

Novozymes Liquoflow[®] Go 2X

A good liquefaction system is vital for successful pre-saccharification and SSF. In liquefaction, an efficient temperature stable alpha-amylase is added to the starch milk. Mechanical liquefaction may be achieved using a jet cooker followed by ex. continuous stirred tank reactors (CSTR).

Advanced liquefaction with Liquoflow[®] Go 2X makes it feasible to realize values beyond standard liquefaction. Reduced mash viscosities, low pH and low temperature liquefaction and no calcium requirements allow realizing costs savings at various downstream stages of the process.

Benefits

Liquoflow[®] Go 2X is a remarkable liquefaction enzyme which can operate at lower pH, lower temperatures and calcium levels than conventional thermo stable alpha-amylases. Liquoflow[®] Go 2X offers benefits and values beyond standard liquefaction:

- Improved plant profitability and reduced operation costs
- Higher output due to ability to operate at higher DS ($\geq 30-35\%$ DS)
- Energy savings due to operations at higher DS
- Cost savings at several downstream stages
- Savings in chemicals and water due to increased recycling of stillage and running at lower pH
- Robust and excellent performance on all starchy raw materials

Products

Liquoflow[®] Go 2X is a liquid enzyme preparation containing a heat stable alpha-amylase expressed in and produced by a genetically modified strain of a Bacillus microorganism.

The systematic name of the enzyme is 1,4-alpha-D-glucan glucano-hydrolase (EC 3.2.1.1).

Find more information at [Novozymes Market](#).

Performance

Good performance at low pH and broad tolerance:

- Broad pH tolerance 4.5-6.5
- Permits increased usage of backset in the pre-cook mash or starch slurry
- Less acid is needed to reduce the liquefaction pH prior to saccharification/fermentation
- A pH of 5.4-5.8 optimizes enzyme dose, but can run at pH below 5.0 on non corn raw materials in order to save chemical usage

Reduced viscosity of mash and stillage:

- Unsurpassed viscosity reduction
- Ability to operate with increased levels of dry solids (>30% with corn, rice, sorghum, millet, potatoes,)
- Improves jet cooker performance and heat exchanger efficiency
- Processing “Forgiveness” - Ability to withstand process variations

No calcium requirement:

- No additional calcium required (~5 ppm)
- Decreases calcium oxalate formation, called beer stone, in many unit operations
- Results in reduced scaling in post liquefaction heat exchangers and coolers
- Normally, the calcium available in grain and well-water is usually sufficient

Temperature preference

- The optimum liquefaction temperature is 85-87°C for corn and sorghum and 85-90°C for other grains.
- For dry grind milling or whole grain mash the limit for Liquoflow Go 2X is around 87°C. When distilling applications with dry grind milling requires temperature above 87°C, we recommend you contact Novozymes customer solution support.

Usage

When using Liquoflow® Go 2X, plants can eliminate the addition of lime or calcium chloride. Sufficient calcium exists in mashes to meet the requirements of this extremely stable enzyme.

Liquoflow® Go 2X will result in a dramatic increase in DE and a rapid reduction in mash viscosity. This affords you the option of reducing pH or the enzyme dose and/or increasing dry solids.

While distillers in the past had to run at pH values around 6.0, Liquoflow® Go 2X will allow you to operate at a lower pH of 5.4-5.2 or lower. While Liquoflow® Go 2X is successfully used in commercial plants at a pH of 5.2, we have seen good liquefaction on rice at a pH of 4.8 and even lower.

Dosage

Liquoflow® Go 2X 150 - 250 g/ton starch

When applying a jet cooker with temperature above 100°C, a split enzyme dose provides the best process performance and optimum economy. This can be done by adding about one-third of the Liquoflow® Go 2X dose prior to jet cooking and the remainder during secondary liquefaction. We also recommend keeping the temperature for secondary liquefaction at 85-95°C for corn and sorghum and 85-90°C for other grains.

More specific dosage recommendations depending on grain type and conditions, can be obtained from Novozymes' Customer Solutions Support.

Storage in application

Ideal storage conditions are 0-25°C in sealed packaging in a dry environment protected from the sun. The products have been manufactured for optimum stability. However, enzymes gradually lose activity over time.

Extended storage and/or adverse conditions such as higher temperatures or increased humidity may lead to a higher dosage requirement.

Safety, handling and storage

Safety, handling and storage guidelines are provided with all products.

Get ahead

Staying ahead of the dynamic food and beverage market requires the best technology and expertise to become even more flexible, efficient and profitable. With our solutions and knowhow, Novozymes can support you on that journey. Let's transform the quality and sustainability of your business together.

About Novozymes

Novozymes is the world leader in biological solutions. Together with customers, partners and the global community, we improve industrial performance while preserving the planet's resources and helping build better lives. As the world's largest provider of enzyme and microbial technologies, our bioinnovation enables higher agricultural yields, low-temperature washing, energy-efficient production, renewable fuel and many other benefits that we rely on today and in the future. We call it Rethink Tomorrow.

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