

Product Description

Beerzym MULTI is a special liquid enzyme used for beer production from malts with low enzyme activity and/or for brewing with large amounts of unmalted barley or other cereal adjuncts in the grist in infusion mashing. The enzyme is produced from specially selected strains of *Bacillus subtilis*, *Talaromyces emersonii* and *Penicillium funiculosum*. The main activity of the enzyme is based on an α -amylase (1,4- α -D-glucan-glucanohydrolase: EC 3.2.1.1), a neutral proteinase (EC 3.4.24.4 and different β -glucanases (endo-1,3(4)- β -D-glucanase: EC 3.2.1.6 and endo-1,4- β -glucanase: EC 3.2.1.73)). The composition of the enzyme components is comparable to the enzyme complex of the malt. Beerzym MULTI is tested by specialized laboratories for purity and quality.

Aim of Treatment

Exposure of proteins to achieve the desired protein modification in mashing at temperatures up to 60 °C (140 °F), thus ensuring a sufficient supply of amino acids for an improved yeast nutrition (increase of the FAN-value). Glucan degradation in mashes up to 85 °C (185 °F) for an improved lautering and filtration as well as for the liquefaction of the gelatinized, broken down starch in mashes up to 80 °C (176 °F).

Product and Effect

Proteins from unmalted barley and other cereal adjuncts cannot be utilized directly in the brewing process. Only by the neutral proteinase of Beerzym MULTI they are broken down accordingly. In this process the peptide bonds are cleaved under liberation of soluble peptides and assimilable amino acids. At the same time the β -glucanase of Beerzym MULTI hydrolyzes disturbing glucans (e.g. barley glucan), which occur in the unmalted raw grain always in higher concentrations than in the malt produced from these adjuncts. Higher gelatinization temperatures are needed for the hydrolysis of starch from adjuncts than for starch from malt. Here the α -amylase contained in Beerzym MULTI effects a reliable conversion of the starch because the α -amylase is, due to its activity profile, better suited for starch degradation at higher temperatures than malt amylase.

Dosage

Beerzym MULTI is required in beer brewing when, as a result of using malts with low enzyme activity and/or adjuncts (barley, wheat, rye), the enzyme activity of the malt or the malt portion is not sufficient. The dosage of the enzyme depends on the quality of the raw material, the temperature and the reaction time.

Guide value: 300 - 500 ml/ton malt
1500 - 2000 ml/ton adjunct

Application

Dilute Beerzym MULTI with cold water. The enzyme dilution is best added directly during mashing in into the mash tun or the mash copper, so that the specific enzyme components can be fully active in the particular temperature range. The enzyme complex is active within the pH-range of the mash up to 80 °C (176 °F).

Storage

Beerzym MULTI keeps its declared activity up to 36 months if stored optimally (0-10 °C/32-50 °F). Higher storage temperatures result in a shorter shelf life. Temperatures above 25 °C (77 °F) are to be avoided. Reseal opened packagings tightly and use up as soon as possible.

Special enzyme for the production of beer from malts with low enzyme activity and/or brewing with large amounts of unmalted barley or other cereal adjuncts in the grist

- please turn over -

General Characteristics

Enzyme characteristics: the activity range of the enzyme is between pH 3.0 and 8.0 for all activities of the enzyme complex, the optimum ranges from pH 5.0 to 7.0 in the presence of substrate. The temperature range is between 30 °C (86 °F) and 90 °C (194 °F) for the α -amylase, the temperature optimum is at 70-80 °C (158-176 °F) in the presence of substrate, calcium and at an optimal pH-value. For the neutral proteinase the temperature range is between 15 °C (59 °F) and 70 °C (158 °F) with an optimum at 45-55 °C (113-131 °F). For the β -glucanases the temperature range is between 25 °C (59 °F) and 85 °C (185 °F) with one optimum at 80 °C (176 °F) and the other at 60 °C (140 °F).

The diagrammes 1 and 2 show the influence of temperature and pH-value on the α -amylase activity, the diagrammes 3 and 4 show the influence of temperature and pH-value on the proteinase activity of Beerzym MULTI.

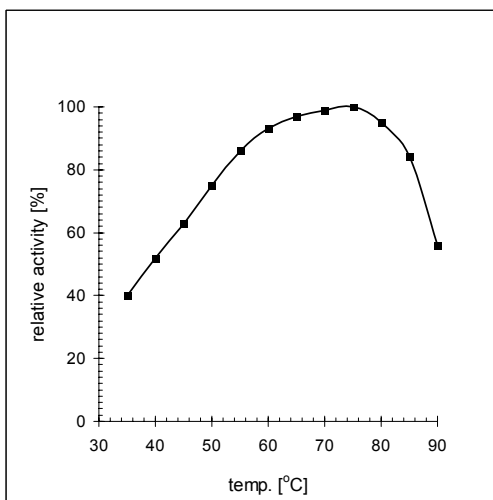


Fig 1: Influence of temperature on α -amylase activity (16% starch, pH 6.0)

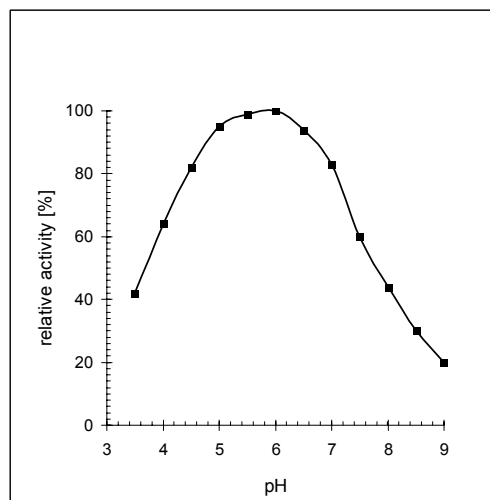


Fig 2: Influence of pH-value on the α -amylase activity (16% starch; 70 °C/158 °F)

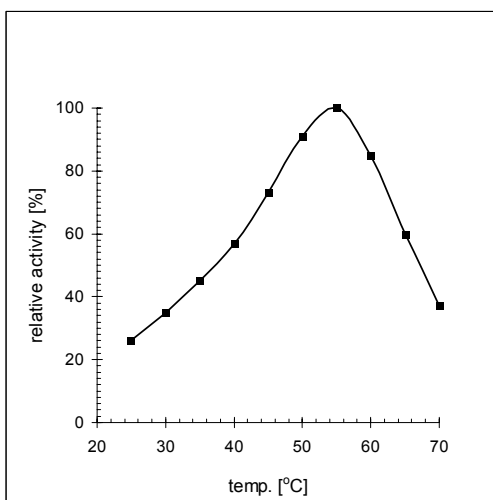


Fig 3: Influence of temperature on neutral proteinase activity (2% casein solution; pH 7.0).

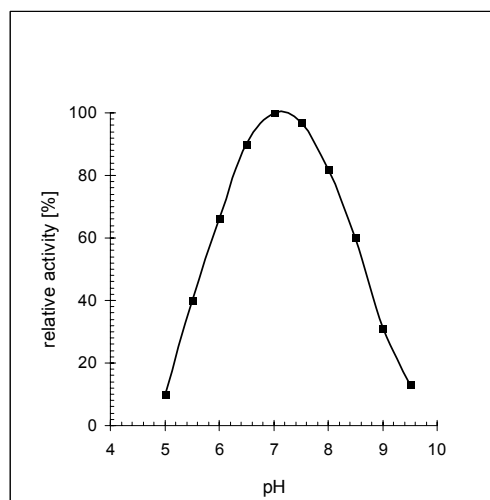


Fig 4: Influence of pH-value on neutral proteinase activity (2% casein solution; 55 °C/131 °F).

Continuing: General Characteristics

The diagrams 5, 6, 7 and 8 show the influence of temperature and pH-value on the different β -glucanases of Beerzym MULTI.

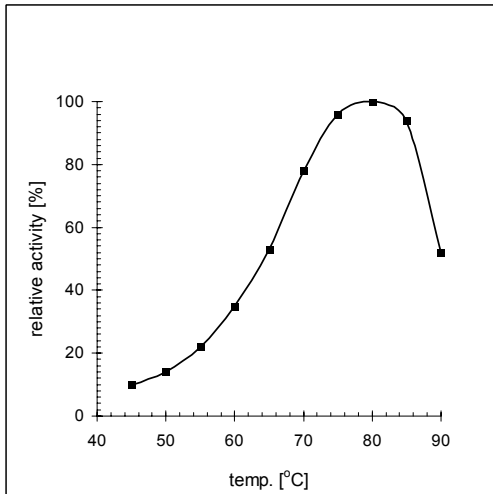


Fig 5: Influence of temperature on heatstable β -glucanase activity (barley- β -glucan, pH 4.5).

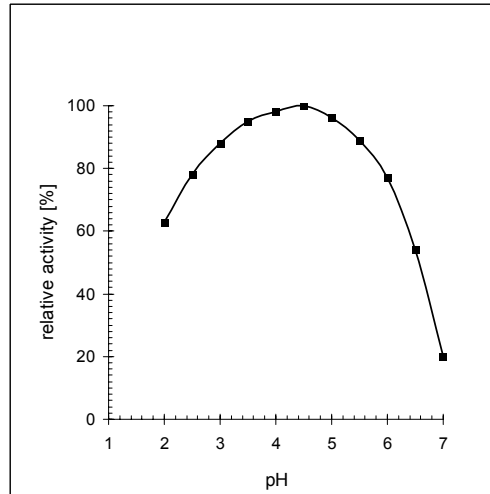


Fig 6: Influence of pH-value on heatstable β -glucanase activity (barley- β -glucan, 75 °C/167 °F).

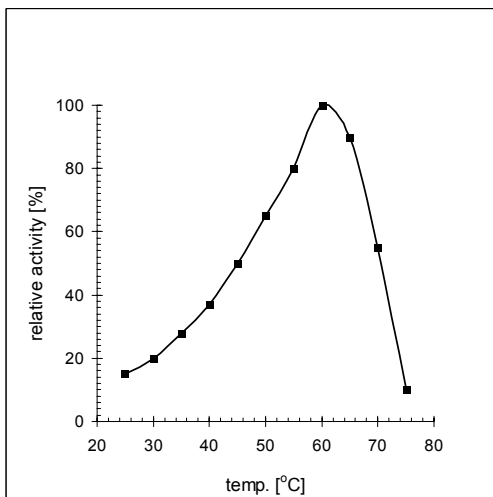


Fig 7: Influence of temperature on heat tolerant β -glucanase activity (barley- β -glucan, pH 5.0).

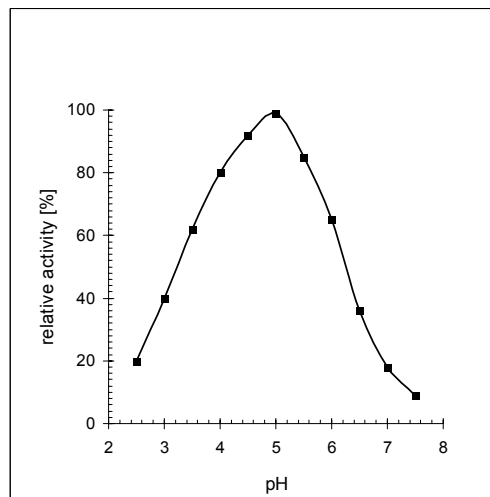


Fig 8: Influence of pH-value on heat tolerant β -glucanase activity (barley- β -glucan, 55 °C/131 °F).

Please note:

When applying Beerzym MULTI the food regulations of the individual countries currently in force have to be adhered to.