

Novozymes Liquozyme® LpH

Viscosity reduction
at low pH – performance
without compromise



A new cost-effective alpha-amylase from Novozymes is designed for ethanol plants needing better viscosity reduction at low pH

Novozymes Liquozyme® LpH is a new, highly efficient alpha-amylase that reduces mash viscosity and breaks down starch to shorter dextrin chains, even at low pH.

For ethanol producers, the ability to reduce the viscosity of their mash results in more efficient and smoother operational performance. Novozymes Liquozyme® LpH offers industry-proven, extra-robust performance to ensure against pH excursions. In addition, this new alpha-amylase lets producers:

- Reduce or eliminate the need for ammonia in the cook process, resulting in a safer working environment, easier compliance and reduced risk
- Reduce the need for sulfuric acid in the cook process, providing cost savings
- Produce similar or higher ethanol yield compared to standard industry liquefaction products
- Potentially increase throughput

The formulation and performance of Novozymes Liquozyme® LpH provides an economical enzyme choice that you can trust.

Industry-proven

Plant trials with Liquozyme® LpH demonstrate robust, trusted performance at low pH conditions. Liquozyme® LpH provided up to a 40% improvement in viscosity in slurry, and up to 17% improvement in liquefaction, compared to a baseline mash with a competitive, commercially available low-pH alpha-amylase.

(Viscosity was determined as the time it took for one liter of mash to flow through a tube. So the slurry with Liquozyme® LpH moved through the tubing up to 40% faster than the baseline mash.)

At the same time, Liquozyme® LpH delivers equal or higher DE (dextrin equivalence) in the cook process when compared with another commercially available low-pH alpha-amylase.

Novozymes Liquozyme® LpH vs. competitive low pH AA

Better viscosity break

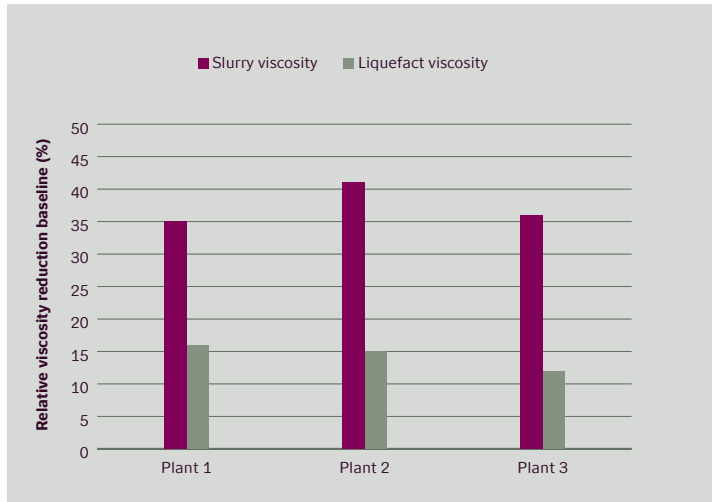


Figure 1: A competitive low-pH alpha-amylase provides a baseline at zero. The bar charts show the percentage in viscosity improvement in slurry using Novozymes Liquozyme® LpH. The gray columns show viscosity improvement with Liquozyme® LpH in liquefaction.

Performance of Novozymes Liquozyme® LpH vs. competitive low pH AA

Similar or higher DE

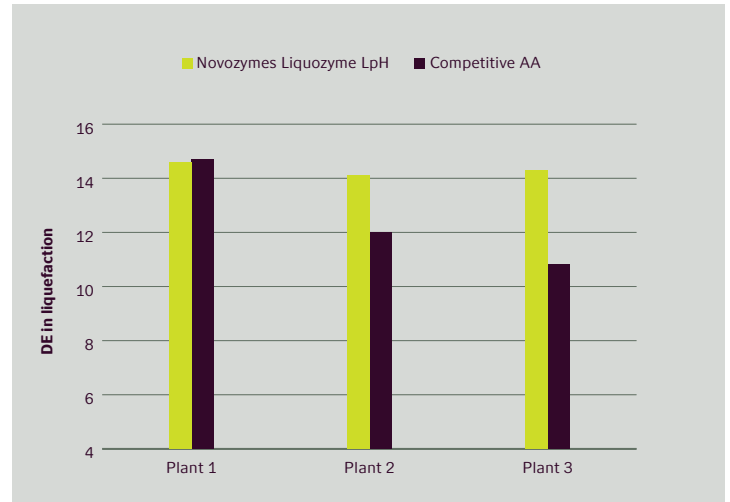


Figure 2: Liquozyme® LpH achieves equal or higher DE values in the cook process (green columns) when compared with a competitive low pH alpha-amylase (dark purple columns).

Designed for your operational needs

Novozymes Liquozyme® LpH is designed for ethanol plants that:

- Need better viscosity reduction at low pH and low enzyme cost
- Want to reduce or eliminate ammonia
- Want to run higher solids and increase throughput without sacrificing yield.

For more information

Contact your Novozymes account manager to learn more about Liquozyme® LpH.

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 to 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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Novozymes North America, Inc.

77 Perry Chapel Church Road
Franklinton, NC 27525
USA

Tel. +1 919 494 3000

Novozymes A/S

Krogshøjvej 36
DK-2880 Bagsvaerd
Denmark

Tel. +45 4446 0000

bioenergy.novozymes.com
[@NZ_Bioenergy](https://twitter.com/NZ_Bioenergy)

novozymes.com