



## CraftZYM® garnet

Plant proteinase to improve the Kolbach index in brewing mashes and the chillproofing and protein stability of finished beer

### Product description

CraftZYM® garnet is a special liquid enzyme to increase the degree of protein modification (Kolbach index) in brewing mashes and for chillproofing of finished beer, active in the temperature range between 4 °C (39.2 °F) and 70 °C (158 °F). The enzyme is produced from the latex of *Carica papaya* (papaya melons). The main activities of the enzyme are papain and chymopapain (peptidyl-peptidohydrolases: EC 3.4.22.2).

In the mash, improvement of extract yield and degree of protein modification (Kolbach index), which leads to a better foam stability/head retention. Additionally the chillproofing is improved by application of the enzyme to the mash. When applied in unfiltered and filtered beer, CraftZYM® garnet results in an improved chill and protein stability of the beer. As an endoenzyme CraftZYM® garnet hydrolyzes proteins, peptides, amides and esters, in particular, when alkaline amino acids or leucine or glycine are included in the bonds. Preferably high-molecular, easily coagulable proteins are cleaved into medium-molecular proteins, peptides and amino acids.

#### Please note:

When applying CraftZYM® garnet the food regulations of the individual countries currently in force have to be adhered to.

### Dosage

CraftZYM® garnet is necessary in beer brewing when problems in the quality of the beer are to be expected, due to seasonal conditions affecting the malt used, or when part of the malt is replaced by adjunct (e.g. barley, rice, corn). Also during a single infusion mash method like Ale-brewing, brings higher degradation of proteins, because the CraftZYM® garnet works at a temperature of 60 - 65 °C.

The dosage of the enzyme depends on the quality of the raw material, the temperature and the reaction time.

Guide value: 20 - 100 mL/ton malt (grist)  
1 - 3 mL/100 L during fermentation  
2 - 4 mL/100 L in beer during storage/in ageing  
1 - 2 mL/100 L in filtration

Dilute CraftZYM® garnet with cold water. In the pH-range of the mash, the enzyme is active practically throughout the entire mashing duration. During the subsequent wort boiling CraftZYM® garnet is completely inactivated. In case of an application in unfiltered beer, dosage is best made together with the yeast, i.e., at fermentation start. Thus medium-molecular proteins are directly degraded to alpha-amino nitrogen (FAN) and, at the same time, serve as elementary yeast nutrient. An addition to the beer in the storage cellar or also during filtration results in a slowed down CraftZYM® garnet effectiveness, however, the lowered activity due to temperature is considered by including the contact time into the calculation of the dosage so that a good chill stability is also assured at low temperatures. Due to its high isoelectric point the enzyme protein as such does not flocculate in the pH-range of the beer and therefore does not lead to turbidity. The enzyme remains active even after pasteurisation. Only after approx. 4 weeks of storage of the beer there is, as a result of the denaturation of the enzyme protein, no longer any proteolytic activity detectable.

#### Very important:

The dosing point of the enzyme in the Brewhouse, will be in the "mash-in-water" before the grist will be mashed in and as a 2<sup>nd</sup> parameter; the Calcium content in the brew water must be higher than 35 mg/L to ensure a 100 % activity of the enzyme.

ERBSLÖH Geisenheim GmbH • Erbslöhstraße 1 • 65366 Geisenheim, Germany  
Tel.: +49 6722 708-0 • Fax: +49 6722 6098 • [info@erbsloeh.com](mailto:info@erbsloeh.com) • [www.erbsloeh.com](http://www.erbsloeh.com)

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The application recommendations given herein describe the intended use of the product as a processing aid or additive as part of a good manufacturing practice. Only this application can lead to a food safety of the final product. However, please note: Our technical product leaflets are based on our current knowledge and experience. They have to be seen as general information on our products only. Due to the imponderabilities of treating natural products and the potential prior treatment we cannot accept any liability. Accordance with all national laws and regulations for use of our products has to be ensured by each user. All data is therefore provided without any warranty. All information is subject to change without prior notice. Our general terms of business apply, please refer to [www.erbsloeh.com](http://www.erbsloeh.com).  
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The diagrams 1 and 2 show the influence of temperature and pH-value on the enzyme activity of CraftZYM® garnet.

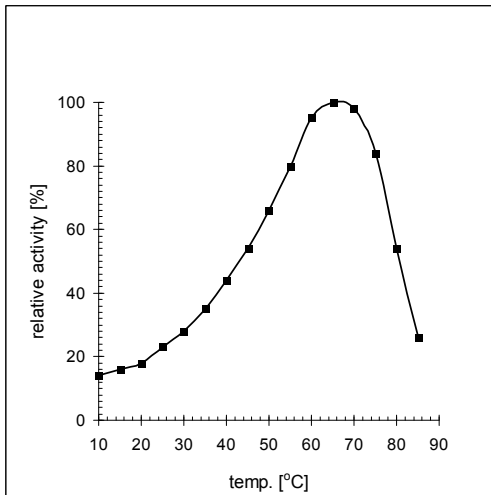


Fig 1: Influence of temperature on activity (2 % casein solution; pH 6.0).

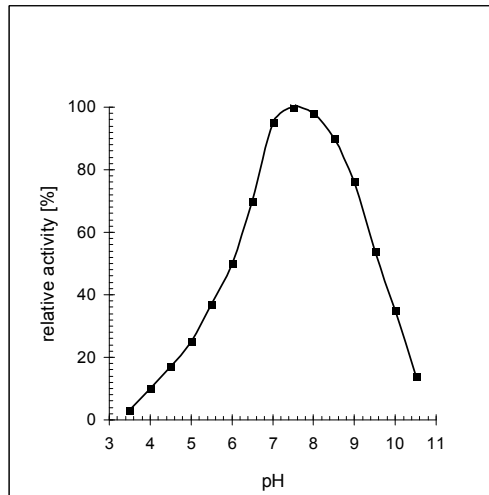


Fig 2: Influence of pH-value on activity (2 % casein solution; 40 °C (104 °F)).

## Storage

Optimal storage is at 0 - 10 °C / 32 - 50 °F. Higher storage temperatures lead to reduced shelf life. Avoid temperatures above 25 °C (77 °F). Reseal opened packagings tightly and use up soon.