ALPHA PRO 4X

Next Generation Enzymes for Liquefaction (Grain Processing)

PRODUCT INFORMATION

To effectively process starch in dry-milled grains for the production of alcohol, alpha-amylase is needed to hydrolyze starch to oligosaccharides and dextrins and also to reduce mash viscosity prior to saccharification and fermentation with yeast.

Delhi Molecular Company has developed a range of liquefaction products in order to enhance starch processing in grain-based distilleries. DMC's liquefaction product Alpha PRO 4X is a next generation enzyme used as dry milled grain liquefaction enzyme which works on a broader temperature and pH range, and thus is more forgiving in accommodating process variation.

Alpha PRO 4X CHARACTERISTICS

Viscosity Reduction	Enhanced reduction compared to other competitor products enabling higher solids throughput
ph Range	5 – 6.5
Temperature Range	82^{o}C to 108^{o}C
Dosage Range	0.20 – 0.35 kg/MT Starch
Activity	8000-8200 Unit/g

The amount of enzyme required depends on the process variables and substrate, but Alpha PRO 4X is suitable for use under typical liquefaction conditions and various substrates used in India like wheat, Maize, Jowar, Bajra and Rice.

ADVANTAGES OVER OTHER ENZYMES

For the production of Alcohol from dry-milled grain substrates, **Alpha PRO 4X** provides the following benefits:

• Increased Operation Flexibility because of working at higher temperature and lower pH range

- Increased Alcohol Yields when used with next generation Gluco Amylase
- Effective Liquefaction at Low pH
- Reduces Thin Stillage Solids, when used with NGN Gluco Amylase
- Reduces Gluco Amylase Usage
- Reduces chemical costs like the usage of liquid ammonia or urea

USES

Alpha PRO 4X provides same or better performance at the 30-50% lower dosage rates in primary and secondary liquefaction of dry-milled whole-grain substrates.

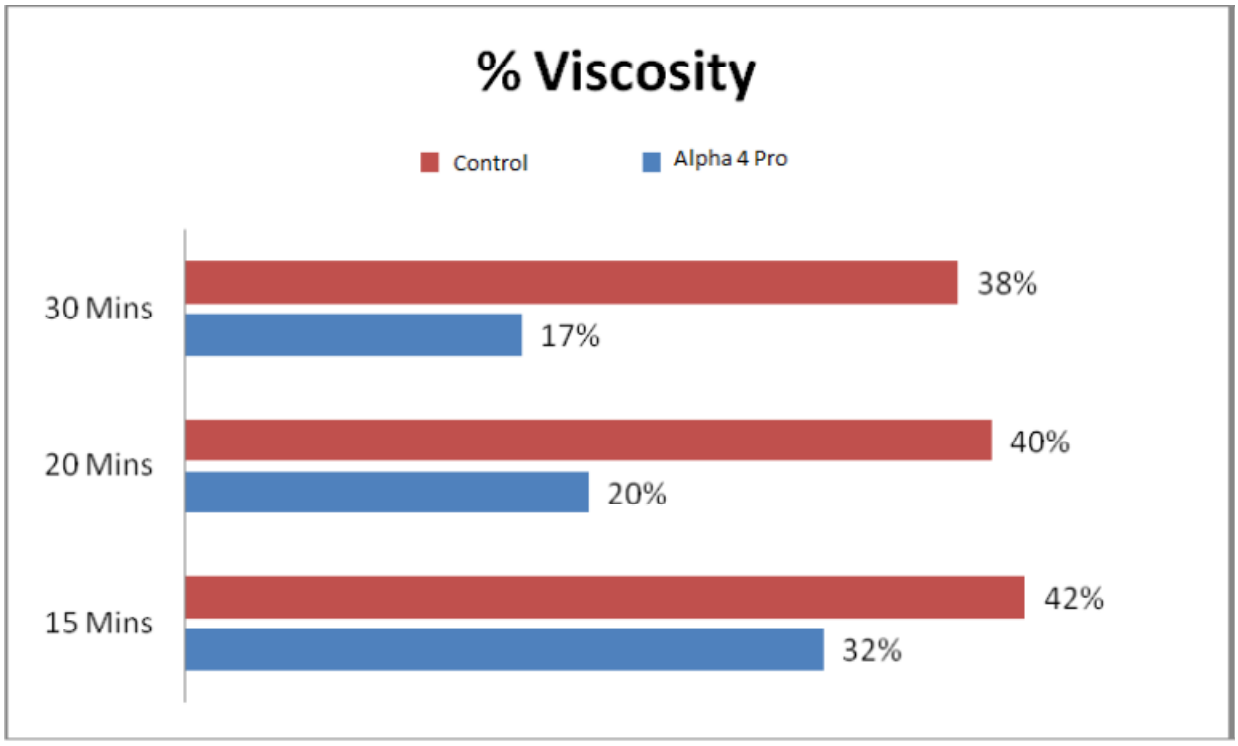
APPLICATION GUIDELINES

Alpha PRO 4X has shown better performance in many different liquefaction systems with a variety of starches from different whole grains including corn, sorghum (milo), wheat, bajra, barley etc, when compared with Alpha4.
Alpha PRO 4X performs best over a temperature range of (85 – 91°C) and over a pH range of 5.0 – 5.4. However, it is effective over a broad operating range and can be effectively used between pH 5 – 6.5 and up to 108°C.

PERFORMANCE

Dextrose Equivalent (DE) development in liquefaction is determined by the enzyme activity, enzyme addition rate, residence time, and process conditions such as substrate, pH, and temperature.

VISCOSITY REDUCTION CHARTS



STORAGE

Recommended storage conditions are 0–25 °C in sealed packaging, well protected from the sun. The product has been formulated for optimal stability. However, enzymes gradually lose activity over time. Extended storage and/or adverse conditions such as higher temperature may lead to a higher dosage requirement. Other handling instructions are available in the Material Safety Data Sheet.

SHELF LIFE

Alpha PRO 4X is stable under recommended storage conditions for a period of 6 months when stored at temperatures of 10-15 °C with less than 5% drop in activity. Drop in activity can be compensated with corresponding higher enzyme dosage.

SAFETY & ENZYME HANDLING

Alpha PRO 4X is non toxic, non hazardous and non corrosive. Inhalation of enzyme liquid should be avoided. In case of contact with the skin or eyes, promptly rinse with water for at least 15 minutes.

TECHNICAL SERVICE

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

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