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AC AlfaBoost

COMPLEX ACTIVE



VEGAN



COSMOS



IN VITRO



IN VIVO



ISO 16128



PRODUCT
PASSPORT



THE FEATURES.

Nourish your roots with Active Concepts' vegan, water-soluble, and botanical ingredient, AC AlfaBoost. Derived from *Medicago sativa* (alfalfa) seeds that are sustainably grown in cell culture sulfur-rich supplemented media, this aqueous extract cracks the code to natural hair growth. Alfalfa has long been prioritized for its superior content in vitamins, minerals, and protein. Based on research investigating the relationship between sulfur and hair growth, we have naturally enhanced alfalfa's sulfur-rich peptide content to provide an efficient method for increasing hair and eyelash density, and antioxidant protection for the scalp.

Medicago Sativa (Alfalfa) Callus Culture Conditioned Media Extract & Lactobacillus Ferment Lysate

Actions

Encourages Hair Shaft &
Eyelash Density
Nourishes the Scalp
Reduces ROS Levels

TECHNICAL DATA SHEET.



THE REGULATION.

INCI. Medicago Sativa (Alfalfa) Callus Culture
 Conditioned Media Extract &
 Lactobacillus Ferment Lysate
CAS. 84082-36-0 & 68333-16-4 (OR) 92128-79-5
EINECS. 281-984-0 & N/A (OR) 295-777-8
EUROPE. Contact Us, EU Version Available
USA. Compliant
CHINA. Contact Us, CHI Version Available

THE SPECIFICATION.

Origin. Botanical/Bacteria
Natural Antimicrobial. Lactobacillus
 Ferment Lysate
Preservatives. None
Solvents Used. None
Soluble/Miscible. Water Soluble
Appearance. Clear to Slightly Hazy Liquid,
 Colorless to Pale Amber
Use Level. 1- 10 %



THE STORY.

Natural hair and scalp remedies are constantly searched for in the personal care industry. However, there is a lot of recent buzz around eyelash and eyebrow care as well — an area that has a gap in the market. What these two areas have in common is consumers are constantly trying to find products that naturally increase the length of their hair. Multiple studies have shown that women and men feel that a major source of their confidence stems from having a head full of vibrant, healthy hair. It's finally time to put away those harsh chemical serums and lock up the fake eyelash glue, because AC AlfalfaBoost starts at the roots to encourage an increase in hair length and density.

Alfalfa, or *Medicago sativa*, is a clover-like, leguminous plant of the pea family, *Fabaceae*, and has been grown as feed for livestock for hundreds of years. It is predominately harvested in the northern and western areas of the United States and grows best in deep, well-drained friable soils. This sprouting plant has historically been prioritized for its superior content in vitamins, minerals, and proteins, and utilizes sulfur more than many other crops. Alfalfa's richness in natural phytochemicals has historically aided in stimulating appetite and other medicinal uses¹. However, alfalfa has now sprouted its way into the personal care industry.

As an honorable mention, alfalfa has the remarkable ability to regenerate new stems and leaves, and can be harvested in a single growing season because of its abundant regrowth¹. Active Concepts grows alfalfa sprouts in cell culture, a sustainable practice as it reduces the need for energy crop production and allows us to reduce our carbon footprint. As sustainability is no longer a trend, but rather a quality of practice in the personal care industry, it is critical for AC AlfalfaBoost to have sustainable manufacturing processes.

THE SCIENCE.

Hair growth occurs in three phases: the growth phase (anagen), the transitional phase (catagen), and the resting phase (telogen)². Eyelashes also have the same categorized growth phases, just with different timelines. For hair, the anagen phase lasts about three to five years, while an eyelash's anagen phase is around thirty to forty-five days. Hair's catagen phase is only around ten days, while an eyelash's catagen phase is two to three weeks. Lastly, hair's telogen phase typically lasts around three months, while an eyelash's telogen phase is four to eight weeks^{2,3}. Some individuals experience shorter anagen phases, which make it difficult for their hair to grow beyond a certain length. While intrinsic and environmental exposure factors can contribute to hair growth struggles, it is important to understand typical growth phases in order to create a remedy.

As mentioned previously, *Medicago sativa* contains more sulfur than many other crops, and is also rich in phytochemicals such as saponins, flavonoids, and phytosterols⁴. Sulfur helps prolong the hair's anagen phase which is a critical benefit to aiding one of the leading struggles for healthy hair growth. Keratin, which makes up about 95% of hair, is rich in sulfur content.⁵ Therefore, it is no surprise that when sulfur is topically applied to the scalp and hair follicles that there is an increase in hair density. However, AC AlfalfaBoost is not high in just sulfur content, but sulfur-rich *peptide* content. Peptides are able to penetrate the outer layer of the skin, therefore increasing the bioavailability of the cosmetic extract.

Additionally, the key to healthy hair growth starts at the scalp. Reactive oxygen species, or ROS, are highly reactive molecules that can decrease a cell's natural ability to regenerate. Exposure to environmental factors and UV irradiation can impair the scalp's ability to support healthy cell renewal. Alfalfa is known to contain alkaline amino acids, which have been reported to have strong antioxidant capabilities⁶. AC AlfalfaBoost provides a source of sulfur-rich peptides, not only aiding in prolonging the hair's growth phase, but it also providing antioxidant protection to the scalp.

THE BENEFITS.

Hair

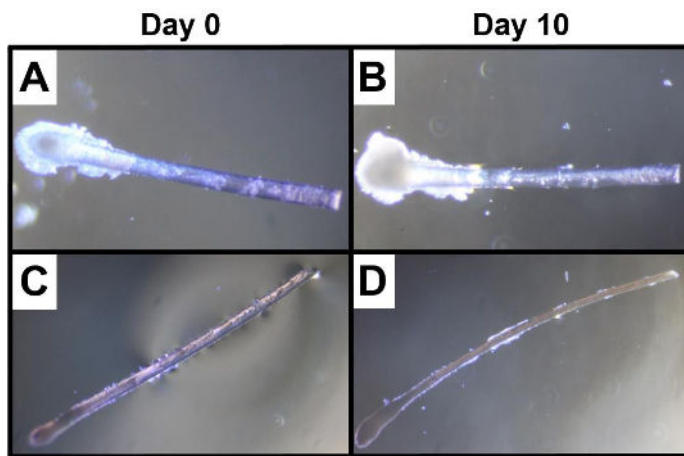
Hair Growth	<i>In Vitro Hair Shaft Elongation Assay</i>	
Growth Mechanism	<i>IGF-1 ELISA Analysis</i>	
Oxidative Stress Scavenging	<i>Reactive Oxygen Species Scavenging Assay</i>	

Scalp Care	<i>Scalp Study</i>	
Eyelash Growth	<i>VISIA - Eyelash Characteristics</i>	

THE EFFICACY.

Hair Shaft Elongation Assay.

A study was conducted using an *in vitro* Hair Shaft Elongation Assay to evaluate the impact of AC AlfalfaBoost in enhancing the length of hair follicles. Hair follicles in the anagen phase were extracted from the scalps of 5 healthy male volunteers aged 18-40 and subsequently cultured. The length of the cultured hair follicles was assessed after a period of 10 days at 37°C (5% CO₂, 95% RH), using different concentrations of AC AlfalfaBoost diluted with CM (0.01%, 0.1%, and 1.0%).



Increased treated hair shafts by 44%, 144%, and 167%, respectively
(Tested at 0.01%, 0.1%, and 1.0%)

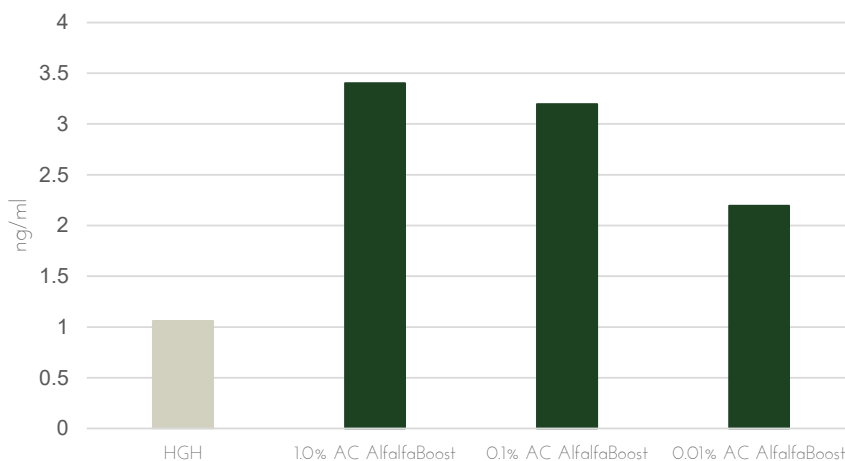
Hair Shaft Growth.

Increases hair shaft length *in vitro* & May promote existing hair growth *in vivo*

Figure 1. Representative images of plucked hair follicles incubated with complete media (A, B) and 0.1% AC AlfalfaBoost (C, D) on Day 0 (A, C) and Day 10 (B, D).

IGF-1 ELISA Analysis.

The impact of AC AlfalfaBoost on Insulin-Like Growth Factor-1 (IGF-1) levels in human dermal papilla cells was evaluated through an IGF-1 ELISA. Human dermal papilla cells were cultured in collagen-coated 24-well plates using Dermal Papilla Growth Media (DPGM) until reaching confluency. Different concentrations of AC AlfalfaBoost (1%, 0.1%, 0.01%) were introduced to the DPGM and incubated with the cells for 3 days. A positive control was included, utilizing DPGM containing 0.25mM L-Ascorbic acid 2-phosphate.



AC AlfalfaBoost created an environment conducive to hair growth and follicle stimulation (tested at 0.01%, 0.1%, and 1.0%)

Growth Mechanism.

Hair growth & Hair follicle stimulation

Figure 2. AC AlfalfaBoost-Treated Dermal Papilla Cells IGF-1 Concentrations and Percent Change

Eyelash Characteristics.

An *in vivo* study was conducted over a period of eight weeks to evaluate the effects of 5.0% AC AlfalfaBoost in a serum on eyelash characteristics when compared to a base serum alone. This study used 10 female volunteers between the ages of 25 - 32 and applied the eyelash serum to the upper lash line of both eyes once nightly for an eight-week period. Participants were instructed to not start any new products for the duration of the study. Half of the participants used 5.0% AC AlfalfaBoost in a base serum while the other half used the base serum alone.



Image 1. Images of Participant Treated with 5.0% AC AlfalfaBoost in Base Serum with and without VISIA Enhancement. Left = Initial. Right = Eight Weeks.

Treated eyelashes grew 23% in length over the course of eight weeks.
(tested at 5%)

Eyelash Growth.

Improves eyelash characteristic when added to personal care applications.

Scalp Care Study.

An *in vivo* salon study was conducted to determine the scalp care benefits of 5.0% AC AlfalfaBoost in a shampoo and conditioner vs. the control. The study had 20 M/F panelists with pictures taken of the front, middle, and back of their scalps. A DermaLab Corneometer was used to measure the moisture levels of the scalp and the pigmentation measurement of the DermaLab Combo was performed using a handheld probe. When used at 5.0%, AC AlfalfaBoost showed improvements in scalp hydration and a reduction in scalp redness. *See presentation for moisturization results.

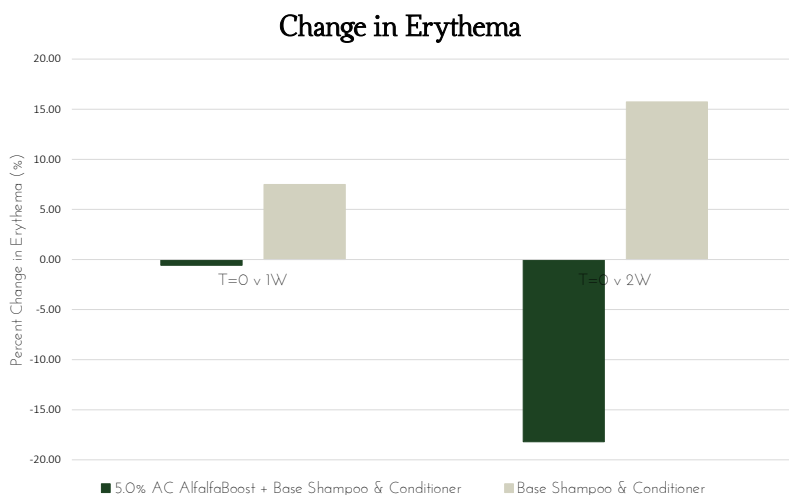


Figure 3. Change in Erythema of Experimental and Control Materials Over Time.

References

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