



β -AMYLASE IN FOOD PROCESSING:

Innovating Food Production with
Advance Enzyme Solutions

The Application of β -Amylase in the Food Processing

β -Amylase (EC 3.2.1.2) is an exo-type glycoside hydrolase enzyme from the glycoside hydrolase family 14 (GH14). It specifically breaks down α -1,4-glycosidic bonds at the non-reducing ends of starch or dextrin, releasing β -maltose step by step. However, β -amylase cannot hydrolyze α -1,6-glycosidic bonds. As a result, when it acts on highly branched starches, it stops 2-3 glucose units before the branching point, producing β -limit dextrins and leading to a slower hydrolysis rate of branched starches, typically below 60%.

β -Amylase is commonly found in a variety of plants and microorganisms. In plants, it helps break down stored starch into maltose during the germination of barley seeds. . Barley-based β -amylase has an optimal pH range of 5.0-6.0 and works best at temperatures between 50-60°C. Microbial β -amylase, typically obtained from Bacillus species, has better heat stability, operating effectively at temperatures from 60-70°C.

With recent advancements in genetic engineering, protein engineering, and structural biology tools for studying the crystal structure of β -amylase, significant progress has been made in enhancing its catalytic efficiency and substrate specificity. Researchers have reengineered β -amylase to improve its thermal stability and catalytic efficiency, using directed evolution techniques to create mutants with 8-10°C higher melting temperatures (T_m) and improved catalytic efficiency (kcat/ K_m), making them better suited for industrial applications.



Optimizing Efficiency in Food Production with VTR Biotech β -Amylase

VTR Biotech S-1006 series β -amylase, sourced from high-quality microorganisms, offers exceptional performance across diverse industries, including baking, starch sweetener production, and brewing. S-1006 series β -amylase helps optimize processes, enhance product consistency, and unlock new potential in your food applications.

1 Cost Savings in Food Production

S-1006 β -amylase optimizes raw material usage, reducing consumption and lowering production costs.

2 Improved Product Performance

In baking, S-1006 β -amylase extends bread shelf life, and in liquefaction processes, it accelerates filtration for smoother operations.

3 Synergistic Benefits

S-1006 β -amylase works effectively alongside other starch-degrading enzymes, such as fungal α -amylase and pullulanase, to enhance overall enzyme efficiency.



Applications of VTR Biotech β -Amylase

Baking Industry

- **Shortened Fermentation Time:** β -Amylase accelerates the breakdown of starch, providing more fermentable sugars for yeast, thus improving dough fermentation efficiency.
- **Improved Bread Quality:** The addition of β -amylase improves the texture and mouthfeel of the bread, resulting in better product quality.
- **Extended Shelf Life:** Maltose has excellent moisture retention properties, helping to slow down the aging process of bread and extend its shelf life.

Starch Sweetener

In the starch sweetener industry, β -Amylase plays a vital role in producing high-purity maltose syrup. Its main benefit is its ability to efficiently convert starch into maltose, greatly improving product quality. Maltose syrup is mildly sweet (about 30% of sucrose), has low hygroscopicity, and excellent heat stability, making it a preferred food additive. When combined with Pullulanase, β -Amylase effectively breaks down starch at its branching points, increasing the maltose content to over 70%. Unlike fungal α -Amylase, β -Amylase offers a more controlled, precise action with minimal by-product formation (glucose <0.5%), making it the ideal choice for producing high maltose syrups ($\geq 70\%$) and ultra-high maltose syrups ($\geq 88\%$).

Other Industries

β -Amylase also has wide-ranging applications in industries like brewing and pharmaceuticals. In beer production, it works in tandem with α -Amylase to break down starch from malt and other ingredients into fermentable sugars, directly impacting the beer's flavor and alcohol content. β -Amylase supports more sustainable growth in these industries by enhancing product quality and production efficiency while helping to reduce costs.



A Sustainable Solution for the Future of Food

β -Amylase is emerging as a highly valuable enzyme in the food industry, as technology progresses and market demands continue to evolve, the scope of β -Amylase's applications is set to grow even further. In the future, β -Amylase will not only lead the way in transforming and upgrading food production processes but will also become an integral part of human health, offering unique biological benefits that improve overall quality of life and protect well-being.

Partner with **VTR Biotech** for smarter, more efficient food manufacturing.

Connect with our expert to explore VTR Biotech advanced industrial enzyme solutions and discover how we're shaping the future of food innovation for better health and sustainability.

About VTR Biotech

VTR Biotech is a science-driven multinational biotechnology company, founded in 1991, committed to advancing bioengineering in enzyme manufacturing, biosynthesis products, and plant extracts to deliver advanced biotech solutions worldwide. We operate in over 60 countries with a diverse global team of more than 1,100 employees, driving bioimpact for the betterment of billions of lives and working towards a more innovative, responsible, and sustainable world.