

AC Plant Keratin PF



Combination of plants
No animal byproducts
Botanical Exfoliator
Conditions Skin and Hair Natural
Moisturization

BACKGROUND

Take a glance at your skin. Now, take a look at your hair. Based on outward appearances, they are as different as night and day. Anyone would be surprised to know that a major component of your skin, hair, and even your fingernails is the same material: keratin. Keratin is sourced from animals, NO one can argue it is ineffective, thus the need for a naturally derived alternative has arisen. **AC Plant Keratin PF** was created to replicate the benefits of the animal protein with none of the stigma. Keratin is a structural protein that does not soften in hot or cold water and is not susceptible to proteolysis. However, keratinaceous substances are somewhat vulnerable in another way. Repeated exposure of skin and hair to soaps, chemicals, hard water and harsh weather can cause dryness which can lead to more significant detrimental effects such as roughness, scaling, dullness and eventual breakage.

The high natural protein content of both the skin and the hair allows for extensive protein use in a wide variety of cosmetic applications. Because of their poor water solubility, most proteins are unsuitable for use in cosmetics. In order to be incorporated into cosmetic applications, proteins must undergo hydrolysis; the process by which a protein is cleaved in small peptide chains called hydrolysates or cleaved further into amino acid molecules. Traditionally, almost all proteins utilized in cosmetic products were derived from animal sources because of their availability and high functionality as a moisturizers, conditioners and film formers.

Recently, consumer concerns regarding the use of animal proteins has led to user-friendly plant-based alternatives from sustainable sources such as wheat, corn and soybeans. Hydrolyzed proteins play an important and functional role in keeping our skin and hair moisturized and healthy.

Code Number: 20624PF

INCI Name: Hydrolyzed Corn Protein & Hydrolyzed Wheat Protein & Hydrolyzed Soy Protein

INCI Status: Conforms

REACH Status: Complies

CAS Number: 100209-41-4 & 70084-87-6 (or) 94350-06-8 & 68607-88-5

EINECS Number: 309-349-6 & N/A (or) 305-225-0 & 271-770-5

Origin: Botanical

Processing:

GMO Free

No Ethoxylation

No Irradiation

No Sulphonation

Additives:

Preservatives: None

Antioxidants: None

Other additives: None

Solvents Used: Water

Appearance: Amber Liquid

Soluble/ Miscible: Water Soluble
86.55% Biodegradability

Microbial Count: < 100 CFU/g,
No Pathogens

Suggested Use Levels: 1.0 - 5.0%

Suggested Applications:

Moisturization, Conditioning

Benefits of AC Plant Keratin PF:

- Versatile in Formulations
- Intense Moisturizing Benefits
- Conditions Hair and Skin

AC Plant Keratin PF

SCIENCE

In the skin, hydrolyzed proteins are among a group of key nutrients that are often referred to as the natural moisturizing factor (NMF). These compounds are responsible for maintaining moisture content and suppleness of the skin by attracting and retaining water to keep the outer layer of the stratum corneum hydrated. Hydrolyzed proteins derived from plants such as corn, wheat and soybeans are substantive to both skin and hair.

When applied to the skin, these proteins penetrate the outer layers of the stratum corneum to provide hydrating benefits while forming a film that minimizes trans-epidermal water loss (TEWL). Hydrolyzed proteins have also been shown to reduce irritation caused by surfactants typically used in shampoos and cleansers. In hair care, hydrolyzed proteins are able to penetrate the outermost layer called the cuticle. In doing so, these proteins offer protective benefits by helping to repair split ends and cuticle damage, increasing strength and elasticity and limiting the adverse effects of chemical processing.

BENEFITS

AC Plant Keratin PF features hydrolyzed proteins derived from wheat, corn and soybeans, which combined can enhance moisturization and conditioning properties of a wide variety of skin care and hair care applications, in addition to, providing film forming and anti-irritant benefits to leave skin and hair hydrated and healthy.

EFFICACY DATA

Reactive oxygen species (ROS) are generated by normal cellular processes, environmental stress, and UV irradiation. Unfortunately, consumers are chronically exposed to these everyday external factors. ROS are detrimental to cellular structures and functional molecules as they act as strong oxidizing agents or free radicals. However, substances that provide antioxidant activity are able to protect the skin from these reactive oxygen species by controlling autoxidation by interrupting the propagation of free radicals, or inhibiting the formation of free radicals.

Low levels of intracellular oxidative stress are produced during normal physiological functions. However, UV irradiation, pollutants, foreign substances, and aging elicit unrestricted increases in reactive oxygen species (ROS). These deregulated augmentations in oxidative stress lead to an acceleration of DNA mutation, cellular senescence, advanced glycation end products, protein oxidation, and collagen degradation. Moreover, when intrinsic antioxidant capacities are reduced, such as during aging, an imbalance between pro- and anti-oxidant systems further accentuates these hallmarks of cellular aging, such as premature wrinkles, sagging, and the appearance of fine lines.

A ROS Scavenging Assay was conducted to assess the in-vitro effect of **AC Plant Keratin PF** to scavenge unnecessary oxidative stress in dermal fibroblasts. Attenuating any excessive ROS preserves the cellular homeostasis and blunts intrinsic and extrinsic age-related declines in skin cell function. Figure 1 below displays the effect of **AC Plant Keratin PF** on ROS scavenging.

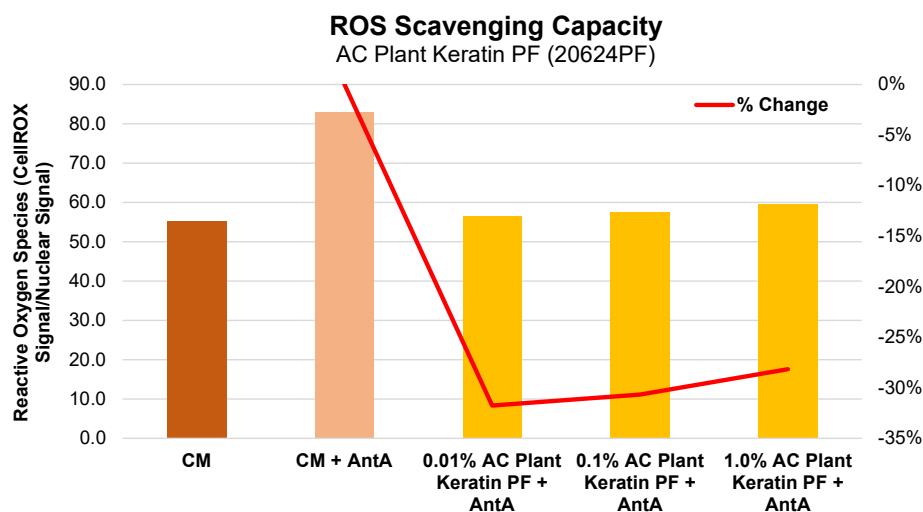


Figure 1. ROS Scavenging Assay

AC Plant Keratin PF

As shown in figure 2, **AC Plant Keratin PF** exhibited antioxidant activity comparable to 200µM Trolox®. The antioxidant capacity of **AC Plant Keratin PF** increased as the concentration increased, as a result we can assure that its ability to minimize oxidative stress is dose dependent. **AC Plant Keratin PF** began exhibiting antioxidant activity at a 0.1% concentration and was designed for problem skin with and hair. With the present study 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 applications.

ORAC Assay

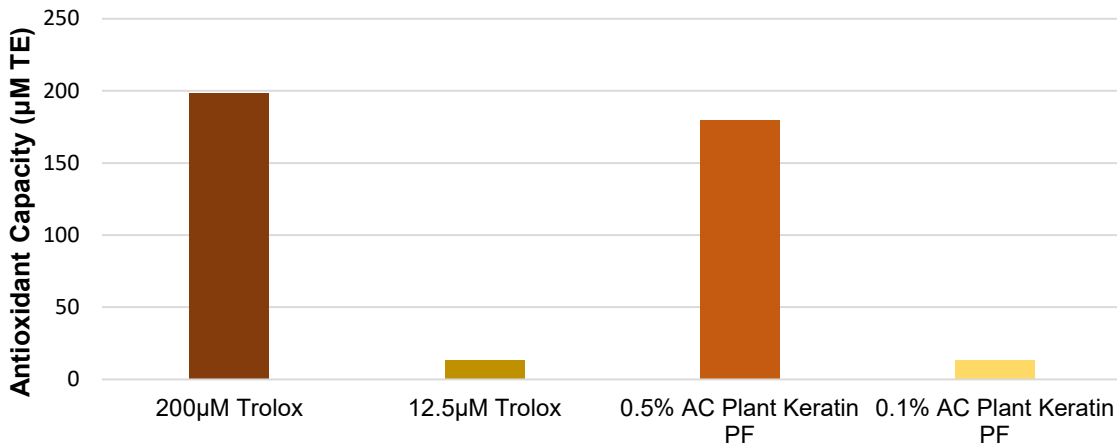


Figure 2. Antioxidant capability

A half head study was conducted to determine the comparison of a control shampoo vs. 2% **AC Plant Keratin PF** in the control shampoo. Additionally, a comparison between the control conditioner vs. 2% **AC Plant Keratin PF** in the control conditioner was reported. 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 (Figures 4 & 5) were used in conjunction with a sensory assessment subjectively rating the parameters in Figure 3 – cleansing, smoothing, wet and dry combability, anti-frizz, overall feel, shine and hydration of the hair. These attributes make **AC Plant Keratin PF** an ideal ingredient for use in products intended for all hair types.

Assessment of Hair Characteristics

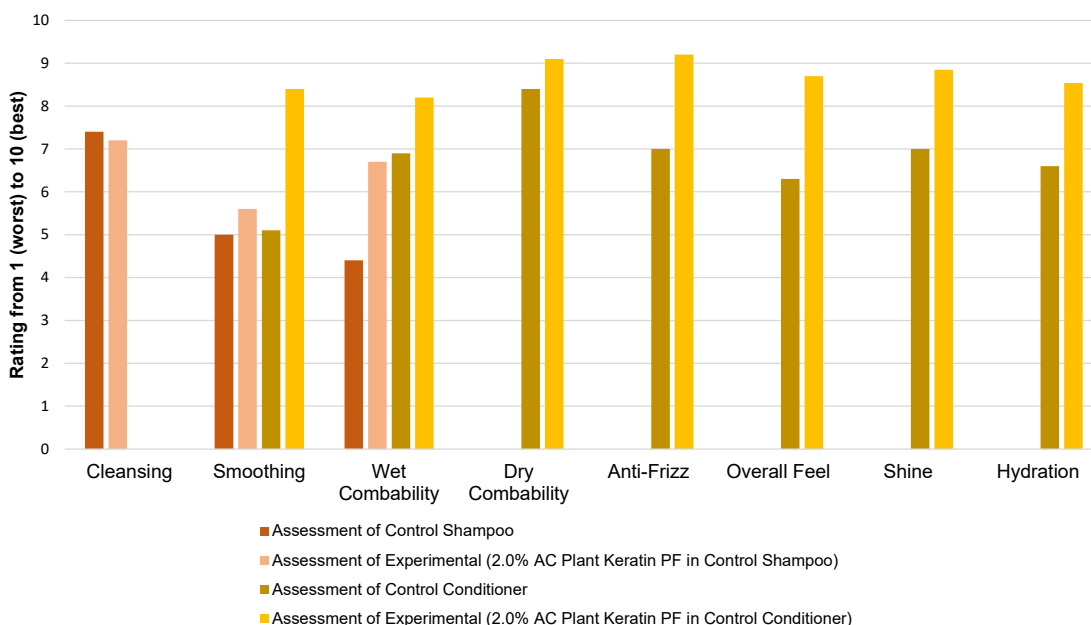


Figure 3. Rating of hair characteristics following sensory assessment

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Figure 4. Full head Baseline, Untreated Hair

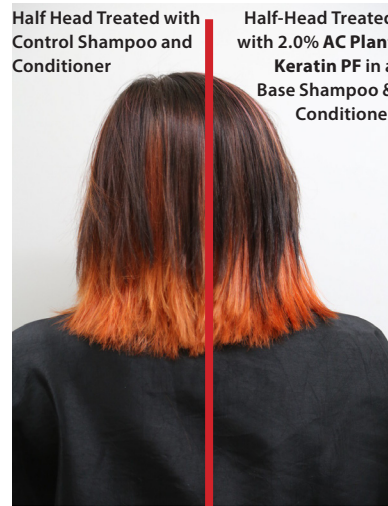


Figure 5. Half Head Treated

An ex-vivo Hair Pollution Protection Assay assessed the ability of **AC Plant Keratin PF** to shield the hair from oxidative effects of air pollution. Environmental aggressions such as pollutants resulting from automobile exhaust gas, industrial emissions, and even contaminants from household chores such as cooking and cleaning can have a detrimental effect on hair. Exposure to environmental pollution can result in dry, brittle hair with decreased strength and elasticity.

The assay evaluated hair swatches exposed to cigarette smoke and assessed peroxidation of hair lipids utilizing a Malonaldehyde (MDA) Assay. The MDA assay quantitatively measures the end product of lipid peroxidation and determines oxidative stress. An increase in MDA indicates an increase in lipid peroxidation. A generic shampoo and conditioner formulation incorporated 5.0% **AC Plant Keratin PF** to evaluate the active's ability to reduce lipid peroxidation. **AC Plant Keratin PF** demonstrated lower levels of MDA than the untreated hair swatch as well as the hair swatches treated with the control shampoo and conditioner alone. **AC Plant Keratin PF** offers effective protection against hair pollution.

Malonaldehyde Lipid Peroxidation AC Plant Keratin PF (20624PF)

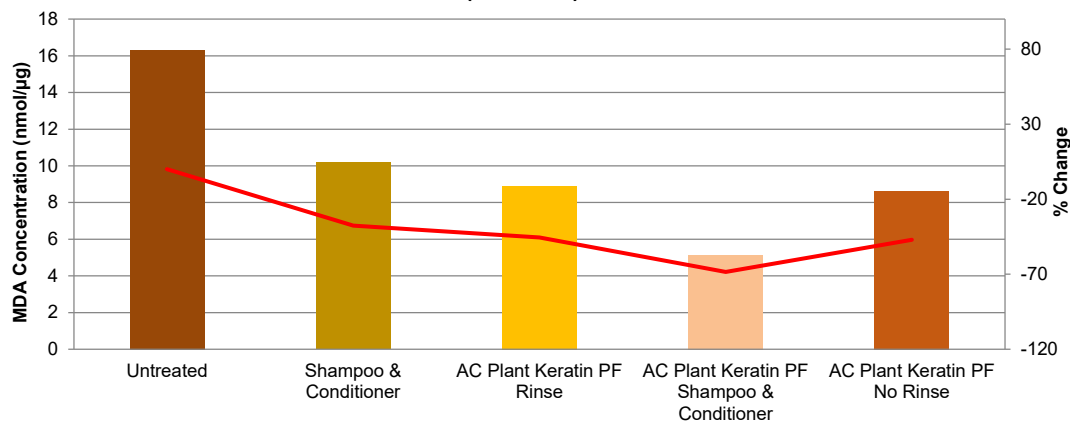


Figure 6. Rating of hair characteristics following sensory assessment

References:

- 1) Yang, C. et al. 1992. Protoplasma. Intermediate filaments in higher plant cells and their assembly in a cell-free system. 171(1): 44-45
- 2) Secchi, G. et al. 2008. Clinics in Dermatology. Role of protein in cosmetics. 26(4): 321-325
- 3) Lipkowski, A. et al. 2009. Polimery. Keratin-associated protein micromaterials for medical and cosmetic applications. 54(5): 386-388