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DEVELOPMENT AND EVALUATION OF BANAYAN ROOTS HERBAL HAIR GEL WITH COMBINATION OF REETHA

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ABSTRACT

Herbal hair care, rooted in the age-old wisdom of Ayurveda, has gained considerable recognition in contemporary hair care practices. One remarkable natural concoction leading this trend is herbal hair gel made from a fusion of Reetha (soapnut) and banyan tree root extracts. This abstract provides a concise overview of the unique properties and benefits of this extraordinary herbal hair gel. This research involes the collection of the excipients, extraction by soxhlet method of reetha and banayan roots and main drugs and their identification test and the preparation of herbal hair gel with their evaluation parameters. The prepared herbal hair gel gives better results as a natural prodeucts are used. For those looking for a natural and holistic approach to hair care, the herbal hair gel mixed with Reetha and Banyan tree roots offers a promising option, promoting both cosmetic and therapeutic benefits.

Keywords: Hair, Hair Gel, Banayan Tree Root, Reetha, Natural

INTRODUCTION

The search for natural hair growth treatments is on the rise due to the global increase in hair loss. Dermatological procedures are still being sought after **[1, 2]**. The process of creating herbal hair gel has become more and more popular as demand for chemical-free, natural hair care products rises. Herbal hair gel is made with extracts from (Sapindus mukorossi) Reetha (soapnut) and (*Ficus benghalensis*) banyan tree roots, two plant-based ingredients with several health and styling benefits. Herbal hair gel has grown in popularity recently due to its all-natural ingredients and potential

health benefits for hair. Herbal hair gel can be used for the following purposes: Hair protection, hair stimulation, hair nourishment, scalp health, and hair styling **[3]** Compared to synthetic hair gel, herbal hair gel has natural components, nourishing properties, less damage, and is environmentally friendly **[4, 5, 6]**. Herbal hair gel nourishes and hydrates hair, preventing dryness and increasing general hair health. It is enhanced with natural elements including banyan tree root extracts and Reetha **[7]**. Herbal hair gels, featuring banyan tree roots and Reetha, provide a chemical-free option for those prioritizing natural ingredients. These botanical elements enhance hair health without the need for artificial additives, making them suitable for sensitive skin **[8]**. Compounds with antibacterial and anti-inflammatory properties found in banyan tree roots help relieve and shield sensitive scalps from irritation **[9]**. *Ficus benghalensis* and Sapindus mukorossi were extracted using this method. Natural gums are a popular choice for use in therapeutic applications because they are affordable, readily available, nontoxic, chemically changeable, perhaps biodegradable, and, with a few exceptions, biocompatible. Ramakrishna S. *et al*. Natural gums, like guar gum, modified for drug delivery, prove competitive with synthetic excipients. In herbal hair gel, guar gum, combined with jatamansi extract, demonstrates promising results within acceptable limits **[10]**.

MATERIAL AND METHODOLOGY

Material

Ficus benghalensis, the botanical name for the roots of the Banayan tree, is a member of the Moraceae family. *Ficus benghalensis* is used in herbal hair gels to give hair a variety of benefits. Packed with vitamins and minerals, they hydrate hair to keep it from breaking and becoming dry while also encouraging hair growth and strength. Because these ingredients soothe irritation and reduce inflammation, they also support optimum scalp health **[11]**.

Banyan tree root extracts are used in traditional Ayurvedic hair treatment to strengthen and nourish hair while also improving its texture. These extracts give hair a more bright, natural look while also making it smoother and shinier **[12]**. The roots of the banyan tree, which are considered to strengthen and improve overall hair health, are used in traditional Ayurvedic and natural hair care practices. Nutrient-rich, these roots keep the hair and scalp nourished, avoiding dryness and preserving ideal moisture levels **[13]**. The use of banyan tree roots in Ayurvedic and natural hair care is thought to strengthen and encourage hair growth from the roots up. It is believed that nutrient-rich extracts provide essential elements to hair follicles,

thereby promoting growth and thickness **[14]**.

Reetha, also known as Sapindus Mukorossi, is a deciduous tree in the Sapindaceae family. Saponins found in their fruit shell provide mild cleaning and quick drying. This supports healthy hair follicles and the creation of new hair by clearing buildup, extra oil, and debris from the hair and scalp **[15]**. The saponins in Reetha gently cleanse and foam without removing natural oils from the skin. This keeps the hair hydrated and helps to maintain the proper balance of moisture **[15]**.

Methylparaben is used in food, medicine, and cosmetics as an antibacterial preservative. Pharmaceutical formulations frequently contain glycerin, but polyethylene glycols (PEGs) are also widely utilized, particularly in controlled-release systems. A galactomannan called guar gum is used in food, medicine, and cosmetic products. Topical medicine emulsions are made with triethanolamine. In the production and formulation of pharmaceuticals, water is an essential component, raw material, and solvent **[16]**.

Methodology

• Extraction process of Roots of Banayan

The leaves of *Ficus benghalensis* were finely processed and then divided into fine and coarse powders. A continuous extraction approach with ethanol was used, utilizing the Soxhlet apparatus. The extract was placed in an airtight container after it had been filtered, condensed, and freeze-dried into a powder **[17]**.

Figure 1: Extraction process of Roots of Banayan

• Extraction Process of Reetha

After three days of drying at 80°C, sapindus mukorossi was pulverized. Using a solid-liquid ratio of 1:10, extraction studies were carried out using the Soxhlet apparatus with a variety of solvents, including pure ethanol. The solvent, ethanol, was utilized in ten to fifteen three-hour cycles. For yield calculations, the extract was concentrated, boiled, and kept in a sealed container **[18]**.

Figure 2: Extraction Process of Reetha

• Identification test of banayan roots

1. **Flavonoids (A) Shinoda test.** -One milliliter of extract was mixed with ten drops of diluted HCL and a piece of

magnesium; the resultant rich crimson colour indicated the presence of flavonoids **[19]**.

2. Tannins

(A) Ferric chloride test- A few drops of a 10% ferric chloride solution were mixed with two milliliters (2 mL) of the extract's aqueous solution (light yellow). Gallic tannins were suggested by the presence of a blackish blue colour, while catechol tannins were indicated by the presence of a greenish black colour **[20]**.

3. Phenols

(A) Ferric chloride test.One milliliter of the extract was mixed with two milliliters of a 5% neutral ferric chloride solution; the extract's dark blue colour indicates the presence of tannins and phenolic chemicals.

4. Saponin

(A) A test tube containing 5.0 ml of distilled water and aqueous crude plant extract was thoroughly mixed. When the foam was forcefully stirred with a few drops of olive oil, saponins were visible in the look of the foam **[21]**.

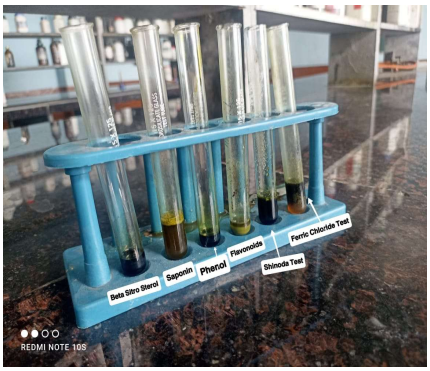

Figure 3: Identification test of Banayan Roots

• Identification test of reetha

1. Saponins

(A) Foaming Test: A test tube containing 5.0 ml of distilled water and aqueous crude plant extract was thoroughly mixed. When the foam was forcefully stirred with a few drops of olive oil, saponins were visible in the look of the foam **[21]**.

Figure 4: Identification test of Reetha

• Preparation of herbal hair gel

Various ratios of plant extracts were used to develop five different herbal hair gel formulations. Using a magnetic stirrer, glycerin, polyethylene glycol, methyl paraben, and gum were combined and stirred in water. Aqueous extracts of Reetha and Banyan Root were added, and triethanolamine was utilized as a neutralizer. The transparent gel that was produced was kept at ambient temperature **[22]**.

Table 1: Formula table for Herbal Hair Gel

Sr.no	formulation	HG 1	HG 2	HG 3	HG 4	HG 5
1.	Roots of Banayan	2 ml	1ml	2ml	1ml	2ml
2.	Reetha extract	1ml	2ml	3ml	4ml	5ml
3.	Methyl paraben	80mg	80mg	80mg	80mg	80mg
4.	Gaur gam	2gm	2gm	2gm	2gm	2gm
5.	Polyethylene glycol	100 ml	100 ml	100ml	100ml	100ml
6.	Glycerol	3ml	3ml	3ml	3ml	3 ml
7.	Triethanolamine	5 ml	5 ml	5ml	5ml	5ml
8.	Distilled water	85 ml	85 ml	85 ml	85 ml	85 ml

Figure 5: Preparation of Herbal Hair Gel

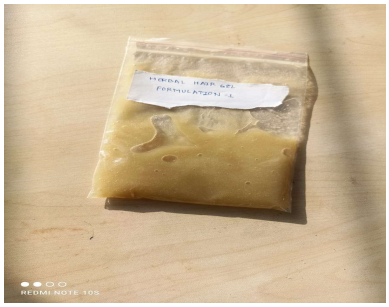

Figure 6: Herbal Hair Gel

• Evaluation test

Physical Appearance: The gel formulation was assessed for physical appearance, including phase separation, color change, odor, and rheological parameters. Homogeneity was evaluated visually for the absence of aggregates and flocculates.

pH: The pH was measured using a digital pH meter after dissolving one gram of gel in 100 ml distilled water.

Washability: Washability was tested on the skin, assessing ease and extent of washing with water.

Extrudability: Extrudability was checked by filling the gel into collapsible tubes and evaluating the ease of material extrusion upon tube pressing.

Spreadility: For spreadability, 2g of gel was placed between glass slides under a 500g weight for 5 minutes. Spreadability (S) was calculated using the formula

S=M.L/T, where M is the weight, L is the diameter in cm, and T is the time in seconds. Skin irritation test: the herbal hair gel was applied to the skin, and observations were made for irritation, redness, or rashes **[23]**.

RESULT AND DISCUSSION

The results of the preliminary phytochemical investigation of ethanolic extract of Roots of Banayan are shown below, is all test are positive

Table 2: Qualitative Phytochemical investigation of Banyan roots extract and Reetha extract

S. No.	Plant constituents	Test performed	Results
1.	Test for flavonoids	Shinoda test	positive
2.	Test for tannins	Ferric chloride test	positive
3.	Test for phenol	Ferric chloride test	positive
4.	Test for saponins	Foaming test	positive

• **Physicochemical assessment of formulated herbal hair gel**

1. Physical appearance - The hair gel, with a pleasing greenish-yellow color, has a good fragrance, smooth texture, and is free from particles, ensuring a visually appealing product.

2. pH - The pH of our formulated gel was 6.06, The pH means value of female hair 6.784±0.16, and that of male hair 5.604±0.93.

3. Homogeneity - The prepared hair gel was Smooth, Homogeneous and no agglomerates were found.

4. Skin Irritation - The prepared herbal hair gel was applied on the skin of hand and exposed to sunlight for 4-5 min. It was found skin compatible and non-irritant.

5. Washability - The prepared herbal hair gel was applied then washed in water. After washing there is no trace of gel.

6. Spreadability - Spread ability plays an important role in consumer acceptability and helps in uniform application. The spread ability of prepared gel was found to be 5.0cm/sec.

Table 3: Physicochemical evaluation of formulated herbal hair gel

S. No.	Parameters	Observation
1.	Colour	Greenish yellow
2.	Odour	Characteristic
3.	Consistency	Semisolid
4.	pH	6.06
5.	Spreadiability	5.0 cm/sec
6.	Homogeneity	Homogenous, smooth and consistent
7.	Skin irritability test	Non -irritants
8.	Washability	Shows Good washability

CONCLUSION

Bantayan roots and Reetha hair gel promote hair growth, strengthens strands, and acts as an anti-fungal. Natural ingredients enhance product safety. The formulation's moisturizing and conditioning benefits are notable. Evaluation confirms the herbal hair gel's safety, providing a natural alternative to synthetic gels in the market.

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