



OPTIMASH™ TBG

Heat Stable, Food Grade, Liquid Beta Glucanase Enzyme

DESCRIPTION

OPTIMASH™ TBG enzyme is a heat stable, food grade preparation of the enzyme cellulase, EC 3.2.1.4. The product has been specifically formulated for use in the fermentation ethanol and starch processing industries for the breakdown of the non-starch polysaccharides of barley and wheat. It is produced by the fermentation of a non-genetically modified strain of *Geosmithia emersonii*, also known as *Talaromyces emersonii*. The major enzyme activity of OPTIMASH™ TBG enzyme is a component, endo-1,3(4)- β -glucanase (systematic name: (1,3-1,3;1,4)- α -D-glucan 3(4)-glucanohydrolase), which catalyses the endohydrolysis of 1,3- or 1,4-linkages in β -D-glucans.

TYPICAL CHARACTERISTICS

Activity: 5625 u/g

Appearance: Clear amber liquid

Grade: Food grade

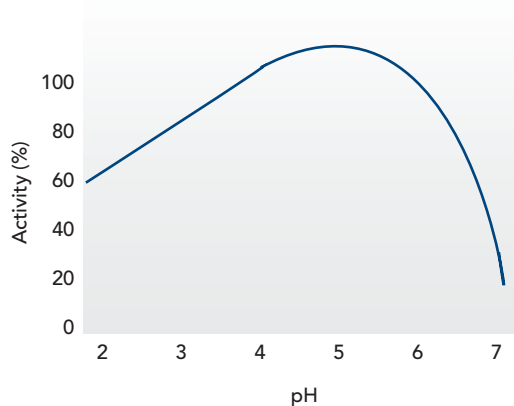
UNIT DEFINITION

One unit of β -glucanase activity is defined as the quantity of enzyme which produces reducing sugars equivalent to 1 μ mole of dextrose per minute from barley β -glucan under standard assay conditions pH 5.0 and 50°C (122°F).

OPTIMASH™ TBG is a multi-component enzyme, exhibiting activity towards cellulose, hemicelluloses, β -D-glucans, and arabinoxylans. Effect of pH on Enzyme Activity Standard assays were carried out at 50°C (122°F) and at different pH values. OPTIMASH™ TBG enzyme has optimum activity at pH 4.2, but has a working range of pH 3.0 - 6.5

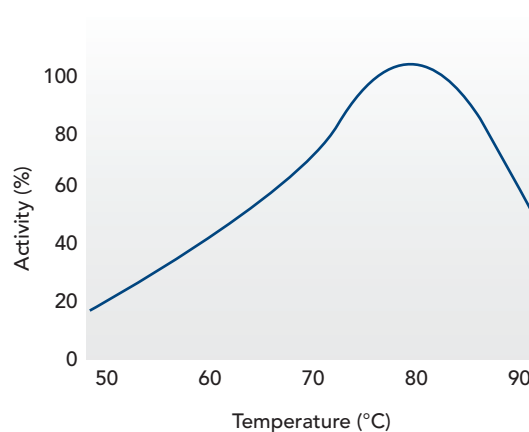
EFFECT OF pH ON ENZYME ACTIVITY

Standard assays were carried out at 50°C (122°F) and at different pH values. OPTIMASH™ TBG enzyme has optimum activity at pH 4.2, but has a working range of pH 3.0 - 6.5.



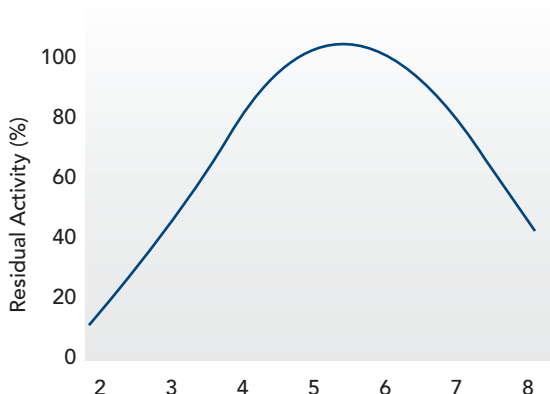
EFFECT OF TEMPERATURE ON ENZYME ACTIVITY

Standard assays were carried out at pH 5.0 and at different temperatures. OPTIMASH™ TBG enzyme shows optimum activity at 80°C (176°F) and can be used at up to 90°C (194°F). However, for prolonged reacting periods a maximum temperature of 75°C (167°F) is recommended.



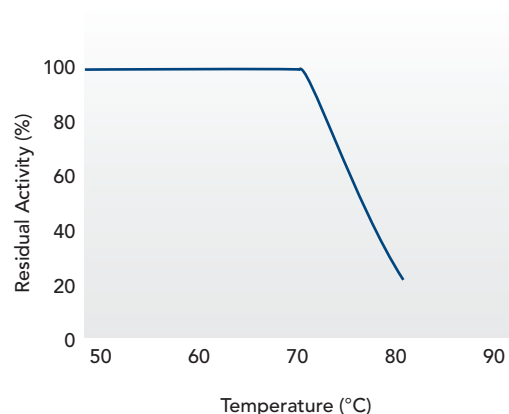
EFFECT OF pH ON ENZYME STABILITY

A dilute solution of OPTIMASH™ TBG enzyme was held at 50°C (122°F) for 60 minutes at different pH values. The solutions were then cooled and assays carried out under standard conditions.



EFFECT OF TEMPERATURE ON ENZYME STABILITY

A dilute solution of OPTIMASH™ TBG enzyme was heated at various temperatures for 60 minutes. On cooling, the standard assay was carried out, taking an unheated control to be 100% active.



APPLICATION & DOSAGE RECOMMENDATIONS STARCH AND DISTILLING

In the processing of wheat starch, addition of OPTIMASH™ TBG enzyme into saccharification of syrups reduces the viscosity of the syrup leading to improvements in subsequent evaporation. In ethanol production from grains, mainly barley and wheat, OPTIMASH™ TBG enzyme is used to reduce viscosity during pretreatment steps to enable the use of higher dry substance mash which results in higher total ethanol. Due to its excellent thermostability, OPTIMASH™

TBG enzyme may also be beneficial when used in secondary liquefactions and in pre-saccharification processes that utilize this step.

In distilling, the enzyme may be added into the spent wash prior to evaporation to give the following benefits:

- Higher solids content of final syrup
- Better heat transfer, lower energy requirement
- Reduced evaporator fouling, reduced cleaning costs

Because of the heat stability of the enzyme, OPTIMASH™ TBG enzyme may also be added directly into the evaporator.

REGULATORY STATUS

OPTIMASH™ TBG complies with the current recommended purity specifications for food-grade enzymes given by the Joint FAO/WHO Expert Committee on Food Additives (JECFA) and the Food Chemicals Codex (FCC) and is GRAS (Generally Recognized As Safe) in the United States.

PACKAGING

OPTIMASH™ TBG is available in various package sizes. Please consult your DuPont representative for detailed information.

STORAGE & STABILITY

DuPont enzymes can be safely stored in unopened and sealed original containers.

SAFETY & ENZYME HANDLING

Inhalation of enzyme dust and mists should be avoided. In case of contact with the skin or eyes, promptly rinse with water for at least 15 minutes.

For detailed handling information, please refer to the appropriate Material Safety Data Sheet, the Enzyme Technical Association (ETA) handbook *Working Safely With Enzymes*, and the Association of Manufacturers and Formulators of Enzyme Products (AMFEP) handbook *Guide to the Safe Handling of Microbial Enzyme Preparations*. All are available from DuPont.

TECHNICAL SERVICE

Information covering specific applications of this product is available. DuPont will work with customers to enhance processes and solve problems. Let us know what you need and we will assist you.

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