

# ANGEL THERMO-STABLE ACID ALPHA-AMYLASE

## AHA-400

### Description

Angel Thermo-Stable Acid Alpha-Amylase is a food-grade starch hydrolyzing  $\alpha$ -amylase with high heat and low pH stability derived from *Bacillus licheniformis*

### Characteristics

Name: Thermo-Stable Acid  $\alpha$ -Amylase

System name: EC.3.2.1.1, 1,4- $\alpha$ -D-Glucan-glucanohydrolase

Activity: 40,000u/mL (minimum)

Appearance: brown liquid

pH: 5.5 to 7.0

Specific gravity: 1.10 to 1.25 g/ml

### Effect of pH

The enzyme is stable in the range of pH5.0 to 10.0, and effective in the range of pH4.8 to 7.0, the optimum pH is in the range of 5.5 to 6.5.

### Effect of Temperature

The optimum temperature for this product is above 90°C, with most effective performance in the range of 95°C to 97°C. The enzyme maintains considerable activity at higher temperatures (100°C or above).

### Mechanism

The enzyme is an endoenzyme that is able to hydrolyze the  $\alpha$ -1,4 glycosidic bonds in starch, soluble dextrin, and low-polysaccharides under high temperatures. This enzyme is also able to quickly reduce viscosity of starch slurries to facilitate further handling and processing.

### Applications and Usage

This product can be used in production of alcohol, starch sugar, monosodium glutamate, antibiotics, citric acid, beer, Chinese rice wine, and other fermentation products. The recommended for optimum industry operation condition is temperature 90°C~100°C, whereas if steam jet method is used, temperature may increase to 105-110°C, 5-7 minutes; pH 5.0~6.0.

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- 1. Ethanol Industry:** After mixing ingredients with water, for each ton of ingredient add 0.3~0.5kg of enzyme. Adjust the pH to approximately 5.5 only if it is higher than 6.0. Heat and hold the temperature at  $95\pm 5^{\circ}\text{C}$  for 100 minutes.
- 2. Beer industry:** for each ton of ingredient, add 0.2~0.3kg of enzyme. Quickly increase the temperature to  $95^{\circ}\text{C}$  or above. Hold the temperature at  $95\pm 5^{\circ}\text{C}$  for approximately 30 minutes, until liquefying completes.
- 3. MSG, candy, and glucose:** Mix ingredients with water according to specification, adjust the pH, and add 0.3~0.4kg of enzyme to each ton of ingredient. If liquefying is done in a tank, heat the tank to  $95^{\circ}\text{C}$ - $100^{\circ}\text{C}$  and hold the temperature for approximately 30 minutes. Whereas if steam jet method is used, heat steam jet nozzles to  $100\pm 5^{\circ}\text{C}$  and afterwards store liquid in a  $95^{\circ}\text{C}$  environment for 30 minutes or until viscosity meets the requirement.

## Specifications

Liquid, 40,000U/mL

Sealed in Plastic Bucket; Net Weight 30kg/bucket.

## Storage

The product if stored at  $25^{\circ}\text{C}$  below, at least 180d shelf life, if under the  $4\sim 10^{\circ}\text{C}$  cold storage, shelf life is 12 months; under warranty, measured activity not less marked activity. Over shelf life, enzymes may decrease, but can still be used, usage should be increased accordingly.

The product is bio-active substances, so sunlight, temperature, and humidity can cause inactivation of enzymes. Therefore, should transport and store in cool dry place. Avoid direct exposure to sunlight or moisture. Warehouses should be maintained in a clean, cool, and dry.

## Precautions

1. The product is bio-active substances, inhalation of dust or aerosols may induce sensitization and may cause allergic reactions in sensitized individuals. Unnecessary contact with the product and inhalation of dust should be avoided.
2. In case of contact with the eyes or skin, promptly rinse with the affected area with plenty of water for at least 15 minutes.
3. Starch sources material should contact with the enzyme completely, larger contact area, more time and more benefits.

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