Seeds of Change
How a unique corn seed helped transform an ethanol plant’s operation

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Quad County Corn Processors (QCCP) earned a reputation for producing corn ethanol efficiently and profitably. But the dry grind ethanol plant, located in Galva, Iowa, did not always have an answer to the market variability and production challenges common in the industry. Approximately 4 years ago, a three-month period of trial and error led the plant to a unique solution that would transform its existing operation.

Breakthrough technology

This success story actually began in 2000 when Delayne Johnson, an original board member and now general manager of QCCP, and a group of like-minded supporters decided to become part of the growing ethanol business. Born and raised in a farming community only 7 miles from Galva, Johnson believed that corn ethanol could have a tremendous impact on his community.

“I knew by working at QCCP and becoming involved in the ethanol industry, I, along with our local farmers, would have an opportunity to succeed,” Johnson said. “We knew we could make an impact on our local economy. Our goal has always been to maximize our plant’s productivity and efficiency to bring value to our community.”

To reach that goal, QCCP searched for solutions that could break down its slurry and mash viscosity, allowing for an increase in solid levels and ethanol yields, while simultaneously reducing the use of energy and natural gas. Just like owners and managers of any other business, the team at QCCP wanted to make more ethanol at a lower cost. In 2009, it discovered a unique way to deliver alpha amylase enzyme — but it was not in liquid form like most traditional enzymes used in ethanol production. This enzyme was actually inside corn grain produced by Midwestern farmers.

“When we first learned about Enogen® corn from Syngenta, we were intrigued by the benefits and the potential to improve our plant’s profitability,” Johnson said.

Enogen corn features the only output trait designed specifically to enhance dry grind ethanol production. The revolutionary corn seed delivers alpha amylase enzyme in the corn kernel, which eliminates the need for liquid amylase. The enzyme found in Enogen corn helps create significant reductions in slurry viscosity, enabling unprecedented levels of dry solids loading (up to 36 percent in some cases). These changes can lead to downstream benefits, such as increased plant throughput or yield and reductions in natural gas, water and chemical use.

Growing local

An ethanol plant that has signed a commercial agreement with Syngenta works directly with local farmers to contract the necessary Enogen grain — only 10-20 percent of an ethanol plant’s total corn grind needs to be Enogen grain in order to achieve the desired results — paying them a per-bushel premium above market rates for supplying the plant’s alpha amylase enzyme.

“Learning that we could purchase our alpha amylase enzyme from local corn producers was another positive aspect of Enogen corn,” said Travis Brotherson, QCCP plant engineer. “We saw an opportunity to cultivate better relationships with area producers and redirect the money that we were sending out to liquid enzyme producers back into the local economy.”

In hopes of a long-term solution, members of QCCP agreed to trial Enogen grain. After using the grain once, they noticed an instant transformation.

Brotherson recalls the immediate change in the ethanol plant’s production during the trial.
“The plant smoothed out so much,” he said. “The alpha-amylase enzyme thinned out our liquefactions and we could actually hear the machinery begin to run smoother. It was an exciting time; we immediately saw the opportunities we had for increasing our alcohol yield and throughput, while reducing our use of energy.”

Although QCCP was pleased with the results of its 2009 trial, the plant had to wait until the corn seed was fully deregulated before signing a commercial agreement, which it did in December 2011, the same year Enogen corn received its deregulation.

**Partnership first**

On January 8, 2013, QCCP became the first ethanol plant to use Enogen corn in commercial production. QCCP and Syngenta worked together to make sure the transition was smooth. Carmen Costable, Enogen technical services manager for Syngenta, said grain contracting, infrastructure and process were key components of the transition. Stewardship of the contracted grain that local farmers grew, stored and delivered also was critical.

“During the entire transition from the trial into commercial production, there was a high level of communication and interaction between QCCP and the Syngenta team,” Costable said. “We worked collaboratively to assess the plant’s current operation and generate the inclusion protocol that defined the steps needed to switch the plant from its liquid alpha amylase to the alpha-amylase enzyme in Enogen grain.”

Once the plant began to grind Enogen corn, Syngenta assisted with monitoring, sample analysis and process recommendations. Additionally, the Syngenta team assisted with the setup of the plant’s new and expanded data collection system, which helped QCCP monitor, optimize and troubleshoot its operations.

**Proof positive**

Excitement and anticipation heightened as QCCP noticed positive results in the plant following the switch to commercial production. Employees who were absent during the introduction of Enogen grain were now questioning if the plant was “OK,” claiming it was much quieter than before. The noises they no longer heard were the once-rattling pipes in the plant’s cook section.

This revelation is one of many discoveries since commercial production began. Enogen grain has enabled more starch to be incorporated into the plant’s fermentation process, yielding a higher percentage of alcohol and saving on natural gas and electricity costs.
"We’ve increased our solids loading," Brotherson said. "That allows us to achieve higher ethanol concentrations (close to 15 percent) at the end of fermentation and use less energy in distillation. We’ve actually seen our energy usage per un-denatured gallon decrease by about 5 percent."

Even during less-than-ideal seasons, Enogen corn can make a positive impact.

"2012 was a very challenging crop to ferment," Brotherson said. "We saw less starch and more variability in the starch; but since we started using Enogen corn, our ethanol yields have actually increased by about 0.04 to 0.05 gallons per bushel."

Johnson agreed that switching to Enogen grain was a good business move.

“Our ethanol plant has had great results, and the transition has been very easy,” he said. “The decrease in energy costs and increase in number of gallons of alcohol produced per bushel of corn have been critical drivers to enhancing our bottom line.”

The community surrounding the plant also feels the positive effects.

“Just as important to us is that Enogen corn represents a unique value proposition for our community,” Johnson said. “We’re paying our local farmers an average premium of 40 cents per bushel for their Enogen grain. For some farmers, that could mean an extra $80 an acre. So that’s a win for QCCP and a win for the farmer.”

Prior to using Enogen grain, QCCP was spending approximately half a million dollars annually on liquid alpha amylase enzyme. Now that money can go to 27 local farmers, who, by growing Enogen corn, have become enzyme suppliers.

“This is a very good thing for our community and our local economy,” Brotherson said. “And we get the chance to cultivate those relationships with our local farmers as well.”

**Bright future**

As QCCP wraps up its second year of working with local farmers to produce and supply Enogen grain, the ethanol producer is excited about what the future holds.

In July of this year, QCCP broke ground on the construction of its bolt-on Adding Cellulosic Ethanol (ACE) technology, which will allow the plant to convert corn kernel fiber into cellulosic ethanol, effectively increasing the plant’s capacity by 6 percent.

“Enogen corn should be a nice complement to the ACE technology,” Johnson said. “We can continue to run a higher amount of solids in our fermentations, which should only enhance the capability of the technology.”

In addition to increased ethanol production, QCCP hopes the two technologies will work in tandem to increase the plant’s corn oil extraction while also creating a higher protein livestock feed which, according to Johnson, is “value-added agriculture at its best.”

Learn more about Enogen corn by visiting www.Enogen.net, or calling 877-4ENOGEN.