



# Viscoferm<sup>®</sup>

– Increase output and save costs with High Gravity Fermentation

Viscoferm provides viscosity reduction plus higher alcohol output and cost savings from:

- Rye, wheat, barley, triticale, and oats
- Fresh cassava/manioc/tapioca
- Stale and difficult-to-process corn, rice, and other raw materials

#### Increased output/capacity by High Gravity Fermentation (HGF)

- HGF with DS levels up to 30–35%
- Thinner mash at higher solids (less water)

#### Reduced costs for energy, water, and operation

- Lower energy consumption (steam, electricity, oil, gas) as less water needs to be heated, cooled, and evaporated
- More flexible backset management
- Reduced fouling, cleaning, and wear of equipment

#### Increased efficiency

- Better mash flow and heat exchange operations
- Improved centrifuge and evaporator efficiency

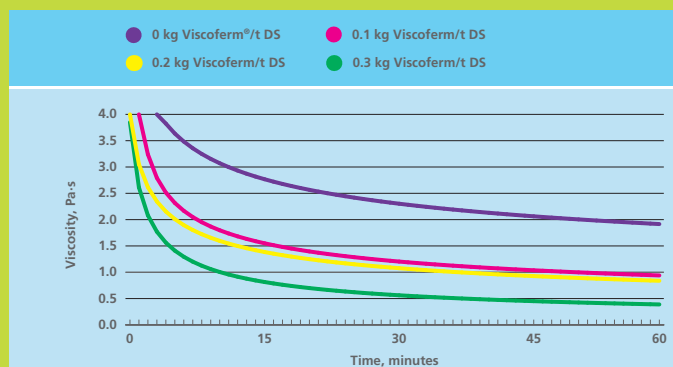
#### Flexibility in raw material usage

- Cereal and raw material composition can be changed and optimized according to price/availability



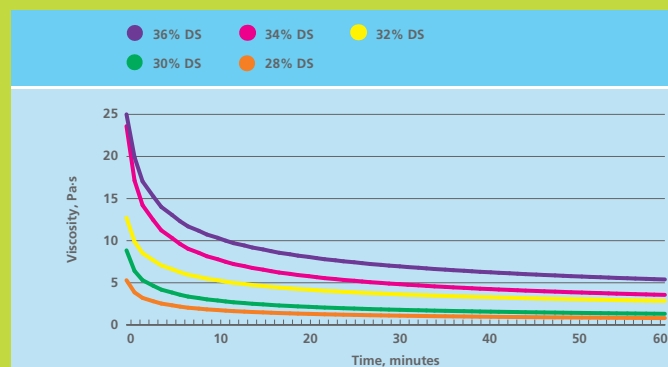
Novozymes is the world leader in bioinnovation. Together with customers across a broad array of industries we create tomorrow's industrial biosolutions, improving our customers' business and the use of our planet's resources.

### Viscosity reduction of mash with 50% wheat + 50% rye at pH = 5.0 and temperature = 50 °C



Modern production facilities need the flexibility to change raw material or to run with mixtures, for example wheat with rye. The figure shows the unique properties of Viscoferm<sup>®</sup> at a mash containing 50% wheat and 50% rye.

### Viscosity reduction of Viscoferm<sup>®</sup> as a function of mash dry substance



Viscoferm<sup>®</sup> effectively reduces the viscosity of mashes with high dry substance, making it a unique enzyme product for High Gravity Fermentation (HGF). With a dosage of 0.3 kg Viscoferm/t DS the viscosity of mashes with 100% dry-milled rye can be reduced by 80%. By using Viscoferm, rye mash slurries with as high as 36% DS can be made pumpable and easy to process. Viscoferm enables similar viscosity reduction for mashes of wheat, barley, and triticale.

100% rye: industrial test	Control – no VRE	Traditional VRE	Viscoferm <sup>®</sup>
DS achieved	13–15 °Bx	20–22 °Bx	> 26 °Bx
Alcohol content in mash (v/v)	6–7.5%	> 10%	> 14.5%
Capacity increase	Control	30%	> 90%
100% wheat: industrial test	Control – no VRE	Traditional VRE	Viscoferm <sup>®</sup>
DS achieved	14.5–16.5 °Bx	19–22 °Bx	> 26 °Bx
Alcohol content in mash (v/v)	8–9%	10–12%	> 14.5%
Capacity increase	Control	35%	> 70%

For more information, or for more office addresses, visit [www.novozymes.com](http://www.novozymes.com)

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