

Herbal Extracts for Hair Growth and Skin Rejuvenation: A Potential Solution for Hair Fall and Enhancing Skin Glow

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Abstract: *Hair loss can have significant psychological and sociological impacts on individuals, affecting how they perceive themselves and are perceived by others. Globally, there has been a rise in the proportion of both men and women experiencing hair loss or thinning hair. Dermatological disorders, including alopecia, are common causes of hair loss, leading to a constant search for natural products that may promote hair growth. Several factors contribute to hair loss, including stress, major illnesses, medication use, depression, autoimmune diseases, family history, hormonal imbalances, and nutritional deficiencies. In India, approximately 50% of the population is experiencing hair loss at an accelerated rate, partly due to the use of inferior hair products in the beauty industry. Various herbs have been identified for their potential to promote skin renewal and hair development. These include Ficus religiosa, Ficus bengalensis, coriander seeds, rock sugar, and Chlorophytum borivilianum. These herbs contain nutritional components that can help manage hormonal imbalances and stimulate hair growth. Herbal formulations offer a natural and potentially effective solution for hair loss management. They can be tested for quality control and evaluation to ensure their safety and efficacy. These formulations may serve as immunoboosters or highly nutritious compositions, providing additional health benefits beyond hair care. Importantly, such remedies are typically associated with minimal or no negative side effects, making them a preferred option for individuals seeking natural approaches to address hair loss and related concerns.*

Keywords: Skin Rejuvenation, Ficus religiosa, Ficus bengalensis, Chlorophytum borivilianum

I. INTRODUCTION

Hair has always a psychological and sociological impact on how people perceive themselves, both as individuals and as a whole (1) One of the most common causes of patient concern is alopecia (2, 3) Hair loss is a prevalent concern nowadays, influenced by various factors, including environmental conditions and genetic predisposition. To address this issue, a formulation comprising easily accessible herbs such as ficus religiosa, ficus bengalensis, safed musli, coriander seed, and rock sugar has been developed. These herbs are commonly found in the surroundings and have been selected for their potential therapeutic effects. The formulation aims to mitigate hair loss, improve skin health, activate tissue regeneration, enhance hemoglobin levels, and promote better blood circulation. It is designed to have no adverse effects and to provide stronger therapeutic benefits. To ensure the quality and efficacy of the herbal formulation, rigorous quality assessments are conducted during both the formulation process and the in-process stages. This involves a chemical analysis of the formulation and a physical assessment of the raw components, including their organoleptic properties. The overall characteristics of the herbs are also evaluated to maintain consistent quality standards. Extraction of the formulation is carried out using various techniques such as maceration, infusion, decoction, percolation, digesting, Soxhlet extraction, superficial extraction, ultrasound-assisted extraction, and microwave-assisted extraction. These techniques are selected based on factors such as the type of plant material, the solvent used, pH, temperature, and solvent-to-sample ratio, as well as the intended application of the final product. Furthermore, secondary metabolites are separated and purified using techniques such as gas chromatography (GC), paper

chromatography (PC), thin-layer chromatography (TLC), and high-performance liquid chromatography (HPLC). This allows for the identification of bioactive components contributing to the formulation's therapeutic effect (4). The research objective is to evaluate different extraction solvents, techniques, fractionation, purification, phytochemical screening, and the identification of bioactive components in medicinal plants.(4) By optimizing the extraction process and ensuring quality control measures, the aim is to develop a safe and effective herbal product for addressing hair loss and related issues.

Ficus Religiosa



Fig 1: Peepal leaf

Scientific Classification of ficus religiosa:

- Kingdom : Plantae
- Clade: Tracheophytes
- Clade : Angiosperm
- Clade : Eudicots
- Order: Rosales
- Family: Moraceae
- Genus: Ficus
- Subgenus: F. Subg. Urostigma
- Species: F. Religiosa(5)

Chemical composition:A *Ficus religiosa* leaf includes various compounds such as lupeol, alpha-amyrin, beta-amyrin, campesterol (phytosterols), alpha-amyrin, sitosterol, and 28-isofucosterol (triterpene alcohols). These compounds are present in different proportions, with pet ether as a solvent extracting about 28.5% of the phytosterols from the leaves. Additionally, the leaves of *Ficus religiosa* contain a range of amino acids including arginine, aspartic acid, alanine, cysteine, lysine, methionine, serine, glycine, threonine, proline, isoleucine, tryptophan, tyrosine, valine, and leucine. The presence of acidic detergent fiber, neutral detergent fiber, and acid detergent lignin (ADL) is also noted. Furthermore, tannic acids and condensed tannins make up approximately 1.5% of the tannin content in the leaves.(6)

Geographical Source: *Ficus religiosa* is endemic to Asia-Tropical regions, including countries like Bangladesh, India, Nepal, Pakistan, China, Myanmar, Thailand, Vietnam, and Iraq. Originally found in tropical Asia, particularly in Chad, India, Nepal, and Thailand, it has been dispersed and cultivated worldwide. In terms of ecology, *Ficus religiosa* typically grows in wooded areas, often as an epiphyte on other trees. Interestingly, *Ficus religiosa* is known by over 150 names globally, reflecting its widespread distribution and cultural significance across different regions(7)

Pharmacological effects: These may comprise antioxidant, anticancer, antiulcer, antiasthmatic, anthelmintic, and qualities that are antibacterial, anticonvulsant, and antidiabetic. Folk medicine has traditionally utilised *Ficus religiosa* to cure a variety of ailments, including scabies, asthma, cough, earaches, headaches, stomach problems, diarrhoea, haematuria, and abnormal sexual behaviour. The infusion of leaves provides analgesic effects. (7)

- Antibacterial activity
- Antifungal activity
- Wound healing
- Antidiabetic
- Antiulcer etc

Ficus Bengalensis:



Fig 2: Banyan Leaves

Botanical classification of *Ficus bengalensis*

- Botanical Name : *Ficus bengalensis*
- Domain : Plantae
- Division : Magnoliophyta
- Class : Magnoliopsida
- Order : Urticales
- Family : Moraceae
- Genus : *Ficus*
- Taxonomy : Bengalensis

Chemical components: 9.63% crude protein, 26.84% crude fibres, 2.53% calcium oxalate, and 0.4% phosphorus are all present in the leaves. Numerous qualitative chemical studies of the ethanol and aqueous leaf extracts show that the plant contains significant amounts of sterols, flavanoids, phenol, tannins, and saponins, but none of the following: aromatic acids, carbohydrates, triterpenoids, gums, mucilage, and volatile oils. Quercetin-3-galactoside and rutin have been identified as the flavonols found in leaves. Quercetin-3-galactoside, rutin, Friedelin, taraxosterol, lupeol, β -Amyrin, and psoralen and bergapten are all found in leaves. (8)

They are enormous, quickly expanding, spreading-branch, multi-aerial rooting trees that can reach a height of 3.0 metres. *Benghalensis* is a huge spreading-branch tree that grows to a height of 3.0 metres. It is found in tropical and subtropical woodlands.

Geographical Source: *Benghalensis* was found to be a part of Ayurveda, Siddha, and other traditional medical systems in South Asia. The three principal medical ailments that the stem bark was used to treat were diarrhoea, dysentery, and diabetes. (9)

Pharmacological effect:

- 1) Antitumor activity
- 2) Analgesic, antipyretic activity
- 3) Anti-rheumatic activity
- 4) Antioxidant activity
- 5) Antiulcerogenic activity
- 6) Hypoglycemic activity
- 7) Antidiabetic Activity
- 8) Nutritive Evaluation
- 9) Antidiarrhoeal activity
- 10) Wound healing activity (10, 23)

3) Chlorophytum borivilianum (Safed musli):



Fig 3: Safed musli

Scientific name or Botanical Classification

- Kingdom: Plantae
- Clade: Angiosperms
- Clade: Monocots
- Order: Asparagales
- Family: Asparagaceae
- Subfamily: Agavoideae
- Genus: Chlorophytum
- Species: C. Borivilianum

Chemical constituents: The primary biochemical components of C. Bolivilianum are: 42% carbohydrates, 10% protein, 20–30% fibres, 2–17% saponins, and 15%–25% alkaloids. Alkaloids and saponins have the most therapeutic efficacy. It has four high concentrations of simple sugars, mainly glucose, fructose, galactose, mannose, and xylose. Moreover, it is rich in proteins, calcium, magnesium, phenol, resins, and polysaccharides, as well as over 25 alkaloids and vitamins. Furostanol and 17 chlorophytoside-I (3b, 5a, 22R, and 25R) have been designated for saponin and stigmaterol, respectively. -26-(β-Dglucopyranosyloxy) -22-hydroxy-furostan-12-one-3yl O-β-D-galactopyranosyl (1-4) glucopyranoside has been isolated. (10) An examination of a drug determines its identity and rates its purity and quality. The three main factors that necessitate investigation of crude pharmaceuticals are drug storage, the influence of treatment, and the biochemical variability of the medication. (16)

Geographical source: The recent surveys in different states of India revealed that ethnic communities of Aravali Hills, Rajasthan (Meena), Mizorum (Mizo), Maharashtra (Pawra and Thakar) and Madhya Pradesh (Korku and Bhabra) have enjoyed the health, vitality and longevity by incorporating safed musli in their health care system (Patil, 2001, Jagtap et al., 2009, Meena and Rao, 2010, Deshwal and Trivedi, 2011, Rai and Lalramnghinglova, 2011). (23)

Pharmacological effect:

- Keeps young, healthy and energetic
- Helps to cope with stress and strain
- Useful in rheumatoid arthritis,
- Diabetes mellitus
- Piles and post menopausal syndrome
- Improves physical and mental strength in children
- Immunomodulator
- Improves Physical stamina etc.(17)

Coriander:



Fig 4: Coriander seed

Scientific or Botanical Classification:

- Subkingdom: Tracheobionta
- Division: Magnoliophyta
- Class: Magnoliopsida
- Subclass: Rosidae
- Order: Apiales
- Family : Umbelliferae
- Genus: Coriandrum
- Species: Coriandrum sativum
- Synonym: Coriander fruit, Fructus Coriandrum, Cilantro

Biological source: coriander consist of dried ripe fruit of Coriandrum sativum Linn Chemical constituents: volatile oil (0.3-1%), volatile components (90%), D-linalool Coriandrol (90%), L- Borneol, Geraniol, Pinene Leaves contain Vit A, fixed oil (13%), Protein. It has many vitamins and minerals along with anti-bacterial properties; hence Coriander is helpful for health. Coriander contains many minerals and vitamins. Per 100 Grams of it Potassium -14 % i.e. 521 mg, Fiber – 11 %, Calcium -6 %, Iron – 9 %, Vitamin B-6 -5 %. Apart from this, magnesium, Vitamin C, sodium etc. are also in sufficient quantity. (8)

Geographical source:Coriander is cultivated in various regions including Maharashtra, Uttar Pradesh (U.P.), and Rajasthan, Jammu and Kashmir in India. It is also found in a wild state in the east of England. Additionally, it is cultivated in Central and Eastern Europe, particularly in Russia and Hungary, as well as in Africa and India.

Pharmacological effect:

- 1) Anticancer
- 2) Liver Protection
- 3) Anemia
- 4) Alzheimer disease
- 5) Allergies
- 6) Diabetics
- 7) Reduced blood pressure.
- 8) Skin related problem
- 9) Diarrhea
- 10) Help to improve Digestion etc (18)

Rock Sugar:

Scientific or Botanical Classification:

- Kingdom: Plantae
- Order: Poales
- Family: Poaceae
- Subfamily: Panicoideae
- Genus: Saccharum
- Species: S. Officinarum

Chemical constituents:They have contain nutrients such as carbohydrates (10%), flavonoids, Monosaccharide and polysaccharide , sucrose, calcium , sodium, iron, Vitamin C etc.

Use:

- It is good for sore throat and cough
- It is help in boosting Hb.
- It help indigestion
- It boosts the energy level.
- Also provide fresh breath

Preparation method of herbal Churna:

Maceration Method for Herbal Extracts:

Procedure:

Clean young leaves of herbal drugs (such as coriander, ficus religiosa, and ficus bengalensis) by rinsing them in clean water to remove adulterants and dirt.

Pulverize the cleaned leaves (2 kg) and macerate them in distilled water for 24 hours to obtain an aqueous leaf extract.

Dry the resultant decoction to a constant weight in an oven preheated to 40°C.

Decant the extract, filter it, and concentrate it under pressure in a rotary evaporator operating at 60°C.

Store the dried extract at around 4°C in an airtight container until needed.

Yield: The dried extract yielded 20.14% (w/w).

Conversion into Churna:

Process:

After maceration, herbal extracts are converted into churna (powder) by drying them and pulverizing them into a fine powder.

Grinding can be done using a grinder or a mortar and pestle.

It is crucial to ensure that the powder is finely ground to optimize its efficiency.

Storage and Use of Herbal Extracts in Churna Form:

Once herbal extracts are in churna form, they can be conveniently stored and used for various purposes.

The drying process is completed during the conversion into churna.

Quality Assurance:

Combine all ingredients thoroughly after conversion into churna.

Verify the criteria of their chemical and physical examination to ensure quality.

Herbal products that can be available:

Herbal products that can be available: Tea bags, pills, tablets, liquids, and powders are among the various types available. Black cohosh, echinacea, garlic, ginkgo, saw Palmetto, and St. John's wort are examples of common herbal health remedies and supplements. These are some examples of herbal products. (13)

Physical Evaluation: Physical needs for the drugs must be determined wherever possible. These requirements are seldom constant when evaluating raw pharmaceuticals, although they can be beneficial when considering variables such as viscosity, moisture content, specific gravity, density, optical rotation, refractive index, melting point, and solubility in different solvents.

A) Moisture content: The breakdown of crude pharmaceuticals will either cause microbial growth or a chemical change depending on the drug's moisture content. Therefore, it is vital to monitor and control the moisture content of a drug. The moisture content of a drug is determined by cooking it in an oven at 105 °C until it reaches a consistent weight.

Moisture content (%) = $W_2 - W_3 \times 100$.

B) Solubility: Based on drug-specific behavior, a drug's solubility in various solvents is taken into consideration. One herbal preparation, for example, dissolves in petroleum ether.

C) Optical rotation: The polarization of plane-polarized light can be rotated by isotropic crystalline solids and samples having a high amount of one chiral molecule's enantiomer. This characteristic—called optical rotation—occurs in some materials.

D) Refraction of light:

The phenomenon of refractive index describes how a material alters the speed of radiation, typically light, as it passes through it. It's quantified as the ratio of the speed of light in a vacuum to the speed of light through the material. Refractive indices vary with light frequency, resulting in different colors of light traveling at different speeds through the material. High intensities can also affect the refractive index of a material. Additionally, isotropic rotation can alter the orientation of plane-polarized light as it passes through a substance.

Specific Gravity: Specific gravity, also known as relative density, is the mass ratio of a substance to an equivalent volume of another substance under specific conditions. For gases, it's often compared to air or hydrogen, while for

liquids and solids, it's compared to the density of water at a specified temperature. It provides information about the density of a substance relative to a standard substance, aiding in its identification and characterization.

Melting Point: The melting point is the temperature at which a substance transitions from a solid to a liquid phase. In pharmaceuticals, the melting point is significant for determining the purity and identity of a compound. Crude pharmaceuticals may have a range of melting points due to their chemical composition, but pure substances generally have a specific and consistent melting point.

Ash Value: Ash value refers to the residue left behind after a substance is completely burned or incinerated. In pharmaceutical analysis, ash measurement is used to assess the purity and quality of herbal drugs and plant materials. Different ash values, such as total ash, sulphated ash, water-soluble ash, and acid-insoluble ash, provide information about the presence of inorganic impurities, excess earthy or salty ingredients and the extent of adulteration in the sample. These values help in identifying genuine crude drugs and detecting any contamination or adulteration.



Figure 5: Ash Value

$$\% \text{ Total ash} = \text{Ash weight} / \text{Sample weight} \times 100$$

Total Ash: Imagine total ash as a detective tool for spotting sneaky impostors in medicinal herbs like nutmegs and ginger. It helps us catch any unwanted guests like sand, earth, chalk powder, or even other drugs pretending to be something they're not!

Acid Insoluble Ash: Acid insoluble ash is like that stubborn friend who refuses to dissolve even when invited to the party (in this case, diluted hydrochloric acid). It's a clue that calcium oxalate might be crashing the herbal scene, and there can be a lot or a little of it.

Extractive Values: Think of extractive values as different potions we make by mixing herbs with special solvents. We brew one potion with water to draw out things like tannins, glycosides, and mucilage from the herbs. Another potion, made with alcohol, is perfect for pulling out tannins, glycosides, and resin.

Angle of Response: Picture a powder party where we measure how well the powder flows using a funnel. We're like scientists at a mini mountain-building contest! The angle of response tells us how steep or gentle our powder mountain is, helping us understand how powders behave.

The angle of response was calculated using the funnel method. To create a mound, the powder was forced to pass through a funnel that was mounted on a platform.

$$\Theta = \tan^{-1} (h/r)$$

Where h is the heap's height, r is its radius, and Δ is the response angle. (15)

Advantages of Herbal Formulations:

Digestive Health: Herbal churna formulations, like Digestive Health Churna, are known for promoting healthy digestion by supporting bowel regularity, alleviating constipation, and aiding in the body's cleansing process.

Antioxidant Properties: Herbal formulations often contain rich sources of antioxidants, such as leaf extracts, which help protect the body from oxidative stress and damage caused by free radicals.

Immune Support: Many herbal formulations are designed to boost the immune system, helping the body defend against illnesses and infections more effectively.

Detoxification: Herbal formulations are commonly used to support the body's natural detoxification processes, thereby improving overall well-being by eliminating toxins.

Hormonal Balance: Certain herbs like safed musli are known for their ability to help maintain hormonal balance, offering benefits for reproductive health and overall wellness.

Hair Growth: Ingredients like ficus bengalifolia leaves may be beneficial for promoting hair growth and improving hair health.

Reduced Side Effects: Compared to synthetic drugs, herbal formulations are often perceived as having fewer negative side effects due to their natural origins.

Holistic Approach: Herbal formulations have the advantage of targeting multiple aspects of well-being simultaneously, addressing various health concerns comprehensively.

Uses of Formulation;

Hair Loss and Growth: Certain herbal formulations are known to address hair loss issues and promote hair growth, offering a natural solution for maintaining healthy hair.

Boost Blood Flow: Some herbal formulations have properties that can enhance blood circulation, which is essential for overall health and wellbeing.

Skin Rejuvenation: Herbal formulations may possess ingredients that aid in skin rejuvenation, helping to maintain youthful and healthy skin appearance.

Anti-Allergic Characteristics: Certain herbs contain compounds that exhibit anti-allergic properties, providing relief from allergic reactions and symptoms.

Antimicrobial Effects: Many herbal formulations have been found to possess

II. CONCLUSION

Based on the review article, it's evident that hair loss affects both men and women worldwide. Therefore, utilizing herbal formulations can be an effective approach to address this concern, along with promoting hair growth and addressing skin aging or related issues. For optimal results, it's essential to consider various aspects related to the preparation and application of herbal medicine. This includes researching its toxicity, safety, acceptability, cost-effectiveness, and its comparative value with other medications used in contemporary medicine. To ensure the quality and standardization of herbal products, it's important to take into account different factors such as physical, biological, and analytical parameters. Incorporating herbs like coriander seed, safed musli, ficus religiosa, and ficus bengalensis leaves into the formulation can be beneficial, as they offer specific properties that support hair health, skin rejuvenation, and overall well-being. By integrating these herbs and conducting thorough research on various aspects of herbal medicine, we can develop formulations that effectively address hair loss, promote hair growth, and provide additional benefits for skin health, thereby offering holistic solutions for individuals experiencing such concerns.

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