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Formulation and assessment of herbal hair gel: A natural solution for men's hair care

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Abstract

This study aims to formulate and evaluate a herbal hair gel specifically tailored for men. The formulation process involved selecting natural herbal ingredients known for their hair nourishing and styling properties, such as flax seeds, Almond oil, Various formulations were prepared and assessed for their viscosity, spreadability, pH, stability, and sensory attributes. The finalized formulation exhibited desirable characteristics, including optimal viscosity for easy application, good spreadability, suitable pH for scalp health, and pleasant aroma. Additionally, the herbal hair gel was subjected to stability studies to ensure its efficacy over time. Overall, the developed herbal hair gel presents a promising solution for men seeking a natural and effective hair styling product with added benefits for hair health.

Keywords: Herbal hair gel, men's grooming, natural ingredients, formulation, evaluation, hair care, scalp health, stability studies, sensory attributes

Introduction

Flaxseed (also known as linseed) is emerging as an important functional food ingredient because of its rich contents of α -linolenic acid (ALA, omega-3 fatty acid), lignans, and fiber. Apart from this, flaxseed is full of fatty-acids and anti-oxidants which help to remove toxins and dead cells from the scalp. Flax seed gel can be applied to scalp and hair as a moisturizer that can help to stimulate growth and improve the strength of existing hair. Topical formulations include oils, creams, ointments, pastes and gels out of which gels are getting more popular now a day because they are more stable and also can provide controlled release than other semisolid preparations.

Almond oil

- **Helps in softening and conditioning the hair:** The emollient properties of almond oil help retain the moisture in the hair. When applied to the hair ends it helps in reducing the frizz or dryness^[10].
- **Reduces dandruff of flaky scalp:** Almond oil helps in reducing the dryness of the scalp by moisturizing it, thus helps in relieving the itchiness of scalp.
- **May promote hair growth:** Almond oil contains biotin which is touted to be beneficial for hair growth. It is naturally found in almond oil and regular use of the same might help in promoting hair growth.
- **Helps in strengthening and repairing the hair:** As stated earlier, Almond oil contains vitamin E, which is a natural antioxidant. The antioxidant combats the environmental stress around the hair, thereby strengthening them.

Rosemary oil

Rosemary oil is easily known as the ultimate hair tonic. It not only controls hair loss but also prevents premature greying, gives your hair a thicker and fuller look, improves texture, and imparts shine and luster.

The two most common side effects are allergic reactions and skin irritations. To avoid these, we would recommend doing a patch test on a small section of your scalp.

Introduction of Hair

Hair, an important part of our body, not only possesses aesthetic significance in our culture, but also offers protection. Hair fibers have a typical hierarchical structure similar to other α -keratin materials, such as wool, nails, claws, and horns present in mammals. A typical hair fiber has a diameter of 50–100 μm and is covered by an outermost layer, the cuticle. The cuticle consists of thin overlapping scales. Each scale has an average length of 60 μm and a thickness of about 0.5 μm . Furthermore, 5–10 such scales overlap to create a total thickness of $\sim 5 \mu\text{m}$. The morphology of the cuticle edges is thought to be affected by weathering, combing, and brushing, with more severe damage seen on long hair fibers.

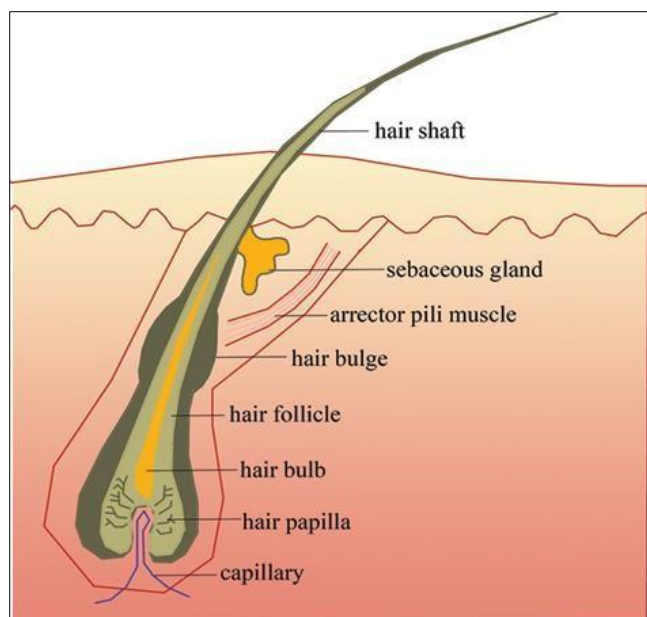


Fig 1: Anatomy of hair

Common names of flax seeds

Flax seed, linseed, Alsi or teesi (Hindi, Gujarati, and Punjabi), Ali vidai in Tamil, Atasi and Jawas in Marathi, Tishi in Bengali, Pesi in Oriya, Agasi in Kannada, Aviseginzalu in Telugu, and Cheru chana vithu in Malayalam [22].

Biological Source

Linseed is the dried, ripe seed of *Linum usitatissimum* Linn. Linseed oil is obtained by expression of linseeds, belonging to family Linaceae.

Scientific name: *Linum usitatissimum*

Kingdom: Plantae

Order: Malpighiales

Family: Linaceae

Genus: *Linum*

Species: *L. usitatissimum*

Benefits of flaxseed hair gel

Flaxseed gel helps hair grow faster and longer by providing nourishment to the hair follicles," explains Celeste Arnold, senior stylist and owner. The presence of vitamin E in flaxseed provides nutrition to the scalp and reduces free radical damage.



Fig 2: Flax seeds

For curly hairs

Flaxseed gel is amazing at creating nice curl clumps to reduce frizz," says Arnold. "Clumping is an area many struggle with, especially when first embracing their curls. Flaxseed gel helps clumps come together easier than other styling products, and this in turn, greatly reduces frizz.

The vitamin E present in flaxseed plays a significant role in fending off damage. It's known to combat free radicals and reduce scalp inflammation. Additionally, it can increase elasticity in the hair while adding shine.

Flaxseed gel is specifically beneficial for curly or wavy hair, as it doesn't harden too much but gently defines and moisturizes the hair, giving it movement.

For hair growth

Flaxseed contains trusted Source a powerhouse mix of vitamins, nutrients, and healthy fats, all of which may help to:

- Treatment of scalp
- Prevent hair loss
- Promote hair growth Flaxseed is packed with nutrients and has several hair and health benefits due to its makeup of:
 - Protein
 - Omega-3 fatty acid
 - Fiber
 - Vitamin E
 - Lignans or bio active compound
 - Vitamin B
 - Magnesium
 - Manganese
 - Selenium

Functions of hair gel: Hair gel is a versatile styling that has been used by both men and women for years.

- **Hold and control:** - Hair gel is a thick and viscous product applied to the hair to provide grip and control for various hair style.
- It contain ingredients such as water, flax seeds, Carbopol, methyl paraben, rosemary essential oil, triethanolamine.
- **Texture and volume:** - It can add texture and volume to fine or thin hair.

- **Environment protection:** - Hair gels polymers create a barrier around the hair shaft, shielding it from environment element like humidity and wind. This is beneficial for those living in humid climates or spending time outdoors.
- **Drawback of hair gel:** Some hair gels, especially those containing alcohol, can dry out of the hair by depleting its natural oils. This may worsen dry or damaged hair.
- **Build up:** Over time, hair gel can build up on the scalp and hair shaft, leading to an oily or sticky feeling. This buildup may contribute to dandruff or an itchy scalp.

Tips for safe use

- **Choose wisely:** Select a hair gel that suit your hair type. Look for alcohol-free option with moisturizing component like *Aloe vera*, glycerin, for dry or damaged hair.
- **Apply sparingly:** Remember that a little hair gel goes a long way. Start with a small amount and add more if need.
- **Even application:** Apply the gel evenly throughout your hair to avoid clumps or uneven spots.
- **Thoroughly wash:** After using hair gel, thoroughly wash your hair to remove any build up or residue.

Table 1: Ingredients and its properties

Sr. No.	Ingredients	Category
1.	Flaxseed extract	Anti-Bacterial & Anti-Fungal
2.	Almond oil	Help to shiny hair
3.	Rosemary	Fragrance
4.	Triethenolamine	pH adjuster
5.	Carbopol 940	Gelling agent
6.	Methyl paraben	Preservative
7.	Glycerine	Moisturizing agent
8.	EDTA	Water purifying agent

Herbal ingredients and there uses

Almond oil: Use for the protection of hair.



Fig 3: Almond oil

Rosemary oil: Help in the Re- growth of hairs.



Fig 4: Rosemary oil

Plan of work

Properties of chemical ingredients

Carbopol 940: Carbopol polymer have been used in combination with film forming materials for taste-masking coating composition.



Fig 5: Weighing of Carbopol

Methyl Paraben: It is a type of paraben. Parabens are chemicals that are often used as preservatives to give products a longer shelf life.



Fig 6: Weighing of methyl paraben

Triethenolamine: -Use for the ph adjustment of hair gel.



Fig 7: Measuring of triethanolamine

- Add Carbopol with continue stirring
- Check the pH of the solution
- Add triethanolamine with continue stirring
- Add methyl paraben as a preservative
- Add Rosemary essential oil
- Clear gel was prepared

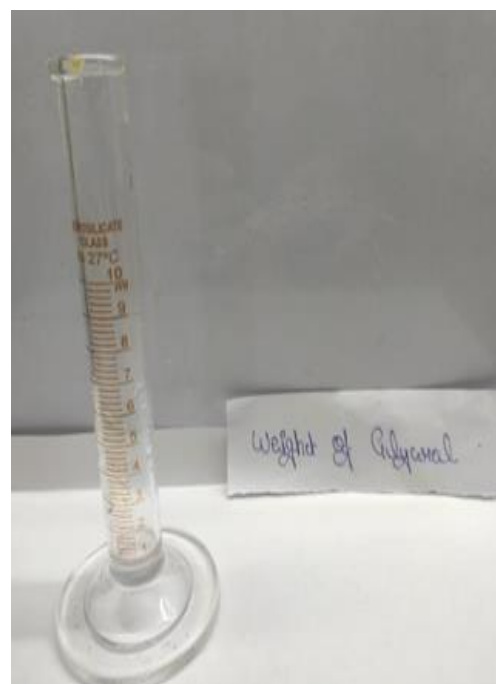


Fig 8: Weighing of glycerol

Glycerol: Use for the moisturization of scalp.

Materials and Methods

- Boil water on heating mantle.
- Add EDTA with continue stirring.
- Add (API) flaxseed in water
- Boil flaxseed on heating mental
- Filter flaxseed gel with cotton cloth
- Add glycerol with continue Stirring



Fig 9: Preparation of Hair Gel

Evaluation parameters

- **Physical properties:** The physical appearance was visually checked for the appearance, colour and the odour application of prepared base gel formulations.
Color - White
Odor - Rosemary
- **pH determination:** The pH of all hair gel formulations were determined by using the digital pH meter. One gram of gel was dissolved in 100 ml distilled water and stored for two hours. Electrodes were completely dipped into the hair gel formulations and pH was noted. The measurement of pH of each formulation was done in triplicate and average values were calculated.

Result

The pH of all base formulation ranged between 6.7 to 7.3, Hair gel pH is 6.45.

Spreadability test: The Spreadability is term express to denote the extent of area to which the paste readily spreads on application area. One of the criteria for a paste to meet

ideal quality is that it should possess good spreadability. About 1 gm of hair gel was weighed and kept at the center of the glass plate (10 x10 cm) and, another glass plate was placed over it carefully. 100gm weight was placed at the center of the plate (avoid sliding of the plate). The diameter of the paste in cms, after 15 min. was measured.



Fig 10: pH determination using digital pH meter



Fig 11: Measure the Spreadability of gel

1. **Homogeneity:** After the gel formulations have been set in the container, all developed gels were tested homogeneity by visual inspection. They were tested for their appearance and presence of any lumps, flocculates or aggregates.
2. **Stability studies:** The formulated gel was filled within the collapsible tubes and stored at room temperature and 40 °C at 75% RH. The three-month stability assessment was carried out. The parameters like appearance, pH, homogeneity, viscosity, and spreadability were tested every month.
3. **Wash ability:** The prepared hair gel formulation is applied on the skin and then ease and extent of washing with water is checked normally.

Results and Discussion

The polyherbal hair gels formula was assessed at many parameters. Visual inspection was performed for every organoleptic property, including color, odor, homogeneity, and appearance. Consequently, the color was perceived as white. The texture and uniformity of the preparation on the discovered skin were examined using particals. The normal wash ability quality were discovered, as it washes of easily with regular water. The formulation pH was examined and determined to be skin friendly (pH-6.45). Glass plates were used to access the spreadability qualities & the result showed that the preparation was easily spreadable. Apply small quantity on the dorsal part of the hand, checks for irritation and redness & the result was redness and itchiness are absent.

Table 2: Test & Results

S. NO.	TEST	RESULT
1.	Physical properties	White color, rosemary fragrance
2.	pH	6.45
3.	Spread ability	Easily spreadable
4.	Homogeneity	Good
5.	Skin irritation	No irritation
6.	Washability	Normal

Conclusion

The use of polyherbal gels for pharmaceutical applications is attractive because they are economical & readily available nontoxic capable of chemical modifications, potentially biodegradable, & with few exceptions, also biocompatible. Natural gel can also be modified to have tailor made products for drug delivery systems & thus can compete with synthetic excipients available in the market. Hence with the huge scope of research in the present study flax seeds is used as a natural gelling agent & it is incorporated with almond oil for the preparation of Herbal hair gel. The work justifies all the Evaluation parameters & the resultant value lies within the standard limits.

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