

A Comprehensive Enzymatic Strategy for Maximizing Yield, Process Efficiency, and Distillate Quality

SpiritoZym **MAM** & SpiritoZym **MAG** Applications

In grain-based distillate production, efficient starch conversion is essential for maximizing alcohol yield, supporting reliable fermentations and improving overall process performance.

SpiritoZym MAM and **SpiritoZym MAG** work synergistically throughout the production process, from liquefaction to saccharification and fermentation. Together, they optimize the conversion of starch into fermentable sugars, helping producers improve raw material utilization, increase process efficiency, and consistently produce high-quality distillates.

SpiritoZym **MAM**

High-Performance Thermostable α-Amylase



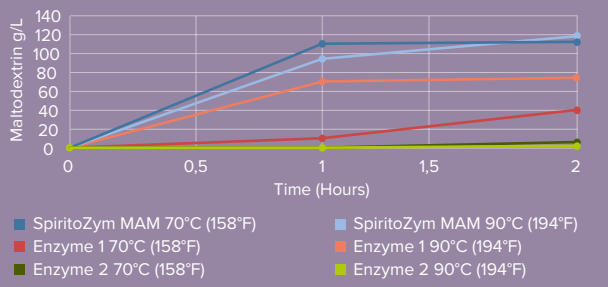
SpiritoZym MAM rapidly liquefies starch by breaking down α-1,4 bonds into soluble dextrins and oligosaccharides.
Its high thermal stability delivers reliable performance even under demanding high-temperature processing conditions.

Key Benefits

- Rapid and efficient starch hydrolysis
- Thermal stability up to 108°C (226.4°F)
- Reduced mash viscosity
- Increased availability of fermentable substrates

SpiritoZym MAM is ideal for high-starch mashes such as corn and grains that require high gelatinization temperatures.

Market reference comparison with SpiritoZym MAM



Higher starch hydrolysis performance than market reference enzymes, particularly under high-temperature conditions commonly used for corn and grain processing.

SpiritoZym **MAG**

Amyloglucosidase for Maximum Sugar Conversion

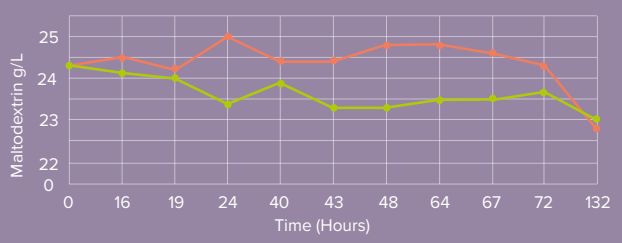


Produced from a selected strain of *Aspergillus niger*, SpiritoZym MAG converts dextrins and oligosaccharides into fermentable sugars, maximizing starch utilization and alcohol yield.
It can be added during saccharification or directly into fermentation to support fermentation stability and yeast performance.

Key Benefits

- Complete dextrin and oligosaccharide conversion
- Maximum fermentable sugar production
- Direct fermentation application
- More consistent and controlled fermentations
- Improved distillate quality through aroma preservation

Fermentation temperature



More stable fermentation temperatures with direct fermentation application.

RECOMMENDED ENZYMATIC PROGRAM

Mash Preparation

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Liquefaction
SpiritoZym MAM
90°C (194°F):
0.35-1 L/ton

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Saccharification
SpiritoZym MAG
60°C (140°F):
0.5-1 L/ton

or

Direct Fermentation
SpiritoZym MAG
30°C (86°F):
0.5-1 L/ton

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Maximum Yield
& Efficient Fermentation

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