

Product Description

Beerzym COMBI is a special liquid enzyme for beer production from overmodified malts and/or for brewing with large amounts of adjuncts, low in proteins, in the grist in infusion mashing. The enzyme is produced from specially selected strains of *Bacillus subtilis* and *Geosmithia emersonii*. The main activity of the enzyme is based on an α -amylase (1,4- α -D-glucan-glucanohydrolase: EC 3.2.1.1) and several β -glucanases (endo-1,3(4)- β -D-glucanase: EC 3.2.1.6, endo-1,4- β -glucanase: EC 3.2.1.73 and endo-1,4- β -glucanase: EC 3.2.1.4).

Beerzym COMBI is tested by specialized laboratories for purity and quality.

Aim of Treatment

Degradation of glucan by thermolabile bacterial and thermostable fungal β -glucanase in mashes in a temperature range between 35 °C (95 °F) and 80 °C (176 °F) for improved lautering and filtration. Hydrolysis of starch by liquefaction of the gelatinized, broken down starch by bacterial α -amylase in mashes up to a temperature of 80 °C (176 °F).

Product and Effect

Overmodified malts have, as a result of the almost complete dissolution of the endosperm, high contents of protein and β -glucan. While proteins are mainly being hydrolyzed already during the malting process, β -glucan concentrations remain unchanged at high levels. Unmalted raw grain always has a higher content of β -glucans than malts produced from these adjuncts. Beerzym COMBI reliably hydrolyzes the β -glucans in overmodified malts and in adjuncts by its combination of thermolabile bacterial and thermostable fungal β -glucanase throughout the entire mashing process. Particularly for the hydrolysis of starch from adjuncts low in proteins, higher gelatinization temperatures are needed than for starch from malted cereals. Here the α -amylase contained in Beerzym COMBI 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. Products formed hereby are α -limit dextrines and oligosaccharides. Due to the combined effect of β -glucanase and α -amylase Beerzym COMBI ensures a constantly high extract yield, non-problematic lautering and filtration processes and prevents cloudiness derived from glucan and starch.

Dosage

Beerzym COMBI is required in beer brewing when, as a result of using overmodified malts and/or adjuncts low in proteins (corn, rice, sorghum), 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: 200 - 400 ml/ton malt
800 - 1500 ml/ton adjunct

Application

Dilute Beerzym COMBI 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 COMBI 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.

Combination of α -amylase and β -glucanase for beer production from overmodified malts and/or with large amounts of adjuncts low in proteins in the grist

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General Characteristics

Enzyme characteristics: the activity range of the enzyme is between pH 4.0 and 8.0 for the α -amylase, the optimum is at pH 5.8-6.0 in the presence of substrate and calcium. 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 β -glucanase the activity range of the enzyme is between pH 2.5 and pH 6.5, the optimum is at pH 4.5. The temperature range of the enzyme is between 15 °C (59 °F) and 90 °C (194 °F) for the β -glucanase, the optimum is at 75-85 °C (167-185 °F). The diagrammes 1 and 2 show the influence of temperature and pH-value on the enzyme activity of the α -amylase, the diagrammes 3 and 4 show the influence of temperature and pH-value on the enzyme activity of the β -glucanase of Beerzym COMBI.

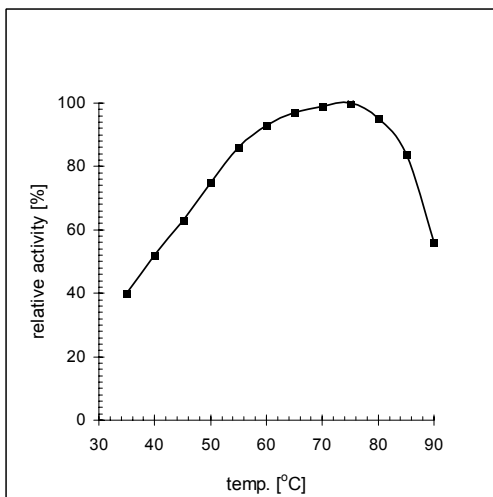


Fig 1: Influence of temperature on α -amylase activity (16% starch; pH 6.0)

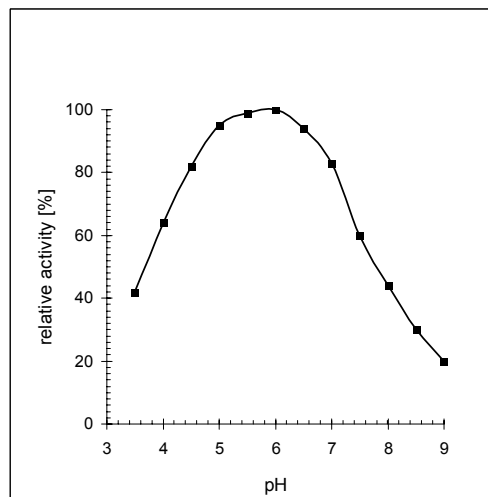


Fig 2: Influence of pH-value on α -amylase activity (16% starch; 70 °C/158 °F).

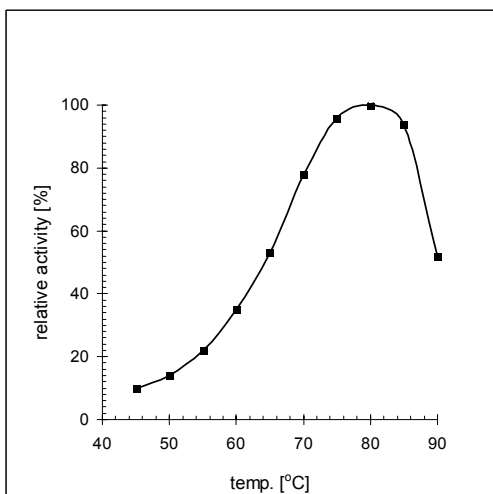


Fig 1: Influence of temperature on β -glucanase activity (barley- β -glucan, pH 4.5).

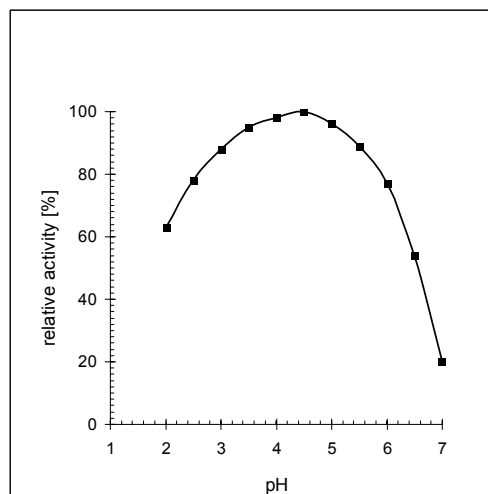


Fig 2: Influence of pH-value on β -glucanase activity (barley- β -glucan, 75 °C/167 °F).

Please note:

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

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