

AETHERN[®]
ULTIMATE HAIR BOOSTER

Tech Book

Vers.23.001



Index

- I. Overview of the US Hair Market
- II. Overview of naturally sourced ingredients
- III. The causes that affect Hair Health
- IV. AETHERN science applied to ULTIMATE HAIR BOOSTER
- V. Supplement Facts
- VI. Nutrients Benefits on Hair
- VII. Nutrients Benefits on Hair (General Chart)
- VIII. FAQs
- IX. Fact Sheet
 - 1. Name of the product
 - 2. Qualitative and quantitative composition
 - 3. Pharmaceutical form
 - 4. Data
 - 5. Products properties
 - 6. Product information
 - 7. Bearer of rights of sale
- X. Statistical Report

I. Overview of the Hair Market

The US hair market is a multibillion-dollar industry that includes various products such as topicals, serums, and supplements. According to Grand View Research, the US hair care market was valued at \$15.3 billion in 2020 and is expected to grow at a compound annual growth rate (CAGR) of 4.4% from 2021 to 2028.

Topicals, such as shampoos, conditioners, and hair masks, are the most common hair care products, accounting for the largest share of the market. In 2020, the shampoo segment held the largest revenue share of over 35%. The increasing demand for natural and organic hair care products is a significant growth driver in this segment.

Serums, which are leave-in products designed to treat specific hair concerns like frizz or breakage, are also gaining popularity in the US market. According to Statista, the serum market size in the US was valued at \$383.8 million in 2020 and is projected to reach \$489.8 million by 2026, growing at a CAGR of 3.9% during the forecast period.

The COVID-19 pandemic has significantly impacted the hair health of many people who experience increased levels of stress, anxiety, and depression. Stress and anxiety can cause hair loss, breakage, and thinning; some people also experience hair loss. In addition, changes in diet and lifestyle resulted from the overview.

Hair supplements, which include vitamins and minerals that promote hair health, are experiencing massive growth. The global hair supplement market size was valued at \$1.18 billion in 2020 and is expected to grow at a CAGR of 7.9% from 2021 to 2028, and dermatologists could beware of the phenomenon:

- Dermatologists can stay informed about the latest research and clinical studies to identify supplements that may be effective for their patients and recommend them accordingly.
- Hair supplements can be used with other treatments, such as topical minoxidil and finasteride, to improve their efficacy. Additionally, hair supplements can be an essential part of an overall hair care regimen, including a healthy diet, regular exercise, and avoiding hair-damaging practices like excessive heat styling.
- Patient preference and adherence. Some patients may prefer to use natural supplements as part of their hair care routine. By offering them as a recommendation, dermatologists can help improve patient satisfaction and adherence to treatment. In addition, by taking a holistic approach to hair health and incorporating supplements as a part of a larger treatment plan, dermatologists can help their patients achieve optimal hair growth and health.

II. Overview of naturally sourced nutraceuticals

Natural hair supplements are a growing trend in the hair care industry. Consumer fears about synthetic ingredients and other potentially harmful substances have grown recently as more people become aware of the potential risks associated with these ingredients. This trend is part of a broader shift toward more sustainable, eco-friendly, and natural products in many industries, including the hair care industry.

Consumers are increasingly seeking products made with natural and sustainable ingredients, which is reflected in the growing popularity of natural hair supplements. Natural hair supplements are often made with ingredients derived from plant sources and are free from synthetic chemicals and additives that may harm the hair and scalp.

In addition to the potential health benefits of natural hair supplements, many consumers are attracted to these products because of their sustainability and eco-friendliness. Many natural hair supplements are packaged in eco-friendly materials and are often manufactured using sustainable production methods that minimize their environmental impact.

Additionally, **liquid hair supplements**, which are typically taken orally, offer several advantages over other forms:

Faster absorption: They are absorbed more quickly by the body than pills and capsules, as they do not need to be broken down before absorption. This means that the nutrients in liquid supplements can be delivered to the hair follicles more quickly, potentially improving their efficacy.

Customizable dosage: With liquid supplements, it's easy to customize the dosage to meet individual needs. A shot of 25ml can't be compared to the difficulty of swallowing 25 pills.

Improved digestion: Liquid supplements are more accessible than pills and capsules, which can be especially beneficial for people with digestive issues or other conditions affecting nutrient absorption.

Better taste: Formulated with natural flavors, they are more palatable than pills and capsules. This can be especially important for people who have difficulty swallowing tablets or are sensitive to other supplements' tastes.

Versatility: Liquid supplements can be mixed with other liquids, such as water or juice, making them more versatile than pills and capsules. This can make it easier to incorporate into a daily routine and ensure they are taken consistently.



III. The causes that affect hair health

Seven clinically proven root causes affect hair health:

1. Hormonal imbalance or deficits:

High levels of DHT (Dihydrotestosterone) have been scientifically shown to be a significant root cause of hair health problems. DHT, a hormone derived from testosterone, can accumulate in the hair follicles and shrink them over time, blocking nutrient absorption necessary for hair growth. This can cause hair thinning, miniaturization, and eventual hair loss. Clinical studies have linked high levels of DHT to male and female pattern hair loss, also known as androgenetic alopecia. Reducing DHT levels through supplementation or lifestyle modifications has been proven effective in preventing hair loss and promoting growth.

1. Kwon, O.-S., & Kim, M. H. (2017). Is serum dihydrotestosterone level related to androgenetic alopecia? A retrospective cross-sectional study. *Annals of Dermatology*, 29(1), 48–52

2. Randall et al. "Androgenic alopecia: an enzyme-linked immunosorbent assay (ELISA) for dihydrotestosterone (DHT) quantification in scalp skin." *Journal of Investigative Dermatology*, vol. 102, no. 1, 1994, pp. 49-53.

3. Shapiro et al. "Hair loss in women: evaluation and treatment." *International Journal of Women's Dermatology*, vol. 4, no. 4, 2018, pp. 218-227.

4. Lattanzi et al. "Insulin resistance and circulating androgens: a relationship with female pattern hair loss." *Journal of Endocrinological Investigation*, vol. 42, no. 3, 2019, pp. 295-303.



III. The causes that affect hair health

2. Stress

Stress is a well-known factor that can negatively impact hair health. When the body experiences stress, it can cause hair to enter the telogen or “resting” phase of the hair growth cycle, leading to hair shedding and thinning. Chronic stress can also disrupt the body’s hormonal balance, leading to conditions such as alopecia areata, which can cause hair loss in patches. In addition, stress can cause damage to the scalp and hair follicles, leading to dryness, itchiness, and inflammation, which can further affect the hair’s health. Reducing stress levels through supplementation or lifestyle modifications has been proven effective in preventing hair loss and promoting growth.

1. Dlova, N. C. (2018). Hair and stress. *International Journal of Women’s Dermatology*, 4(4), 230–2312018
2. Peters EM, Liotiri S, Bodó E, et al. Probing the effects of stress mediators on the human hair follicle: substance P holds a central position. *Am J Pathol*. 2007;171(6):1872–1886.
5. Arck PC, Handjiski B, Peters EM, et al. Stress inhibits hair growth in mice by induction of premature catagen development and deleterious perifollicular inflammatory events via neuropeptide substance P-dependent pathways. *Am J Pathol*. 2003

3. Sleep disorder

Sleep disorders are a root cause that can negatively affect hair health. Sleep is crucial for the body’s ability to repair and regenerate itself, including the hair. Sleep deprivation has been shown to increase stress hormones, disrupt the normal hair growth cycle, and contribute to hair loss. In addition, sleep disorders can affect the body’s hormonal balance, leading to conditions such as androgenetic alopecia, characterized by hair thinning and balding. Lack of sleep can also cause fatigue and a weakened immune system, further impacting the hair’s health. Therefore, ensuring proper sleep hygiene through supplementation or lifestyle modifications has been proven effective in maintaining healthy hair.

1. Liamsoombut S, Pomsoong C, Kositkuljorn C, Leerunyakul K, Tantrakul V, Suchonwanit P. Sleep quality in men with androgenetic alopecia. *Sleep Breath*. 2022.
2. Gupta S, Goyal I, Mahendra A. Quality of life assessment in patients with androgenetic alopecia. *Int J Trichology*. 2019; 11:147–152.
3. Dai YX, Tai YH, Chen CC, et al. Bidirectional association between alopecia areata and sleep disorders: a population-based cohort study in Taiwan. *Sleep Med*. 2020; 75:112–116.

4. Metabolism

Metabolism is a crucial process that affects the body’s ability to maintain healthy hair. The hair follicle requires constant nutrients and oxygen to grow and remain healthy. The body’s metabolism converts the nutrients we eat into energy, which is then used to fuel the body’s cellular processes, including hair growth. An imbalanced metabolism, such as in conditions like diabetes or thyroid disorders, can negatively affect the hair’s health. These conditions can lead to nutrient deficiencies and hormonal imbalances, which can cause hair thinning, shedding, and slow growth. Therefore, maintaining a healthy and balanced metabolism through supplementation and proper nutrition can be essential for healthy hair.

1. Trueb RM. Oxidative stress in the ageing of hair. *Int J Trichology*. 2016;8(2):73–77.
2. Su L, Sun G, Cheng X, Yin J, Song L. Association between metabolic syndrome and male androgenetic alopecia: A cross-sectional study. *J Diabetes Investig*. 2020;11(5):1231–1237.
4. Singh S, Bhardwaj M, Kaur S, et al. A comparative study of serum zinc, copper, and iron levels in alopecia areata patients with and without metabolic syndrome. *Int J Trichology*. 2017;9(2):49–54.

III. The causes that affect hair health

5. Nutrition

Nutrition is a critical root cause that affects the overall health and appearance of the hair. The hair follicle requires a variety of nutrients, such as protein, zinc, or biotin, to grow and remain healthy. A lack of these nutrients in the diet can cause hair loss, thinning, and dullness. In addition, consuming too much of certain foods, such as sugar or processed foods, can cause inflammation in the body, leading to hair loss. Proper nutrition, including a diet rich in whole foods, fruits, and vegetables, can help provide the necessary nutrients for healthy hair growth. However, nutrient deficiencies are present, and proper supplementation has been proven effective in preventing hair loss and promoting healthy and strong hair.

1. Guo, E. L., & Katta, R. (2017). Diet and hair loss: effects of nutrient deficiency and supplement use. *Dermatology Practical & Conceptual*, 7(1), 1-10.

6. Aging

Aging is a natural process that can significantly impact the hair's health and appearance. As we age, the hair follicles may become less active and produce thinner, weaker hair strands. Natural aging can also decrease hormone production, affecting the hair's health. In addition, as we age, the body's ability to absorb and utilize nutrients from food may decrease, which can also negatively affect hair health. Therefore, paying extra attention to hair care and nutrition as we age, including using gentle hair products, maintaining a healthy and balanced diet, and supplementing with vitamins and minerals to support healthy hair growth.

1. Ji J, Ho BS, Qian G, Xie XM, Bigliardi P, Bigliardi-Qi M. Aging in hair follicle stem cells and niche microenvironment. *J Dermatol Sci*. 2017;87(2):87-93. doi:10.1016/j.jdermsci.2017.05.003.

7. Lifestyle

Lifestyle factors can significantly impact the health and appearance of the hair. Smoking, for example, can damage the hair and scalp by reducing blood flow and causing oxidative stress. Overexposure to the sun, frequent heating tools, and harsh hair products can also cause damage and weaken the hair. In addition, a sedentary lifestyle can lead to poor circulation, which can negatively affect the health of the hair follicles. On the other hand, regular exercise can help promote blood flow and circulation, supporting healthy hair growth. Therefore, healthy lifestyle habits, such as avoiding smoking, protecting the hair from the sun and heat, staying physically active, and supplementing, can be essential to maintaining strong and healthy hair.

1. Almohanna, H. M., Ahmed, A. A., Tsatalis, J. P., & Tosti, A. (2019). The Role of Vitamins and Minerals in Hair Loss: A Review. *Dermatology and Therapy*

2. Babadjouni A, Pouldar Foulad D, Hedayati B, Evron E, Mesinkovska N. The Effects of Smoking on Hair Health: A Systematic Review. *J Am Acad Dermatol*. 2021;84(3):689-696.

IV. AETHERN's science applied to ULTIMATE HAIR BOOSTER

First, we restore our body and mental balance by providing the environment for nutrient absorption in a four-stroke phase:

1. Promoting sleep
2. Fighting stress
3. Supporting microbiota
4. Supporting hormones balance

Comprehensive list of the nutrients further in this document: Supplements Facts, Nutrients Benefits, General Chart
AETHERN science is detailed in the document: AETHERN Approach

Then we Support, Nurture, Strengthen, and Protect them in a two-stroke phase by:

1. Providing targeted nutrients to help address all seven causes that affect hair health
2. Protecting against sunlight damage



V. Supplement Facts

Serving Size 1 bottle (25 mL)

Servings Per Container 28

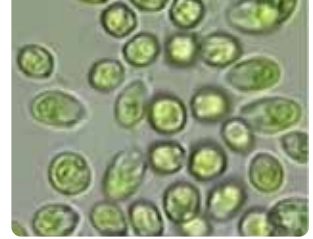
Amount Per Serving	% Daily Value
Calories 25	
Total Carbohydrate 4g	2%**
Total Sugars 4g	†
Includes 1g Added Sugars	2%**
Protein 2g	
Vitamin A (as Beta-Carotene from <i>Dunaliella salina</i> , herb) 416mcg	46%
Vitamin C as L-Ascorbic Acid (from Acerola Extract <i>Malpighia Glabra L.</i> , fruit) 90mg	100%
Vitamin D (as Cholecalciferol) 20mcg	100%
Vitamin E (as D-Alpha-Tocopherol) 15mg	100%
Vitamin K (as Menaquinone) 120mcg	100%
Thiamin (Vitamin B1) 1.2mg	100%
Riboflavin (Vitamin B2) 1.3mg	100%
Niacin (as Nicotinamide) 16mg	100%
Vitamin B6 (as Pyridoxine Hydrochloride) 1.7mg	100%
Folic Acid (as Pteroylmonoglutamic Acid) 400mcg	100%
Vitamin B12 (as Cyanocobalamin) 2.4mcg	100%
Biotin (as D-Biotin) 3,000mcg	10,000%
Pantothenic Acid (as D-Calcium Pantothenate) 6mg	120%
Iodine (from <i>Laminaria digitata</i> , herb) 150mcg	100%
Choline (as Choline Bitartrate) 350mg	64%
Magnesium (as Magnesium Bisglycinate) 63mg	15%
Zinc (as Zinc Bisglycinate) 11mg	100%
Selenium from Enriched Yeast 55mcg	100%
Silicon (from Bamboo Extract <i>Bambusa arundinacea</i> , thallus) 60mg	†
Fish Collagen Peptides 250mg	†
Saw Palmetto Extract (<i>Serenoa repens</i> , fruit) 250mg	†
Keratin 200mg	†
L-Glycine 200mg	†
Rhodiola Extract (<i>Rhodiola rosea</i> , root) 200mg	†
L-Hydroxyproline 175mg	†
L-Proline 150mg	†
L-Lysine 125mg	†
Hyaluronic Acid 100mg	†
Ashwagandha (<i>Withania somnifera L.</i> , root and herb) 100mg	†
Turmeric (<i>Curcuma longa L.</i> , root) 100mg	†

** Percent Daily Values are based on a 2,000 calorie diet.

† Daily Value not established.

Other Ingredients: Water, Grape Syrup, Citric Acid, Natural Flavors, Sodium Benzoate and Potassium Sorbate (preservative), Sucrose Esters. Contains: Fish (Cod, Salmon, Trout, Haddock, Pangasius, Tilapia, Ling, Channel and Atlantic Catfish).

Vitamin A (as beta-carotene from *Dunaliella salina*)



Vitamin A, specifically in the form of beta-carotene from *Dunaliella salina*, has been shown to have numerous benefits for hair health. In the human body, beta-carotene is converted to Retinol (Vitamin A), which plays a critical role in vision, immune function, and skin health. Additionally, beta-carotene and retinol have been shown to have numerous health benefits, including reducing oxidative stress, preventing cellular damage, and improving the appearance of skin and hair.

Beta-carotene has been found to improve hair growth, increase the size of hair follicles, and protect against hair damage. These benefits are partly due to beta-carotene's potent antioxidant properties, which help prevent cellular damage.

Research has shown that beta-carotene can also improve scalp health. Beta-carotene can help prevent dandruff and other scalp conditions that can lead to hair loss by regulating oil production and decreasing sebum secretion. Beta-carotene can help promote new, healthy hair growth by reducing oxidative stress on the scalp.

In addition to its benefits for hair growth and scalp health, beta-carotene from *Dunaliella salina* has also been found to protect against damage from harmful environmental factors such as UV radiation and pollution. By reducing oxidative stress and scavenging free radicals, beta-carotene can help to prevent damage to the hair shaft and keep hair looking healthy and shiny.

Apart from supplements, you can find a good source of vitamin A in the following foods: A 3-ounce serving of beef liver provides over 500% of the RDI, one medium-sized sweet potato contains over 400% of the RDI, one cup of raw carrots contains over 100% of the RDI and, one cup of cooked butternut squash provides over 100% of the RDI.

1. Cho S, Lee DH, Won CH, Kim SM, Lee S, Lee MJ, Chung JH. Differential effects of low-dose and high-dose beta-carotene supplementation on the signs of photoaging and type I procollagen gene expression in human skin in vivo. *Dermatology*. 2010 ;221(2):160-71

2. Das A, Datta S, Dey AC. Vitamin A Supplementation Induces Hair Growth in Neonatal Mice. *Int J Trichology*. 2015;7(4):156-161

3. Köpcke W, Krutmann J: Protection from sunburn with beta-carotene – a meta-analysis. *Photochem Photobiol* 2008; 84:284–288.

Vitamin C (as acerola extract)



Vitamin C is an essential nutrient that is critical to overall health and has been shown to have numerous benefits for hair health.

It promotes hair growth: Vitamin C is an essential nutrient that plays a critical role in producing collagen, a protein that helps grow hair. Adequate levels of collagen are necessary for strong and healthy hair, as they help to provide structure and support to the hair shaft. Vitamin C helps to stimulate the production of collagen, which in turn can help to speed up hair growth and improve the overall health of hair.

It prevents hair damage: Vitamin C is a powerful antioxidant that can help to protect hair from damage caused by free radicals and oxidative stress. This can help to prevent hair breakage and split ends, leading to healthier hair. Free radicals and oxidative stress can cause hair damage and weaken its structure, making it more prone to breakage and split ends. Vitamin C helps to neutralize these harmful effects, keeping hair looking and feeling its best.

It improves scalp health: Vitamin C can help improve the scalp's health by reducing inflammation and promoting circulation. This help to prevent conditions such as dandruff, itching, and dryness.

It enhances hair shine: Vitamin C can help improve hair's overall health, making it shiny and lustrous. It also helps to prevent dullness and fizziness, giving hair a more polished look. Dull and frizzy hair can result from damage caused by free radicals and oxidative stress. Vitamin C helps to prevent this damage, leaving hair looking shiny and lustrous.

It strengthens hair: Vitamin C helps to strengthen hair by improving its elasticity and resilience. This can help prevent breakage and split ends, leading to healthier, stronger hair.

Apart from supplements, you can find a good source of vitamin C in the following foods: one serving of Camu camu provides 1180% of RDI, acerola cherry contains 820% of the RDI per serving, a single bell pepper provides over 200% of the RDI, one cup of strawberries contains about 150% of the RDI and, one cup of cooked broccoli contains about 135% of the RDI.

1. Trüeb, R. M. (2002). Oxidative stress in aging of hair. *International Journal of Trichology*, 4(2), 49-56.

2. Nusbaum, P., Ostro, A., & Barrientos, S. (2010). The effect of vitamin C supplementation on hair growth and morphology in women with inadequate dietary vitamin C intake. *Journal of cosmetic dermatology*, 9(1), 67-73.

3. Wang, X., & McMichael, J. (2011). Vitamin C and iron overload: oxidative stress and cellular damage. *Journal of Nutritional Biochemistry*, 22(10), 899-907.

Vitamin D (as cholecalciferol)

Vitamin D is essential for a healthy body, including hair health. The vitamin plays a crucial role in maintaining the growth cycle of hair follicles and regulating the production of keratin, which is critical for hair strength and growth.

Studies have shown that lacking vitamin D can lead to hair loss, thinning, and slow hair growth. This is because the hair follicles need vitamin D to function properly. Therefore, the hair growth cycle can slow down when the body doesn't receive enough vitamin D, leading to hair loss and thinning.

Furthermore, studies have also suggested that vitamin D may help treat autoimmune diseases that affect hair health, such as alopecia areata. Alopecia areata is a condition in which the immune system attacks hair follicles, leading to hair loss.

Research has also shown that vitamin D may have a role in reducing inflammation in the scalp, promoting healthy hair growth. Inflammation in the scalp can damage hair follicles and lead to hair loss and thinning, so reducing inflammation can help to promote healthy hair growth.

Vitamin D is crucial for the proper functioning of hair follicles and the regulation of hair growth. Any vitamin D deficiency can lead to hair loss, thinning, and slow hair growth.

While food sources of vitamin D are essential, it can be difficult to obtain adequate amounts through diet alone. Fatty fish like salmon, sardines, mackerel, and tuna are among the best food sources of vitamin D, three-ounce serving provides up to 100% of RDI, and one large egg yolk provides about 6% of the RDI.

1. Saini K, Mysore V. Role of vitamin D in hair loss: A short review. *Int J Trichology*. 2018;10(5):211-213. doi:10.4103/ijt.ijt_71_17.

2. Ezzedine, K., & Kechichian, E. (20XX). Vitamin D and the Skin: An Update for Dermatologists.

Vitamin E (as D-alpha-tocopherol)

Vitamin E is a fat-soluble nutrient that acts as an antioxidant and has several benefits for hair health. D-alpha-tocopherol is the natural and the most biologically active form of this vitamin.

One of the primary benefits of vitamin E for hair health is its ability to promote blood circulation in the scalp. This increased blood flow helps deliver important nutrients and oxygen to the hair follicles, essential for healthy hair growth. Additionally, vitamin E can help prevent oxidative stress in the scalp and hair follicles, leading to hair damage and loss.

Vitamin E also has moisturizing properties that can help improve hair's overall appearance and texture. It helps to prevent dryness and breakage, which can lead to split ends and thinning hair. Vitamin E can also help reduce inflammation in the scalp, which can benefit individuals who experience dandruff or other scalp conditions.

Another significant benefit for hair health is its ability to support the immune system. A healthy immune system is essential for maintaining healthy hair growth, and vitamin E can help to strengthen the immune system and reduce the risk of hair loss.

Some studies have also suggested that vitamin E may help promote hair growth in individuals who experience hair loss or thinning hair. Vitamin E's ability to promote blood circulation and reduce oxidative stress may play a role in its potential hair growth benefits.

Apart from supplements, you can find a good source of vitamin E in the following foods: a quarter-cup serving of sunflower seeds provides about 82% of the RDI, one-ounce serving of almonds provides about 37% of the RDI, and, one medium-sized avocado provides about 20% of the RDI.

1. Beoy LA, Woei WJ, Hay YK. Effects of tocotrienol supplementation on hair growth in human volunteers. *Trop Life Sci Res.* 2010;21(2):91-99.
2. Almohanna HM, Ahmed AA, Tsatalis JP, Tosti A. The Role of Vitamins and Minerals in Hair Loss: A Review. *Dermatol Ther (Heidelb).* 2019;9(1):51-70.
3. Nofal E, Helal M, Nofal A, Alakad R, Nasr M. Topical tocopherol acetate in the treatment of androgenetic alopecia: A pilot study. *Indian Dermatol Online J.* 2014;5(3):276-281.

Vitamin K (as menaquinone)

Vitamin K is a fat-soluble vitamin essential for proper blood clotting and bone health. However, recent research has suggested that vitamin K (specifically, menaquinone or vitamin K2) may also benefit hair health.

One of the primary benefits of vitamin K for hair health is its ability to help prevent the calcification of the hair follicles. Calcification occurs when calcium builds up in the hair follicles and can lead to hair loss and thinning. Vitamin K can help prevent this by promoting calcium transport from the hair follicles into the bones.

Vitamin K also has anti-inflammatory properties that can help reduce scalp inflammation. Inflammation can cause damage to the hair follicles and lead to hair loss and thinning, so reducing inflammation can help to promote healthy hair growth. Additionally, vitamin K can help improve the hair's overall health and appearance by promoting circulation and delivering essential nutrients to the hair follicles.

A 2018 study published in the journal *Nutrients* found that supplementation with vitamin K2 significantly increased the thickness and strength of hair in women with thinning hair.

It can be challenging to obtain adequate amounts through diet alone. Still, apart from supplements, you can find a good source of vitamin K2 in the following foods: Natto, a traditional Japanese food made from fermented soybeans, is the richest food source of vitamin K2, with a three-ounce serving containing over 1,000% of the RDI and, one-ounce serving of brie or cheddar providing up to 25% of the RDI.

1. Finner AM. Nutrition and Hair: Deficiencies and Supplements. *Dermatologic Clinics*. 2013;31(1):167-172.

2. Khalil Z, Alam B, Akbari AR, Sharma H. The Medical Benefits of Vitamin K2 on Calcium-Related Disorders. *Cureus*. 2020

Vitamin B1 (as thiamine hydrochloride)

Vitamin B1, known as thiamine, is a water-soluble vitamin essential for energy metabolism and nerve function. It also has several benefits for hair health.

One of the primary benefits is its ability to improve circulation in the scalp. This increased blood flow helps deliver vital nutrients and oxygen to the hair follicles, essential for healthy hair growth. Additionally, vitamin B1 can help prevent oxidative stress in the scalp and hair follicles, leading to hair damage and loss.

Vitamin B1 also has moisturizing properties that can help improve hair's overall appearance and texture. It helps to prevent dryness and breakage, which can lead to split ends and thinning hair. Vitamin B1 can also help reduce inflammation in the scalp, which can benefit individuals who experience dandruff or other conditions.

Another significant benefit of vitamin B1 for hair health is its ability to support the immune system. A healthy immune system is essential for maintaining healthy hair growth, and vitamin B1 can help to strengthen the immune system and reduce the risk of hair loss.

Some studies have also suggested that vitamin B1 may help promote hair growth in individuals who experience hair loss or thinning hair.

Apart from supplements, you can find a good source of vitamin B1 in the following foods: a three-ounce serving of cooked pork contains about 50% of the RDI, and whole grains such as brown rice, oats, and quinoa are good sources of vitamin B1, one cup of cooked brown rice providing about 24% of the RDI and, legumes such as black beans, lentils, and chickpeas are also good sources of vitamin B1, with a one-cup serving of cooked black beans providing about 28% of the RDI.

1. Almohanna H, Ahmed A, Tsatalis J, Tosti A. The Role of Vitamins and Minerals in Hair Loss: A Review. *Dermatologic Therapy*. 2021
2. Lukienko PI, Mel'nichenko NG, Zverinskii IV, Zabrodskaya SV. Antioxidant properties of thiamine. *Biochemistry (Moscow)*. 2000

Vitamin B2 (as riboflavin)



Vitamin B2, also known as riboflavin, is a water-soluble vitamin essential for energy metabolism and cellular function. It also has several benefits for hair health.

One of the primary benefits of vitamin B2 for hair health is its ability to promote healthy hair growth. Vitamin B2 helps convert nutrients such as carbohydrates, fats, and proteins into energy, essential for healthy hair growth. Additionally, vitamin B2 can help reduce oxidative stress in the scalp and hair follicles, leading to hair damage and loss.

Vitamin B2 also has moisturizing properties that can help improve hair's overall appearance and texture. It helps to prevent dryness and breakage, which can lead to split ends and thinning hair. Vitamin B2 can also help reduce inflammation in the scalp, which can benefit individuals who experience dandruff or other scalp conditions.

Another important benefit of vitamin B2 for hair health is its ability to support the immune system. A healthy immune system is essential for maintaining healthy hair growth, and vitamin B2 can help to strengthen the immune system and reduce the risk of hair loss.

Some studies have also suggested that vitamin B2 may help prevent premature greying of hair.

Apart from supplements, you can find a good source of vitamin B2 in the following foods: a three-ounce serving of beef liver provides about 200% of the RDI, a one-ounce serving of almonds provides about 20% of the RDI, and one cup of yogurt provides about 26% of the RDI for vitamin B2.

1. Wieland M, Mann S, Gollnick NS, Majzoub-Altweck M, Knubben-Schweizer G, Langenmayer MC. Alopecia in Belgian Blue crossbred calves: a case series. [Internet]. 2023
2. Mahabadi N, Bhusal A, Banks SW. Riboflavin Deficiency. [Internet]. 2023

Niacin (as nicotinamide)

Niacin, also known as vitamin B3, is a water-soluble vitamin essential for cellular function and energy metabolism. It also has several benefits for hair health.

One of the primary benefits is its ability to promote healthy blood circulation in the scalp. This increased blood flow helps deliver important nutrients and oxygen to the hair follicles, essential for healthy hair growth. Additionally, niacin can help prevent oxidative stress in the scalp and hair follicles, leading to hair damage and loss.

Niacin also has moisturizing properties that can help improve hair's overall appearance and texture. It helps to prevent dryness and breakage, which can lead to split ends and thinning hair. Niacin can also help reduce inflammation in the scalp, which can benefit individuals who experience dandruff or other scalp conditions.

Another critical benefit of niacin for hair health is its ability to support the production of keratin, a protein that makes up the structure of the hair. Niacin can help strengthen hair and prevent breakage by promoting the production of healthy, strong keratin production.

Apart from supplements, you can find a good source of niacin in the following foods: a three-ounce serving of cooked chicken breast provides about 72% of the RDI, a three-ounce serving of canned tuna provides about 50% of the RDI, and one cup of sliced cooked mushrooms provides about 16% of the RDI.

1. Sallabi SM, Alhmoudi A, Alshekaili M, Shah I. Determination of Vitamin B3 Vitamer (Nicotinamide) and Vitamin B6 Vitamers in Human Hair Using LC-MS/MS. [Internet]. 2023

Vitamin B6 (as pyridoxine hydrochloride)



Vitamin B6, also known as pyridoxine, is a water-soluble vitamin essential for many body processes, including protein metabolism and neurotransmitter synthesis. It also has several benefits for hair health.

One of the primary benefits of vitamin B6 for hair health is its role in promoting healthy hair growth. Vitamin B6 helps convert nutrients such as carbohydrates, fats, and proteins into energy, essential for healthy hair growth. Additionally, vitamin B6 can help prevent hair loss and thinning by supporting the production of keratin, the protein that makes up the structure of the hair.

Vitamin B6 also has anti-inflammatory properties that can help reduce scalp inflammation. Inflammation can cause damage to the hair follicles and lead to hair loss and thinning, so reducing inflammation can help to promote healthy hair growth. Additionally, vitamin B6 can help improve the hair's overall health and appearance by promoting circulation and delivering essential nutrients to the hair follicles.

Another significant benefit of vitamin B6 for hair health is its ability to support the immune system. A healthy immune system is essential for maintaining healthy hair growth, and vitamin B6 can help to strengthen the immune system and reduce the risk of hair loss.

Some studies have also suggested that vitamin B6 may help prevent hair loss associated with hormonal imbalances.

Apart from supplements, you can find a good source of vitamin B6 in the following foods: one cup of cooked chickpeas provides about 55% of RDI, a three-ounce serving of canned tuna provides about 30% of the RDI, and one medium-sized potato provides about 21% of the RDI.

1. Almohanna HM, Ahmed AA, Tsatalis JP, Tosti A. The Role of Vitamins and Minerals in Hair Loss: A Review. J Clin Aesthet Dermatol. 2018

Folic acid (as pteroylmonoglutamic acid)

Folic acid, also known as vitamin B9 or Folate, is a water-soluble vitamin essential for many body processes, including cell growth and repair. It also has several benefits for hair health.

One of the primary benefits of folic acid for hair health is its ability to promote healthy hair growth. Folic acid produces new cells, including those that make up hair follicles. Additionally, folic acid can help to prevent hair loss and thinning by supporting the production of healthy, strong hair.

Folic acid also has moisturizing properties that can help improve hair's overall appearance and texture. It helps to prevent dryness and breakage, which can lead to split ends and thinning hair. Folic acid can also help reduce inflammation in the scalp, which can benefit individuals who experience dandruff or other conditions.

Another essential benefit of folic acid for hair health is its ability to support the immune system. A healthy immune system is essential for maintaining healthy hair growth, and folic acid can help to strengthen the immune system and reduce the risk of hair loss.

Apart from supplements, you can find a good source of folic acid in the following foods: vegetables such as spinach, asparagus, and broccoli are good sources of folic acid, with one cup of cooked spinach providing about 66% of the RDI, legumes such as lentils, chickpeas, and black beans are also good sources of folic acid, and with a one-cup serving of cooked lentils providing about 90% of the RDI.

1. Yamada H, Yoshida H, Nishikawa T. A new supplement for female pattern hair loss: a randomized, placebo- controlled, double-blind clinical trial. J Cosmet Dermatol. 2010

Vitamin B12 (as cyanocobalamin)

Vitamin B12, also known as cyanocobalamin, is a water-soluble vitamin essential for many body processes, including energy metabolism and nervous system function. It also has several benefits for hair health.

One of the primary benefits of vitamin B12 for hair health is its ability to promote healthy hair growth. Vitamin B12 helps convert nutrients such as carbohydrates, fats, and proteins into energy, essential for healthy hair growth. Additionally, vitamin B12 can help to prevent hair loss and thinning by supporting the production of healthy, strong hair.

Vitamin B12 also has moisturizing properties that can help improve hair's overall appearance and texture. It helps to prevent dryness and breakage, which can lead to split ends and thinning hair. Vitamin B12 can also help reduce inflammation in the scalp, which can benefit individuals who experience dandruff or other scalp conditions.

It Improves hair texture: Vitamin B12 helps produce keratin, which is essential for hair strength and growth and improves hair texture.

It Prevents premature graying: Adequate vitamin B12 can help prevent premature graying, maintaining the natural hair color.

Another significant benefit of vitamin B12 for hair health is its ability to support the immune system. A healthy immune system is essential for maintaining healthy hair growth, and vitamin B12 can help to strengthen the immune system and reduce the risk of hair loss.

Apart from supplements, you can find a good source of vitamin B12 in the following foods: a three-ounce serving of cooked clams provides about 1,400% of the RDI, and a three-ounce serving of cooked beef liver provides about 980% of the RDI.

1. DiBaise M, Tarleton SM. Hair, Nails, and Skin: Differentiating Cutaneous Manifestations of Micronutrient Deficiency, 2023

Biotin (as D-biotin)

Biotin, also known as vitamin H, is a water-soluble B vitamin that plays a vital role in maintaining healthy hair and is essential for many processes in the body, including energy metabolism and cell growth.

Here are some key points that explain how biotin promotes hair growth and enhances overall hair health:

Promotes healthy hair growth: Biotin is essential to produce keratin, a protein that makes up hair, skin, and nails. Adequate biotin intake promotes healthy hair growth by helping the body produce more keratin.

Prevents hair breakage: Biotin strengthens the hair shaft, preventing breakage and split ends, resulting in longer and healthier hair.

Improves hair texture: Biotin can improve the texture of hair, making it thicker and stronger. It helps to increase the diameter of individual hair fibers, resulting in fuller, more voluminous hair.

Prevents hair loss: Biotin deficiency is associated with hair loss, as biotin is necessary to grow and maintain hair follicles.

Enhances overall hair health: Biotin improves the health of hair follicles and scalp health, leading to overall hair health. It helps to reduce inflammation, increase blood flow to the scalp, and improve the absorption of nutrients.

Apart from supplements, you can find a good source of biotin in egg yolk: a large egg yolk provides about 10 micrograms (mcg) of biotin, approximately 33% of the RDI.

1. Patel DP, Swink SM, Castelo-Soccio L. A Review of the Use of Biotin for Hair Loss. [Internet]. 2023

Iodine from *Laminaria digitata*



Iodine is a trace mineral essential for many body processes, including thyroid hormone production and regulation. It also has several benefits for hair health, mainly from sources such as *Laminaria digitata*, a type of brown seaweed.

One of the primary benefits of iodine for hair health is its ability to support healthy thyroid function. The thyroid gland produces hormones that regulate many essential bodily functions, including hair growth and maintenance. Iodine plays a crucial role in this process, and iodine deficiencies can lead to hair loss and thinning.

Additionally, iodine has antimicrobial properties that can help to promote a healthy scalp and prevent conditions such as dandruff and fungal infections. It also has anti-inflammatory properties that can reduce scalp inflammation and improve hair health.

Apart from supplements, they can be obtained from various sources, including seaweed and seafood.

1. Glinoe D. The regulation of thyroid function during normal pregnancy: importance of the iodine nutrition status. Eur J Endocrinol. 1997
2. Chung HR. Iodine and thyroid function. Ann Pediatr Endocrinol Metab. 2014

Choline (as choline bitartrate)

Choline is an essential nutrient important for many body processes, including nervous system function and cell membrane structure. It also has several benefits for hair health.

One of the primary benefits of choline for hair health is its ability to support healthy hair production. Choline is involved in the production of phosphatidylcholine, which is an essential component of hair follicles. Additionally, choline can help prevent hair loss and thinning by supporting the production of healthy, strong hair production.

Choline also has anti-inflammatory properties that can help to reduce scalp inflammation and promote overall hair health. Inflammation can cause damage to the hair follicles and lead to hair loss and thinning, so reducing inflammation can help to promote healthy hair growth.

Another essential benefit of choline for hair health is its ability to support healthy liver function. The liver plays a key role in removing toxins and other harmful substances from the body, and a healthy liver is essential for maintaining healthy hair growth. Choline can help support liver function and reduce the risk of liver damage, positively impacting hair health.

Apart from supplementation, it can be found in various foods, such as eggs, liver, and soybeans.

1. Fischer LM, da Costa KA, Kwock L, Galanko J, Zeisel SH. Dietary choline requirements of women: effects of estrogen and genetic variation. *Am J Clin Nutr.* 2010

2. Fischer LM, daCosta KA, Kwock L, Stewart PW, Lu TS, Stabler SP, Allen RH, Zeisel SH. Sex and menopausal status influence human dietary requirements for the nutrient choline. *Am J Clin Nutr.* 2007

Magnesium (as magnesium bis-glycinate)



Magnesium is an essential mineral that plays a crucial role in many processes in the body, including energy metabolism, muscle and nerve function, and bone health. It also has several benefits for hair health.

One of the primary benefits of magnesium for hair health is its ability to support healthy circulation. Magnesium helps to relax blood vessels and improve blood flow, which can be beneficial for delivering essential nutrients to hair follicles. Additionally, magnesium can help to reduce scalp inflammation and improve overall hair health.

Magnesium also has moisturizing properties that can help improve hair's overall appearance and texture. In addition, it helps to prevent dryness and breakage, which can lead to split ends and thinning hair. Magnesium can also help reduce stress and anxiety, positively impacting overall health and well-being, including hair health.

Another essential benefit of magnesium for hair health is its ability to support healthy hair production. Magnesium is involved in the production of keratin, the protein that makes up the structure of the hair. Additionally, magnesium can help to prevent hair loss and thinning by supporting the production of healthy, strong hair.

Apart from supplementation, it can be found in various foods, such as spinach, almonds, and whole grains.

1. Chandrasekaran NC, Sanchez WY, Mohammed YH, Grice JE, Roberts MS, Barnard RT. Permeation of topically applied magnesium ions through human skin is facilitated by hair follicles. *Magnes Res.* 2016

Zinc (as zinc bis-glycinate)



Zinc is an essential mineral that plays a crucial role in many processes in the body, including immune system function, wound healing, and protein synthesis. It also has several benefits for hair health.

One of the primary benefits of zinc for hair health is its ability to support healthy hair growth. Zinc is involved in producing new cells, including those that make up hair follicles. Additionally, zinc can help prevent hair loss and thinning by supporting the production of healthy, strong hair production.

Zinc also has anti-inflammatory properties that can help to reduce scalp inflammation and promote overall hair health. Inflammation can cause damage to the hair follicles and lead to hair loss and thinning, so reducing inflammation can help to promote healthy hair growth.

Another essential benefit of zinc for hair health is its ability to support the production of healthy sebum, which is the natural oil that lubricates the scalp and hair. As a result, zinc can help prevent dryness and breakage, leading to split ends and thinning hair.

Zinc can also help to reduce the risk of scalp conditions such as dandruff and fungal infections.

Apart from supplementation, it can be found in various foods, such as oysters, beef, and pumpkin seeds.

1. Alhaj E, Alhaj N, Alhaj NE. Diffuse alopecia in a child due to dietary zinc deficiency

Selenium from enriched yeast



Selenium is a trace mineral essential for many body processes, including immune system function and thyroid hormone production. It also has several hair health benefits, mainly from sources such as enriched yeast.

One of the primary benefits of selenium for hair health is its ability to support healthy thyroid function. The thyroid gland produces hormones that regulate many essential bodily functions, including hair growth and maintenance. Selenium plays a vital role in this process, and deficiencies in selenium can lead to hair loss and thinning.

Selenium also has antioxidant properties that can help protect against damage from free radicals, leading to hair damage and loss.

Also, selenium can help reduce scalp inflammation and promote overall hair health.

Another significant benefit of selenium for hair health is its ability to support healthy hair production. Selenium produces selenoproteins, essential for the growth and maintenance of hair follicles.

Also, selenium can help prevent hair loss and thinning by supporting the production of healthy, strong hair.

1. Morris, J. S., Stampfer, M. J., & Willett, W. (1983). Dietary selenium in humans toenails as an indicator. *British journal of nutrition*, 49(3), 393-409 1983

2. Lv, J., Ai, P., Lei, S., Zhou, F., Chen, S., & Zhang, Y. (2021). Selenium levels and skin diseases: systematic review and meta-analysis. *Journal of Trace Elements in Medicine and Biology*

Silicon from Bamboo extract (*Bambusa arundinacea thallus*)



Silicon is a trace mineral essential for many body processes, including forming connective tissues such as hair, skin, and nails. It also has several hair health benefits, mainly from bamboo extract (*Bambusa arundinacea thallus*).

One of the primary benefits of silicon for hair health is its ability to support the production of healthy hair. Silicon is involved in the formation of collagen, which is an essential component of hair follicles. Additionally, silicon can help prevent hair loss and thinning by supporting healthy, strong hair production.

Silicon also has moisturizing properties that can help improve hair's overall appearance and texture. In addition, it helps to prevent dryness and breakage, which can lead to split ends and thinning hair.

Silicon can also help reduce inflammation in the scalp, which can benefit individuals who experience dandruff or other scalp conditions.

Another essential benefit of silicon for hair health is its ability to improve hair elasticity and strength. Silicon helps increase hair's tensile strength, making it less likely to break or become damaged.

I. Kalman DS, Hewlings SJ. A Randomized Double-Blind Evaluation of a Novel Biotin and Silicon Ingredient Complex on the Hair and Skin of Healthy Women. *J Clin Aesthet Dermatol.* 2018

Fish collagen peptides



Collagen is a protein found in the body's connective tissues, including the skin, hair, and nails. Fish collagen peptides are a form of collagen derived from fish and have several benefits for hair health.

One of the primary benefits of fish collagen peptides for hair health is their ability to support healthy hair production. Collagen is an essential component of hair follicles, and it can help to prevent hair loss and thinning by supporting the production of healthy, strong hair.

Fish collagen peptides also have moisturizing properties that can help improve hair's overall appearance and texture. They help prevent dryness and breakage, leading to split ends and thinning hair.

1. Proksch E, Schunck M, Zague V, Segger D, Degwert J, Oesser S. Oral intake of specific bioactive collagen peptides reduces skin wrinkles and increases dermal matrix synthesis. *Skin Pharmacol Physiol*. 2014

2. Hexsel D, Zague V, Schunck M, Siega C, Camozzato FO, Oesser S. Oral supplementation with specific bioactive collagen peptides improves nail growth and reduces symptoms of brittle nails. *J Cosmet Dermatol*. 2017

Saw palmetto extract (*Serenoa repens*)



Saw palmetto extract is a natural substance derived from the fruit of the saw palmetto plant, which has been used for centuries for its medicinal properties. Its effects on hair health have been the subject of several scientific studies. Here are some of the ways saw palmetto extract can benefit hair health:

One of the most significant benefits of saw palmetto extract is its ability to prevent hair loss. Saw palmetto extract has been shown to inhibit the production of dihydrotestosterone (DHT), a hormone that contributes to hair loss. By blocking the action of DHT, saw palmetto can help prevent hair loss and promote hair growth.

Saw palmetto extract has also improved hair density and thickness in people with androgenetic alopecia (male and female pattern baldness). It does this by blocking the action of 5-alpha-reductase, an enzyme that converts testosterone into DHT.

In addition, saw palmetto extract has anti-inflammatory properties that can help reduce inflammation in the scalp, contributing to hair loss. It has also been shown to increase hair shine and luster.

Thanks to its antifungal and antibacterial properties, saw palmetto extract can also help treat scalp conditions like dandruff and scalp acne.

1. Dhariwala MY, Ravikumar P. An overview of herbal alternatives in androgenetic alopecia. J Cosmet Dermatol. 2019

Keratin

Keratin is a protein naturally present in hair, skin, and nails. Its role in hair health has been widely studied, offering numerous benefits to improve hair appearance and strength.

One of the main benefits of keratin is its ability to strengthen hair. It does this by binding to the hair shaft, reducing breakage and split ends. This strengthening effect promotes healthier, longer hair over time.

Keratin is also an effective solution for damaged hair. It can help to restore hair that chemical treatments, heat styling, or other factors have damaged. By helping to repair the hair, keratin can restore its natural texture and shine.

In addition, keratin can smooth frizzy hair, making it look sleeker and shinier. This can reduce the need for heat styling and make hair easier to manage. By smoothing the hair, keratin can also make it more manageable, reducing tangles and making it easier to style.

Keratin can also increase hair volume by thickening individual hair strands. This gives the hair a fuller and more youthful appearance.

1. Addor FAS, Donato LC, Melo CSA. Comparative evaluation between two nutritional supplements in the improvement of telogen effluvium. *Int J Trichology*. 2017

L-glycine

L-glycine is a non-essential amino acid produced by the body but can also be found in dietary sources. Its role in hair health has been extensively studied and provides several science-based benefits.

One of the primary benefits of L-glycine for hair health is that it promotes healthy hair growth. It is involved in the production of collagen, a protein that is crucial for healthy hair growth. Collagen helps maintain the structure of hair follicles and the scalp, providing the foundation for healthy hair growth.

L-glycine also produces creatine, a molecule that provides energy to cells. This energy strengthens the hair shaft, reducing hair breakage and improving hair strength.

Furthermore, L-glycine plays a role in the production of elastin, a protein that provides elasticity to hair. By enhancing hair elasticity, L-Glycine can help improve the texture of hair, making it smoother and more lustrous.

L-glycine has also been shown to reduce hair loss by improving the health of hair follicles. It helps maintain the proper balance of nutrients and hormones for healthy hair growth. This amino acid is known to promote scalp health too. Its anti-inflammatory properties help soothe and calm the scalp, reducing itching, redness, and irritation, leading to a healthier scalp environment for hair growth.

Another critical benefit of L-glycine for hair health is its ability to support melanin production, the pigment that gives hair its color.

1. Addor FAS, Donato LC, Melo CSA. Comparative evaluation between two nutritional supplements in the improvement of telogen effluvium. Int J Trichology. 2017

L-hydroxyproline

L-hydroxyproline is an amino acid that plays a crucial role in maintaining healthy hair. It is a collagen component, providing the structural framework for skin, bones, and connective tissue. Collagen is also a vital component of hair follicles, and L-hydroxyproline is an essential component of collagen.

One of the significant benefits of L-hydroxyproline for hair health is that it promotes healthy hair growth. The amino acid helps form hair, making it thicker, stronger, and more resilient. It is also known to increase hair elasticity, which helps prevent hair breakage and damage caused by styling, chemicals, and environmental factors.

L-hydroxyproline's unique molecular structure enables it to penetrate the hair shaft, increasing its water retention capacity. This results in hair that is softer, smoother, and more manageable, improving its overall texture and appearance. Additionally, L-hydroxyproline helps balance the production of hormones, enzymes, and other essential factors for healthy hair growth, preventing hair loss.

Another benefit of L-hydroxyproline for hair health is that it strengthens the hair shaft. L-hydroxyproline enhances the production of collagen and elastin, which work together to strengthen the hair shaft, reducing hair breakage and improving hair strength.

L-hydroxyproline can be obtained from dietary sources such as meat, fish, and dairy products..

1. Jenkins CL, McCloskey AI, Guzei IA, Eberhardt ES, Raines RT. O-acylation of hydroxyproline residues: Effect on peptide-bond isomerization and collagen stability. Vancouver: Biochemistry. 2005

L-proline

L-Proline is a crucial amino acid contributing to collagen production, a protein necessary for healthy hair growth. Collagen provides the structural framework for hair follicles and is essential for robust and resilient hair. L-Proline has many benefits for hair health, making it necessary for hair care.

One of the significant benefits of L-Proline is that it promotes healthy hair growth. It is a critical component of collagen, which provides the structure of hair follicles and the scalp. As a result, L-Proline helps form hair, making it thicker, stronger, and more resilient. By promoting healthy hair growth, L-Proline helps to prevent hair loss and improve overall hair health.

L-Proline also helps to increase hair strength. Collagen synthesis is critical for the strength and resilience of hair, and L-Proline plays a crucial role in this process. Higher levels of L-Proline can enhance collagen production, resulting in stronger, healthier hair. With increased hair strength, L-Proline also helps to prevent hair breakage, making hair less prone to damage and improving its overall health and appearance.

In addition to promoting healthy hair growth and strength, L-Proline can also help reduce hair thinning. Since L-Proline supports collagen production, it is essential for forming new hair, resulting in thicker and healthier hair.

L-Proline also improves scalp health by enhancing the structure and elasticity of the skin. A healthy scalp is essential for healthy hair growth, and L-Proline helps to promote a healthy scalp, making it an essential component of hair care.

1. Lubec G, Pollak A, Coradello H, Aschinger H, Wagendristl A, Bangert H, Seifert K, Ratzenhofer E. Structural changes of hair after incorporation of the proline analogue L-azetidine-2-carboxylic acid. A model of hair disease by alteration of primary structure. Vancouver: J Invest Dermatol. 1988

2. Colella G, Cannavale R, Vicidomini A, Rinaldi G, Compilato D, Campisi G. Efficacy of a spray compound containing a pool of collagen precursor synthetic amino acids (L-proline, L-leucine, L-lysine and glycine) combined with sodium hyaluronate to manage chemo/ radiotherapy-induced oral mucositis 2009.

3. Albaugh VL, Mukherjee K, Barbul A. Proline Precursors and Collagen Synthesis: Biochemical Challenges of Nutrient Supplementation and Wound Healing. Vancouver: J Nutr. 2017

L-Lysine

L-Lysine is a crucial amino acid that has numerous benefits for hair health. It is an essential component of collagen, which is necessary for the growth and maintenance of healthy hair. Collagen provides structure and support to hair, skin, and nails, and L- Lysine plays a critical role in its production.

One of the most significant benefits of L-Lysine for hair health is its ability to promote healthy growth. It helps form hair, making it thicker, stronger, and more resilient. It also produces collagen, which provides the structure of hair follicles and the scalp, leading to healthy hair growth.

L-Lysine also increases hair strength and reduces hair breakage. In addition, it helps to maintain the structural integrity of hair by supporting the production of collagen, making hair less prone to breakage and damage. This improves the overall health and appearance of hair.

In addition to promoting healthy hair growth and strength, L-Lysine can also prevent hair loss. L-Lysine deficiency is associated with hair loss, and supplementation with L-Lysine can help to prevent hair loss and promote healthy hair growth.

L-Lysine also enhances hair texture and supports the health of the scalp. It helps to increase the production of collagen, improving hair's texture and appearance, making it softer, smoother, and more manageable. It has also been shown to improve the scalp's health by increasing blood flow and oxygenation, reducing inflammation, and promoting the growth of healthy hair follicles.

1. Rushton DH. Nutritional factors and hair loss. Vancouver: Clin Exp Dermatol. 2002

Hyaluronic Acid



Hyaluronic acid is an essential substance that has numerous benefits for hair health. It is a naturally occurring substance in the body that helps maintain hair's health and vitality. Hyaluronic acid is a glycosaminoglycan found in high concentrations in connective tissue, skin, and the extracellular matrix of the scalp.

One of the significant benefits of hyaluronic acid for hair health is its moisturizing effect. It has a unique ability to retain moisture and can hold up to 1,000 times its weight in water. This helps keep hair hydrated and moisturized, essential for preventing dryness and brittleness.

Another benefit of hyaluronic acid for hair health is its ability to improve hair elasticity. Improving hair's elasticity can prevent breakage and damage caused by styling, chemicals, and environmental factors. This helps to keep hair strong and healthy.

Hyaluronic acid has also been shown to stimulate the growth of new hair follicles, which can increase hair density and thickness. It can help to reduce hair loss by promoting the growth of healthy hair follicles and preventing damage to existing hair.

Furthermore, hyaluronic acid can improve scalp health by increasing blood flow and oxygenation, reducing inflammation, and promoting the growth of healthy hair follicles. The scalp is essential for healthy hair growth, and maintaining a healthy scalp is necessary for healthy hair.

I. Zerbinati N, Sommatitis S, Maccario C, Capillo MC, Di Francesco S, Rauso R, Protasoni M, D'Este E, Dalla Gasperina D, Mocchi R. In Vitro Hair Growth Promoting Effect of a Noncrosslinked Hyaluronic Acid in Human Dermal Papilla Cells. J Cosmet Dermatol. 2017

Rhodiola extract (*Rhodiola rosea*)



Rhodiola, also known as the “golden root”, has been a part of traditional medicine for centuries, and researchers increasingly recognize its benefits for hair health. It contains various bioactive compounds that have been shown to promote healthy hair growth, prevent hair loss, and improve overall hair health.

One of the critical benefits of Rhodiola for hair health is its ability to promote healthy hair growth. Their bioactive compounds stimulate hair follicles and help prevent hair loss by reducing the production of dihydrotestosterone (DHT) production. This hormone can cause hair follicles to shrink and eventually stop producing hair. Promoting healthy hair growth can help increase hair density and thickness.

In addition to promoting healthy hair growth, Rhodiola has anti-inflammatory properties that help reduce scalp inflammation. Inflammation is a common cause of hair loss and damage, and reducing inflammation can help to promote healthy hair growth and prevent hair loss.

Rhodiola can also improve hair texture by strengthening hair and making it smoother, shinier, and more manageable. It does this by promoting the growth of new hair follicles and increasing the size of existing ones. In addition, Rhodiola contains antioxidants that protect hair from environmental stressors such as UV radiation and pollution, which can prevent damage to the hair and promote healthy hair growth.

Finally, it has been shown to have adaptogenic properties that can help to reduce stress and improve overall well-being. Stress is a common cause of hair loss and damage, and by reducing stress, Rhodiola can positively impact hair health.

1. Bongiorno P. Stress, Immunity, and Hair Health: A survey of conventional and natural therapeutics for treating stress-induced, immune-mediated hair loss. *Altern Med Rev.* 2012

2. Kang H, Wu WY, Lo BK, et al. Hair follicles from alopecia areata patients exhibit alterations in immune privilege-associated gene expression in advance of hair loss. *J Invest Dermatol.* 2010

3. Rhodiola Rosea M Morgan, K Bone - *MediHerb. Newsl,* 2005

Ashwagandha (*Whitania somnifera L.*)



Ashwagandha, also known as *Withania somnifera*, is a popular Ayurvedic medicine herb with numerous hair health benefits. Recent research has highlighted some of the following benefits of ashwagandha for hair:

Firstly, ashwagandha contains bioactive compounds that stimulate hair follicles, increase nitric oxide production, and improve hair growth. In addition, it helps to prevent hair loss by reducing the production of dihydrotestosterone (DHT), a hormone that can cause hair follicles to shrink and eventually stop producing hair. Therefore, ashwagandha promotes healthy hair growth and prevents hair loss.

Secondly, inflammation is a common cause of hair loss and damage, and ashwagandha contains anti-inflammatory compounds that help reduce scalp inflammation and promote healthy hair growth. This can lead to reduced hair loss and improved hair health.

Thirdly, ashwagandha can improve hair thickness by promoting the growth of new hair follicles and increasing the size of existing ones. This can result in thicker and healthier hair, enhancing its overall appearance.

Furthermore, the scalp is an essential component of healthy hair growth, and ashwagandha can improve scalp health by increasing blood flow and oxygenation, reducing inflammation, and promoting the development of healthy hair follicles. This can lead to a healthier scalp and improved hair growth.

Stress is also a common cause of hair loss and damage, and ashwagandha has been shown to have adaptogenic properties, which can help to reduce stress and improve overall well-being. This can have a positive impact on hair health.

Finally, ashwagandha helps to strengthen hair and improve its overall texture. It can make hair smoother, shinier, and more manageable, enhancing its appearance. In conclusion, ashwagandha is a beneficial herb that can improve hair health.

1. Lopresti AL, Smith SJ, Drummond PD. Modulation of the hypothalamic-pituitary-adrenal (HPA) axis by plants and phytonutrients: a systematic review of human trials. *J Affect Disord.* 2014

2. Akhgarjand C, Asoudeh F, Bagheri A, Kalantar Z, Vahabi Z, Shab-Bidar S, Rezvani H, Djafarian K. Does Ashwagandha supplementation have a beneficial effect on the management of anxiety and stress? A systematic review and meta-analysis of randomized controlled trials. *Complement Ther Med.* 2021



Turmeric (*Curcuma longa L.*)

Turmeric is a spice commonly used in traditional medicine for its wide range of health benefits. However, recent studies have shown that turmeric has several benefits for hair health. Turmeric contains curcumin, a bioactive compound that has been found to promote hair growth by increasing blood circulation to the scalp and stimulating hair follicles. Curcumin also helps reduce inflammation, preventing hair loss and promoting healthy growth.

Another benefit of turmeric for hair health is its ability to reduce dandruff, a common scalp condition that can cause itching and flaking. Turmeric contains antifungal and antibacterial properties that help to reduce dandruff and improve scalp health. It can also help to prevent other scalp conditions, such as eczema and psoriasis, which can cause hair loss.

In addition to promoting healthy hair growth and improving scalp health, turmeric can enhance hair texture. It helps to make hair softer, smoother, and more manageable. Turmeric can also prevent hair breakage and split ends, resulting in longer and healthier hair.

Several studies support the antioxidant properties of turmeric and its potential benefits for protecting hair from environmental stressors. For example, Curcumin, the active compound in turmeric, has protective effects against UVB radiation-induced damage to human keratinocytes, which are the cells that make up the outermost layer of the skin and the hair follicle.

1. Gupta SC, Patchva S, Aggarwal BB. Therapeutic roles of curcumin: lessons learned from clinical trials. *AAPS J.* 2013.
2. Kang JI, Kim MK, Kim SW, et al. Curcumin sensitizes human hair follicle dermal papilla cells to minoxidil by increasing the expression of transforming growth factor- α . *J Dermatol Sci.* 2017
3. Dulak J. Nutraceuticals as anti-angiogenic agents: hopes and reality. *J Physiol Pharmacol.* 2005

VII. Nutrients Benefits (General Chart)

Nutrients	Sleep & Stress	Immune F. & Microbiota	Anti-Inflammatory	Hormonal Balance	Skin & Hair	Sexual F. & Libido	Brain & Cognitive F.	Energy & Endurance	Detox & Weight M.	Joints Muscles
Vitamin A		✓	✓		✓	✓				✓
Vitamin B1		✓	✓	✓	✓			✓		
Vitamin B5		✓	✓	✓	✓	✓		✓		
Vitamin B2		✓	✓	✓	✓			✓		
Vitamin B6	✓	✓	✓	✓	✓		✓	✓		
Vitamin B12	✓	✓	✓	✓	✓	✓	✓	✓		
Vitamin C	✓	✓	✓		✓		✓	✓		
Vitamin D	✓	✓	✓		✓				✓	✓
Vitamin E		✓	✓		✓					
Vitamin K			✓		✓		✓			✓
Biotin		✓	✓	✓	✓	✓		✓		
Choline		✓	✓		✓		✓		✓	
Folic Acid		✓	✓	✓	✓	✓	✓	✓		
Niacin		✓	✓	✓	✓			✓		
Iodine				✓	✓		✓		✓	
Magnesium	✓			✓	✓			✓		✓
Selenium		✓	✓	✓	✓		✓			
Silicium		✓			✓				✓	✓
Zinc		✓	✓	✓	✓					✓
Collagen					✓				✓	✓
Keratin					✓					
L-Gycine	✓		✓		✓				✓	✓
L-Hydroxyproline					✓					
L-Lysine					✓				✓	✓
L-Proline					✓				✓	✓
Ashwagandha	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Rhodiola	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Turmeric	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Saw Palmetto			✓	✓	✓					
Hyaluronic Acid					✓					✓

● Vitamins

● Minerals

● Amino Acids

● Adaptogens

● Herbal

VIII. FAQs

Is AETHERN ULTIMATE HAIR BOOSTER recommended for all hair types?

Yes. Whether for dry, damaged, devitalized, dyed, gray or curly hair, the AETHERN ULTIMATE HAIR BOOSTER provides optimal nutrition that promotes maximum hair renewal, improving strength, growth, and shine for all hair types.

How soon will I start to see results?

After 4 weeks of taking AETHERN ULTIMATE HAIR BOOSTER, you will notice more hydrated and revitalized hair. After 12 weeks, you will see the benefits of hair growth, improve scalp cover, had strong, shiny, healthy and beautiful hair. The optimal results will be observed after 24 consecutive weeks of daily dose.

Can the program be repeated?

Yes, of course. You can repeat it as many times as you want.

Can I take more than one dose a day?

It is not necessary. A single dose contains all the nutrients with the right amount that your hair needs.

How is it taken?

With its pleasant taste, it can be taken directly from the container, or you can also dilute it on water or natural fruit juice.

Can it be taken together with other food supplements?

Yes, AETHERN ULTIMATE HAIR BOOSTER can be taken with other food supplements.

Any contraindications?

No contraindications have been identified.

Any side-effects?

No side effects have been observed.

Any precautions?

Consult your physician before using AETHERN ULTIMATE HAIR BOOSTER if you are pregnant, nursing or have a chronic medical condition.

Suitable for?

Vegetarian	NO
Vegans:	NO
Diabetics:	NO
Gluten-free	NO

IX. Fact Sheet

1. Name of the product

ULTIMATE HAIR BOOSTER
25 ml / 0.85 fl. oz. bottles

2. Qualitative and quantitative composition

Purified Water; Grape Syrup; Choline Bitartrate; Acidulant: Citric Acid; Magnesium Bisglycinate; Fish Collagen; Saw Palmetto Dry Extract (*Serenoa repens*); Keratin; L- glycine; Rhodiola Dry Extract (*Rhodiola rosea*); Bamboo Dry Extract (*Bambusa arundinacea*) 70% silicon dioxide; Acerola Dry Extract (*Malpighia glabra* L.) 50% Vitamin C (L-Ascorbic Acid); L-Hydroxyproline; L-Proline; L-Lysine; Hyaluronic Acid; Ashwagandha Dry Extract (*Whitania somnifera* L.); turmeric (CURSOL®); Natural Fragrance; Vitamin K2 (Menaquinone); Zinc Bisglycinate; Preservatives: Potassium Sorbate; *Dunaliella salina* Dry Extract 7.5% Beta-Carotene; Stabilizer: Sucrose Esters Derived from Natural Ingredients; Vitamin E (D-Alpha-Tocopherol); Vitamin B3 (Nicotinamide); *Laminaria digitata* Dry Extract (1% Iodine); Selenium-Enriched Yeast; Vitamin D3 (Cholecalciferol); Vitamin B5 (D-Calcium Pantothenate); D-Biotin; Vitamin B6 (Pyridoxine Hydrochloride); Vitamin B1 (Thiamine Hydrochloride); Vitamin B2 (Riboflavin); Folic Acid (Pteroylmonoglutamic Acid); Vitamin B12 (Cyanocobalamin).

Values are shown in 25 ml

Calories	25
Total Carbohydrate	4g
<i>Total Sugars</i>	4g
<i>Included 1g Added Sugars</i>	
Protein	2g

3. Pharmaceutical form

Oral suspension

IX. Fact Sheet

4. Data

4.1. Role of active ingredients

Plant extracts, amino acids, vitamins, and minerals promote hair health

4.2. Dosage and administration

This food supplement is taken orally.

It can be taken alone or diluted in water or fruit juice.

Take a daily dose. The duration of the treatment (one box) is four weeks and can be repeated as necessary when recommended by a healthcare professional.

Suitable for:

Vegetarians: NO

Vegans: NO

Diabetics: NO

Gluten-free: NO

4.3. Contraindications

No contraindications have been identified

4.4. Instructions for use or special warnings

No special precautions are necessary

4.5. Interactions

Consult with a medical professional if you are taking any medication

4.6. Pregnancy and breastfeeding

Consult with a medical professional if you are pregnant or breastfeeding

4.7. Effects on the ability to operate heavy machines

No special precautions are necessary

4.8. Side-effects

No side effects have been observed

4.9. Overdose

No symptomatic reactions have been observed

5. Products properties

A dietary supplement with regenerative properties. A dietary supplement that promotes hair health.

IX. Fact Sheet

6. Product information

6.1. List of excipients

Purified Water, Grape Syrup, Citric Acid, Natural flavors, Potassium Sorbate and Sodium Benzoate (preservatives), and Sucrose Esters. Contains fish.

6.2. Incompatibilities

None have been observed

6.3. Shelf life

2 years

6.4. Special storage instruction

Store at a temperature below 77°F (25°C)

6.5. Natural ingredients and packaging materials

Topaz-colored bottle of recycled PET with a screw-on cap. 0.85 fl. oz. (25ml) oral-suspension bottle

6.6. Special precautions regarding disposal and other manipulations

No special precautions necessary

7. Bearer of rights of sale

Biorganic Pharma S.L.
Jaume Piquet, 22 baixos
E-08017 Barcelona



GMO-FREE



NO ARTIFICIAL
COLORS



GLUTEN-FREE



NON-DIARY



ALCOHOL-FREE



LOW CALORIES



DRUG-FREE



CRUELTY-FREE

X. Statistical Report

Efficacy of an Oral Supplement
in Women Hair Wellness Test

PARTIAL STATISTICAL REPORT

**24-WEEK ASSESSMENT OF THE EFFICACY OF AN ORAL SUPPLEMENT IN WOMEN
HAIR WELLNESS (A000162-01)**

INVESTIGATIONAL PRODUCT NAME AETHERN ULTIMATE HAIR BOOSTER

PROTOCOL NUMBER MLS-E-ES-A000162-01-04-22-PRV02

STUDY CODE MLS-E-ES-A000162-01-04-22

AETHERN

Carrer Jaume Piquet, 22 Baixos 08017

SPONSOR Barcelona - Spain

Telephone: +34932063969

Study Responsibility: BIORGANICPHARMA SLU

INTERNATIONAL RESEARCH SERVICES, INC.

222 Grace Church Street

STUDY CENTER Port Chester, NY 10573

Telephone: 914.937.6500

MEDIA LAB SCIENCE

4370 Tujunga Avenue Suite #210

STUDY SITE Studio City, CA 91604

Telephone: +1 818 400 8157

Investigator in Charge: Nathalia Souza, PhD

Sub-Investigator: Aimeann DeJohn

TIME-POINT T12w

STATISTICAL REPORT DATE 01/27/2023

CONTENTS

1 INTRODUCTION 3

2 STATISTICAL ANALYSIS 3

3 RESULTS 4

3.1 Self-Assessment Questionnaire Performed by the Study Subjects 4

1 INTRODUCTION

The objective of this study was to determine the efficacy of an ingestible supplement, under normal use conditions, through the following methodology:

- Self-Assessment Questionnaire.

2 STATISTICAL ANALYSIS

Description of the treatment applied to the data is presented in the table below.

Table 1. Detailed statistical analysis

Data Type	Statistical Method	Data Reported	Sample size
Self-assessment questionnaire	Descriptive Statistics	Positive response percent and frequency (% , n)	36

3 RESULTS

3.1 Self-Assessment Questionnaire Performed by the Study Subjects

The tables below represent the percentage and frequency of favorable results (answers higher than 3).

Table 2. Percentage and frequency of positives answers – T12w

Statement	T12w
	% positives (n)
Noticed improvement on my overall hair growth	83.3% (30)
Noticed improvement on my overall hair volume	83.3% (30)
Noticed improvement on my hair quality	83.3% (30)
Saw stronger hair	72.2% (26)
Noticed improvement on my hair breakage	72.2% (26)
Noticed amount of new hair	77.8% (28)
Noticed improvement on my hair growth rate	83.3% (30)
Saw healthier looking hair	86.1% (31)
Saw shinier looking hair	72.2% (26)
Saw longer looking hair	69.4% (25)
Saw fuller looking hair	77.8% (28)
Hair appears fuller & bouncier	72.2% (26)
Hair feels softer	75.0% (27)
Hair appears thicker looking	72.2% (26)
Noticed improvement in my sleep quality	38.9% (14)
Noticed improvement in my stress level	55.6% (20)
Noticed improvement in my anxiety level	41.7% (15)
Noticed improvement in my overall wellbeing	69.4% (25)
Noticed improvement on my nail's strength	61.1% (22)
Noticed improvement on my nails growth rate	63.9% (23)
Noticed improvement on my eyebrow's hair growth	47.2% (17)
Noticed improvement on my eyelashes' growth	30.6% (11)
Noticed improvement on my skin smoothness	61.1% (22)
Noticed improvement on my overall skin appearance	63.9% (23)
Noticed less amount of hair in my hair brush after brushing?	61.1% (22)