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2 Florida professors, sugar producer team up on ethanol plant

BY OSCAR CORRAL
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Scientists at the University of Florida and Florida International University are moving ahead with plans to build the state's first cellulosic ethanol plant on land belonging to sugar giant Florida Crystals.

It would be the state's most ambitious biofuels project using technology that has only been used on a couple of small pilot projects around the country. If successful, it could help unleash a powerful new energy production tool, and pave the way for Florida's sugar growers to become an energy powerhouse.

The technology was developed by Florida scientists who vow to lay the seeds for the fuel of the future.

The low-tech inspirations for the breakthrough: E. coli and tequila. Scientists are billing it "next generation ethanol" or "ethanol 2.0."

Unlike the controversial ethanol produced from corn in the Midwest -- a move that has sent food prices soaring globally -- the Florida plant will not use food products. That's because cellulosic ethanol is made from the inedible portions of plants: the stems, leaves, husks, hulls.

"There is no food versus fuel controversy," said Florida International University chemical engineering Professor George Philippidis, associate director of the school's Applied Research Center. "That's the beauty of this second-generation ethanol technology. Unlike corn, we are looking for sustainable ways to make ethanol in the long run."

Some scientists believe the overall impact of cellulosic ethanol production on the U.S. economy will be positive because it could help jump-start moribund farms, reduce the demand on foreign oil and create jobs.

Bruce Dale, a professor of Chemical Engineering at Michigan State University, published a report last year that concluded "the entire U.S. economy will benefit from a strengthened fuels and chemicals sector."

CRITICISM

But cellulosic ethanol is not without its critics and skeptics.

Cornell University Ecologist David Pimentel says cellulosic ethanol is not commercially viable because it requires too much energy and biomass to produce every gallon. For example, he said, a cellulosic ethanol plant would require three to five times more cellulosic biomass to get the same quantities of sugars and starches that corn has.

"To get starches and sugar out of cellulosic material you have to use a strong acid or an expensive enzyme, then you have to stop the acidity using an alkaline," Pimentel said. "That's why there isn't a single ethanol plant in the world that is using cellulosic biomass to produce ethanol. It's because of economics and energy."

Pimentel said he supports the idea of building a research and development plant to try to solve some of those questions. However, even if efficiency is significantly increased, Pimentel said cellulosic ethanol will probably never be able to provide more than five to seven percent of the country's liquid fuel needs.

"Remember, there isn't as much biomass out there as one would like to think," Pimentel said. "Ethanol alone will not solve this country's energy problems."

Still, the Florida scientists who are working on the project say that it's a step in the right direction to produce sustainable fuels that have much cleaner emissions than fossil fuels.

"We began our research after several oil crises and standing in line for gasoline," said University of Florida Microbiology Professor Lonnie Ingram, who has patented several processes to turn cellulosic matter into ethanol.

The way it would work is that biomass would be piled up next to the plant, and processed through a chemical factory to create ethanol. Supporters say it's crucial to have the raw materials close by to reduce transportation costs.

PRINCIPAL PRODUCT

Bagasse, the mulch-like refuse that remains after sugar cane is squeezed, will be the principal product used to make the cellulosic ethanol, along with yard waste brought in from South Florida. Florida Crystals will also provide the land, utility services and maintenance.

The sugar producer is no stranger to the energy market. For years, Florida Crystals has been producing its own electricity by burning bagasse, and selling the excess electricity it produces back to Florida Power & Light.

The state of Florida provided Ingram with a \$20 million grant to build the plant. Philippidis received another \$2 million grant to study the pre-treatment phase, which

has proven to be the trickiest in terms of making cellulosic ethanol commercially viable.

Florida Crystals views cellulosic ethanol as a business with potentially big profits in an era of high gas prices.

"Liquid fuels are something Florida Crystals wants to get into," said Steve Clark, Florida Crystals' director of Industrial Research and Development. "The long-term goal . . . is to be more than a sugar company; it's to be in the forefront of energy development, both power and liquid fuels."