Comprehensive utilization and development trend of

silk protein

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Catalog

This paper briefly introduces the composition and properties of silk protein, and specifically describes the application and research progress of silk in clothing, cosmetics, food, medicine, medical materials, biotechnology and environmental protection. Finally, the development prospect of silk protein was discussed.

Composition and properties

- composition
- Properties

Compositon of Silk Peptide

This paper briefly introduces the composition and properties of silk protein, and specifically describes the application and research progress of silk in clothing, cosmetics, food, medicine, medical materials, biotechnology and environmental protection. Finally, the development prospect of silk protein was discussed.The content of silk protein is as high as 98%. It is mainly composed of silk fibroin and sericin, of which 70% - 80% is silk fibroin and 20% - 30% sericin is sericin. Silk fibroin is composed of an H chain and an L chain through S-S bond. Both silk fibroin and sericin contain 18 kinds of amino acids including essential amino acids for human body. The main components of silk fibroin are glycine, alanine, tyrosine and serine, while serine, aspartic acid and glutamic acid are abundant in sericin, followed by glycine, threonine and lysine. In sericin, hydrophilic amino acids are more than hydrophobic amino acids, while hydrophilic amino acids in silk fibroin are less than hydrophobic amino acids. Silk protein also contains no more than 0.7% potassium, calcium, silicon, strontium, phosphorus, iron and copper and other inorganic elements.

Table 1. Amino acid composition of silk fibroin and sericin

Name	Fibroin	Sericin
Glycine	41.87	13.75
Alanine	27.03	4.90
Leucine	0.32	0.80
Isoleucine	0.31	0.91
Phenylalanine	0.66	1.07
Methionine	0.70	0.87
Tryptophan	0.60	0.50
Proline	0.34	1.40
Cystine	0.30	0.20
Serine	12.45	33.31
Threonine	0.58	8.07
Aspartic acid	1.23	19.62
Glutamate	1.29	3.25
Histidine	0.36	1.91
Lysine	0.71	0.87
Arginine	1.83	3.58

Properties of Silk Peptie

From the perspective of industrial materials, compared with other natural biopolymers, silk protein has the following outstanding characteristics: 1) the material is uniform and simple, the protein content is more than 95%, and the pure silk protein can be obtained from the silk; 2) the pure silk protein solution can be obtained by dialysis with water without using harmful reducing agent; 3) silk can be used by silkworm at any time and place It is easy to change its structure by heating, drying, compressing, chemical treatment, etcFiber, powder, film, solution and other forms. ⑥ Silk fibroin is insoluble in alcohol solutions, which helps silk fibroin to be used as a biomaterial because the solvent is harmless to living tissues.

Comprehensive utilization of silk protein

- Application in cosmetics
- Application in food
- Application in medicine
- Application in Biotechnology
- Application in beautifying environment
- Application in composite materials

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