Distizym® AG ALPHA

Combination enzyme for the saccharification of starch in distilling mashes from farinaceous raw materials

Product Description

Distizym® AG ALPHA is a combination enzyme which is applied in alcohol production of distilling mashes derived from farinaceous materials for the saccharification of the liquefied starch. The enzyme is produced from specially selected strains of *Aspergillus niger* and *Aspergillus oryzae*. The main activity of the enzyme is based on a fungal glucoamylase (exo-1,4-α-D-glucosidase: EC.3.2.1.3.) and a fungal α-amylase (1,4-α-D-glucan-glucanohydrolase: EC.3.2.1.1.). Distizym® AG ALPHA is tested by specialized laboratories for purity and quality.

Aim of Treatment

Extensive saccharification of the liquefied starch to fermentable maltose and D-glucose units.

Product and Effect

As endo enzyme the amylolytic enzymatic activities of Distizym® AG ALPHA hydrolyse 1,4-α-D-glycosidic bonds within the starch molecule and, at the same time, progressively the 1,4-α-D-glycosidic bonds of starch, dextrins and oligosaccharides starting from the non-reducing chain end. In this process maltose and D-glucose units are split off. Additionnally, also the 1,6-α-D-glycosidic bonds of the amylopectin are cleaved. The enzyme is applied at temperatures of up to 60 °C and is effective in a pH-range of 4.0-5.5.

Dosage

The following standard dosage is recommended:

450 mL Distizym® AG ALPHA/tonne liquefied cereal starch or potato starch.

Application

Distizym® AG ALPHA is diluted with cold water. Subsequent to starch liquefaction the enzyme dilution is added during the cooling phase as of 60 °C. In the High Pressure Cooking Process (at 5-6 bar respectively 150-160 °C), a combined addition together with Distizym® BA-N, Distizym® BA-TS or Distizym® AG is possible. After the enzymes are added, the mash is transferred into the saccharification vat with a temperature which must not exceed 60 °C. An addition of calcium (in form of $Ca(OH)_2$, $CaCl_2$, etc.) in amounts of 20-40 ppm related to pure calcium supports the activity and stability of the fungal α-amylase in Distizym® AG ALPHA.

Storage

Optimum storage conditions at 0-10 °C. Higher storage temperatures result in a shorter shelf life. Temperatures above 25 °C must be avoided. Reseal opened packagings tightly and use up as soon as possible.

General Characteristics

Enzyme characteristics: the activity range of the fungal glucoamylase of Distizym® AG ALPHA is between pH 2.5-6.5, the optimum is at pH 3.8-4.2. The temperature range of the enzyme is between 25 °C and 80 °C, the optimum is at 65 °C. The activity range of the fungal α-amylase of Distizym® AG ALPHA is between pH 3.0-7.0 with the optimum at pH 5.0 in the presence of substrate and calcium. The temperature range is between 25 °C and 70 °C, the optimum is at 50 °C. In the presence of higher starch concentrations, calcium and optimal pH-value the temperature optimum increases to 60 °C.

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The diagrammes 1 and 2 show the influence of temperature and pH-value on the enzyme activity of the fungal glucoamylase in Distizym® AG ALPHA.

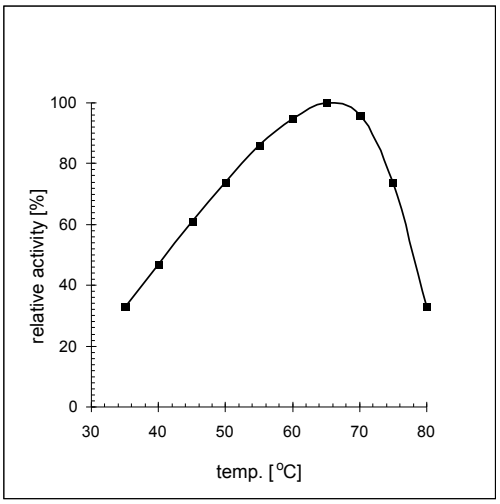

Fig. 1: Influence of the temperature on the fungal-glucoamylase activity in Distizym® AG ALPHA (30 % maltodextrin DE18, pH 4.0).

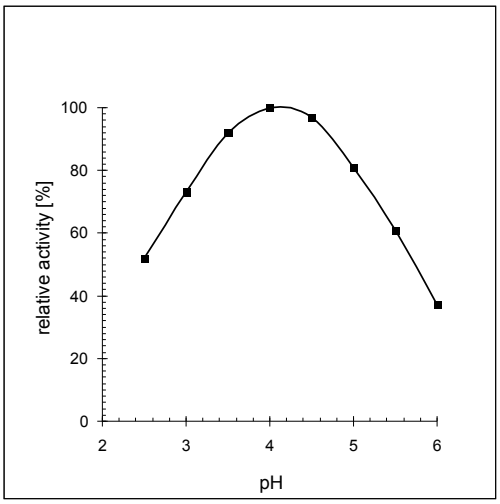

Fig. 2: Influence of the pH-value on the fungal glucoamylase activity in Distizym® AG ALPHA (30 % maltodextrin DE18, 60 °C).

The diagrammes 3 and 4 show the influence of temperature and pH-value on the enzyme activity of the fungal α-amylase in Distizym® AG ALPHA.

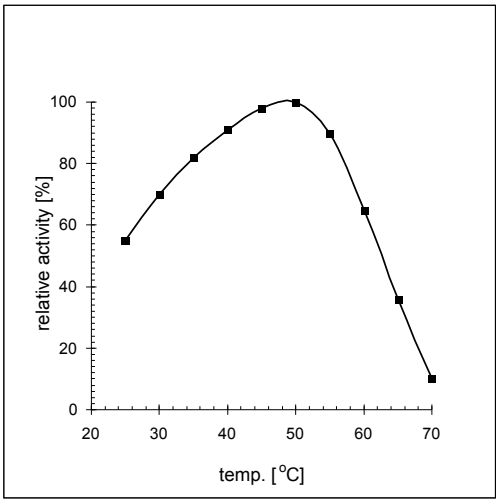

Fig. 3: Influence of the temperature on the fungal α-amylase activity in Distizym® AG ALPHA (10 % soluble starch, pH 5.0).

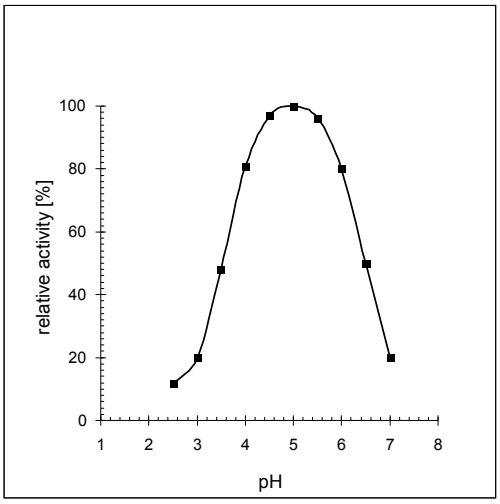

Fig. 4: Influence of the pH-value on the fungal α-amylase activity in Distizym® AG ALPHA (10 % soluble starch, 50 °C).

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