

Formulation and Evaluation of Herbal Beard Balm

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Abstract: In recent years, beards have gained popularity as a fashion trend, and many men are looking for ways to preserve and enhance the appearance and health of their facial hair. But keeping a beard healthy may be difficult since it has to be properly nourished and hydrated to avoid dryness, irritation, and itching. The personal care business has made the creation of natural and efficient beard care products a top goal in response to this increasing demand. The creation of a herbal beard balm using a variety of natural ingredients, such as coconut oil, almond oil, rosemary oil, kalonji oil, hard paraffin, yellow soft paraffin, extra pure paraffin, beeswax, emulsifying wax, aloe vera gel, glycerin, and vitamin E capsules, is described in this report [1]. The balm was designed to hydrate and feed the beard, encourage healthy growth, and reduce irritation. To guarantee stability, effectiveness, and customer acceptance, a number of trials were conducted to perfect the formulation. For men wishing to enhance the beauty and health of their beards, the resultant herbal beard balm provides a natural, efficient solution [2].

Keywords: Balms

I. INTRODUCTION

In recent years, beards have gained popularity as a fashion trend, and many men are looking for ways to preserve and enhance the appearance and health of their facial hair. But keeping a beard healthy may be difficult since it has to be properly nourished and hydrated to avoid dryness, irritation, and itching. The personal care business has made the creation of natural and efficient beard care products a top goal in response to this increasing demand. The creation of a herbal beard balm using a variety of natural ingredients, such as coconut oil, almond oil, rosemary oil, kalonji oil, hard paraffin, yellow soft paraffin, extra pure paraffin, beeswax, emulsifying wax, aloe vera gel, glycerin, and vitamin E capsules, is described in this report [1]. The balm was designed to hydrate and feed the beard, encourage healthy growth, and reduce irritation. To guarantee stability, effectiveness, and customer acceptance, a number of trials were conducted to perfect the formulation. For men wishing to enhance the beauty and health of their beards, the resultant herbal beard balm provides a natural, efficient solution [2].

1.1 INTRODUCTION OF BALM

Balms are semisolid formulations that are applied to the skin to offer medicinal effects, hydration, and protection [3]. They often include butters, oils, and waxes that form a barrier on the skin to transport active ingredients and stop moisture loss [4]. Because of their antibacterial, anti-inflammatory, and antioxidant qualities, herbal balms which contain natural extracts and essential oils have grown in popularity. These days, balms are frequently used in cosmetics, such as body, lip, and beard balms, which provide both practical and cosmetic advantages [5].

1.1.1 Beard Balm

Herbal beard balm is a semi-solid mixture that supports healthy skin below facial hair while nourishing it. Herbal beard balms, as opposed to synthetic ones, often consist of natural butters like cocoa butter, carrier oils like jojoba oil, and essential oils such as peppermint oil, beeswax, which has antioxidant, antimicrobial, and moisturizing qualities [6,7]. These components not only make the beard look better and be easier to handle, but they also may lessen the itching, relaxing, and skin irritation that are typically connected to beard growth [8].



1.2 EXTRACTION OF PEPPERMINT OIL USING A CLEVENGER APPARATUS

The Clevenger apparatus is a common setup that uses hydrodistillation to extract essential oils from plant materials such as *Mentha piperita* (peppermint).

1.2.1 Principle

Plant material is submerged in water and heated during the hydrodistillation process. Because of their immiscibility and density variations, volatile oils evaporate with steam, condense in a Clevenger arm, and are collected apart from water.

1.2.2 Materials Required

Fresh or dried peppermint leaves (100–200 g), 500 mL–1 L of distilled water, apparatus of the Clevenger type (oil separator, condenser, and flask), heated plate or heating mantle, grinder or mortar and pestle, separate funnel (not required), beaker and measuring cylinder.

1.2.3 Procedure:

A. Plant Material Preparation:

- To enhance surface area, crush or ground peppermint leaves roughly.
- Weigh the sample (200 g fresh or 100 g dry).

B. Setting Up the Equipment:

- Put the peppermint in a flask with a round bottom.
- To submerge the plant material, add 500–700 milliliters of distilled water.
- Attach the flask to the condenser and Clevenger equipment.

C. Hydrodistillation:

- Bring the mixture to a gentle boil.
- The volatile oil is transported to the condenser by steam as it develops.
- After condensing, the vapor enters the Clevenger arm, where water and oil separate.
- Distillation should be continued for two to three hours, or until no more oil is recovered.

D. Collection of Oil:

- Pipette out the essential oil using the Clevenger's side arm.
- To eliminate any remaining moisture, dry the oil using anhydrous sodium sulfate.
- Keep at a cold temperature in a dark glass container [9].

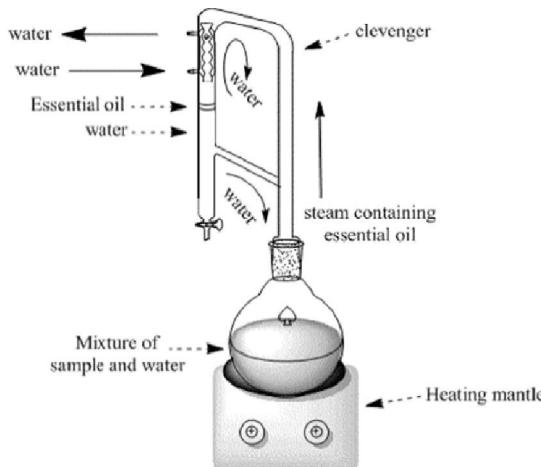


Figure- 1.1 Clevenger Apparatus [9]



1.3 TOPICAL DRUG DELIVERY SYSTEM

Topical drug delivery systems (TDDS) are a desirable alternative for both local and systemic drug administration because they provide a number of benefits over traditional oral or injectable methods. One of the main advantages is localized delivery, which minimizes systemic drug exposure and hence lowers the risk of systemic adverse effects by enabling the medication to function precisely at the site of application [10]. Topical administration guarantees that the therapeutic substance reaches high concentrations precisely where needed, increasing treatment results for illnesses including psoriasis, eczema, acne, fungal infections, or localized pain [11].

1.3.1 Benefits of Topical Drug Delivery System

- i. Steer clear of first pass metabolism.
- ii. Practical and simple to use.
- iii. Steer clear of danger.
- iv. The drawbacks of intravenous therapy and the various absorption circumstances, such as changes in pH, the presence of enzymes, the time it takes for the stomach to empty, etc.
- v. Continuous drug input to achieve effectiveness with a reduced total daily dosage of medication.
- vi. Prevent medication level fluctuations between and within patients [12].

1.4 HAIR

A keratinized filament that emerges from skin follicles is called hair. There are two primary components to it: The visible portion above the skin's surface is called the hair shaft.

Hair roots are located in the follicle of the skin.

I. Hair Shaft Layers

Three concentric layers make up the hair shaft:

A. Cuticle

- i. The outermost layer composed of scale-like cells that overlap.
- ii. Made of clear keratin.
- iii. Serves as a shield.
- iv. Mechanical protection and water content management are among its functions [13].

B. Cortex

- i. The thickest and middle layer.
- ii. Has melanin granules and keratin filaments.
- iii. In charge of color, flexibility, and strength.
- iv. Has microfibrils embedded in a high-sulfur protein matrix [14].

C. Medulla

- i. The central core, which fine hair may lack.
- ii. Has air gaps and keratin that is loosely packed.
- iii. Support for structure [13].

II. Anatomy of Hair Roots and Follicles

A. Hair Follicle

- i. An epidermal-derived tubular structure that penetrates deeply into the dermis or subcutis.
- ii. Envelops the root of the hair.

1.4.1 Elements

- i. The developing hair is supported and shaped by the Inner Root Sheath (IRS).
- ii. The outer root sheath (ORS), which runs the length of the epidermis.
- iii. The dermal papilla controls the cycle of hair development and contains nerves and capillaries.
- iv. The hair shaft and IRS are produced by matrix cells, which are actively proliferating cells [15].

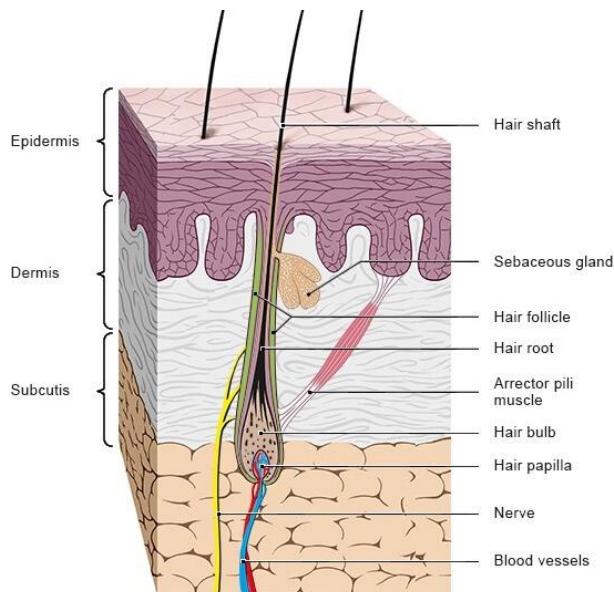


Figure- 2 Structure of Hair [16]

THE HAIR CYCLE

There are four main stages:

Growth Phase, or Anagen

Duration: 2–7 years (scalp hair); depends on heredity and body location.

Activity: Hair shaft elongation due to active mitosis in the hair matrix.

Hair Qualities: Thick, pigmented, and firmly embedded in the dermis.

Follicle Depth: Deep inside the subcutis or dermis.

85–90% of scalp hair is present [17].

2. The Regression Phase, or Catagen

Time frame: Two to three weeks.

Activity: Follicle involution caused by apoptosis.

Features: Dermal papilla detaches, lower follicle decreases, and mitosis ceases.

Hair Features: Hair separates from the dermal papilla and pigmentation ends [18].

3. The resting phase, or telogen

Time frame: Three months.

Activity: Follicle lies close to the skin's surface during the quiescent period.

Features of Hair: Club hair stays attached in the follicle and is fully keratinized and does not grow.

10–15% of the scalp is hair [19].



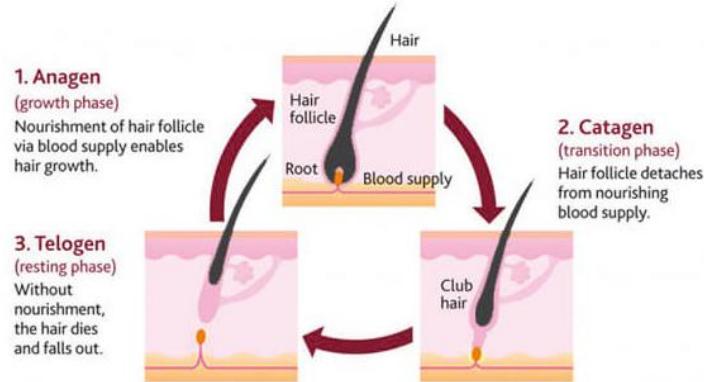


Figure- 3 Hair Growth Cycle [20]

1.6 BEARD BALM'S MODE OF ACTION

In order to improve beard health, manageability, and attractiveness, herbal beard balm targets both the hair shaft and the underlying skin through a mix of physical, chemical, and biological effects.

Hydration and Moisturization

Triglycerides and fatty acids are abundant in natural butters like cocoa butter and carrier oils like jojoba and almond oil. By forming an occlusive barrier on the skin and beard hair, these molecules improve moisture retention and lower trans epidermal water loss (TEWL). Coarse beard hair is softened by this moisture, which makes it easier to handle and less likely to break [21].

Styling and Sealing

Beeswax serves as a natural sealant and is a typical basis ingredient in beard balm. It creates a thin, pliable layer on the surface of the hair that helps retain moisture and provides a gentle grip for style. This reduces frizz and gives the beard a polished appearance [22].

Repair and Nourishment

Rich in antioxidants and vitamins, especially vitamin E, carrier oils like jojoba and argan help strengthen the hair shaft, heal damaged cuticles, and restore luster. These nutrients support the skin's barrier function and guard against irritation or dryness [23].

Anti-inflammatory and Antimicrobial Properties

Essential oils with antibacterial and anti-inflammatory properties include tea tree, lavender, and rosemary. By lowering the chance of folliculitis, dandruff, or itching underneath the beard, these activities enhance the general health of the skin [24, 25].

Improved Blood Flow

When used topically, certain essential oils, including eucalyptus or peppermint, have modest rubefacient effects that improve local blood flow. Better beard growth may be encouraged by improved circulation, which can support healthy hair follicle activity [26].

1.6.1 Benefits of Beard Balm:

- It nourishes and moisturizes the skin underneath the beard, leaving it smooth and glossy.
- Giving the beard a modest grip and shaping effect that makes it appear well-groomed.
- Promoting a fuller, healthier-looking beard by increasing hair thickness and stimulating hair growth.
- Preventing environmental harm to the skin and hair, such as pollution and sun exposure.
- Calming and lessening skin irritation and redness, resulting in reduced itching and discomfort.
- Keeping the skin and beard healthy by preventing infections since certain substances have antibacterial and anti-inflammatory qualities [27].



- vii. Preventing dryness and flakiness by drawing and holding moisture to the skin and hair.
- viii. Repairing damaged skin and hair because some substances, such vitamin E and aloe vera, have healing qualities [6].

1.7 METHOD OF APPLICATION

Using clean hands or tiny applicators, the balm can be administered directly to the skin. Here are a few typical ways to apply balm:

- i. Start by cleaning your beard: The beard should be clean and slightly moist (but not wet) before applying balm. To improve the balm's absorption, wash the beard with a mild, natural shampoo to get rid of debris, perspiration, and extra oil [28].
- ii. Take a Small Amount: Take a tiny bit of balm—roughly the size of a pea for short beards or a dime for larger beards. A small amount goes a long way since herbal balms contain rich natural butters and waxes [29].
- iii. Warm the Balm Between Your Hands: To melt and soften the balm, rub it between your hands or fingers. For shea butter and beeswax to apply uniformly on the skin and hair, they must be gently warmed [22].
- iv. Apply to Skin and Beard: Work your way from the base of the beard, close to the skin, to the tips by massaging the melted balm into it. To avoid dryness and flakiness, concentrate on evenly applying the cream while nourishing the skin beneath [21].
- v. Comb or Brush for Even Distribution: Smooth the beard into position, untangle knots, then apply the balm evenly using a beard comb or brush. In addition to improving product penetration, this step promotes better hair development by increasing circulation in the skin underneath [30].
- vi. Style as Desired: Lastly, shape and style your beard [23].

II. AIM AND OBJECTIVE

2.1 Aim:

To create and assess a herbal beard balm with natural ingredients that have antibacterial, conditioning, and skin-soothing qualities in order to support healthy skin and beard development.

2.2 Objective:

- i. To choose and standardize herbal ingredients (such as coconut oil, shea butter, jojoba oil, beeswax, and essential oils like tea tree or rosemary) that are recognized to have hair moisturizing, growth-promoting, antibacterial, and anti-inflammatory qualities.
- ii. To create a stable beard balm with the right excipients (such as butters and waxes) to guarantee acceptable spreadability, consistency, and user acceptance.
- iii. To assess the balm's physicochemical characteristics, such as its appearance and color, spreadability, melting point, pH, viscosity, and stability under various storage circumstances.
- iv. To use agar well diffusion or comparable techniques to evaluate the balm's in vitro antimicrobial effectiveness against skin and hair-related infections.
- v. To do a sensory analysis and user acceptance study for characteristics including overall satisfaction, texture, scent, and non-greasiness.
- vi. To guarantee that the formulation is free of dangerous synthetic compounds, allowing it to be used topically on the skin and hair of the face on a regular basis.

III. MATERIAL AND METHOD

3.1 Coconut Oil (7ml):

- i. For generations, people have used coconut oil, a natural oil, to encourage hair development.
- ii. It contains a lot of medium chain fatty acids, which nourish hair from the inside out by penetrating the hair shaft.
- iii. Additionally, vitamin E, which helps strengthen hair and lessen hair loss, is found in coconut oil [31].





Figure- 3.1 Coconut Oil

3.2 Almond Oil (5ml):

- Rich in vitamins and minerals that are necessary for healthy hair growth, almond oil is a natural oil.
- It has a lot of vitamin E, which can strengthen hair follicles and lessen breakage.
- Additionally, fatty acids included in almond oil help hydrate and nourish the scalp and hair, encouraging healthy hair growth [32].



Figure- 3.2 Almond Oil

3.3 Peppermint Oil (2 Drops):

- Hair development is encouraged by this essential oil.
- It has antioxidants that support healthy hair development by boosting blood flow to the scalp [33].



Figure- 3.3 Peppermint Oil

3.4 Kalonji Oil (3ml):

- Black seed oil, or kalonji oil.
- The Nigella sativa plant's seeds are used to obtain this extremely concentrated oil.
- It can encourage healthy hair development, lessen dandruff and other scalp issues, and give hair more luster and smoothness.
- Encourage the growth of healthy hair and give it a sheen and smoothness [34].



Figure- 3.4 Kalonji Oil



3.5 Castor Oil (5ml):

- Contains fatty acids and antioxidants that soften your beard and hydrate your skin.
- It makes it simpler to style and more glossy [35].

3.6 Beeswax (4gm)

- The honeycomb of honeybees and other bees is used to make beeswax.
- In cosmetics, yellow and white beeswax are utilized as thickeners, emulsifiers, and stiffening agents [36].

**Figure- 3.6 Beeswax****3.7 Emulsifying Wax (1gm)**

- Oil-in-water emulsions are made with Emulsifying Wax NF, a full emulsifying wax obtained from vegetables.
- Depending on the concentration, it can be employed to create thick or thin emulsions.
- It gives balm a smooth consistency and is a deep moisturizer [37].

**Figure- 3.7 Emulsifying Wax****3.8 Aloe Vera Gel (10gm)**

- Aloe vera is a naturally occurring plant with therapeutic qualities.
- It has enzymes that can support healthy hair development and aid in the restoration of damaged hair.
- Aloe vera may be included into hair care products or used straight to the scalp as a conditioning therapy [38].

**Figure- 3.8 Aloe Vera Gel****3.9 Vitamin E Capsules (2gm)**

- Oils and fats in cosmetic goods should be stabilized to avoid rancidity.
- It has hydrating and calming effects on the skin and is an antioxidant [39].

3.10 Paraffin wax (4gm)

- Barrier-forming



3.11 Petroleum Jelly (6gm)

- Protects the skin.

3.12 Liquid paraffin (1gm)

- Moisture-sealing

3.13 Glycerin (7ml)

- Humectant [36].

3.14 Formulation of Beard Balm

- Carrier oils:** These oils act as the balm's foundation and aid in the skin's absorption of the active ingredients. Coconut oil, olive oil, jojoba oil, and sweet almond oil are a few popular carrier oils utilized in balm compositions [40].
- Beeswax:** This natural wax is frequently utilized to help thicken and solidify balm compositions. Additionally, it helps to lock in moisture and gives the skin a protective layer [41].
- Essential oils:** Because of their medicinal qualities, essential oils—highly concentrated plant extracts—are used to balms. Tea tree oil and peppermint oil are two typical essential oils used in balm compositions [42].
- Vitamin E:** A natural antioxidant, vitamin E is frequently added to balms to help shield the skin from harm brought on by free radicals [43].

3.15 PROCEDURE

- Weigh each item precisely in accordance with the recipe.
- Melt the liquid paraffin and paraffin wax, then dissolve the petroleum jelly, beeswax, and emulsifying wax.
- Next, include almond, peppermint, coconut, and kalonji oils.
- Next, whisk the mixture thoroughly after adding the vitamin E pills and aloe vera gel.



Figure- 3.9 Solidified beard balm

3.16 Beard Balm Evaluation Parameters

- pH measurement:** A pH meter was used to measure the balm's pH at 25 °C.
- Phase Separation:** A suitable wide-mouth container was used to transport the produced balm. After 24 hours, the oil phase and aqueous phase separation were assessed after being set aside for storage [44].

IV. RESULT
4.1 Evaluation Parameter Outcome

Table- 4.1 Evaluation Parameter Result

S.NO.	PARAMETERS	RESULT
1.	Colour	Yellowish
2.	Odour	Aromatic
3.	PH	6.0
4.	Texture	Smooth



4.2 Product completion and label

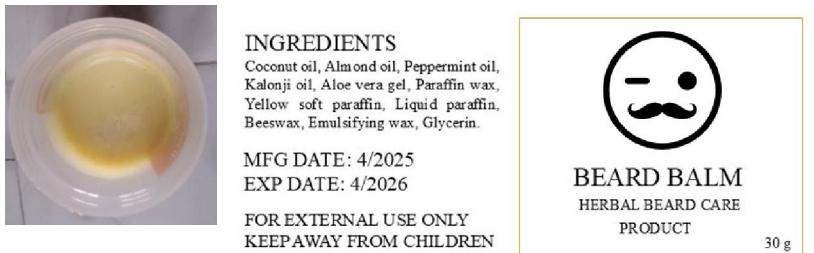


Figure- 4.1 Product completion and label

V. CONCLUSION

In summary, the creation and assessment of the herbal beard balm have shown its effectiveness and safety as a complete beard care solution. Coconut oil, almond oil, peppermint oil, kalonji oil, and aloe vera gel are among the carefully chosen components that provide a variety of advantages for the beard and underlying skin. It has been discovered that the balm successfully hydrates and nourishes the beard, giving it more manageability, softness, and gloss. A fuller and healthier-looking beard is encouraged by the use of rosemary and kalonji oils, which promote hair growth. Aloe vera gel has calming qualities that lessen skin inflammation and redness. Crucially, the herbal beard balm has been judged safe for usage after thorough testing, guaranteeing the user's wellbeing. All things considered, this formulation offers a comprehensive approach to beard care and grooming by addressing several facets of beard health.

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