agents.^[13]

Significance

- *They calm sensitive skin and reduces redness post-depilation.
- *It enhances the creams soothing and healing properties.
- *Helps prevent infections and skin eruptions after hair removal when the skin more sensitive.
- *Powerful antimicrobial agents. This help prevent infection on freshly depilated skin, which is often more prone to microbial invasion due to open pores and mild abrasions.
- *Reduces skin inflammation and irritation.
- * Tulsi promotes the natural healing process of the skin.
- * Antioxidant protection.

4. PAPAYA POWDER

Constituents: Papain (proteolytic enzyme), vitamins A, C, and E, and antioxidants.

Mechanism: Papain breaks down keratin in hair, weakening the hair shaft and aiding in its removal. Exfoliates dead skin cells, improving skin texture post-depilation. Papaya powder contains a natural enzyme called Papin, which is responsible for its hair removal and skin benefits in herbal depilatory formulations.^[14]

Significance

- * Acts as a natural depilatory agent, complementing chemical depilatory ingredients.

* Promotes smoother skin by removing dead cells and preventing ingrown hairs.

* Acts as an emollient, emulsifier, and thickener in the cream, improving its texture and spreadability.

*It also hydrates the skin, preventing dryness caused by depilatory chemicals.

* It helps weaken the hair at the root, making it easier to remove without harsh chemicals

* They act as a skin brightening effect

5. BEESWAX

Constituents: Esters, fatty acids, and hydrocarbons.

Mechanism: Acts as a natural emollient and occlusive agent, locking in moisture and protecting the skin barrier. Beeswax in herbal depilatory cream functions mainly as a base, stabilizer, skin protector, and emollient.^[15]

Significance

- *Hydrates and softens the skin, counteracting the drying effects of depilatory chemicals.
- * Forms a protective layer, reducing irritation and sensitivity post-hair removal.
- *Prevents separation of oil and water phases in the formulation.
- * Forms a protective skin barrier. It also reduces trans epidermal water loss.

6. ORANGE OIL

Constituents: Limonene, citral, and other terpenes.

Mechanism: Provides a pleasant fragrance, masking the chemical odor of depilatory agents. It has mild antiseptic and anti-inflammatory properties, soothing the skin. May contribute to mild exfoliation due to its astringent effects.^[16]

Significance

- *Enhances the sensory appeal of the cream with a refreshing citrus scent. Also reduces irritation and supports skin healing post-depilation.
- *Adds a natural, uplifting element to the formulation.

FORMULATION AND DEVELOPMENT OF HERBAL DEPILATORY CREAM

1. Pre-formulation Studies^[17]

Pre-formulation studies are carried out to evaluate the physicochemical and biological properties of herbal ingredients and ensure stability, compatibility, and efficacy.

Identification of Active Herbs: E.g., *Curcuma longa* (Turmeric), *Ficus religiosa*

Physicochemical Properties: Solubility, pH, moisture content, particle size

Compatibility Studies: Herbal actives with base and excipients

Microbial Load Testing: To ensure safety and quality

Stability Screening: Under different temperature and humidity conditions

2. Method of Formulation

Step-by-step procedure

1. Selection of Herbal Actives: (e.g., turmeric for hair growth retardation)
2. Extraction: Using aqueous or hydro-alcoholic extraction methods
3. Preparation of Cream Base: Oil phase and aqueous phase prepared separately
4. Fusion: Oil and aqueous phases are mixed using heating and stirring
5. Incorporation of Herbal Extracts: Added at 40–45°C to avoid degradation
6. Addition of Fragrance/Preservatives: To enhance aesthetics and stability

7. Filling and Packaging: Filled into suitable containers and sealed

3. Role of Excipients and Additives

COMPONENT	ROLE	EXAMPLES
CREAME BASE	PROVIDE STRUCTURE & CONSISTENCY	SREARIC ACID, CETYL ALCOHOL
EMULSIFIER	STABILIZE OIL & WATER PHASE	GLYCERYL MONOSTEARATE, TWEEN 80
HUMECTANTS	RETAIN SKIN MOISTURE	GLYCERINE, PROPYLENE GLYCOL
PRESERVATIVES	PREVENT MICROBIAL GROWTH	METHYL PARABEN, PHENOXYETHANOL
pH ADJUSTERS	MAINTAIN SKIN – FRIENDLY pH (5.5-6.5)	CITRIC ACID, TRIETHANOLAMINE
FRAGRANCE	IMPROVE SENSORY ACCEPTABILITY	HERBAL ESSENTIAL OILS (eg: LAVENDER etc...)
COLORANTS (OPTIONAL)	ENHANCE VISUAL APPEAL	NATURAL COLORANTS (eg: CHLOROPHYLL)

IN PROCESS QUALITY CONTROL

In-process quality control ensures the consistency, safety, and efficacy of the formulation during manufacturing. It involves monitoring and testing at various stages of production.

1. Raw Material Inspection
2. Cream Base Preparation
2. Mixing of Herbal Extracts
4. Final Product Evaluation (Before Filling)
5. Filling and Packaging
6. In-Process Records & Documentation

LABELLING

Labelling is a critical aspect of regulatory compliance and consumer information. It must adhere to AYUSH and Drugs and Cosmetics Act guidelines in India.

Components of the Label

1. **Product Name:** E.g., Herbal Depilatory Cream
2. **Net Content:** Quantity in grams (e.g., 100 g)
3. **List of Ingredients:** Active herbal ingredients and excipients (in descending order or % w/w)
4. **Usage Instructions:** Direction for application and removal (Example: Apply evenly, leave for 5–7 minutes, remove with spatula, rinse thoroughly)
5. **Warnings/Precautions:** For external use only, Patch test recommended before use
Avoid contact with eyes and broken skin
6. **Storage Conditions:** Eg. Store in a cool, dry place away from sunlight
7. **Manufacturing Details:** Name and address of the manufacturer, manufacturing license number
8. **Batch Number:** For traceability and quality control
9. **Date of Manufacture (Mfg.) and Expiry Date (Exp.)**

10. MRP (Maximum Retail Price): Inclusive of all taxes

11. Regulatory Statement: "Herbal product – No harmful chemicals used" (if applicable)
"Marketed under Ayurvedic Proprietary Medicine" (if licensed accordingly)

QUALITY CONTROL, DOCUMENTATION AND FINAL REPORT

DOCUMENTATION

Documentation is a critical aspect of industrial production of depilatory cream to ensure quality, consistency, safety, and regulatory compliance. It involves recording every stage of production, including

- Raw Material Specifications: Details of herbal extracts, excipients, and additives used.
- Batch Manufacturing Records (BMR): Step-by-step procedures, quantities, equipment used, and process conditions.

Standard Operating Procedures (SOPs): Established methods for manufacturing, quality testing, cleaning, and handling.

Quality Control (QC) Reports: Test results for raw materials, in-process samples, and finished products.

Packaging and Labelling Records: Information on container types, labelling details, and batch numbers.

- Stability and Shelf-Life Data: Results from studies showing product performance over time.

Proper documentation supports traceability, audits, and continuous improvement in the production process.^[18]

CONCLUSION

The industrial development of herbal depilatory cream represents a growing shift toward safe, effective, and eco-friendly personal care products. Utilizing natural

plant-based ingredients, these formulations offer a milder alternative to synthetic depilatories, reducing the risk of skin irritation and allergic reactions. The development process involves detailed preformulation studies, selection of suitable herbal extracts with proven depilatory and skin-soothing properties, and incorporation of excipients for texture, stability, and shelf life. With increasing consumer demand for herbal cosmetics, this segment holds significant potential for innovation and market expansion, balancing efficacy with sustainability.

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