Ethanol Industry Turns to Plant Residue, Scraps

DAVID PITT - Associated Press - Associated Press

After decades of talk, the ethanol industry is building multimillion dollar refineries in several states that will use corn plant residue, wood scraps and even garbage to produce the fuel additive.

The breakthrough comes at a key time for the industry, after the drought heightened criticism about the vast amount of corn used to brew up ethanol rather than be transformed into animal feed or other foods. The corn crop already was smaller than expected because of drought last year, and livestock groups were especially critical of how 40 percent of the crop being diverted toward ethanol caused corn prices to soar.

The new cellulosic ethanol technology could quiet that criticism while also making use of material largely seen as worthless.

Experts said it hasn't been easy.

"You're fighting against millions, perhaps hundreds of millions of years of evolution and that's sort of the secular equivalent of going against the word of God," said C. Ford Runge, a University of Minnesota professor of applied economics and law.

Making ethanol from corn is relatively simple, as kernels are cracked and fermented. But to produce ethanol from the woody and fibrous parts of plants, scientists had to figure out a way to break lignin — the tough fibers that plants have developed through evolution to make stems, trees and corn stalks stiff — from the cellulose. They must then extract the plant's sugars and convert them into ethanol.

Efforts to make that leap have made for a punch line in the industry since the 1980s. Cellulosic ethanol, everyone would say, is just a few years away.

But high oil prices eventually drove companies to spend more on research and development. The government jumped in too. The 2008 farm bill provided $1 billion in financial incentives to encourage cellulosic development.

"You cannot underestimate the impact on the world of $80- or $90- or even $100-a-barrel oil," said Monte Shaw, executive director of trade group Iowa Renewable Fuels Association.

Oil futures first reached $100 a barrel in January 2008, marking a quadrupling of price in five years since 2003. Oil trades now at around $95 a barrel.

The push for more ethanol production comes amid federal requirements that the petroleum industry mix 36 billion gallons of the additive into the nation's fuel supply by 2022.

The Environmental Protection Agency has required that 16 billion gallons of that ethanol be cellulosic, providing another incentive for companies to pursue cellulosic research. Only about 25,000 gallons of cellulosic ethanol were produced last year, but 10 million gallons are expected in 2013.

"Suddenly technological development started to occur," said Adam Monroe, president of Novozymes North America, which makes enzymes used in cellulosic production.

Scientists found enzymes that more efficiently break down the plant material and better yeast strains to convert sugars to alcohol, clearing the way for cellulosic production.

About 70 cellulosic projects are under way, reflecting billions of dollars of private investment.

In Iowa, the nation's leading corn producer, two cellulosic plants are under construction that will use corn plant leaves, stalks and cobs known as corn stover.

Near Nevada, a small Iowa farming community about 40 miles north of Des Moines, DuPont is building a $200 million factory that when completed in 2014 will be the nation's largest cellulosic ethanol plant, capable of making 30 million gallons a year.

Scientists said it's a major step forward.

"We had lab experiments. That's all we had five years ago," said Jan Koninckx, a chemical engineer and DuPont's global business director for biofuels.

The DuPont plant will work with 500 local farmers to collect more than 375,000 tons of corn stover annually.

In northwest Iowa, two companies are teaming up to build another corn stover plant producing 25 million gallons of ethanol annually. Sioux Falls, S.D.-based ethanol-maker POET and Royal DSM, a biotechnology company based in the Netherlands, are building the $250 million plant in Emmetsburg.

Other cellulosic plants are under construction in Kansas, Michigan and Mississippi. Plants in Georgia and Nevada will convert garbage into ethanol in commercial-size plants. One in Florida will convert yard waste and other plant material from a nearby landfill to the fuel additive.

Other projects are testing the feasibility of making ethanol from fast-growing trees and various grasses.

If cellulosic production can ease the demand for corn, the change will be welcomed by livestock producers who have been infuriated by rising feed costs.

"The bottom line is it's all about the competition for corn," said J.D. Alexander, a

cattle feeder and corn producer from Pilger, Neb., who is president of the National Cattlemen's Beef Association.

The ethanol industry said millions of gallons of cellulosic ethanol should begin flowing this year and rapidly increase over the next few years.

Wade Robey, a board member at POET-DSM Advanced Biofuels, said the companies are confident the new plants will be profitable.

"We feel very strongly this is a good business to be in and a good investment for our companies," he said.

Some companies, including DuPont and Abengoa, acknowledged they are already looking at sites for more cellulosic plants.

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