



A Review: On Hair Oil Extracted from Herbs

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ABSTRACT:

Hairs are the skin's follicles' outgrowths, and herbal medications like Hairs are described as "enhanced epithelial structure created as a result of keratinization of germinative cells." Hair is made of keratin, which contains the elements carbon, nitrogen, sulphur, and oxygen (O). Although each person's rate of hair growth is different, on average, hair grows 15 to 30 mm every month. The current study's primary objective is to cure alopecia. Alopecia areata is a disorder that causes erratic hair loss. Herbal remedies used both orally and topically promote hair growth to stop premature greying or hair loss. The assertion of improved hair growth and a decrease in hair loss. The promise of improved hair growth and decreased hair loss. One of the main issues affecting urban residents as a result of stress, environmental issues, etc. is alopecia. Therefore, with the aid of this review paper, we draw the conclusion that many herbal medicines are effective in treating alopecia without causing adverse effects. There are numerous different allopathic medicine kinds for treating hair loss, however they all have negative side effects. Any investigation into medicine should begin with herbs. About 80% of the population said that herbal treatments were preferable to synthetic ones because they had less negative side effects. *Cyperus rotundus*, *B. officinalis*, and *B. monniera* were chosen for the manufacture of poly herbal hair oil. The three herbs were combined in a set proportion and individually prepared hair oils were made using coconut oil as the foundation and varied concentrations of each of the three herbs. Applying the prepared oil directly to the shaved skin of albino rats allowed researchers to assess its physical, chemical, and hair growth qualities. Using healthy albino rats, a primary skin irritation test, a hair length test, and a comparison of hair growth with standard *Minoxidil* 2% ethanolic solution were carried out. When compared to the other formulations, it was found that the hair oil formulation (HF3) had the best results by demonstrating an increase in follicular size and length.

Keywords: Hair loss, Herbal drugs, *Embolic officinalis*, *Bacopa monniera*, *Cyperus rotundus*, herbal hair oil, hair length.

Introduction:

Hairs are the outgrowths from the follicles that occur on the skin and are characterised as "improved epithelial structure developed as a result of keratinization of germinative cells." Hair is made of keratin, which contains the elements carbon, nitrogen, sulphur, and oxygen (O). Although each person's rate of hair growth is different, on average, hair grows 15 to 30 mm every month. The current study's primary objective is to cure alopecia. Alopecia areata is a disorder that causes erratic hair loss. Herbal remedies used both orally and topically promote hair growth to stop premature greying or hair loss. The assertion of improved hair growth and a decrease in hair loss. One of the main issues affecting urban residents as a result of stress, environmental issues, etc. is alopecia. Therefore, with the aid of this review paper, we draw the conclusion that many herbal medicines are effective in treating alopecia without causing adverse effects. There are numerous different allopathic medicine kinds for treating hair loss, however they all have negative side effects. Any investigation into medicine should begin with herbs. About 80% of the population said that herbal treatments were preferable to synthetic ones because they had less negative side effects.

An rising number of men and women are dealing with the painful issue of hair loss. Development of innovative medicines for the treatment of hair loss is therefore crucial. It is a dermatologic condition, and the search for natural items that could encourage hair development is ongoing^{1, 2}. Alopecia, or hair loss, is a common patient complaint and a major source of emotional and physical distress³. Apart from a number of other variables, androgens are thought to be one of the most significant causes of alopecia. ⁴There are natural products on the market in the form of herbal formulations that may be used as a hair tonic, hair growth booster, hair conditioner, hair-cleansing agent, antidandruff agent, as well as for the treatment of alopecia, dandruff, and lice infection. ⁵ . Several herbal products have received praise for their ability to encourage hair growth. ⁶ . Numerous herbal medicines are recognised by India's traditional medical system as effective in promoting hair growth. In our research, we discovered that *Emblica officinalis*, *Bacopa monniera*, and *Cyperus rotundus* ethanolic extracts are effective in treating "Indralupta" (i.e., hair loss)^{7,8}. The present study was, therefore, undertaken to develop a formulation containing Ethanolic extracts of these drugs in the form of herbal hair oils in varying ratios & concentrations and evaluating the formulated oils for their hair growth initiating and hair growth promoting activity.

Along with sweat glands, sebaceous glands, and nails, hair is a crucial component of the human integument and is regarded as a protective appendage on the body [9]. The most prevalent issues with hair include dandruff, thinning hair, and pigmentation issues (fading)[10]. The three cyclical phases of each hair's development are anagen (growth), catagen (involution), and telogen (rest). Anagen might last anywhere from two to six years. The hair transitions to the next phase during the catagen phase, which lasts for two to three weeks. The hair enters a resting phase during the telogen phase, which lasts for two to three months. Alopecia, or shedding of more than 100 hairs per day, is considered to be a condition. On average, 50 to 100 hairs are reported to fall out every day. Amla is a good source of vitamin C and includes a sizable quantity of pectin, which is rich in minerals including calcium, iron, and

phosphorus[11]. Bacopa monnieri has a nervine tonic effect on the brain. Hibiscus contains calcium, phosphorus, iron, vitamin B1, riboflavin, niacin, and vitamin C, which are used to promote the growth of thicker hair and delay the onset of greying. Alkaloids found in bramhi increase protein kinase activity. Methi provides a high protein dietary source that gives hair the necessary protein nutrients. For its cleaning and softening properties, Trigonella foenum graecum is utilised as high protein feed. It also promotes scalp health and inhibits hair loss [12]. Because of their antibacterial qualities, Murraya koenigii leaves are utilised [13]. The plant cocos nucifera is used to encourage hair development.

HAIR FALL

Alopecia areata (AA) and androgenetic alopecia (AGA), two conditions that cause hair loss, are very frequent dermatological issues seen in daily practise. 1,2 Although there are successful medications easily available for some kinds of alopecia, there are very few therapeutic choices and bad results for some subtypes. As a result, initiatives have been undertaken to create or enhance therapy strategies for untreatable alopecia. Recent developments in the treatment of hair loss illnesses, including innovative methods for accurate diagnosis, inventive therapy strategies, and prospective developments are outlined in this study. Treatments for severe AA are stressed in particular. The understanding of hereditary hair loss or aberrations at the molecular level has advanced significantly, but due to their rarity, these disorders are not included in this article.



Along with sebaceous glands, sweat glands, and nails, hair is one of the essential body components that develops from the ectoderm of the skin. Hair serves as protective appendages on the body and is regarded as an accessory structure of the integument. They are referred to as epidermal derivatives because during embryological development, the epidermis is where they first appeared. A key component of the human body's overall aesthetic attractiveness is hair. Alopecia, a dermatological condition that has been known about for more than 2000 years, is a frequent issue in both cosmetics and general medical treatment. It is widespread throughout the world and is thought to impact 0.2% to 2% of everyone on the planet. A powerful vasodilator, minoxidil is a synthetic medication that has been scientifically shown to be effective in the treatment of alopecia. However, the usage of these synthetic pharmaceuticals is linked to several negative side effects and is typically not recommended for the safe and efficient treatment of alopecia; thus, natural drugs are required to replace the synthetic ones and lessen the negative side effects linked to them. As a result, this review paper is provided, combining all the most recent data on natural herbs that have powerful anti-alpecia effects as well as their mechanisms of action. The medical word for baldness or hair loss is alopecia.

People frequently ask about vitamin and mineral supplementation, as well as nutrition, as a way to avoid or treat dermatological conditions, including hair loss. Given the vast and contradictory quantity of available information, it might be difficult to provide answers to these questions. The most recent findings have emphasised the need for continued research investigations and encourage new evidence-based recommendations for the prevention and treatment of atopic dermatitis, psoriasis, acne, and skin cancer [14, 15]. About 100,000 hair follicles may be found on the human scalp. 90% of them are in the anagen phase, which has no alopecia and calls for the effective production of healthy hair as well as necessary nutrients including proteins, vitamins, and minerals [16, 17]. As a result, micronutrients including vitamins and trace minerals are essential parts of our diet [18]. Vasco de Gamma documented the deaths of 100 of his 160 sailors in 1497 owing to scurvy, and 300 years later James Lind associated scurvy with vitamin C insufficiency, citing skin bleeding and hair loss, according to Stewart and Guthrie [19]. Skin and hair abnormalities are common in protein-energy malnutrition, as shown, for instance, in children with kwashiorkor, marasmus, and marasmic-kwashiorkor situations [21]. In practically every culture, having hair is a sign of attractiveness. Long hair is a sign of beauty and health for women. In the wealthy and sophisticated societies, this had a significant influence on the cosmetics business. If the doctor is familiar with the typical causes of hair diseases, they can play a significant part in diagnosing and treating hair issues. There are some conditions that require referral to a specialist. The common causes of hair loss disorders will be covered in this article, along with methods of evaluation.

Hair cycle:

There are three stages to the hair cycle. The first phase, often known as the anagen phase, is the active phase. During this phase, the hair continues to grow over the course of several weeks to a few years as it grows in to replace the previous hair. The catagen phase, which occurs after the shift from active to dormant hair, is the second stage. This stage might last up to three weeks. The third phase of hair growth, known as telogen, is characterised by

the hair remaining in the scalp without growing, and it may be removed by pulling and combing the hair. Additionally, the hair can remain in this phase until the new hair emerges and naturally pulls the older hair to fall out. The telogen phase may last for three months.

Table 1. Common causes of telogen effluvium.

<i>f</i> Fever.
<i>f</i> Postpartum.
<i>f</i> Crash.
<i>f</i> Dieting / hypoproteinemia.
<i>f</i> Thyroid dysfunction.
<i>f</i> Iron deficiency.
<i>f</i> Prolonged operation & anesthesia.
<i>f</i> Malignant disease.
<i>f</i> Renal failure.
<i>f</i> Hepatic disease.
<i>f</i> Malabsorption.
<i>f</i> Medications

Androgens, which are male hormones, are a major factor in causing this illness in both sexes. In actuality, androgenic alopecia is brought on by both inherited familial genes and the hormonal sensitivity of the hair receptors in the frontal and middle regions of the scalp. In this disease, the hair gradually falls out and changes into fine, tiny hair, which causes typical baldness. This is quantified in phases as the condition develops. According to the Hamilton-Norwood Classification, the scalp's frontal and vertex regions in men are lost and staged. According to the degree of hair loss, it is classified into seven stages, with stage 1 representing the early stage and stage 7 representing the advanced, severe level. Females lose just their frontal and middle regions, sparing their scalp's forelock hair. According to Ludwig categorization, this is staged. Depending on the degree of the hair loss, it is separated into three stages (mild, moderate and severe patterns). Patients typically lament months and years of progressive hair loss and thinning. After attempting the common over-the-counter tonics, which are ineffective in treating this illness, both men and women experience significant aesthetic harassment. To conceal their baldness, they might have to wear wigs.

TYPES OF HAIR FALL :

- a) Alopecia Areata (prime stage)** - Alopecia areata is a common autoimmune disease that results in the loss of hair on the scalp and else where. It usually starts with one or more small, round, non-scarring smooth patches. Mild Brief Alopecia Areata- Patient with repeated transient alopecia areata but never converts into alopecia totalis or universalis
- b) Temporary Alopecia Areata** - Patient with Alopecia areata in advanced phase and some of them converts into Alopecia totalis/Alopecia universalis.
- c) Ophiasis Alopecia Areata** - Ophiasis type of alopecia areata shows a band like hair loss. It occurs generally in the progressive or the occipital areas of the scalp, and therefore it is more difficult to treat, as most medicines have a delayed action on these areas.
- d) Alopecia Totalis** - Loss of hair from whole Scalp.
- e) Alopecia Universalis** - Loss of hair from entire body including eyebrows and eyelashes Scar ring Alopecia Any inflammatory process (burns, bacterial infections, ringworm, injury) necessary to cause permanent loss of follicles, affected area known as Scarring alopecia. Trichotillomania -This type of hair loss is known as compulsive pulling or dull selfpulling by a patient Himself or herself.
- f) Traction Alopecia** - Hair elegance that tie hairs so tight can causes much traction at the root of hairs, and can develop adhesion alopecia
- g) Chemotherapy and hair loss** - Chemotherapy is exclusive behavior for cancer patients but it marks normal cells and hair follicles too. This causes hair loss and known as anagen effluvium type of alopecia.
- h) Diffuse Alopecia** - Unnecessary Loss of hair all over the scalp without creating a reinforcement. Hair loss due to side effect of the beauty treatments- Any beauty treatments like hair colors, dye, straightening, softening, rebounding, perming etc., which contains harsh chemicals can trigger hair loss for some individuals. Telogen effluvium (TE) and chronic telogen effluvium- (CTE) Dietary lacks, Crash dieting High grade fever, Anemia, Blood loss, Hormonal imbalance and pregnancy etc. can cause telogen effluvium type of hair loss telogen word is known for latent phase of the hair and fluvium means.

CAUSES OF HAIR FALL:

Most cases of hair loss can be divided into three categories: non-cicatricial alopecia, cicatricial alopecia, and hair shaft abnormalities

1. NON-CICATRICIAL ALOPECIA

Non-cicatricial alopecia is a kind of hair loss with regeneration potential. Telogen effluvium (TE), androgenetic alopecia (AGA), and alopecia areata are examples of non-cicatricial alopecia (AA). This category also includes trichotillomania, which is compulsively plucking one's hair, and traction alopecia, which is caused by pulling one's hair. Trauma, however, can disrupt the follicle stem cells (follicle midportion) in chronic situations, resulting in scarring and irreversible hair loss.

Shedding

Telogen effluvium (TE), which is the early transition of hair follicles from the growth to the resting or shedding (telogen) phase, is the most frequent reason for hair loss. Initial descriptions of acute shedding included conditions including febrile illnesses, delivery, chronic systemic illnesses, heparin treatment, and mental distress. Other elements, such as certain medicines, endocrine abnormalities, extremely limited diets, surgical operations, and anesthetics, have been recognised as acute and chronic causes of TE. It has recently been suggested that TE may signal the onset of androgenetic alopecia (AGA) in both sexes.

Shedding is the main symptom that the patient has described. Patients typically complain about more hair on their clothing, pillows, and shower drains. The amount of hair shed each day is greater than usual. On a non-shampoo day, the average person might lose up to 100 hairs. When hair density is lowered by 30% to 50% or more, there may be a discernible decrease in hair volume. Three to six months prior to the onset of the shedding, a thorough clinical history may uncover the reason. Clinicians must rule out anaemia and assess thyroid function while assessing shedding. The detection of androgen excess and perimenopausal alterations can be assisted by hormonal screening. Syphilis should be ruled out by the history and physical exam. Shedding is frequently related to nutritional inadequacies (protein, vitamin, and mineral deficiency).

To treat TE, the cause or causes must be isolated and treated. Patients should always be reassured that the shedding is being replaced and that the chances of becoming bald are remote.

2. CICATRICIAL ALOPECIA

Cicatricial alopecia is irreversible hair loss associated with the destruction of stem cell reservoir located in the midportion of the follicle. Cicatricial alopecia is caused by a diverse group of cutaneous disorders with a variety of presentations.

Discoid lupus erythematosus, lichen planopilaris, and fungal or bacterial folliculitis are common causes of cicatricial alopecia. Other reasons include skin conditions, trauma, bullous disorders that induce scarring (such as porphyria cutanea, bullous pemphigoid, and epidermolysis bullosa), and neoplastic illness (skin tumours and cutaneous metastasis). Clinicians should start with cultures for bacteria and fungus to assess cicatricial alopecia of unknown cause. A scalp biopsy is used to make the diagnosis, and a 4-mm punch is advised. Treatment is usually advised to stop the condition from spreading to unaffected areas, even though this group exhibits permanent alopecia. Referring these individuals to a dermatologist who specialises in hair loss is recommended.

3. HAIR SHAFT ABNORMALITIES

Hair that has irregularities in the hair shaft is brittle and fragile. Patients may have scattered or patchy sections of short hair when they first appear, as well as a history of hair that won't grow past a specific length. The structure of the hair shaft can be altered by inherited diseases (genodermatoses) and external hair shaft injury. The most frequent cause of the atypical hair shaft in adults is repeated stress to the hair shaft, such as pulling, bleaching, perming, or blow drying.

Different hair shaft forms might arise. The trichorrexia nodosa, a nodal region where the hair divides into strands, is the most often seen irregularity of the hair shaft. Trichorrexia nodosa is more frequently acquired as a consequence of external trauma, although it may also be linked to genetic and metabolic conditions that affect the keratinization of the hair. These people ought to be sent to a dermatologist who specialises in conditions of the hair. When trauma is the reason, treatment focuses on eliminating the source. Coating the hair fibres with leave-on conditioners may strengthen the hair and prevent breaking.

METHODS:

In July 2018, we conducted a thorough literature search in PubMed and Google Scholar to gather published studies that analyse the connection between vitamins and minerals and hair loss. The keywords included "hair loss," "alopecia," "vitamin A," "vitamin B," "vitamin C," "vitamin D," and more. "vitamin E", "Iron," "ferritin," "biotin," "zinc," "selenium," "folic acid," "telogen effluvium," and "selenium" The term "alopecia areata" Hair loss in women with a feminine pattern, androgenetic alopecia male pattern hair loss and premature greying of the hair. Only English-language, published papers with human subjects were chosen. 125 publications were chosen to be included in this evaluation after being carefully inspected by three writers who independently evaluated the clinical data and titles and abstracts for relevance.

VITAMIN A:

Retinol, retinal, and retinyl esters are all types of fat-soluble retinoids that are represented by vitamin A [23, 24]. This vitamin performs a variety of functions in the body, including being essential for immune system health, eyesight, and cellular development and differentiation [25]. Preformed vitamin A (from animal sources) and provitamin A carotenoids are both forms of vitamin A that are present in the diet (sourced from plants). The active forms of vitamin A from both sources must be converted intracellularly (retinal and retinoic acid). The liver is where the majority of vitamin A is kept as retinyl esters. Plasma levels are frequently adequate for evaluating sufficiency when retinol and carotenoid levels are being measured. Vitamin A deficiency is indicated by a plasma retinol content of less than 0.70 $\mu\text{mol/L}$ [26].



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A balanced diet will often provide a sufficient quantity of vitamin A [14]. For adults aged ≥ 19 years, the recommended daily intake of vitamin A is 1300 mcg (4300 IU [international units]) for the U.S. population. Provitamin A carotenoids have no maximum dietary limit, however extremely high preformed vitamin A intake can be hazardous. The tolerated upper consumption dosage of preformed vitamin A for individuals ≥ 19 years of age is 10,000 IU [27]. Therefore, it's crucial to think about the amount and kind of vitamin A that supplements (provitamin A carotenoids or preformed vitamin A) include.

Generally speaking, taking excessive amounts of vitamin A or supplementing with it might result in hair loss [28, 29]. Normally, fat-soluble vitamin A is kept in the liver, where the anabolic and catabolic interactions between the inactive and active metabolite tightly control how much of it is released. When vitamin A levels are excessively high, the transport system's capacity is surpassed and vitamin A leaks into the bloodstream [30]. Healthy hair depends on maintaining homeostasis and, consequently, the correct concentration of active metabolites [31].

VITAMIN B:

The eight water-soluble vitamins that make up the vitamin B complex, which support cell metabolism, are thiamine (vitamin B1), riboflavin (vitamin B2), niacin (vitamin B3), pantothenic acid (vitamin B5), vitamin B6, biotin (vitamin B7), folate, and vitamin B12. With the exception of biotin, the only B vitamin the body produces, which cannot be obtained by diet alone, all of these vitamins can be obtained through a balanced diet. Biotin does not need to be supplemented in healthy people. Only vitamin B12, biotin, riboflavin, and folate deficits have been linked to hair loss.



Flavin mononucleotide (FMN) and flavin adenine dinucleotide (FAD), which are both coenzymes, are made up of vitamin B2 (riboflavin), which is crucial [32]. 90% of dietary riboflavin comes from FMN and FAD, both of which are involved in cellular growth and function, fat metabolism, and energy production [33]. Only trace levels of riboflavin are kept in the body's liver, heart, and kidneys. Despite being incredibly rare in the USA, riboflavin deficiency can result in hair loss [34].

VITAMIN C:

The coenzymes flavin mononucleotide (FMN) and flavin adenine dinucleotide (FAD) are made up of the necessary vitamin B2 (riboflavin) [32]. 90% of the dietary riboflavin is made up of FMN and FAD, which are both important in cellular development and function, fat metabolism, and energy production [33]. Only minute amounts of riboflavin are kept in the body's liver, heart, and kidneys. Despite being extremely rare in the USA, riboflavin deficiency can result in hair loss [34].



Humans should supplement their diets with vitamin C since they do not naturally produce the enzyme L-gulonolactone oxidase, which is necessary for the production of vitamin C. *56 Dermatol Ther (Heidelb)* (2019) 9:51–70 High vitamin C content foods include citrus fruits, potatoes, tomatoes, green peppers, and cabbage [36]. Although a vitamin C shortage is frequently linked to irregularities in body hair [37], there is no evidence between vitamin C levels and hair loss.

VITAMIN D:

Epidermal keratinocytes produce vitamin D, a fat-soluble vitamin [38]. Vitamin D that is consumed or synthesized in the skin is inactive and needs to be enzymatically activated. In order to sustain serum levels, UVB-mediated conversion of 7-dehydrocholesterol in the skin to cholecalciferol, which is then hydroxylated in the liver and kidney to produce 1,25-dihydroxyvitamin D [1,25(OH)₂D] as its active form, is the major mechanism [39,40]. In addition to playing a crucial function in preserving proper serum levels of calcium and phosphorus, vitamin D is also strongly suggested to have anti-inflammatory and immunoregulatory effects [38–40]. Uncertainty exists about the processes underpinning vitamin D's contribution to autoimmune [39,40]. Numerous autoimmune illnesses have been linked to low vitamin D levels [41, 42, 43–46].



Through binding to the nuclear vitamin D receptor, vitamin D influences the development and differentiation of keratinocytes (VDR). The anagen stage is when murine hair follicle keratinocytes are most immunoreactive for VDR [47]. Hair loss in people with vitamin D-dependent rickets type II is proof of the vitamin D's role in the hair follicle. These individuals' VDR gene mutations cause vitamin D resistance, scanty body hair, and frequently total scalp and body alopecia [48–49]. Additionally, two patients with familial vitamin D-resistant rickets and alopecia had unique nonsense mutations in the VDR gene, according to Forghani et al. [50].

VITAMIN E:

Immune cells are particularly vulnerable to oxidative harm. As a part of the immunological defense process, they also produce reactive oxygen species, which can cause a lipid peroxidation response. Antioxidant supplementation fundamentally corrects various age-related immunological weaknesses, resulting in higher levels of interleukin-2, higher levels of natural killer cells, better mitogen, and higher overall lymphocyte and T-cell subset counts.



The oxidant/antioxidant imbalance has been linked to AA patients in a number of clinical studies. AA is a condition influenced by autoimmunity, genetic predisposition, emotional stress, and environmental stress. These studies have been examined, and the majority of reviewers found that patients with AA had higher levels of oxidative stress biomarkers and lower levels of beneficial antioxidant enzymes [52]. The oxidant/antioxidant balance and defense against free radical damage are both influenced by vitamin E [53]. In 15 patients with AA, the serum and tissue levels of vitamin E were examined by Ramadan and colleagues, who discovered significantly reduced levels of vitamin E in AA patients compared to healthy controls ($p < 0.001$) [54]. Naziroglu and Kokcam did not support these findings, finding no statistically significant difference in plasma vitamin E levels between AA patients and healthy controls [53].

Symptoms of Hair FALL

There are several factors for the hair loss; some of the main factors are given below –

- Acute illness
- Autoimmune disorders
- Chemicals (hair dyes)
- Chemotherapeutic agents/ drugs.
- Diabetes
- Hair loss following childbirth
- Hair styling products
- Hair styling techniques
- High iron deficiency
- Nutritional deficiencies
- Other fungal infections
- Physical trauma to the scalp
- Poisons
- Poor blood circulation
- Poor diet or malnutrition
- Prescription drugs
- Psychological
- Radiation exposure
- Ringworm
- Skin disease
- Stress
- Sudden weight loss
- Surgery

- Thyroid disease

Conclusion:

Large double-blind placebo-controlled trials are necessary to determine the effect of micronutrient supplementation on hair growth in patients with both micronutrient deficiency and non-scarring alopecia in order to establish any association between hair loss and micronutrient deficiency. This is due to the role of vitamins and minerals in normal hair follicle development and immune cell function. The financial restriction and the dearth of enthusiastic funders for this research are key restrictions. Each study based on data has its own unique limitations.

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