



# ETHANOL PLANTS GET MORE FROM THEIR CORN WITH SPIRIZYME<sup>®</sup> ULTRA

High feedstock prices weigh heavily on ethanol producers and increase the importance of any performance improvement they can get out of their plant. Spirizyme Ultra, a new, premium glucoamylase for saccharification, effectively converts corn and other grains into fuel ethanol, improving yields and profits.

In recent years, the American fuel ethanol industry has been on an upswing. Ethanol producers have been riding a profitable combination of low raw material costs and rapidly growing product demand. But in recent months, the industry picture has changed significantly.

Today, corn prices have nearly doubled, ethanol prices have seen sharp ups and downs, construction costs have increased dramatically, and the industry is now seeking new markets to absorb huge increases in ethanol supply. In this competitive environment it is imperative that each plant optimizes its production and gets maximum value from its feedstock. With this in mind, many plants are looking to boost their ethanol yield per bushel\* of corn processed to thrive in this challenging environment.

Novozymes is working hard to provide ethanol plants with forward-thinking, process-optimizing solutions that improve their business – Spirizyme Ultra is one of these.

#### The freedom to choose

Spirizyme Ultra is a unique enzyme solution that allows a plant to squeeze the last drops of etha-

nol out of its corn. Each and every extra drop of ethanol means an increase in profits.

Spirizyme Ultra also allows a plant to run significantly faster fermentations without sacrificing ethanol yield. With faster fermentations, the plant increases ethanol output to maximize its return on investment.

Either way a plant chooses to go, Spirizyme Ultra improves production and this enables the plant to improve its efficiency and profitability.

#### Optimizing saccharification

Saccharification is the process of breaking a complex carbohydrate (starch) into its monosaccharide components, which can then be fermented into ethanol. It is an integral step in the ethanol production process.

During the saccharification of liquefied starch, enzymes are needed to break down the long dextrans into smaller glucose molecules. Then, during fermentation, the glucose is fed to yeast, which uses it as an energy source while the yeast produces ethanol. To get the most ethanol out of the fermentation process the yeast must be fed an abundant and constant source of glucose.

To maintain an optimal glucose concentration in fermentation, a high-activity glucoamylase with consistent, state-of-the-art quality is needed. Spirizyme Ultra is the best enzyme for the job.

#### Not all enzymes are the same

“It is important to understand that enzymes, even when they are quite similar types, are actually very different both in the way they perform and in their dosing requirements. The performance we see at individual ethanol plants can vary significantly depending on the exact enzyme in use. The choice of enzyme will impact the starch-to-ethanol conversion efficiency,” says Jack Rogers, Regional Marketing Manager, Novozymes.

Take for example glucoamylases used during saccharification. Novozymes produces two types of glucoamylases for this purpose – Spirizyme Fuel and now Spirizyme Ultra. But although both enzymes are used for the same purpose, there can be large differences in yield due to the different ways they convert dextrans to glucose during saccharification.

“Spirizyme Fuel is an established, cost-effective solution for ethanol plants to gain great ethanol

\* 1 US bushel of corn = 25.45 kg.



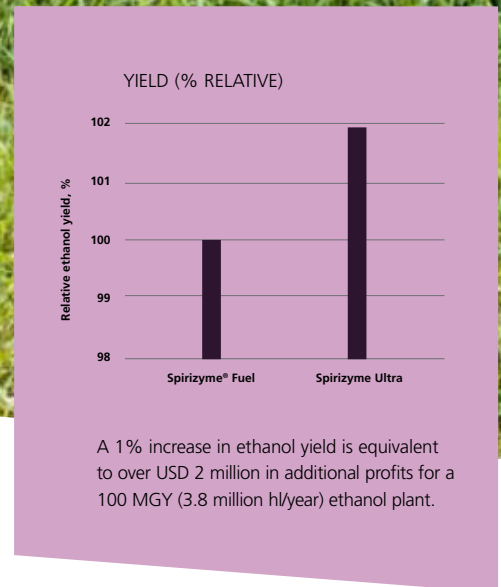
Spirizyme® Ultra improves the conversion of starch into glucose, increasing both ethanol yields and overall ethanol production to improve plant profitability.

“

Many of our customers tell us that Spirizyme® Ultra is the best saccharification enzyme in the market right now.

”

Tom Burns, Customer Solutions Manager, Novozymes



yields. It is the most popular glucoamylase in the world for ethanol production. Spirizyme Ultra has demonstrated it can take that high level of performance even further,” says Jack Rogers.

**Great feedback from plants**

Quite a few American ethanol plants have already run trials with Spirizyme Ultra and are pleased with the results. Those plants that have tried and are now using Spirizyme Ultra as their preferred saccharification enzyme say that this enzyme product really delivers great benefits to their production.

“Many of our customers tell us that Spirizyme Ultra is the best saccharification enzyme in the market right now. They see that it gives them better production efficiency and that they are able

to extract more ethanol from a bushel of corn,” says Tom Burns, Customer Solutions Manager, Novozymes.

This is especially important given the dramatic increase in corn prices. The fact that Spirizyme Ultra can increase ethanol yields makes it a great choice to combat higher feedstock costs.

“Our customers with fast-running plants tell us that Spirizyme Ultra is the most cost-effective way to run at high production levels. These plants see that this enzyme solution gives them better production and many are able to finish their fermentations much faster;” says Tom Burns. “While the usage cost is higher for this enzyme, the benefit to ethanol production is much greater and this contributes to higher overall plant profitability.” ■

**FOR MORE INFORMATION**

Jack Rogers  
 jckr@novozymes.com  
 Tom Burns  
 tjb@novozymes.com

