

Antioxidants For The Treatment of Hair (A Review)

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ABSTRACT

Increasing blood flow, promoting hair growth, and using antioxidants to cure many ailments. Alopecia (hair fall) is a dermatological condition that affects patients' mental well-being. Use plant and oil antioxidant properties to reduce hair loss. Making herbal hair oils with ingredients like Amla, Brahmi, Tridax, Neem, and shikakai and testing them for a boost in hair growth activity Herbal hair oils for hair development and other purposes can be made from it. Numerous diseases, including cancer, rheumatoid arthritis, atherosclerosis, Alzheimer's disease, and diabetes have been related to free radical damage within cells. Numerous nutritional, environmental, and lifestyle factors can damage androgen-sensitive hair follicles or directly contribute to hair loss. Patients with hair loss, thinning, and slow growth may be experiencing androgenetic alopecia in its early phases. By addressing non-androgenic factors, hair loss can be reversed and hair growth can be enhanced. A well-planned dietary regimen can help combat all of these and ensure that hair follicles are strengthened and grow back without the need for finasteride.

Keywords: Antioxidants, Alopecia, Herbal Hair Oils .

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INTRODUCTION

Antioxidants are chemicals that the body naturally produces and that are also present in a wide variety of foods. Antioxidants prevent cellular damage and have regulatory effects on the body, including immune system improvement, ocular health, and neuromuscular system protection. The body primarily produces glutathione, lipoic acid, coenzyme Q10, N-acetyl cysteine (NAC), and enzymes such as glutathione peroxidase, catalase, and superoxide dismutase. Since the body is unable to produce all of the necessary antioxidants, food must be consumed [1]. Vitamins C and E, carotenoids, selenium, zinc, polyphenols, flavonoids, and many other compounds are included in the family of antioxidants. These substances can also be found in green, purple, dark red and brown, yellow, orange, and red fruits and vegetables, nuts, berries, teas, spices, and red wine. Essential oils have strong antioxidant properties as well. Lipid peroxidation is stopped by vitamin E's quenching of lipid peroxy radicals. When present in nanomolar concentrations, the vitamin E compounds tocotrienol and tocopherol protect against neurodegeneration [2]. As an electron donor, vitamin C stops the oxidation of other substances. Lipoic acid inhibits peroxidation, increases intracellular glutathione levels, and even mitigates the effects of vitamin C and E insufficiency. It is capable of working in both lipid and aqueous phases. Certain brain and neural problems, diabetic neuropathy, cataract development, HIV, and radiation traumas are all treated with it. The amino acid N-acetyl cysteine (NAC) is a precursor to glutathione, which aids in DNA repair and is a potent antioxidant. It displays biological effects that are antagonistic to nitric oxide, promotes blood flow, or has vasodilator properties. Zinc lowers the production of ROS because it is a co-factor of Superoxide Dismutase (SOD) and an inhibitor of NADPH oxidase [3]. How can someone determine the OS level? It is simple. When a person has OS, they are always exhausted on a physical, mental, or emotional level; they also experience muscle and joint pain often; memory loss or brain fog; impaired vision; grey hair or hair loss; sensitivity to noise; and infection. Stress, worry, poisons, and illnesses under these circumstances all serve to exacerbate the oxidation process [4].

Hair

One of the most important bodily components, hair is a protective appendage that develops from the skin's ectoderm. They are also referred to as "epidermal derivatives" since they arise during embryological development from the epidermis [5]. A protein filament known as hair grows from dermal follicles [6].

Hair fall

The thinning of scalp hair is known as hair fall. Alopecia is the medical word for hair loss. Alopecia may be transient or ongoing [7]. One of the most prevalent symptoms among all patients is hair loss [8]. Physical stress, poor diet, particularly a lack of protein, excessive hair styling and colouring, using an excessive amount of vitamin A supplements, and a vitamin B deficiency are all factors that contribute to hair loss [9]. *Emblca officinalis* (amla), *Bacopa monnieri* (brahmi), *Ocimum sanctum* (tulsi), and *Nerium oleander* are just a few examples of different types of hair growth promoters that not only aid in minimising hair fall circumstances but also encourage the growth of new hair (kaner) [10].

Role of Antioxidants in Hair

In order to lessen the negative effects on hair fibre, antioxidants have been added to cosmetic formulations [11]. Antioxidants are incredibly helpful for both preventing hair loss and promoting the growth of new, healthy hair. Green tea, blueberries, and grape seed extract are a few of the most potent ones [12]. The family of Piper betles is called Piperaceae [13]. With glossy, heart-shaped leaves, the betel plant is a perennial creeper that is evergreen [14]. Betel leaves for hair loss are effective due to their high polyphenol and flavonoid content, which is antioxidant and anti-inflammatory and can prevent hair loss brought on by free radicals and skin disease inflammation [15].

Symptoms of hair fall

- Male pattern Baldness
- female pattern Baldness
- Alopecia Areata
- Telogen effluvium
- Trichotillomania

Causes of hair fall

There are many medical and non-medical causes of hair loss and grey hair that include:-

- Family history [16]
- Hormonal Imbalance [17]
- Drugs (chemotherapeutic, certain blood pressure control drugs, birth control pills.) [18]
- Radiations [19]
- Thyroid problems, diabetes, lupus, anemia, dermatitis [20]
- Cosmetic procedures (balayage, extenso, hair dye, re bonding) [21]
- pregnancy [22]
- Lack of vitamin C & E [23]
- Low protein diet or junk food [24]
- Genetic defect [25]

HERBAL MEDICINES

Amla, Brahmi, Tridex, Shikakai, Neem, Henna, Methi, Lemon, Tulsi, Reetha, Musk root, Mahabhringraj, Jantamasi, Chitraka, Marigold, Hibiscus, Nutmeg, and Tridex are all included in a herbal hair oil [26]. These exhibit antioxidant properties. Its utilisation of antioxidants & increases in hair growth activity. In essence, these are herbal plant extracts with an oil base. These herbs are used for hair care, making hair oil, preventing or treating baldness or other ailments, and aggravating hair growth. [27].

Amla

Biological source = *Emblca Officinalis* .

Family = Euphorbiaceae.

Uses - Rich source in vitamin-C, Tannins, minerals like phosphorus, iron, Calcium (which provide nutrition to hair and also causes darkening of hair) [28].

Brahmi

Biological source = *Bacopa monnieri* .

Family = Scrophulariaceae . Uses - Alkaloids (kinase activity) , treatment for Dementia [29] .

Neem

Biological source = *Azadirachta indica*.

Family = Meliaceae (saturated glycerides and unsaturated fatty acids)

Uses - treatment for dandruff in hair and relief in itching [30].

Shikakai

Biological source = *Acacia Concinna*.

Family = Sapindaceae.

Uses - natural hair wash for sensitive scalps , control dandruff , Hair growth , strengthen hair roots [31].

MEDICINAL PLANT USED IN HAIR LOSS

1. *Ginkgo biloba* (Ginkgo)

The drug is improves cerebral microcirculation and increases oxygen supply. *Ginkgo biloba* (leaves part used) leaf extract to hair regrowth through combined effects on proliferation and apoptosis of the cells within the follicle, thus potential as a hair dressing [32].

Chemical constituents like Diterpenoids, Kaempferol, Quercetin, , sitosterol and anthocyanins.

2. *Allium cepa* L. (Onion)

It has found essential in patchy baldness. The affected part should be rubbed with onion juice in morning and evening till it's red. It should be rubbed with honey afterwards. It contain Zinc that helps to secrete the scalp with needed oil and avoid dandruff which will cause hair loss. Iron is involved within the oxygenation of your body's red blood cells. Which is essential for normal hair growth and maintaining healthy hair [33].

Chemical constituents like Protein (albumin), diallyl sulphide, alliin, allicin. It also Contains some mineral like potassium, zinc, calcium, magnesium.

3. *Asiasari radix* (Wild ginger)

Asiasari radix extract (from Roots and Rhizoms) has hair growth promoting potential. This effect may be due to its regulatory effects on both cell growth factor genes [34].

Chemical constituents like Safrole (18.4%), Methyl eugenol (18%), methoxytoluenes & 3-benzodioxole derivatives.

4. *Eclipta alba* (L) Hassak(false daisy)

In various polyherbal formulations for hair growth promotion by component *Eclipta alba*. Methanolic extract has hair growth promoter potential . It is also reported that the petroleum ether extract of *E. alba* promotes follicular enlargement and prolongation of anagen phase [35-37].

Chemical constituents like Flavonoids , Wedelolactone, Desmethylwedelolactone, Triterpene, Glycosides , Saponins .

5. *Hibiscus rosa-sinensis* Linn (rose mallow)

Leaf extract of *Hibiscus rosa-sinensis* (Parts used leaves,flowers) increases hair length and the ratio of hair follicles in mice [38]. *Eclipta alba* Hassk, *Hibiscus rosasinensis* Linn, *Nardostachys Jatamansi* have excellent hair growth promoting activity, they mainly act by an enlargement of follicular size and a prolongation of the anagen phase [39].

Chemical constituents like flavonoids; Anthocyanins and Cyaniding-3, 5-diglucoside, Cyaniding-3-sophoroside-5-glucoside, Quercetin-3,7- diglucoside, Quercetin-3-diglucoside.

6. *Phyllanthus embelica* (Embllica)

The oxygenation of your body's red blood cells depends on iron. If an iron deficit will result in hair loss from a lack of oxygen. Its herbal hair oil and polyherbal ointment both encourage hair growth. Iron is essential for healthy hair maintenance and proper hair development. *Trigonellafoenumgraecum* (Linn.), *Hibiscus rosasinensis* (Linn.), *E. officinalis* (Linn.), and *Tridaxprocumbens* (Linn.) were included in a herbal formulation that shown synergistic benefits by significantly increasing hair growth activity [40]. Chemical components such as calcium, phosphorus, iron, tannin, and vitamin C.

7. *Rosmarinus officinalis* (Rosemary)

The olfactory system allows the essential oils to enter your body. They then go to your circulatory system, where they attach to receptors and alter the chemical makeup. Despite the perfect pharmacological activities of these herbs, herbal therapy is proven to stimulate hair follicles and to be the safest option to deal with many types of hair loss (alopecia) [41]. *Angustifolia* Miller (Labiatae) Rosemary contains 1-2% volatile oil, 0.8-6% esters, and 8-20% alcohols, among other chemical components. The primary ingredients are 1, 8-cineole, borneol, camphor, bornyl acetate, and monoterpene hydrocarbons. Lavandulol, linalyl acetate, linalol, lavendulyl acetate, terpineol, and cineol are the main ingredients in lavender oil.

MECHANISM OF HAIR LOSS

Nitric oxide, glutathione derivatives, and lipid peroxidation are signs of ROS-induced oxidative cell death. These indicators have all been found to be significantly elevated in patients with hair loss, demonstrating the significance of ROS in the process of hair loss [42]. It was determined by Inui, Fukuzato, and Itami that androgens prevent hair development by secreting TGF-1 [43]. Examine the specifics of this method to demonstrate how androgens cause the dermal papilla cells to produce more ROS, which triggers the release of TGF-1, which limits hair development. The investigation also showed that ROS scavenger use prevented TGF-1 release and undid the suppression of hair development [44]. According to the

research, antioxidants can stimulate hair growth without the direct use of anti-androgens, and using anti-androgens alone may not result in a full clinical response in all patients with hair loss. According to a theory put out by Kalkan et al.[45], the ROS creates covalent bonds with endogenous proteins in cells, causing structural alterations that alter the proteins' immunological signature. Now that normal proteins are recognised as novel antigens, they can trigger autoimmune, inflammatory, and immunological responses. The study highlights the significance of ROS scavengers and provides evidence supporting the use of antioxidants in the treatment of alopecia areata and hair loss (hair fall) [45].

CONCLUSION

The hair on our bodies plays an important role. The antioxidant properties of plants and oils can be used to cure cancer and other disorders as well as hair loss. In nutritional supplements and for the prevention of illnesses including cancer, coronary heart disease, and even altitude sickness, antioxidants are frequently employed. The use of herbal cosmetics in personal care products and day-to-day life has increased in recent years. Create a herbal shampoo that prevents hair loss and encourages hair growth using the extract from betel leaves described in this research article. Betel leaf and guava leaf extracts were combined in a formulation, and the antioxidant activity of the mixture was assessed using ascorbic acid as the reference. Thus, herbal medicines provide a new revolution in hair growth with the ability to effectively treat alopecia without causing negative effects. These plant extracts, which include a variety of phytoconstituents, can treat alopecia by giving dietary supplements. Additionally, there are some natural gems with active components found in essential oils that can be utilised as aromatherapy to cure alopecia by increasing blood flow to the scalp.

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