Active Concepts
Tomorrow's vision...*Today!*®

AC Wheat Hydrolysate PF

Botanical
Highly pH Resistant Material
Intense Moisturization Natural
Strengthening Film-Forming
Capabilty
Anti-Irritant

BACKGROUND

Proteins are complex organic macromolecules essential for sustaining life. In the body, they are the basic components of antibodies, hormones and enzymes, and on a larger scale they are vital components of our skin and hair. Proteins also play a large multifunctional role in the cosmetics industry. They can be used as moisturizers, emulsifiers and strengtheners, and until recently animal proteins were most commonly used for these applications. However due to health safety concerns about spongiform encephalopathies the market has shifted to using proteins from alternative sources such as wheat. Wheat is a highly durable, renewable product humans have depended on since prerecorded history. Wheat is responsible for the establishment of agrarian societies and for trade between cultures. Prior to the cultivation of wheat, populations were mostly nomadic and constantly in search of food. Wheat sustained people in Europe during the Bronze, Iron and Roman ages. Grains of wheat have been found in the pyramids of Egypt, and have even been traced as far back as early 6,000 BC in southern Turkistan.

SCIENCE

Today wheat remains a staple, and is now an important raw material in the cosmetic industry. Wheat proteins are comprised of four different fractions: albumin, globulin, gliadin and glutenin, which are soluble in water, salt solutions, alcohol and diluted acids respectively. These proteins have elastic and binding properties that offer a wide range of applications. They can be used as emulsifiers, as well as to soothe the irritating effects of surfactants such as Sodium Lauryl Sulphate. Wheat protein also forms films, firms, lifts, nourishes and smooths the skin. In order to use proteins more effectively in cosmetics they must first be broken down into smaller pieces. This can be done by using a combination of acid, alkaline or enzymes to cut the proteins into smaller pieces with water through hydrolysis.

Code Number: 20615PF

INCI Name: Hydrolyzed Wheat Protein
INCI Status: Conforms
REACH Status: Complies
CAS Number: 70084-87-6 or 94350-06-8 or 73049-73-7
EINECS Number: 305-225-0

Origin: Botanical
Processing:
GMO Free
No Ethoxylation
No Irradiation
No Sulphonation
Additives:
Preservatives: None
Antioxidants: None
Other additives: None
Solvents Used: Water
Appearance: Clear to Slightly Hazy Amber Liquid
Soluble/ Miscible: Water Soluble
Microbial Count: <100 opg, No Pathogens

Suggested Use Levels: 2.0 - 5.0%
Suggested Applications:
Film-Forming, Strengthening, Moisturizing, Anti-Irritant

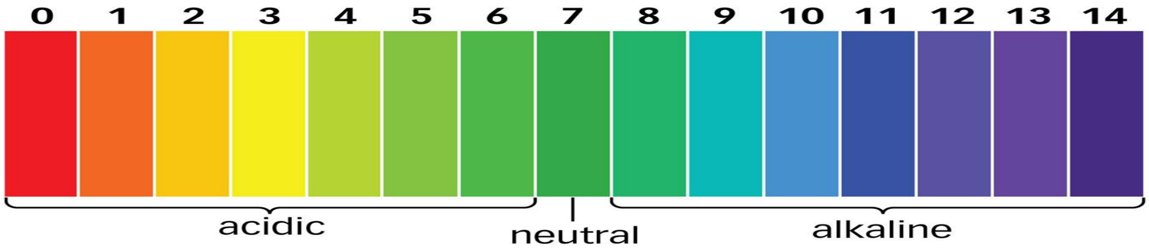
Benefits of **AC Wheat Hydrolysate PF:**

- Natural Film-Former
- Intense Moisturizing Benefits
- Exhibits Anti-Irritant qualities
- Non-GMO
- Moisture binding

AC Wheat Hydrolysate PF

AC Wheat Hydrolysate PF is made via a controlled reaction that uses an enzyme to hydrolyze wheat protein into smaller subunits. Hydrolyzed protein can be further modified for use in different applications. For instance, a fatty acid group added to the wheat hydrolysate turns it into a fatty acid condensate that is oil soluble for use in soap. Alternatively, a sodium or potassium group added onto a fatty acid modified hydrolysate can further enhance the foaming properties. Utilizing protein hydrolysate in cosmetic formulations instead of whole proteins is advantageous.

Whole proteins have high molecular weights. The molecular weight of a species has bearing on its reactivity at a particular pH, solubility (the amount of a material that can be dissolved in a substance) and the temperature at which it remains in solution. Hydrolyzed proteins have low molecular weights ranging from 1,500Da to 4,000Da making them more soluble over a broader pH and temperature range, not to mention that hydrolyzed indiscreet fractions disperse more readily in a solute. **AC Wheat Hydrolysate PF** has a molecular weight of 1,500Da- 2,000Da. The acidic or basic nature of a substance has an effect on its charge/ionic character and this effects how a solute (substance being dissolved) reacts with a medium. Charge refers to a molecule's gain or loss of protons (hydrogen). If a molecule loses protons it is negative, if a molecule gains protons it is positive. If a solute is added to a solvent with a significantly different pH the net charge of the solute will change and not react ideally with the solvent. The size of the solute is also a factor in terms of pH and solubility.



The smaller a species is the less likely it is to react poorly or to separate from a solution with a sub optimal pH. Generally a species with a lower molecular weight can remain functional over a broader pH range more than a species with a higher molecular weight. pKa determines how the net charge of the solute will change with relation to the pH of the solvent. pKa is a logarithmic equation that measures the probability that a species will be positively or negatively charged at a specific pH. Since the type of charge associated with a species affects its solubility, it is beneficial to determine the net charge of a species prior to its addition to a mixture. Generally, when pKa=pH half the molecules in a species will have a negative charge, with the concentration of cations decreasing at higher pH levels. Protein hydrolysates are amphoteric substances meaning that they have both positive and negative charges associated with the molecules.

At a specific pH amphoteric substances have an even ratio of cations (positive charges) and anions (negative charges), this is called the isoelectric point. At this pH the protein is neutral and does not possess a net charge because the two equal ratios of anions and cations cancel each other. The isoelectric point is the pH at which the protein hydrolysate is least soluble. Hydrolyzed wheat proteins are soluble over a broad pH scale of 3 to 11 whereas most proteins are least soluble between the 6 and 7 range, and do not solubilize below a pH of 4 and above a pH of 10. What this means is that the hydrolyzed wheat protein has a wide range of product applications where other proteins are not soluble given the pH of the solute in the final good.

BENEFITS

AC Wheat Hydrolysate PF is safe for use in cosmetic products because it does not contain genetically modified organisms (GMO's). **AC Wheat Hydrolysate PF** is a water-soluble product with strong moisture binding properties. The pH is relatively neutral so it does not irritate the skin. The molecular weight is approximately 1,500Da-2,000Da which is small enough to readily solubilize in a mixture. **AC Wheat Hydrolysate PF** has film-forming properties rendering it an effective moisturizer providing a protective and conditioned feel to hair and skin. As a result **AC Wheat Hydrolysate PF** has a wide range of cosmetic uses and can be a beneficial ingredient in hair and skin care products such as shampoos, cream rinses, permanent conditioners, permanent wave solutions, body wash, lotions, creams, anti-aging products, facial treatments, makeup and hair fixatives.

AC Wheat Hydrolysate PF

EFFICACY DATA

AC Wheat Hydrolysate PF is comprised of peptides with specific amino acids that aid in improving the elasticity and skin texture, as well as aid in repair. As seen in Figure 1, **AC Wheat Hydrolysate PF** was effective at improving moisturization around the eye and mouth area by as much as 25%.

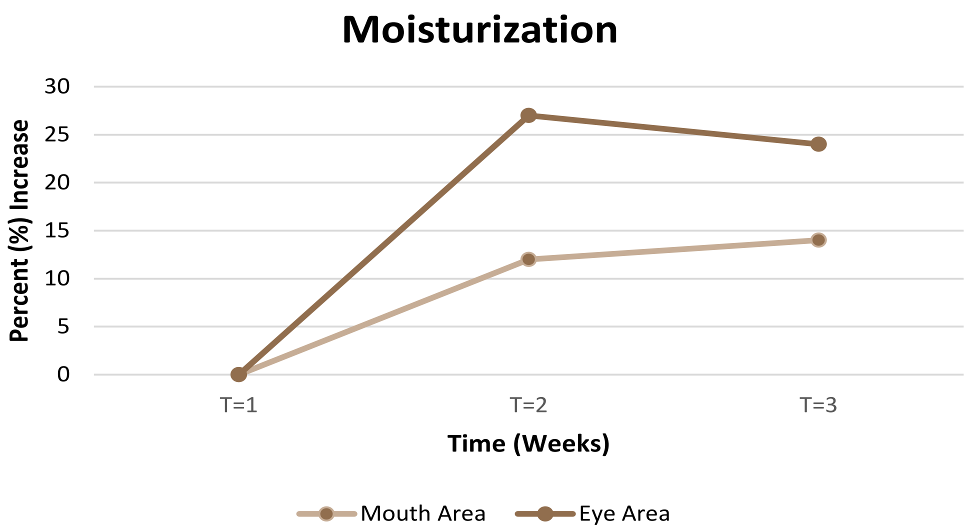


Figure 1. Improvement in Moisturization

AC Wheat Hydrolysate PF's small protein sub units allow for it to have increased levels of substantivity in the hair. As shown in Figure 2, **AC Wheat Hydrolysate PF** is effective at not only remaining Substantive, but actually increasing over time.

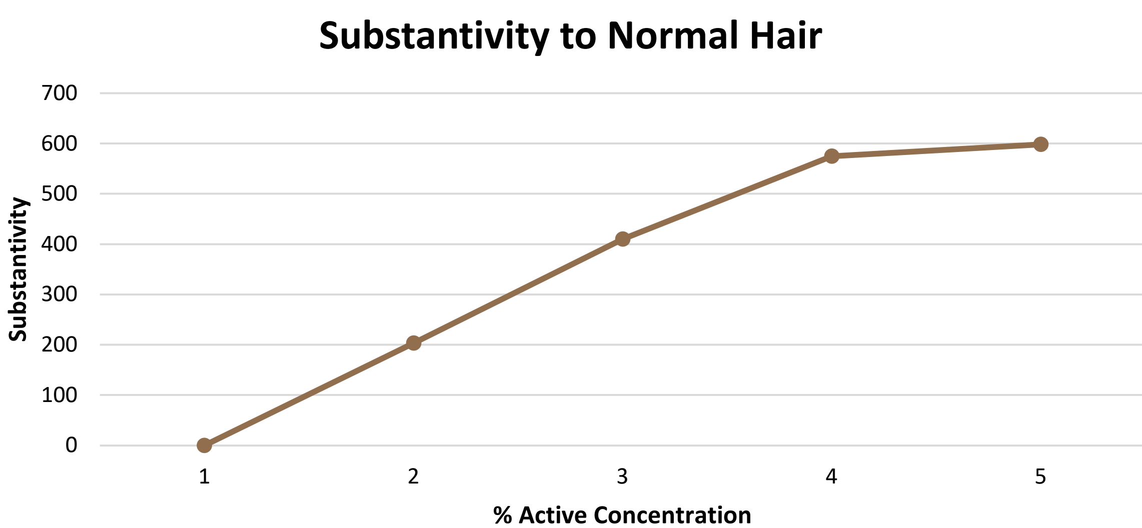


Figure 2. Increase in Substantivity to hair

References

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