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Short Communication Article

Formulation and Evaluation of Polyherbal Hair Gel

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ABSTRACT

The aim of this study was to formulate and evaluate herbal hair gel containing aloe vera, flaxseed, and fenugreek seed extracts, with Carbopol serving as the gelling agent. Three formulations with varying Carbopol concentrations were prepared and evaluated based on parameters such as colour, odour, viscosity, spreadability, homogeneity, and stability. Among the formulations, F2 demonstrated superior stability and homogeneity compared to the others. The results suggest that this polyherbal hair gel could serve as a promising alternative to commercial products, with potential for further pharmacological investigation.

INTRODUCTION

Polyherbal therapy, which combines various herbs, has a long history in Chinese medicine and shows promise in modern healthcare by mirroring successful combination therapies in Western medicine, especially for cancer and infectious diseases[1]. Although scientific evidence remains limited, combining multiple herbs can enhance therapeutic effects[2]. Advanced processing techniques, such as gel formulations, improve skin absorption with fewer side effects by optimizing interactions like mutual enhancement, assistance, or restraint. Hair, a vital part of the integumentary system, serves as a protective appendage. Alopecia, affecting 0.2% to 2% of the population, is commonly treated with minoxidil, but its side effects have led to growing interest in plant-based alternatives like aloe vera[3]. Dandruff, caused by factors such as oily scalp, fungal infections, and poor hygiene, leads to itching, flakes, and potential hair loss[4]. Hair loss, impacting about 50% of adults globally, causes significant distress, with hormonal, genetic, and medication-related factors playing key roles[5]. This study aims to develop a polyherbal hair gel to promote hair growth, reduce dandruff, and prevent hair fall. Natural herb-based remedies are increasingly popular due to their affordability, safety, and effectiveness, offering

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minimal side effects and holistic benefits, making them a preferred choice for hair care solutions[6,7].

MATERIALS AND METHODS

Materials

The fresh aloe vera leaves were harvested from the local area of Nipani. The flaxseeds and fenugreek seeds were purchased from the local market of Nipani. Carbopol, Methylparaben, Glycerine, Polyethylene Glycol, Triethanolamine and all other chemicals and reagents required for polyherbal formulation were obtained from store house of KLE College of Pharmacy, Nipani.

Method

Preparation of Extracts

Aloe vera Extract – Aloe vera gel was extracted using a simple draining method, where 2-4 leaves were trimmed about half an inch from the base to allow the yellow sap to drain out completely.

The mucilage was stirred vigorously in a blender to make it uniform. This solution was strained through a muslin cloth and filtered and the filtrate is stored for further use.

Flaxseeds Extract - The flax seed extract was prepared by boiling 2gm of flax seeds in 5oml of distilled water. A thick mucilage was produced through continuous stirring. The mucilage was then filtered through muslin cloth, collected, and stored for later use[8].

Fenugreek Extract - A 10-gram portion of finely ground fenugreek seed powder was measured, and 50ml of ethyl alcohol was added. The mixture was stirred continuously for 30 minutes, then left at room temperature for 24 hours before filtering. The filtered solution was then stored for future use[9].

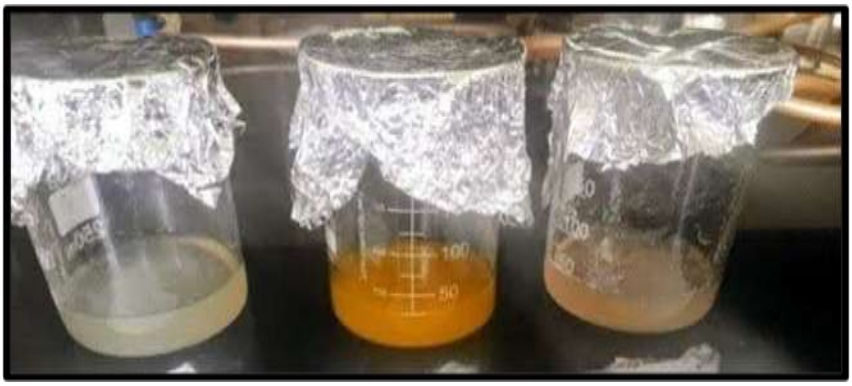
Procedure

1. Measured quantity of polyethylene glycol, glycerine, methyl paraben dissolved in 35ml of water taken in 250ml beaker.
2. The above mixture was then stirred at high-speed using a mechanical stirrer.
3. The measured amount of Carbopol 934 was gradually added to the beaker containing the liquid mixture, while stirring continuously.
4. Next, triethanolamine was slowly added with continuous stirring until gel- like consistency was achieved.
5. Measured quantity of aloe vera extract, flaxseed extract and fenugreek extract were added to above mixture[10].

Formulation Table

Table 1. Formulation of polyherbal hair gel

Sr. No.	Ingredients	Formulations		
		F1	F2	F3
1	Flaxseed extract (ml)	1	1	1
2	Aloe vera extract (ml)	2	2	2
3	Fenugreek seed extract (ml)	1	1	1
4	Carbopol (g)	0.5	0.75	1
5	Methyl paraben (g)	0.04	0.04	0.04
6	Glycerine (ml)	1.5	1.5	1.5
7	PEG (ml)	3	3	3
8	Triethanolamine (ml)	0.25	0.25	0.25
9	Water (ml)	41	41	41



a b c

Figure 1 a-Aloevera extract, b- Fenugreek extract, c-Flaxseed extract

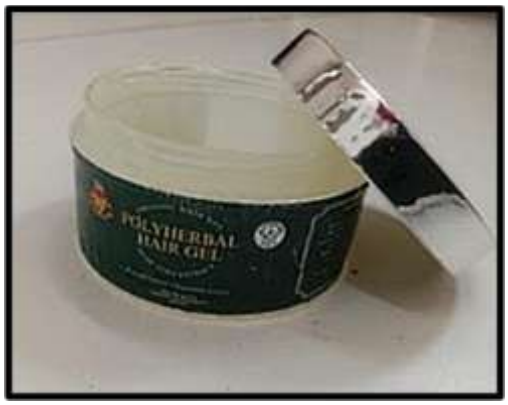


Figure 2 Formulated Polyherbal Gel

EVALULATION

Physical Appearance: Gels were optically evaluated for clearness, colour and gel texture.

Homogeneity: The developed gels were tested through visual inspection for appearance, lumps, and aggregates, as well as by feeling the gel between the thumb and forefinger to check the consistency.

pH Measurement: An automated pH meter was used to measure the pH of each hair gel formulation. One gram of the gel was mixed with 100 ml of distilled water, left to stand for 2 hours, and the pH was recorded after taking three separate measurements to calculate the average value.

Viscosity Measurement: The viscosity of hair gel was determined using a Brookfield viscometer, with spindle number 6 rotating at 100 rpm. Measurements were taken after allowing the sample to stabilize and reach equilibrium.

Spreadability: The formulation was applied between two glass slides, pressed to achieve a uniform thickness, and a 10g weight was placed on the pan. The time required for the top slide to move 10 cm was recorded, and spreadability was calculated using the formula:

Spreadability = weight attached to the upper slide / time taken to separate the slides × length of the glass slide[11].

Stability Studies: The stability study of the hair gel was conducted at 25°C-30°C for 30 days, observing parameters like physical appearance, homogeneity, pH, viscosity and spreadability. The viscosity and spreadability of F2 batch was found optimum with good homogeneity, physical appearance and negligible pH change[12]

Table 2. Evaluation of polyherbal hair gel

Formulation	Physical Appearance	Homogeneity	pH	Viscosity	Spreadability
F1	Translucent, colourless, smooth	Good	6.6	9361 ± 0.002	12
F2	Translucent, colourless, smooth	Good	6.8	9370 ± 0.002	14.8
F3	Translucent, colourless, smooth	Good	6.9	9379 ± 0.003	15.6

After 30 days (Stability study results)					
F1	Translucent, colourless, smooth	Good	6.0	8549 ± 0.002	13
F2	Translucent, colourless, smooth	Good	6.9	9261 ± 0.002	15
F3	Translucent, colourless, smooth	Good	7.5	8768± 0.003	15.9

CONCLUSION:

Hair gels with natural ingredients like flaxseed, aloe vera, and fenugreek show promising results in reducing hair fall and dandruff while also help to repair damage caused by chemicals in commercial products. All formulations yielded satisfactory results, but F2 demonstrated the best gel consistency. Therefore, the polyherbal hair gel offers a safe and effective alternative to existing market products, with potential for further pharmacological exploration.

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