

<b>Code Number:</b>	16086
<b>INCI Nomenclature:</b>	Silk Amino Acids
<b>INCI Status:</b>	Conforms
<b>Suggested Use Levels:</b>	1.0 - 5.0%
<b>Suggested Applications:</b>	Moisturization, Conditioning

The use of plant derived amino acids in cosmetic and personal care applications for improvements in moisturization is appealing to many formulators not only because of their ease of use, but also because they are derived from renewable, "greener" resources. Unlike whole proteins, amino acids have low molecular weights and are therefore readily soluble in water. They are also not subject to the same temperature and pH constraints as whole proteins, and do not contribute to a tacky feel following dry down. In skin care, plant derived amino acids can also easily penetrate the stratum corneum for enhanced moisturization, while in hair care, they are able to increase strength, particularly, in chemically-treated hair.

Silk is a term associated with supple smoothness and elegant sensuality. Silk fabrics are sought after for these characteristics, for when we wear silk, we feel as though they look elegant and expensive. Its lustrous qualities originate from the fibers' triangular prism-like structure, so that it allows the silk to refract incoming light at different angles. This light refraction is what give silk its signature shimmer.

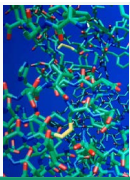
Silk culture began in 2600 BC in ancient China by an Empress, which may be another reason that silk is known as the 'princess' of all fibers. Silk is considered the finest of all natural fibers, and it also possesses the greatest strength. This strength is due to the unique combination of proteins and water made by the silk worm. This combination helps with water binding properties that occur when silk is applied topically. Taken from the silk noils of the silk worm, silk is made up primarily of two types of protein. One protein source is extremely ordered while the other is not. Both proteins found in silk are made up mostly of glycine, which allows it to bind easily to water.

Silk is associated with different qualities depending on the application. For skin, silk is thought to create a smooth silky look, while in hair care, silk may be used to convey strength. The versatility of the silk fiber and its usages is something that makes it very attractive.

**AC Silk Amino Acids PF** help to lock in moisture, leaving the skin looking smooth and polished. This is due to the water binding products found in the hydrolyzed silk. By hydrolyzing the product, the product become water soluble. The protein content becomes more prominent, and the molecular weight decreases, making it easier for the product to penetrate into the skin and hair shaft. This is a preservative free version of our original AC Silk Amino Acids.

Useful over a wide range of pH and temperatures, **AC Silk Amino Acids PFs'** low molecular weight of ~300 Da makes it a product that will provide superior moisturization for multiple skin and hair care formulations.





# AC Silk Amino Acids PF

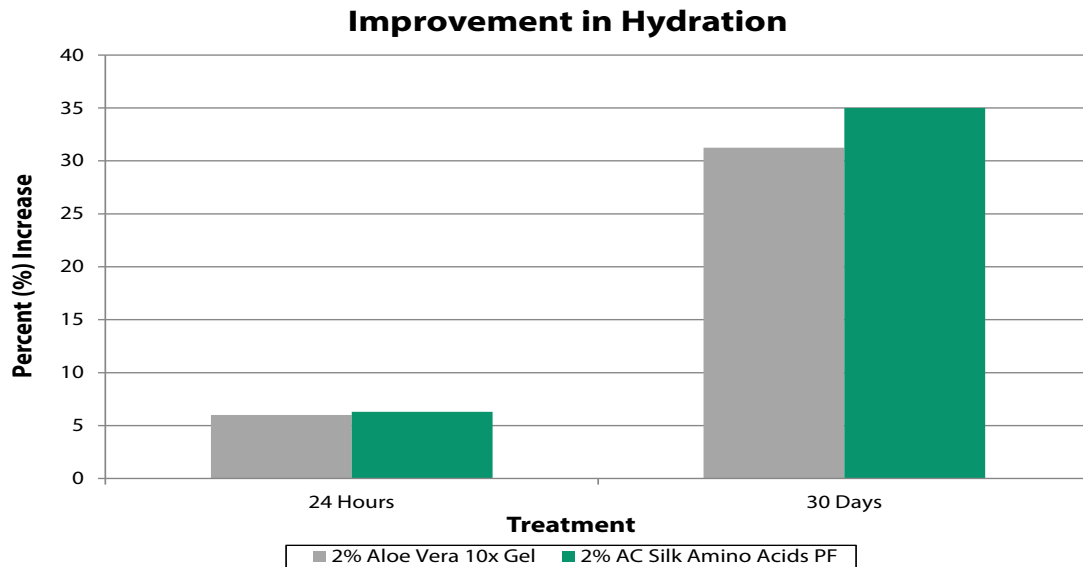


Figure 1. Percent Increase in hydration of 2.0% **AC Silk Amino Acids PF** and 2.0% Aloe Vera Gel.

Amino Acid	Fibroin	Sericin
Glycine	42.8	8.8
Alanine	32.4	4.0
Leucine	0.7	0.9
Isoleucine	0.9	4.2
Histidine	0.3	1.4
Valine	3.0	3.1
Lysine	0.5	5.5
Aspartic Acid	1.9	16.8
Glutamic Acid	1.7	10.1
Serine	14.7	30.1
Threonine	1.2	8.5
Phenylalanine	1.2	0.6
Tyrosine	11.8	4.9
Proline	0.6	0.5
Methionine	0.2	0.1
Tryptophan	0.5	0.5
Cystine	0.1	0.3

Figure 2: Values are given as a gram of amino acid per 100g of protein.

References:

- 1) Zhaorigetu S, Yanaka N, Sasaki M et al. Silk protein, sericin, suppresses DMBA-TPA-induced mouse skin tumorigenesis by reducing oxidative stress, inflammatory responses and endogenous tumor promoter TNF-alpha. *Oncol Rep* 2003;10:537-4.
- 2) Padamwar MN, Pawar AP, Daithankar AV, Mahadik KR. Silk sericin as a moisturizer: an in vivo study. Department of Pharmaceutics, Bharati Vidyapeeth Deemed University, Pune, India. *J Cosmet Dermatol.* 2005 Dec; 4(4): 250-7

