



SPEZYME® ALPHA PF

Thermostable Alpha-Amylase for Starch Sweetener Manufacturing

DESCRIPTION

SPEZYME® ALPHA PF enzyme contains a thermostable starch hydrolyzing α -Amylase (EC 3.2.1.1;1,4-alpha-D-glucan glucanohydrolase) that is produced by a genically modified strain of *Bacillus licheniformis*. The endo-amylase hydrolyzes alpha-1,4-glucosidic bonds to quickly reduce the viscosity of gelatinized starch, producing soluble dextrans and oligosaccharides.

Thermostable amylases are used to reduce liquefact viscosity under direct steam injection heating conditions, to produce soluble dextrans for efficient saccharification to dextrose hydrolyzate. Rapid viscosity reduction ensures high quality mixing and shear in the jet cooker, enabling high-solids operation without compromising hydrolyzate quality.

TYPICAL CHARACTERISTICS

Activity: 13,775 AAU/g (minimum)

Appearance: Brown liquid

pH: 6.0

Specific gravity: 1.15 to 1.19 g/ml

The activity of SPEZYME® ALPHA PF enzyme is expressed in Alpha Amylase Units (AAU). Enzyme activity is determined by the rate of starch hydrolysis as reflected in the rate of decrease in iodine-staining capacity. One AAU of bacterial alpha-amylase activity is the amount of enzyme required to hydrolyze 10 mg of starch per minute under specified conditions. A detailed assay method is available upon request.

PERFORMANCE BENEFITS

SPEZYME® ALPHA PF is engineered to provide:

- Rapid viscosity reduction, allowing high solids liquefaction, with gains in throughput and reduced evaporation cost
- Higher activity than prior conventional products, allowing economical shipping and storage
- Excellent performance with no added calcium, under most conditions
- Improved robustness at higher temperatures
- Significantly reduced overall process cost

APPLICATION RECOMMENDATIONS

RECOMMENDED OPERATIONAL CONDITIONS	
Dry Substance	32 to 38% weight/weight
pH Range	5.3 to 5.8
Liquefaction Conditions	Primary: 105 to 110° C (221 to 230° F) for 7-10 minutes
	DE after Jet: 3.5 to 5.0 DE recommended
	Secondary: 95°C for 60-120 minutes

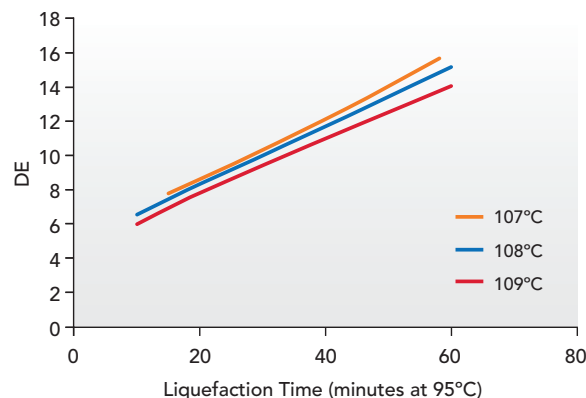


Figure 1: Effect of Jet Temperature on DE, Conditions: 36% DS wheat starch, primary liquefaction for 7 minutes, pH 5.6, no added Calcium, 0.20 kg SPEZYME® ALPHA PF/MT DS

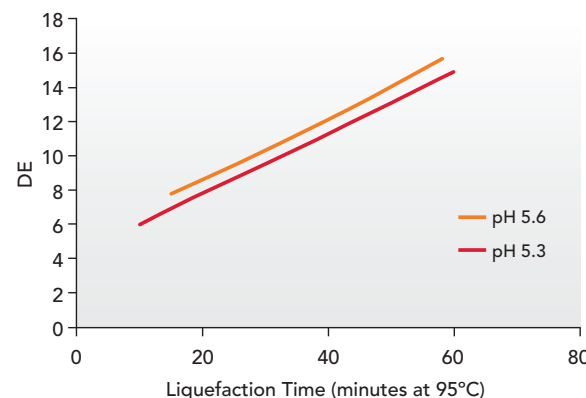


Figure 2: Effect of pH on DE, Conditions: 36% DS wheat starch, primary liquefaction for 7 minutes@107°C, no added Calcium, 0.20 kg SPEZYME® ALPHA PF/MT DS

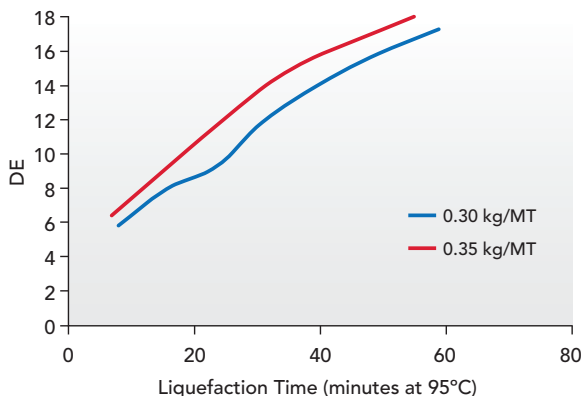


Figure 3: Effect of SPEZYME® ALPHA PF dose on DE
Conditions: 36% DS corn starch, primary liquefaction for 7 minutes@107°C, pH 5.6, no added Calcium, 100 ppm SO₂

DOSAGE RECOMMENDATIONS

SPEZYME® ALPHA PF dose will vary with different substrates and operating conditions such as pH, temperature, and reaction time. Small-scale experiments are recommended to determine optimum enzyme dosage. A minimum enzyme starting dose of 0.20 kg/MT DS (wheat starch) to 0.30 kg/MT/DS (corn starch) is recommended under most conditions.

REGULATORY STATUS

SPEZYME® ALPHA PF complies with current recommended purity specifications for food-grade enzymes given by the Joint FAO/WHO Expert Committee on Food Additives (JECFA) and is GRAS (Generally Recognized As Safe) in the United States.

PACKAGING

SPEZYME® ALPHA PF is available in various package sizes. Please consult your DuPont representative for detailed information.

STORAGE

SPEZYME® ALPHA PF will meet the declared activity upon arrival at your plant. SPEZYME® ALPHA PF should be stored under cool, dry conditions. Refrigeration at 4-10°C is recommended for long-term storage.

SAFETY & ENZYME HANDLING

Inhalation of enzyme dust and mists should be avoided. In case of contact with the skin or eyes, promptly rinse with water for at least 15 minutes.

For detailed handling information, please refer to the appropriate Material Safety Data Sheet, the Enzyme Technical Association (ETA) handbook *Working Safely*

With Enzymes, and the Association of Manufacturers and Formulators of Enzyme Products (Amfep) handbook *Guide to the Safe Handling of Microbial Enzyme Preparations*. All are available from DuPont.

TECHNICAL SERVICE

Information covering specific applications of this product is available. DuPont will work with customers to enhance processes and solve problems. Let us know what you need and we will assist you.

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