ACB Pismum Sativum Peptide

BACKGROUND
Hydrolyzed proteins such as soy, wheat or oat have been used to impart conditioning benefits and film-forming properties to the hair for decades. These hydrolysates are comprised of random amino acid sequences that aid in improving the elasticity, texture, and hydration of the hair. Recent efforts within the Nutritional Industry have focused on the selection of more precise protein fragments to improve the benefits of supplements. In the course of that research, it has become clear that protein fragments from different sources have varied benefits. To use the verbiage of Malcolm Gladwell, one of the “Outliers” is Pismum sativum - protein that is all the buzz within the nutrition industry.

ACB Pismum Sativum Peptide is a hydrolyzed pea protein that utilizes a novel technology to provide all the benefits of hydrolyzed proteins and then some. This product provides antioxidant, anti-aging, hydrating and smoothing benefits to the skin and hair. Not only that, but it also provides volumizing benefits when used in hair care formulations! Pismum sativum continues to gain attention from Nutrition and Health advocates for being a plant-based, hypo-allergic protein with high nutritional value. This popular protein has now crossed over into cosmetics as a quality alternative to other vegetable proteins but with profound benefits.

SCIENCE
Proteins are traditionally hydrolyzed, using acids, alkalis and enzymes or a combination to produce random amino acid sequences. While traditional methods of hydrolysis are well accepted and effective, they are simplistic efforts to duplicate normal cellular protein catabolism whereby cells digest proteins into specific sequences to meet nutritional needs. Active Concepts has harnessed the digestive abilities of a non-GMO bacterial strain, Lactobacillus bulgaricus, to produce ACB Pismum Sativum Peptide with a controlled molecular weight of approximately 2000 Da. For decades hydrolyzed proteins, such as soy, wheat and oat, have been used to deliver conditioning benefits and film forming properties to cosmetic formulations. As these traditional proteins continue to fall out of favor, due to press from consumers, new and exotic proteins with greater benefit are needed.
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BENEFITS
Anti-Aging is the latest trend in Hair Care. ACB Pismum Sativum Peptide can effectively condition and moisturize the skin and hair, keeping them both healthy and nourished. Free radical and UV damage can also accelerate the aging process thus making the appearance of fine lines and wrinkles more noticeable. The aging process is also accompanied by dry skin and hair. Both of these can be counteracted with the antioxidant and moisturization benefits of ACB Pismum Sativum Peptide. ACB Pismum Sativum Peptide targets anti-aging so vibrant, healthy skin and voluminous hair can shine through.

EFFICACY DATA
Not all proteins are created equal, the industry use of what as the standard is long overdue to be re-examined. Pea’s score over 20 points higher on their amino acid composition (on the nutritional index) and as Malcolm Gladwell stated, different Amino Acids carry different benefits. Pea’s have a unique composition of Amino Acids, this made sourcing ACB Pismum Sativum Peptide an easy choice. In addition to containing a significant amount of every amino group, Pea’s have excellent levels of Lysine that is not only naturally occurring, but can be synthesized from their superior Aspartic Acid content.

Typical Amino Acid Composition

Figure 1. Typical Amino Acid Composition.

One of the largest differentiators of Pismum Sativum is its natural antioxidant capability. Due to its high concentration of Lysine based amino acids, it exhibits extraordinary protection against free radicals. An ORAC study conducted on ACB Pismum Sativum Peptide showed its capability of reducing the presence of Reactive Oxygen Species compared with Trolox, the vitamin E analog used as the control. The ORAC value of the other protein hydrolysate show no antioxidant capacity. ACB Pismum Sativum Peptide provides strong antioxidant attributes to deliver more than just moisturizing and conditioning benefits to the hair.

ORAC Assay

Figure 2. Antioxidant capability.
ACB Pism Sativum Peptide

Voluminous hair is an excellent signifier of hair health, by treating with ACB Pism Sativum Peptide vs. the standard wheat control it has become clear just how different amino acids are capable of effective hair. A study conducted at Gaston College Technology Center measured the diameter of color treated hair at different intervals to determine an increase in hair thickness. Using 60 strands of hair, a 2.0% solution of ACB Pism Sativum Peptide was applied to each strand of hair. Immediate results showed an average increase in hair diameter of 14.0% with an average increase of 13.65% four hours after application.

After placing individual hair strands under a microscope, Microscopy Imaging of the individual strands were taken to visually demonstrate the increase in hair diameter achieved when using ACB Pism Sativum Peptide in comparison to the use of Wheat Hydrolysate.

Figure 3. Individual strand immediate following treatment with Wheat Hydrolysate.

Figure 4. Individual strand immediately following treatment with ACB Pism Sativum Peptide.

Figure 5. Individual strand four hours after treatment with Wheat Hydrolysate.

Figure 6. Individual strand four hours after treatment with ACB Pism Sativum Peptide.
In addition to hair diameter, a half head study was conducted in order to determine the comparison of using a shampoo incorporating ACB Pisum Sativum Peptide vs. a control shampoo, in addition to the comparison of using a conditioner incorporating ACB Pisum Sativum Peptide vs. a control conditioner. The volunteer’s hair was photographed. The images of the half head study were used in conjunction with a sensory study to assess the shine, volume, dry and wet combability, thickness, smoothness, hydration, softness and manageability before treatment, after shampoo treatment and blow dry, and again after conditioner treatment and blow dry. Based on the results obtained, ACB Pisum Sativum Peptide is capable of enhancing the volume and overall health of the hair perfect for use in anti-aging hair care product lines.

**Assessment of Hair Characteristics**

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Increased hydration of the hair is a key benefit of hydrolyzed proteins. As evidenced in an *in-vivo* study, ten (M/F) subjects between the ages of 24 and 37 were instructed to apply either an untreated control, a solution containing 5.0% **ACB Pisum Sativum Peptide**, or a 5.0% solution containing Wheat Hydrolysate to their hair as a leave-in conditioner, once a day for a week. The results demonstrated a comparable increase in hair hydration on subjects using both a 5.0% solution of **ACB Pisum Sativum Peptide** and a 5.0% solution of Wheat Hydrolysate.
**ACB Pum Sativum Peptide**

**Increase in Hair Hydration**

![Graph showing increase in hair hydration](image)

*Figure 13. Improvements in Hair Hydration.*

**ACB Pum Sativum Peptide** is active at a cellular level, improving the molecular makeup of hair and skin. As shown in Figure 14, **ACB Pum Sativum Peptide** exhibited positive collagen synthesis activity. The increase in collagen production may lead to improvement in the dermal-epidermal junction integrity as well as an improved scaffolding matrix. For these reasons, we can assume **ACB Pum Sativum Peptide** is suitable for cosmetic applications designed to boost collagen synthesis to aid in providing a younger and healthier complexion.

**Sirius Red Fast Green Assay**

![Graph showing Sirius Red Fast Green Assay](image)

*Figure 14. Sirius Red Fast Green Assay.*
In dealing with cellular activity it is important to note any harm or changes occurring at these levels. In this study, ACB Pisum Sativum Peptide was tested to evaluate its effects on the viability of normal human dermal fibroblasts (NDHF). At concentrations of both 0.1% and 0.01% ACB Pisum Sativum Peptide, nor the preservatives contained therein exhibited any inhibition of cell viability. It can therefore be concluded that at normal use concentrations ACB Pisum Sativum Peptide is not cytotoxic. The data obtained from this study met criteria for a valid assay and the controls performed as anticipated.

**Figure 15. Cellular Viability Assay**

**TGF-β ELISA**

By using a standard TGF-Beta ELISA, we have been able to test for TGF-Beta concentration, a compound responsible for several cell signaling pathways, and more importantly a major control in apoptosis and cell viability. ACB Pisum Sativum Peptide concentration was strongly correlated with lower overall concentration of TGF-Beta. This indicates that ACB Pisum Sativum Peptide has the capacity to influence cellular viability by decreasing the rate of apoptosis.

**Figure 16. TGF-Beta expression.**