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## **Corn Peptides: The Transformation from Field Byproduct to Health Ingredient**

Corn is not only a vital food and cash crop but also a traditional agricultural product in China. During corn starch processing, a byproduct known as “corn protein meal” (also called corn gluten meal or gluten meal) is produced. This meal is rich in nutrients such as protein, starch, and fiber. However, corn protein itself has poor water solubility and an imbalanced amino acid profile, limiting its direct utilization value.

Through modern biotechnology, particularly enzymatic hydrolysis, we can “cut” corn protein into a mixture of small-molecule peptides composed of 2 – 20 amino acids — this is corn polypeptide. This transformation not only significantly enhances its solubility and absorption efficiency but also unlocks multiple physiological regulatory functions, making it a high-value-added bioactive ingredient.

### **I. Preparation of Corn Peptides**

The current mainstream production method focuses on enzymatic hydrolysis, with the key lying in selecting highly efficient and specific proteases to perform controlled hydrolysis of corn protein under mild

conditions.

The main processes include:

1. Enzymatic hydrolysis method: Pre-treat corn protein powder→Add proteases (such as alkaline protease, flavor protease) for enzymatic hydrolysis→Inactivate enzymes→Separate and purify→Concentrate and dry→Obtain final product. This method features mild conditions, strong controllability, and environmental friendliness.
2. Microbial fermentation method: Utilizes microbial enzyme production for synergistic hydrolysis, often yielding richer flavors but with relatively complex process control.
3. Enzymatic hydrolysis-fermentation combination method: Enzymatic hydrolysis followed by fermentation helps improve flavor and further enhance activity, making it a production strategy with relatively good overall benefits in recent years.
4. Chemical hydrolysis method: Hydrolysis using acids or alkalis involves vigorous reactions that can destroy nutrients and potentially generate harmful byproducts. It is currently rarely used in food-grade production.

## II. Core Functions and Biological Activity

The core value of corn peptides lies in their rich biological activity, primarily derived from their specific amino acid sequence (peptide sequence).

The core value of corn peptides stems from their specific amino acid

sequence, exhibiting the following categories of biological activity:

1. **Antioxidant:** Helps eliminate free radicals in the body and protects cells from oxidative damage.
2. **Hypotensive Support:** Contains peptide segments that inhibit angiotensin-converting enzyme activity, aiding in blood pressure regulation.
3. **Sobering and Liver Protection:** Studies indicate it promotes ethanol metabolism, reducing the burden of alcohol on the liver.
4. **Anti-Fatigue:** Provides easily absorbed amino acids and peptides to rapidly replenish energy and promote tissue repair.
5. **Other Potential Functions:** These also include antibacterial properties, immune modulation, and promotion of mineral absorption.

#### IV. Applications of Corn Peptides

With these activities, corn peptides have been widely applied in the following fields:

##### 1. Functional Foods and Health Supplements

Such as sports nutrition products (protein bars, sports drinks), liver-protecting and hangover-relief products, health foods for middle-aged and elderly individuals, as well as nutritional fortification ingredients in regular beverages and yogurt.

##### 2. Pharmaceutical and Clinical Nutrition

As an easily absorbed, high-quality nitrogen source, it is used in

enteral nutrition formulations for postoperative patients or individuals with impaired digestive function; certain specific peptide segments also hold potential for development into peptide-based pharmaceuticals.

### 3. Cosmetics and Personal Care

Leveraging their antioxidant and moisturizing properties, these peptides are incorporated into anti-aging and restorative skincare products. Smaller peptide molecules are more readily absorbed by the skin, helping to enhance skin elasticity.

### 4. Other Applications

Includes use as animal feed additives to enhance animal health, and as plant biostimulants to promote crop growth.

## V. From Research to Production: What Role Does the Peptide Synthesizer Play?

In the corn peptide R&D chain, the peptide synthesizer acts as a “molecular designer,” playing a crucial role primarily during the laboratory phase:

- Assist scientists in verifying the relationship between specific amino acid sequences and biological activity;
- Synthesize high-purity peptide fragments as reference standards for mass spectrometry analysis;
- Design and explore the functions of novel peptide fragments, providing “functional blueprints” for industrial-scale production.

Mass production relies on biomanufacturing technologies such as enzymatic hydrolysis and fermentation, guided by the blueprint established by the former to achieve efficient, low-cost, and sustainable raw material conversion. Together, these approaches drive the transformation of corn byproducts into high-value, health-promoting ingredients.

## VI. Conclusion and Outlook

Corn peptides have achieved a value leap from agricultural byproducts to functional ingredients, linking cultivation, processing, and the health industry. In the future, with further advancements in enzyme engineering, fermentation technology, and proteomics, we can expect to prepare peptides with higher activity and more specialized functions with greater precision, expanding their applications in areas such as medical foods and precision nutrition.

Throughout this process, the synergy between “molecular design” in laboratories and “large-scale production” in factories will continue to propel corn deep processing toward a higher-value-added and more sustainable future.