

Efficacy of Alimental Components in an Oral Supplement for the Treatment of Hair Fall, Hair growth, Skin & Nail Problems and Role of Hairvit Plus in their Composition Upgradation

Rana Neha (Pharmacist)*, Mathur Shabla (Researcher), ** Dr. Taneja indu & Dr. Taneja Evita with inputs from Eric Favre Laboratoire, France

* Pharmacist, Pure Natural Products Pvt. Ltd., Faridabad, India

** Researcher, Pure Natural Products Pvt. Ltd., Faridabad, India

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Abstract- The market of nutritional supplements is proliferating. Hair loss and skin related concerns are faced by everyone these days. To be able to provide effective treatment for [Hair loss](#), Hair fall, [Alopecia](#), Nail and Skin health, Gray hair and many other related issues, these herbal compositions should not only have correct balance of vitamins, amino acids and minerals but also should be upgraded time to time, in accordance to latest clinical findings or developments. Over time, the supplements should be reformulated or upgraded owing to the research confirming the benefits of specific nutrients like Methyl Sulfonyl Methane (MSM) and Green Apple Skin Extract. MSM is responsible for Keratin & collagen production for structuring skin, hair and nails. The antioxidants in green tea extract prevent hair-loss and boosts up hair-growth. The supplement can be upgraded by adding Saw Palmetto extract to treat Alopecia in men.

Index Terms- Biotin, Collagen Production, Keratin Production, Follicle Stimulation, Alopecia

I. INTRODUCTION

Effectiveness of Biotin & Zinc in Cases of Alopecia, Onychoschizia and Some Skin Conditions

Biotin is a water-soluble vitamin and an essential coenzyme for several important enzymes while zinc is an essential micronutrient that is responsible for the normal functioning of hundreds of enzymes¹. The use of these agents for hair loss is based on the observation that alopecia is one of many consequences associated with biotin and zinc deficiencies^{1,2,3}. In one case report, a child with alopecia due to zinc deficiency was administered a zinc supplement and her hair loss stopped in three weeks.⁴

Biotin deficiency leads to dry, irritated skin and cracking of nails. One study in women who had brittle nails or splitting of the nails (Onychoschizia) noted that oral supplementation of biotin at 2.5mg over the course of at least six months increased nail thickness by 25% (reaching normal/healthy control values).⁵ About half the group with brittle nails (4 of 8 subjects) also experienced reductions in nail splitting.⁵ All nails from

biotin-treated individuals showed some improvement when assessed by electron microscopy.⁵

Biotin deficiency leads to complications with the skin, primarily seen as scaly and red (erythematous) dermatitis.⁶ Biotin protects the skin from acne, fungal infections, rashes, severe dryness and cracking of nails. One preliminary study has noted that, in four subjects being given chemotherapy (*gefitinib* or *erlotinib*) known to induce skin rashes, administration of biotin reduced the severity of the rash.⁷

Amino Acids for Collagen Production and Hydration

In orthomolecular medicine vitamins and [amino acids](#) are suitable, easy and safe treatment of many skin and hair problems; especially acne, wrinkles, and hair loss. Amino acids promote collagen production⁸, increase hydration⁹ and promote healthy pH balance. Elevating the concentration of important amino acids, vitamins, minerals, trace elements and other compounds that are necessary to support hair growth, maintenance and protection will help to minimize hair loss.

Methionine strengthens the nails and helps prevent hair loss. [It](#) contains Sulphur which can build chains, which themselves create networks and this is exactly what happens in hair and nails. Methionine can therefore considerably strengthen the hair structure and nails. Methionine can also help against hair loss.¹⁰ Several publications indicate that the Arginine has an enormous effect on hair growth. As a precursor to nitrogen oxide, it is of vital importance for hair growth. The vasodilatory effect of Arginine promotes hair growth as the nitrogen oxide generated from Arginine opens the potassium channels of the cells. The blood supply to the hair root is then improves, which in turn stimulates hair growth.¹¹ Research has shown that hair loss can be reduced with lysine supplementation.¹²

Efficacious Effects of Minerals on Alopecia, Follicle Stimulation and Hair Regrowth

Zinc, Iron, Copper, Sulphur, Selenium are the minerals that largely influence hair growth. Zinc influences hair follicles and hair growth. It is enzyme activator stimulating protein transformation, which have sulfide bonds, necessary for hair building. Research shows its influence on hair cycle.¹³ Iron

deficiency has been associated with hair loss as in alopecia areata, androgenetic alopecia, and telogen effluvium¹⁴. Iron as hemoglobin component supplies energy to matrix cells being subject to division and differentiation which results in hair production, influences enzymes work responsible for hair build and growing rate. Copper Sulphate is very effective for healing sores and skin diseases.¹⁵ Copper also contributes to hair strengthening by influencing growth of proper horn like hair structure. Its deficiency causes lowered number of sulfur bridges responsible for strength and elasticity of hair resulting in brittle, weak, curly hair with tendency to early graying.¹⁶ Sulphur supports strong and thick hair, prevents hair loss and promotes hair growth. It promotes collagen production which helps in the production of healthy skin cells and hair growth.¹⁷ Selenium is a component of at least 35 proteins many of which are enzymes and with its deficiency in the body hair loss with pseudo albinism occurs¹⁸.

Antioxidants and Oligomeric Proanthocyanidin Complexes in Grape Seed Extract for Hair Growth and Skin Protection

Grape seed extract (GSE) is extremely rich in antioxidants and oligomeric proanthocyanidin (OPCs) complexes. Proanthocyanidins are natural chemicals that help in skin protection and hair growth.¹⁹ The extract [moisturizes and conditions the hair](#) by reducing dandruff. It prevents hair loss and strengthens the hair as well – enabling it to grow faster. [The vitamin E content](#) helps build the hair tissue, and linoleic acid promotes hair growth.

Soya Isoflavones for Hair Protection and Skin Nourishment

Soya Isoflavones can effectively reduce Dihydrotestosterone (DHT) in humans. DHT is known to influence the hair growth cycle: the follicles shrink and they no longer produce hair, the hair begins to fall out as the hair follicle cycle survival is shorter, and in the end, hair will stop being produced and microscopic scarring will result from this process. Current treatment for hair loss includes DHT blockers or vasodilators.²⁰

According to a research, isoflavones modify enzyme activity and protect from harmful properties of UV radiation, in deeper parts of skin. In the corium they influence the state of blood vessels and stimulate skin micro circulation which nourishes hair. Indirectly flavonoids increase absorption from the alimentary tract of vitamin C and protect functions conducted by it.²⁰ The flavonoids contained in herbs like Soya Isoflavones, inhibiting 5 α -reductase contributed to faster hair regrowth.²¹

Isoflavones may also be a powerful anti aging tool. The increase in blood vessels leads to better circulation of the scalp which helps in hair regrowth. A study on 30 postmenopausal women showed significant health benefits when isoflavones were supplemented by 100mg/day. The results showed that isoflavone treatment increased the epidermis thickness by 9.46% in 23 out of the 30 women who participated in the study; the collagen amount in the skin as well as the number of elastic fibres increased. Furthermore, the number of dermal blood vessels was increased significantly, which does suggest that isoflavones have a beneficial effect to the skin and the blood vessels.²²

Sulphur in Methyl Sulfonyl Methane (MSM) for Collagen and Keratin Production

The sulphur-based compound or organic sulphur is responsible for the Collagen and Keratin production in the body which serve as the building block for the structure of skin, hair and nails. Hair is made up of a protein called keratin, produced in the follicles in the outer layer of skin. As follicles produce new hair cells, old cells are being pushed out through the surface of the skin. MSM is necessary for the production of collagen and keratin.²³ It glues the keratin and collagen and plays a significant role in maintaining skin, hair and nail health. Researchers report rapid hair growth, and return of color in some cases.

Green Tea Extract with Antioxidants for Hair Growth

Green tea is one of food derived active ingredient potential as topical hair grower.²⁴ Green tea extract contains the antioxidant Epigallocatechin Gallate (EGCG) that has the ability to stimulate hair growth. It also contains catechins that help in repressing DHT or dihydrotestosterone, which is usually responsible for hair loss.²⁵ The compounds found in green tea extract, such as carotenoids, tocopherols, zinc, ascorbic acid, selenium, and manganese help to prevent hair loss and encourage hair regrowth. Its anti-inflammatory properties boost up hair growth.

Green Apple Skin Extract in Procyanidin Therapy for Hair Growth, Stronger Nails and Healthy Skin

Packed with vitamins and minerals, green apple extract offers potential natural remedy for strengthening the hair. It helps control hair fall and promotes hair growth as well. Several studies have shown that Procyanidin therapy promises a potential cure for male pattern baldness.²⁶

The richest known source of Procyanidin is the skin of immature (baby) green apples. Polyphenols from apples have an astonishing range of health effects, and may be nature's perfect antioxidant. Many people taking apple procyanidins in pill form notice faster hair growth, stronger fingernails, and softer, smoother skin.²⁶

Saw Palmetto Extract

Saw Palmetto (*Serenoa repens*) extract has been shown to inhibit both types of 5- α reductase and, when taken orally, has been shown to increase hair growth in Male Androgenetic Alopecia (AGA) patients.²⁷ There are two types of herb palmetto supplements available in the market. One type is dried Saw Palmetto berries and the other type Saw Palmetto extract in the form of tablets. Recommended dose is 160mg twice a day. Although saw palmetto is listed in the US pharmacopoeia, it falls under the guidelines for food supplements.²⁸

Table - Effects Of Nutrient Deficiency And Supplement Use On Hair Loss²⁹

Nutrient	Effect of Deficiency on Hair Loss	Studies of Supplementation
Iron	<ul style="list-style-type: none"> Chronic diffuse telogen hair loss with iron deficiency anemia. In the absence of anemia, studies are not clear whether there is a significant link between ID and hair loss. 	<ul style="list-style-type: none"> Insufficient evidence to recommend iron supplementation to all hair loss patients with iron deficiency in the absence of anemia. Approach on a case-by-case basis. Excess supplementation can cause hemochromatosis.
Zinc	<ul style="list-style-type: none"> Statistically lower serum zinc concentrations in a study of 312 patients with AA, MPHL, FPHL, or TE compared to 30 healthy controls. 	<ul style="list-style-type: none"> A case series demonstrated reversal of hair loss following oral supplementation in five patients with TE and zinc deficiency. Limited information on effects of zinc supplementation improving hair growth in the absence of deficiency. One case report with a patient with dry brittle hair and alopecia, without clear zinc deficiency, who experienced improvement in alopecia following oral zinc therapy. Excess supplementation can cause acute toxic effects including epigastric pain, nausea, vomiting diarrhea, and headache and chronic toxic effects including reduced copper status, interaction with iron, reduced immune function, and decreased concentrations of HDL cholesterol.
Niacin (Vitamin B3)	<ul style="list-style-type: none"> Diffuse hair loss with pellagra due to severe deficiency. No known studies regarding serum niacin levels in patients with hair loss. 	<ul style="list-style-type: none"> Limited information on effects of niacin supplementation improving hair growth in absence of deficiency.
Fatty acids	<ul style="list-style-type: none"> Loss of scalp and eyebrow hair. 	<ul style="list-style-type: none"> Limited information on effects of fatty acid supplementation improving hair growth in absence of deficiency.
Selenium	<ul style="list-style-type: none"> In animal studies, rats deficient in selenium display sparse hair growth, while knockout mice lacking specific selenoproteins exhibit progressive hair loss after birth, ultimately leading to almost total alopecia. One case report of selenium deficiency in a young child reported clinical manifestations of dry skin and sparse, light-colored hair, improving after supplementation. 	<ul style="list-style-type: none"> Limited information on effects of selenium supplementation improving hair growth in absence of deficiency. Toxicity from excess supplementation is well documented and can cause generalized hair loss.
Vitamin D	<ul style="list-style-type: none"> Serum vitamin D2 levels in a study of eight females with either TE or FPHL were shown to be significantly lower than in 40 age-matched female controls, with decreased levels correlating to increased disease severity. 	<ul style="list-style-type: none"> Limited information on effects of vitamin D supplementation improving hair growth in absence of deficiency.
Vitamin A	<ul style="list-style-type: none"> Deficiency has no known link to hair loss. 	<ul style="list-style-type: none"> Limited information on effects of vitamin A supplementation improving hair growth in absence of deficiency. Toxicity from excess supplementation has a strong known link to hair loss, as well as other effects on skin, vision, and bone.
Vitamin E	<ul style="list-style-type: none"> Deficiency has no known link to hair loss. 	<ul style="list-style-type: none"> Limited information on effects of vitamin E supplementation improving hair growth in absence of

Nutrient	Effect of Deficiency on Hair Loss	Studies of Supplementation
		deficiency. <ul style="list-style-type: none"> Supplementation in one study of twenty-one volunteers suffering from hair loss has showed significant increase in hair number compared to placebo. Toxicity from excess supplementation can result in risk of bleeding problems, decreased thyroid hormones, and decreased activity of vitamin K. Additionally, there is some evidence for adverse effect on hair growth with excess supplementation.
Folic Acid	<ul style="list-style-type: none"> No significant difference in serum folate levels in a study of 91 patients with diffuse hair loss and 74 healthy controls. 	<ul style="list-style-type: none"> Limited information on effects of folic acid supplementation improving hair growth in absence of deficiency.
Biotin	<ul style="list-style-type: none"> Deficiency can result in alopecia, eczematous skin rash, conjunctivitis, and candidiasis. 	<ul style="list-style-type: none"> Limited information on effects of biotin supplementation improving hair growth in absence of deficiency.
Amino Acids and Proteins	<ul style="list-style-type: none"> Protein malnutrition can result in hair loss. 	<ul style="list-style-type: none"> L-lysine supplementation in addition to iron supplementation has been shown to significantly increase mean serum ferritin concentration in some women with chronic TE who failed to respond to iron supplementation alone. Limited information on effects other amino acids and proteins improving hair growth in absence of deficiency.

Key of abbreviations: Alopecia areata – AA; Androgenic alopecia – AGA; Female pattern hair loss – FPHL; High density lipoprotein – HDL; Iron deficiency – ID; Male pattern hair loss – MPHL; Telogen effluvium – TE

II. CONCLUSION

The upgradation of nutritional supplements is becoming increasingly important to counter the ever-increasing issues related to hair and skin. It is worth monitoring and keeping a vigilant eye on this new and very rapidly developing food and pharmaceutical industry. The daily administration of nutritional supplement composed of the above mentioned components significantly increases hair growth and helps maintain skin and nail health. Continued improvements may occur with ongoing treatment. No adverse events are reported. The current research also demonstrated the ability of these components to decrease the hair loss, promoting nail growth and glowing of skin.

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AUTHORS

First Author – Neha Rana, Pharmacist at & Production Executive Purenatural Products Pvt. Ltd., Faridabad and neha@purenaturals.life
Second Author – Shabla Mathur, Content-Researcher at Purenatural Products Pvt. Ltd., Faridabad and shabla@purenaturals.life

Correspondence Author – Dr. Indu Taneja 9818590029, drindu.taneja@gmail.com, Dr. Evita Taneja- 7024141251, Evita.taneja@gmail.com