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GlucoStar PLUS

PRODUCT #633

(Industrial grade enzymatic processing aid)

I. INTRODUCTION:

GlucoStar PLUS is an industrial grade acid Glucoamylase (Amyloglucosidase) liquid product from a non-genetically modified strain of *Aspergillus niger*. It contains a high level of exo-glucosidase which catalyzes the hydrolysis of both the alpha-D-1,6-Glucosidic branch points and alpha-D-1,4-glucosidic linear regions of glucose polymer. This allows the enzyme to break down both components of starch – amylose and amylopectin, as well as the products of their dextrinization using alpha-amylase.

II. PHYSICAL PROPERTIES:

Appearance:	Light to medium amber liquid. Please note that color does not affect or reflect activity.
Odor:	Sweet fermentation odor.
pH:	4.0 – 5.0
Specific Gravity:	1.00 - 1.15
Gluco Amylase Activity:	**500-600 GAU/mL**

Assay Principle:

This assay is based on a 15 minute hydrolysis of a p-nitrophenyl-α-D-glucopyranoside (PNPG) substrate at pH 4.20 and 60°C. This is a measure of glucoamylase or amyloglucosidase activity. Glucoamylase cleaves the α linkage of PNPG to liberate one mole of glucose and one mole of p-nitrophenol per mole of PNPG. The absorbance of the liberated p-nitrophenol is then measured at 400 nm. Nitrophenyl-glucopyranoside units (NG) are determined by correlating the activity of a known enzyme standard to that of the unknown sample based on their activity towards PNPG. One NG is equal to one Amyloglucosidase Unit (AG), which is defined as the amount of enzyme which will liberate one gram of reducing sugar as glucose per hour under the conditions of the AG assay.

Definition:

One NG, equal to one amyloglucosidase unit (AG), is defined as the amount of enzyme which will liberate one gram of reducing sugar, as glucose per hour, under the conditions of the AG assay.

III. GENERAL PROPERTIES:

GlucoStar PLUS provides maximal benefit at pH 4.0 – 4.2 and at the temperature of 58 – 64°C (136 – 147°F); see figs. 1 and 2.

Fig. 1
Effect of pH on Performance of GlucoStar PLUS

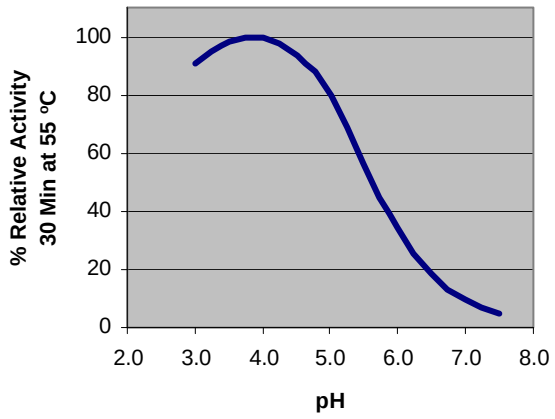


Fig. 2
Effect of Temperature on GlucoStar PLUS Performance

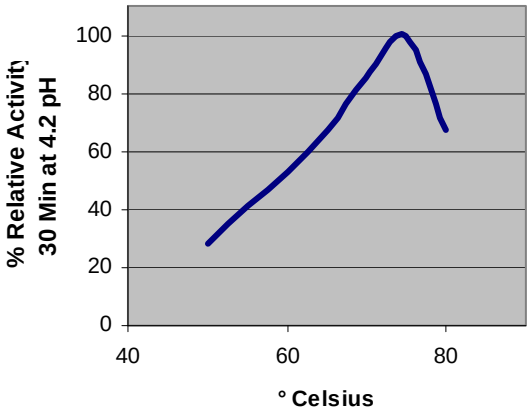


Fig. 3
Effect of pH on Stability of GlucoStar PLUS

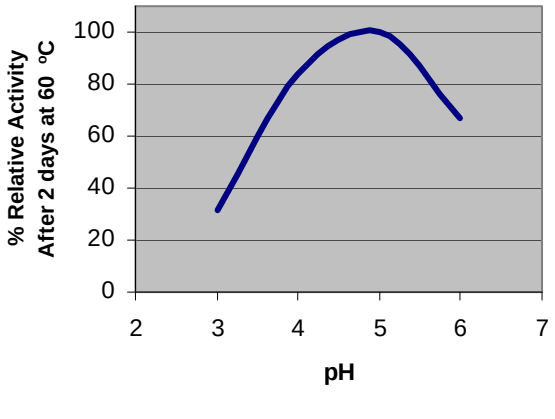
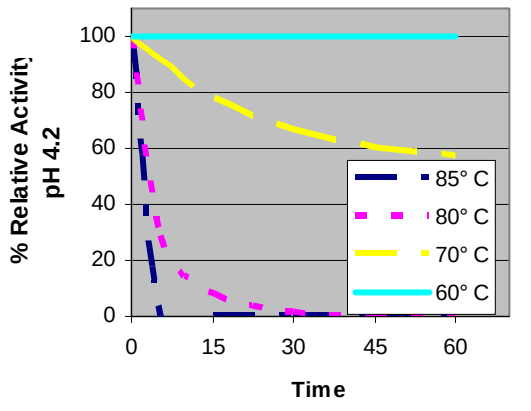


Fig. 4
Effect of Temperature on the Stability of GlcuoStar PLUS



The selection of optimal conditions for **GlucoStar PLUS** performance depends on the process used. Shorter saccharification periods will allow more harsh conditions, since the gradual inactivation of the enzyme will not present a major problem. If the enzyme performance is expected to last several days, taking place along with yeast fermentation, conditions more favorable for enzyme survival should be used (see figs. 3 and 4).

In all cases, addition of protease is recommended to provide protein nutrition to the yeast, especially during the first day of fermentation. Addition of alpha-amylase (fungal or bacterial), as well as beta-glucanase/xylanase/cellulase complex (such as Dyadic ViscoStar series) could be also beneficial for certain raw materials.

V. STORAGE CONDITIONS/ACTIVITY:

GlucoStar PLUS has less than a 10% activity loss after six months when stored at 25°C (75°F - 77°F) out of direct sunlight in the original closed container.

GlucoStar PLUS has less than 10% activity loss after 12 month when stored at +5°C (40°F). Do not let **GlucoStar PLUS** freeze.

VI. INACTIVATION:

Though highly unlikely to be ever needed, **GlucoStar PLUS** can be inactivated by raising the temperature above 80°C for 5 min or above 75° for 40 min. In the starch industry, ion exchange resins or charcoal adsorption are capable to completely remove **GlucoStar PLUS** from syrup.

VII. PACKAGING:

GlucoStar PLUS is packaged in 25kg polyethylene drums.
Other size packaging can be arranged upon request.

VIII. TECHNICAL SERVICE:

Dyadic International (USA), Inc. is constantly testing their enzyme products in customer-oriented applications providing the most adequate technical and application support of the enzyme use.

Information covering specific applications for this product is available from your Dyadic International sales/technical representative. We will work with your technical personnel to resolve problems and optimize your process.

IX. SAFETY AND HANDLING:

For detailed information please refer to the **GlucoStar PLUS** MSDS available upon request. We also recommend consulting the USA Enzyme Technical Association handbook, Working Safely with Enzymes, or the various AMFEP publications on the safe handling of enzymes.