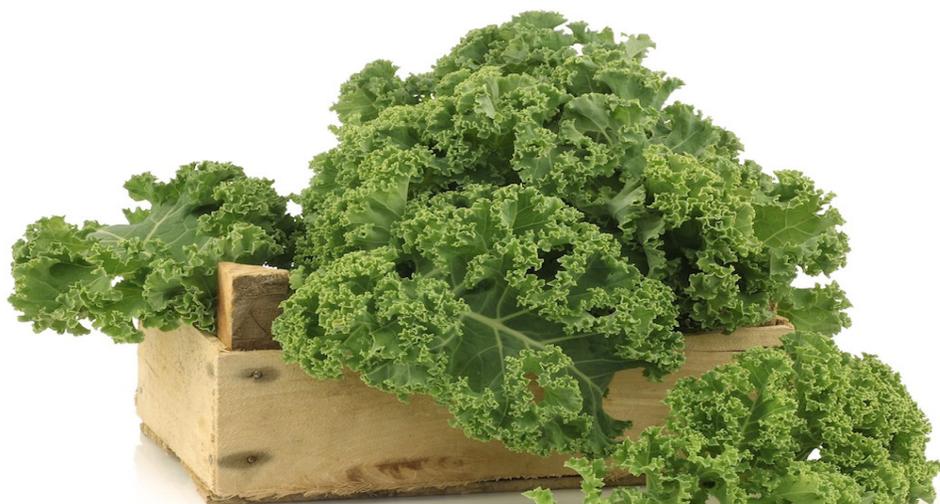


ACB Kale Protein Blend



Moisturizing
Increases Manageability
Film-Forming
Vitamin A
Conditioning
Increases Volume
Improves Shine
Improves Barrier Function
Nourishing
Vitamin C
Enhances Combability
Antioxidants

BACKGROUND

With the cosmetic industry shifting focus to ingredients sourced from nature, it is to no surprise that fruits and vegetables have increasingly gained popularity. The more recent trend of employing vegetables to promote skin benefits has prompted an entirely new avenue of market appeal with its novelty. After transforming the way we consume and make smoothies, salads and even chips, the health-food-of-the-moment, kale is now bringing its super-detoxifying powers to the skin care realm.

SCIENCE

With its incredible benefits, kale is packed full of vitamin A and E, known to work together to boost hydration, elasticity and collagen production.¹ Kale boosts the health of your skin due to its vitamin C content. The skin contains collagen fibers, which are long strands of protein that form a network that holds your skin cells together. Vitamin C helps make the collagen needed for skin strength. Vitamin C's antioxidant function also means it might provide natural protection from the sun, preventing skin damage caused by exposure to the sun's rays.

Carrots, in particular, have amazing beauty benefits. Whether used in cosmetic applications or making them a part of your daily diet, the result of their nutritional value will be evident in the natural glow that radiates from your skin. Carrots can play a significant role in keeping your skin healthy and nourished. The antioxidant properties of carrots greatly benefit the skin by protecting and healing while also providing anti-aging benefits.² The most advantageous antioxidant packed into this vegetable is Vitamin A, or beta-carotene. Beta-carotene provides protection from damage-causing free-radicals which are responsible for the premature signs of aging.² Additionally, Vitamin A promotes the health of the skin by nourishing overly photo-exposed skin and plays an essential role in skin maintenance. Another benefit of this multitasking antioxidant is its ability to aid in repairing skin damage while helping balance and hydrate the cells to alleviate dry, chapped or scaly skin. With the beneficial applications of carrots ranging from problem skin and moisturizing to repairing and nourishing, carrots can be incorporated into a variety of cosmetic formulations to promote healthy skin.

Code Number: 20036

INCI Name: Hydrolyzed Kale Protein & Hydrolyzed Carrot Protein & Hydrolyzed Lemon Protein

INCI Status: Proposed

REACH Status:

CAS Number: 100209-45-8 & 100209-45-8 & 100209-45-8

EINCS Number: 309-353-8 & 309-353-8 & 309-353-8

Origin: Botanical

Processing:

GMO Free
No Ethoxylation
No Irradiation
No Sulphonation

Additives:

Preservatives: None
Antioxidants: None
Other additives: None

Solvents Used: None

Appearance: Clear to Slightly Hazy Liquid

Soluble/ Miscible: Water Soluble

Ecological Information:

100% Biodegradability

Microbial Count:

<100 opg, No Pathogens

Suggested Use Levels: 1.0 – 10.0%

Suggested Applications: Moisturizing, Film-Forming, Nourishing, Conditioning,

Benefits of ACB Kale Protein Blend:

- Moisturizing Super-Food
- Volumizing Protein
- Brand Differentiation
- Improves Barrier Function
- Enhances Hair Manageability
- Noticeably Improves Hair Shine

ACB Kale Protein Blend

Citrus limonum is one of the world’s most important food crops. The juice from the fruit is widely used as a beverage and as a condiment. The rind is used to produce lemon oil, while the remaining skin and pulp may be used as livestock feed. The medicinal virtue of lemons, specifically the citron, is clearly evidenced by its Latin name – Citrus medica.

Traditionally in cosmetics, lemons have been used as a source of the alpha-hydroxyacid (AHA) citric acid. Typically lemon juice contains between 5 and 8 percent citric acid. The most obvious medicinal use of lemon was as a source of Vitamin C to prevent scurvy. Owing to its high level of Vitamin C, fresh lemon juice has been recommended in some herbals as a treatment for sunburn, perhaps not the most sensorially pleasing approach, but not without merit. Given its relatively high acid content, coupled with antioxidant activity, it is obvious why lemon juice has been promoted as a natural skin lightener. As early as 1986 researchers began demonstrating some interesting properties from the peel of the lemon.³ Kroyer showed that the hesperidin and naringin are principally responsible for the significant antioxidant properties of citrus peel. In 2000, the University of Arizona published a study where they were able to correlate consumption of citrus peel with a reduction in squamous cell carcinoma. Coincidentally, Arizona is one of the predominant producers of lemon in the US.

BENEFITS

ACB Kale Protein Blend combines the power of kale, carrot, and lemon into one nutrient rich formula designed to condition and moisturize while fighting the signs of aging and sun damage. **ACB Kale Protein Blend** can be used in skin and hair care products as the perfect addition to promote moisturization, barrier function, and the overall health of both the skin and hair!

EFFICACY DATA

Oxygen Radical Absorbance Capacity (ORAC) assay was conducted to assess the antioxidant capacity of **ACB Kale Protein Blend**. The assay quantitatively measures a sample’s ability to quench free radicals that have the potential to react with and damage cellular components.

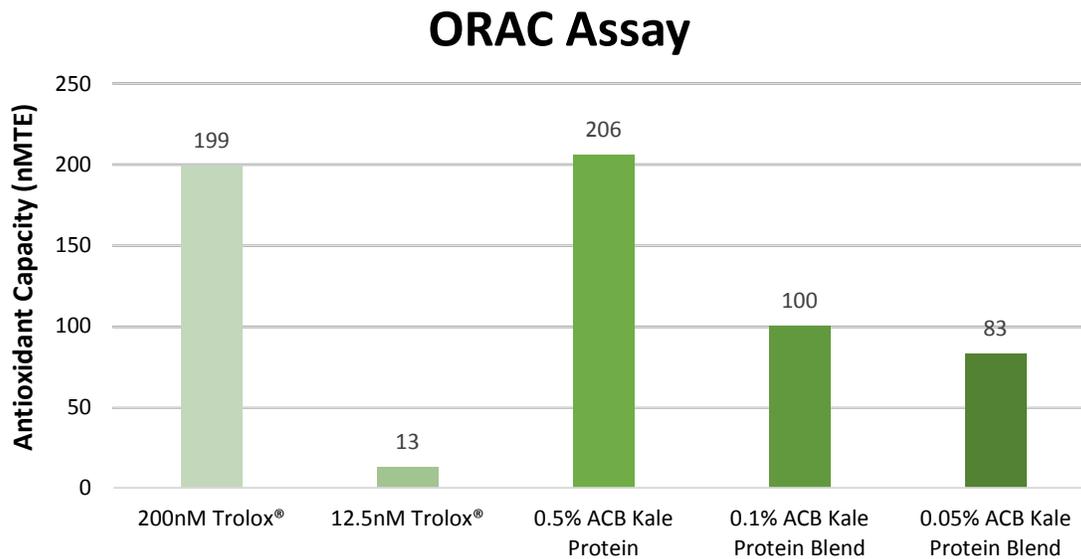


Figure 1. Antioxidant capacities

As shown in figure 1, **ACB Kale Protein Blend** exhibited similar strong antioxidant properties similar to 200µM concentration of Trolox®, our highest standard used. The antioxidant capacity of **ACB Kale Protein Blend** increased as the concentration increased, as a result we can assure that its ability to minimize oxidative stress is dose dependant.

ACB Kale Protein Blend

ACB Kale Protein Blend was designed to provide hair and skin benefits such as conditioning and moisturization and, in addition, act as a film former. However with the ORAC Assay we can confirm that this unique ingredient is not only capable of providing functional benefits but it is also capable of providing potent antioxidant benefits when added to cosmetic and personal skin and hair care applications.

An in-vivo study was conducted over a period of three weeks to evaluate the ability of **ACB Kale Protein Blend** to enhance barrier function through reduction in Transepidermal Water Loss (TEWL). Results indicate that this material is capable of efficiently reducing TEWL which allows for moisture retention.

TEWL Comparison Over Time

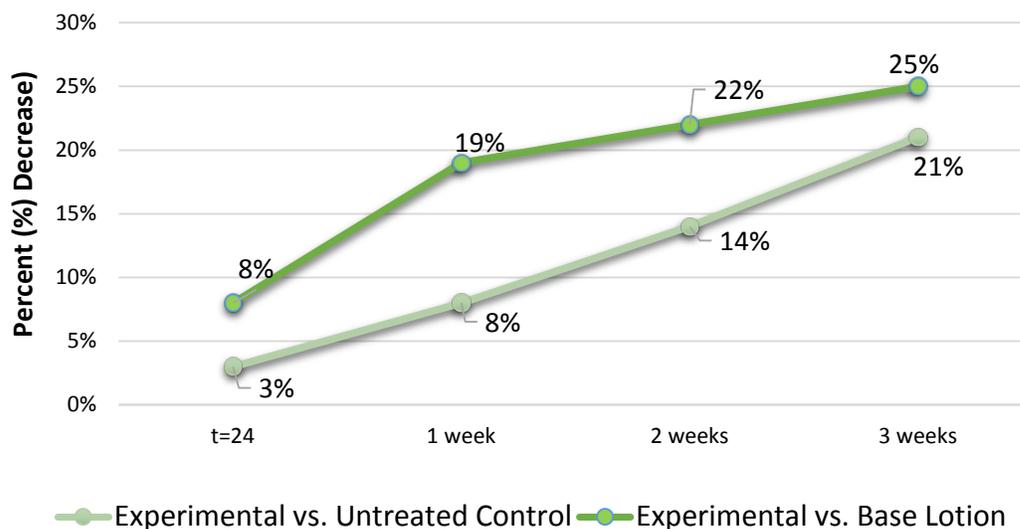


Figure 2. Improvements in barrier function following application of the test materials after a period of 3 weeks.

As shown in Figure 2, results indicate continuous improvements in the barrier of the skin throughout the 3 week test period. After one week, the solution containing 2.0% **ACB Kale Protein Blend** decreased TEWL 8% more effectively than the base lotion alone. After three weeks, the solution containing 2.0% **ACB Kale Protein Blend** demonstrated even more effective barrier protection, decreasing TEWL 21% better than the base lotion alone.

When compared to the untreated control, the solution containing 2.0% **ACB Kale Protein Blend** decreased transepidermal water loss by 19% after one week and by 25% after three weeks.

Hydrolyzed proteins, such as Oat, Soy and Wheat have been used in hair care as a traditional means to hydrate the hair and provide strengthening properties. Until recently, hydrolysis was induced using acid, water, or fermentation. Active Concepts has implemented an innovative hydrolysis approach to the newest and most bio-available vegetable protein on the market, **ACB Kale Protein Blend**. This microorganism prompted hydrolysis creates the by product, lactic acid, as a secretion which provides comparable hydrating benefits to the leading hydrolyzed proteins on the market.

The hair samples used in this study were tested using identical intervals and percentages of two protein hydrolysates, **ACB Kale Protein Blend** and Wheat Hydrolysate. The materials used in the procedure to determine the diameter of each strand were an untreated control hair sample, the control hair sample (2.0% Wheat Hydrolysate in an Aqueous Solution), and the sample treated with the test material (2.0% **ACB Kale Protein Blend** in an Aqueous Solution). Using a 9003 DPM Nova Impedance Meter, hydration levels of each strand of hair were measured. Both the 2.0% Wheat Hydrolysate Aqueous Solution and the 2.0% **ACB Kale Protein Blend** Aqueous Solution were shown to increase moisture levels by comparable amounts in the respective hair strands.

ACB Kale Protein Blend

Increase in Hair Hydration

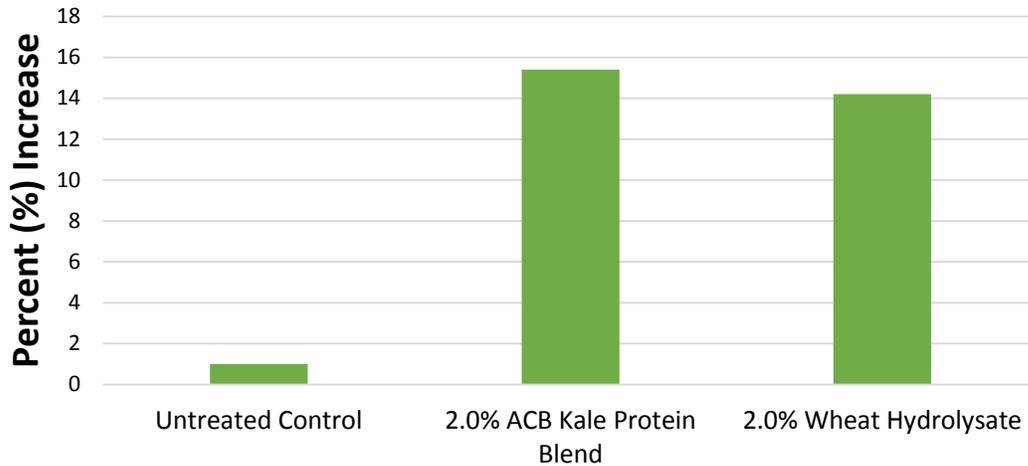


Figure 3. Percent increase in hair hydration using

ACB Kale Protein Blend is manufactured using microorganisms to prompt hydrolysis. This creates the by product, lactic acid, as a secretion which provides volumizing and anti-aging benefits. The hair samples used in this study were tested using identical intervals and percentages of two protein hydrolysates, **ACB Kale Protein Blend** and Wheat Hydrolysate. The materials used in the procedure to determine the diameter of each strand were an untreated control hair sample, the control hair sample (treated with 2.0% Wheat Hydrolysate Solution), and the sample treated with the test material (2.0% **ACB Kale Protein Blend**). Each hair was imaged and measured before a solution was applied. The hairs were then removed from the slide and either placed in the 2.0% solution of the Wheat Hydrolysate or the 2.0% solution of **ACB Kale Protein Blend**. Each hair was removed, measured and imaged then placed aside. After four hours, each hair was reimaged and measured to demonstrate the sustained volume potential of each respective hydrolyzed protein. Immediate results showed an average increase in hair diameter of 13.8% with an average increase of 13.4% four hours following the initial 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 Kale Protein Blend** at 2.0% in a solution compared to the use of Wheat Hydrolysate at 2.0% in a solution.

Effects on Hair Diameter

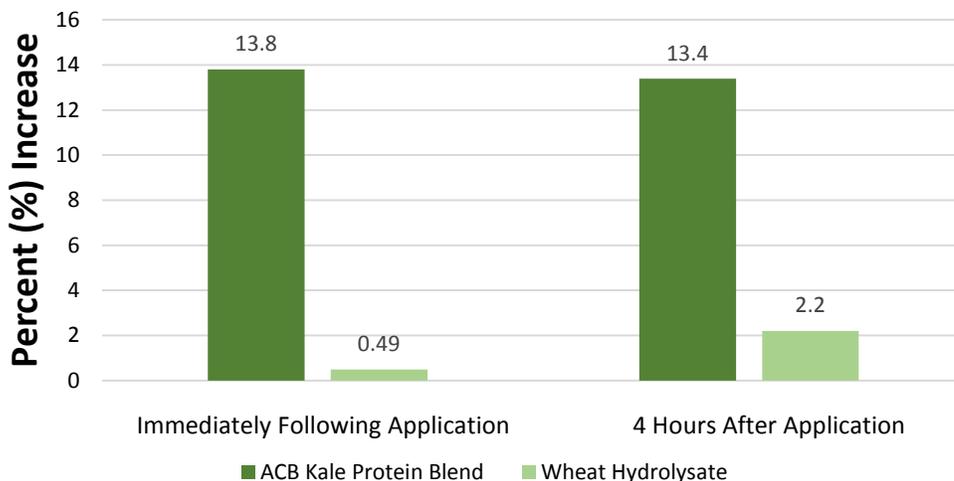


Figure 4. Percent increase in hair diameter over time after treatment

ACB Kale Protein Blend



Figure 5. Individual strand immediately following treatment with ACB Kale Protein Blend



Figure 6. Individual strand immediately following treatment with Wheat Hydrolysate



Figure 7. Individual strand four hours after treatment with ACB Kale Protein Blend

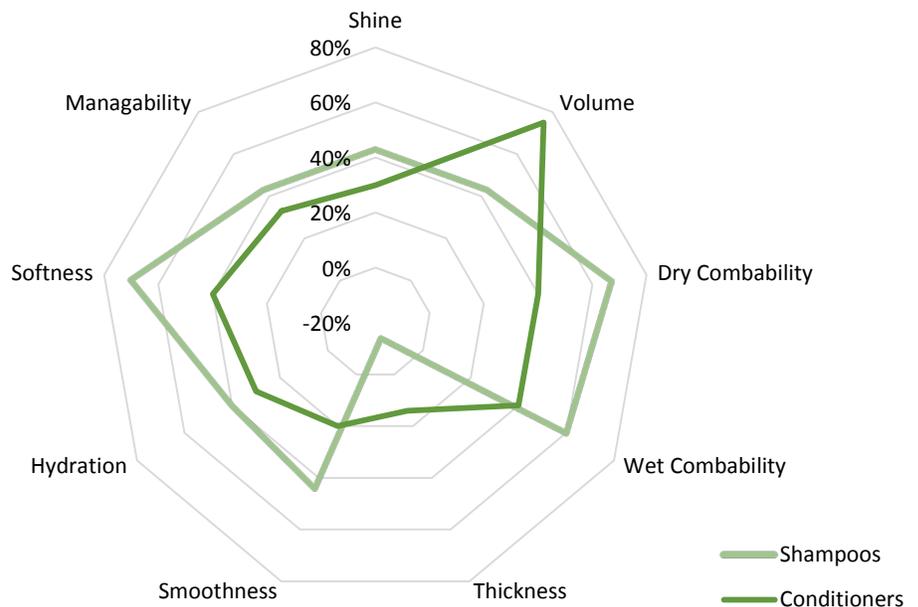


Figure 8. Individual strand four hours after treatment with Wheat Hydrolysate

The condition of the cuticle (the outer most layer of the hair) significantly affects both, manageability and volume of our hair. Overtime as hair becomes damaged the cuticle often lifts as a result of a variety of influences including environment and styling processes. This results in flat, dull hair that is difficult to manage. Improving the body of the hair has been shown to instantly make it appear healthier and more youthful. Increasing combability not only eases manageability, but also helps to minimize physical damage that perpetuates the loss of body and difficulty in styling. **ACB Kale Protein Blend** is a product designed to provide volume, hydration and conditioning properties to the hair. However, this unique ingredient also enhances shine, dry and wet combability, manageability and the smoothness of the hair. A half head study was conducted to determine the use of a shampoo incorporating **ACB Kale Protein Blend** vs. a control shampoo, in addition to the comparison of using a conditioner incorporating **ACB Kale Protein Blend** vs. a control conditioner. Based on this assessment, results show **ACB Kale Protein Blend** is capable of enhancing the volume and overall health of the hair perfect for use in anti-aging hair care product lines.

Amino Acid	mg/kg
Alanine	3522
Arginine	5239
Aspartic Acid	27865
Cystine	1431
Glycine	3418
Glutamic Acid	19119
Histidine	2478
Isoleucine	4627
Leucine	6836
Lysine	6940
Methionine	1821
Phenylalanine	5060
Proline	4075
Serine	4955
Threonine	4134
Tryptophan	1761
Tyrosine	4239
Valine	6448

Percent (%) Difference of Sensory Hair Assessment Control Products in Comparison to the Test



References:1-“Kale Health Benefits Us and Kids” Medicalnewstoday.com. 11 Sep 2015. Web. 13 Oct 2015. 2-Schagen, Silke K. et al. “Discovering the Link between Nutrition and Skin Aging.” *Dermato-endocrinology* 4.3 (2012): 298-307. PMC. Web. 13 Oct. 2015.3-“What are the health benefits of lemons?” Medicalnewstoday.com. 7 Oct 2014. Web. 13 Oct 2015.