



# Distizym<sup>®</sup> FUNGAL ALPHA

Thermotolerant fungal- $\alpha$ -amylase active in the neutral and weakly acidic pH-range, applied for starch conversion in distilling mashes from farinaceous raw materials

## Product Description

Distizym<sup>®</sup> FUNGAL ALPHA is a thermo-tolerant fungal- $\alpha$ -amylase which is active in the neutral and weakly acidic pH-range, applied for starch conversion in distilling mashes from farinaceous raw materials. The enzyme is produced from a specially selected strain of *Aspergillus oryzae*. The main activity of the enzyme is based on a liquefying  $\alpha$ -amylase (1,4- $\alpha$ -D-glucan-glucohydrolase: EC.3.2.1.1.) and a saccharifying  $\beta$ -amylase (1,4- $\alpha$ -D-glucan-glucohydrolase: EC.3.2.1.2.). Distizym<sup>®</sup> FUNGAL ALPHA is tested by specialized laboratories for purity and quality.

## Aim of Treatment

Liquefaction of the gelatinised, digested starch with saccharification at the same time of the liquefied starch to maltose in distilling mashes from cereals and potatoes in the pH-range of pH 3-7 and at temperatures between 25°C and 70°C. The thermo-stability of the enzyme depends on starch concentration and pH-value of the mash (the higher the starch concentration, the better is the thermo-stability, the lower the pH-value of the distilling mash, the lower is the thermo-stability).

## Product and Effect

As an endo enzyme the  $\alpha$ -amylase of Distizym<sup>®</sup> FUNGAL ALPHA hydrolyses 1,4- $\alpha$ -D-glycosidic bonds within the starch molecule. At the same time maltose units are split off, starting from the non-reducing chain end, by the exo-enzyme  $\beta$ -amylase. Products formed hereby are maltose, malto-oligosaccharides and  $\alpha$ -limit dextrins.

## Dosage

The following standard dosages are recommended:

100 mL Distizym<sup>®</sup> FUNGAL ALPHA/ton starch in digestion methods with pressure

150 mL Distizym<sup>®</sup> FUNGAL ALPHA/ton starch in digestion methods without pressure

When processing potatoes, the higher dosages are used. In case of a deviation from standard conditions a higher or lower dosage might be required.

## Application

### Traditional digestion of starch without pressure

Distizym<sup>®</sup> FUNGAL ALPHA can be applied in the traditional pressureless degradation of distilling mashes from all raw materials, whose starch gelatinizes at temperatures below 70°C, as for instance, wheat and rye. The enzyme is dosed into the mash tank before, during or after doughing or milling in the raw material – in the latter case before or at the start of the heating phase. Before adding the enzyme it should be diluted with cold water in the ratio of 1:1. Already when the gelatinisation of the starch sets in (beginning as of 40°C) Distizym<sup>®</sup> FUNGAL ALPHA has a strong liquefaction effect. Dependent on heating velocity a liquefaction rest period has to be kept at a mash temperature of 65-70°C before reaching the final temperature. It is recommended to add calcium (in form of  $\text{Ca(OH)}_2$ ,  $\text{CaCl}_2$ , etc.) in amounts of 20-40 ppm, which has a stabilizing effect. Generally, a pH-correction of the distilling mash is not necessary, but when calcium hydroxide is used for the recommended addition of calcium the slight increase of the pH-value rather has an advantageous effect.

### Special pressure/thermo-processes (High Pressure Cooking Process according to Michurin etc.):

Distizym<sup>®</sup> FUNGAL ALPHA can also be applied in high pressure cooking processes when there is no necessity or possibility to keep a liquefaction rest at high temperatures (90-95°C). This is the case for example in the High Pressure Cooking Process (at 5-6 bar respectively 150-160°C), when, after pressure release in the steam separator, the mash is continuously cooled down to temperatures below 70°C and is transferred into the saccharification vessel. It is recommended to add calcium (in form of  $\text{Ca(OH)}_2$ ,  $\text{CaCl}_2$ , etc.) in amounts of 20-40 ppm related to pure calcium in order to stabilize and protect the enzyme from inactivation by the initially still high temperatures. In case of other High Pressure Cooking Processes with a continuous cooling of the mash, as for instance the Jet-Cooker method, Distizym<sup>®</sup> FUNGAL ALPHA reduces the necessary quantity of thermostable amylase (Dextramyl WH, Distizym<sup>®</sup> BA-T or BA-T Spezial) which always has to be applied in the beginning. This reduction is made by adding Distizym<sup>®</sup> FUNGAL ALPHA at temperatures as of 70°C for further liquefaction. An additional calcium fortification is not necessary because calcium has to be added anyway when bacterial amylases are applied.

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Our technical product leaflets and the treatment recommendations they contain, are based on our current knowledge and experience and we make all reasonable efforts to ensure the accuracy of the information it provides. But since pre-treatment is mostly unknown to us and moreover imponderabilities with regard to the natural products to treat have to be taken into consideration, the advice given provides general information and serves for your consultation. Without a separate, written statement from our side on a defined matter or problem, the information provided should not be relied upon as legal advice or regarded as a substitute for legal advice and is without liability. The information provided is in accordance with the law in force of the Federal Republic of Germany and the EU. In addition, our general terms of business apply.

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## Storage

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

## General Characteristics

Enzyme characteristics: the activity range of the enzyme is between pH 3.0-7.0, the optimum is 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.

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

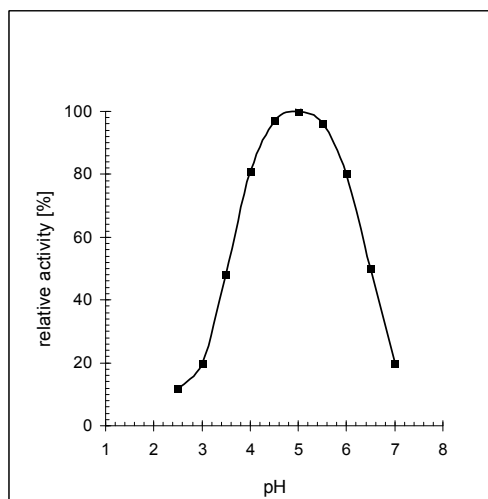
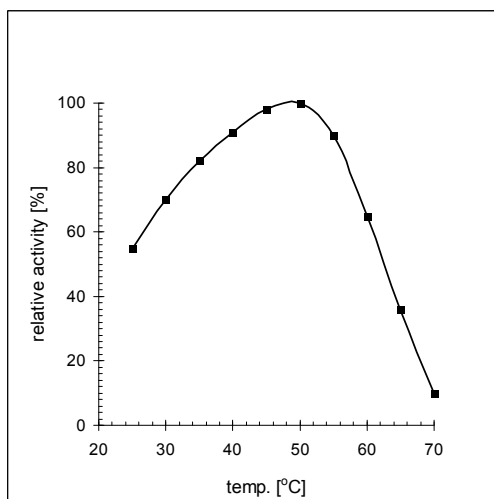


Fig 1: Influence of temperature on enzyme activity (10% soluble starch; pH 5.0).  
Fig 2: Influence of pH-value on enzyme activity (10% soluble starch; 50 °C).

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