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THE FEATURES.

A C Vegan Keratin OS offers a biomimetic and vegan alternative to hydrolyzed keratin protein. The selective combination of quinoa, lentil, and chickpea peptides in an apricot oil base provides a plant-based, non-GMO, gluten-free functional equivalent to oil soluble hydrolyzed keratin. AC Vegan Keratin OS effectively increases hair hydration and smooths hair to reduce frizz. Perfect for emulsions, hair oils, and dry shampoos, AC Vegan Keratin OS allows brands to capture eco-conscious beauty without compromise.

Prunus Armeniaca (Apricot) Kernel Oil & Lens Esculenta (Lentil) Seed Extract & Hydrolyzed Cicer Seed Extract & Chenopodium Quinoa Seed Extract

Actions

Reduces TEWL Hydrates Hair Visibly Reduces Frizz Moisturizes Skin

AC Vegan Keratin OS



	Lens Esculenta (Ler
6	Hydrolyzed Cicer Se
II	Quinoa Seed Extra
Γ	CAS. 68650-44-2 &
5	& 225234-01-5
EC	EINECS. 272-046-1
R	EUROPE. Complia
Æ	USA. Compliant
E	CHINA. Compliant

INCI. Prunus Armeniaca (Apricot) Kernel Oil &
Lens Esculenta (Lentil) Seed Extract &
Hydrolyzed Cicer Seed Extract & Chenopodium
Quinoa Seed Extract
CAS. 68650-44-2 & 90063-40-4 & 92113-26-3
& 225234-01-5
EINECS. 272-046-1 & 289-998-9 & 295-631-3 &

Origin. Botanical Natural Antimicrobial. None Preservatives. None Solvents Used. Prunus Armeniaca (Apricot) Kernel Oil Soluble/Miscible. Oil Soluble Appearance. Clear to Slightly Hazy Liquid, Pale Yellow to Yellow Use pH. 3.0-7.0 Use Level. 1- 10 %



THE STORY.

UROPE. Compliant

Keratin is a basic building block of the complex morphological structure of hair and essential for hair fortification and reparation. Consumers traditionally seek animal derived keratin proteins in hair care products to improve hydration and overall feel. However, the rising trend of vegan beauty inspires the development of new functional equivalents from a botanical source. In the nature of a true innovation, Active Concepts rose to the challenge and created an oil soluble hydrolyzed keratin equivalent using plant derivatives. The enzymatic hydrolysis of plant proteins presents a vegan, non-GMO, gluten-free replacement to animal derived hydrolyzed keratin for hair care.

AC Vegan Keratin OS consists of hydrolyzed chickpea, lentil, and quinoa proteins that mimic the composition of hydrolyzed keratin to provide a sustainable, accountable, and effective solution for hair smoothing and hydration. Chickpea, lentil, and guinoa are superfoods plentiful in nature and provide an easily accessible path to mimic the amino acid composition of hydrolyzed animal keratin. Chickpeas and lentils are old world pulses in the legume family and have traditionally been incorporated into many culinary creations. Lentils and chickpeas are sources of high quality protein, rich in amino acids such as arginine, aspartic and glutamic acids, and leucine.^{1,2} Quinoa, also known as 'the mother grain', is best known as a food ingredient and offers a complete amino acid profile – the highest level of protein of all grains.³ Quinoa contains an amino acid profile rich in lysine, methionine, and cysteine.³ The use of plant based protein as source for cosmetic innovation satisfies the growing consumer demand for vegan beauty and ingredient transparency.

THE SCIENCE.

Keratin is a fibrous and insoluble protein with excellent mechanical properties. Keratin makes up more than 90% of the hair follicle and is rich in cysteine, a sulfur-containing amino acid that gives the protein its unique strength and protective quality.⁴ The major function of the keratin cuticle is to protect the inner cortex of the hair from damage caused by factors including thermal styling, chemical processing, and daily maintenance. The large molecular weight of intact keratin (40-60 kDa) makes the direct application of this protein ineffective at penetrating the hair shaft to support the integrity of the hair.⁵ Keratin proteins need to undergo hydrolysis to effectively deliver hair care benefits.

Through hydrolysis of chickpea, lentil, and quinoa proteins, initiated by the probiotic bacteria Lactobacillus, we are able to derive a controlled keratin peptide analogue with a lower molecular weight (approximately 1 kDa oligopeptides, as opposed to the 2-4 kDa traditional protein hydrolysates). When compared to traditional hydrolyzed proteins, this controlled, lower molecular weight fraction can efficiently penetrate the hair shaft, and deposit at the cuticle junctions. This helps to maintain the hair's structural integrity while promoting conditioning, smoothness, and shine. As this process uses a plant fermentation it is considered more sustainable and environmentally friendly than other hydrolysis methods.^{6,7}

The hydro-lipid layer is a film that assembles across the hair shaft helping to keep each strand moisturized and promoting general hair health. This protective barrier is formed of ceramides, cholesterol, essential fatty acids, triglycerides and water. All styling processes, such as washing, chemical or heat treatments, can strip these essential lipids and moisture form the hair. Additionally, disrupting this hydro-lipid layer, whether by washing or by dry shampooing, may be damaging to the hair. Dispersing the vegan, hydrolyzed keratin peptide analogues in an oil base can help to replenish some of the essential lipids to the hair and scalp without adding to an oily look or feel. In order to render these hydrolyzed plant peptides in an oil soluble form, the peptides are subjected to high shear processing in apricot kernel oil, creating AC Vegan Keratin OS.

AC Vegan Keratin OS



THE BENEFITS. Skin

Moisturizing 24-Hour Moisturization Assay

Hain

Hydrating Gravimetric Hair Hydration



Barrier Function Transepidermal Water Loss Assay

Shine Salon Half-Head Study

THE EFFICACY. _____

An in vivo study was conducted over 24 hours to evaluate the moisturization benefits of AC Vegan Keratin OS. 20 M/F subjects between the ages of 23-45 participated in the study. Results indicate AC Vegan Keratin OS is capable of significantly increasing moisturization. 80.00% 70.00% After 8 hours, AC 60.00% Vegan Keratin OS 50.00% increased moisture levels Percent (%) Change by 48% compared to 40.00% , the untreated site 30.00% (tested at 5.0%) 20.00% More moisture. 10.00% 0.00% Strengthens skin barrier -10.00% T = 0 vs 15 Min T = 0 vs 1 HourT = 0 vs 8 Hours T = 0 vs 24 Hours 5.0% AC Vegan Keratin OS + Base Lotion Base Lotion Untreated

Transepidermal Water Loss Assay (TEWL).

An *in vivo* study was conducted to evaluate the ability of AC Vegan Keratin OS to enhance barrier function through reduction in Transepidermal Water Loss (TEWL). Ten volunteers M/F between the ages of 23 and 45 and who were known to be free of any skin pathologies participated in this study. A DermaLab Combo was used to measure TEWL on the subject's volar forearms. Results indicate that AC Vegan Keratin OS is capable of efficiently reducing TEWL, which allows moisture retention.



Gravimetric Hair Hydration Assay.

An *ex vivo* gravimetric hair hydration analysis was performed in order to assess if the hydrating ability of AC Vegan Keratin OS was comparable to animal-derived keratin. Four hair swatches were weighed, then treated with either 2.0% AC Vegan Keratin OS, 2.0% AC Keratin Hydrolysate OS, Isododecane, or nothing (untreated control). After treatment, hair swatches were weighed and placed into a drying oven for 1 hour at 105°C. When removed, the hair was allowed to cool in a humidity-controlled chamber and weighed one last time. Hair hydration was determined by calculating the percent moisture per hair swatch.

	Untreated Control	Isododecane	2.0% AC Vegan Keratin OS	2.0% AC Keratin Hydrolysate OS
Initial Mass	1.135	1.027	1.097	1.047
Initial Mass + Test Product	1.135	1.720	2.097	2.004
Final Mass	1.032	1.210	1.387	1.277
% Moisture	-9.1%	10.6%	13.9%	11.5%





Salon Half-Head Study

An *in vivo* half head study was conducted on five participants to determine if AC Vegan Keratin OS is capable of providing percievable benefits in a shampoo and conditioner application. Each volunteer's hair was photographed prior to the treatment and again after the shampoo and conditioner had been applied and the hair was styled. The images of the half head study were used in conjunction with a sensory assessment subjectively rating the parameters - cleansing, smoothing, dry and wet combability, anti-frizz, overall feel, shine and hydration. This assessment was conducted both before and after treatment.



Figure 1. Baseline, Untreated Hair



Figure 2. Half Head Treated.

Improved anti-frizz by 27% compared to the control (tested at 2.0%)

Salon tested.

Before and after images depict the visible improvement

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Active Concepts LLC Lincolnton, NC- USA Tel +1 704-276-7100 info@activeconceptsllc.com **Active Concepts SRL** Bareggio, (Milano) ITALY Tel +39 02 90360719 info@activeconcepts.it

Active Concepts LLC, Asia Kaohsiung, Taiwan Tel + 886 73599900 info-asia@activeconceptsllc.com.tw



Website www.activeconceptsllc.com

