Sweet Potato Ethanol

South Carolina Breeder Creates Sweet Potatoes For Processing

Janice Ryan-Bohac holds a conventional sweet potato (left) in comparison to an eTuber.

Janice Ryan-Bohac dreams of turning her new and improved industrial sweet potato into a prolific feedstock specifically-intended for ethanol.

Ryan-Bohac is a sweet potato breeder and owner of Carolina Advanced Renewable Energy (CAREnergy), LLC, a Charleston, SC-based company that she founded in 2008 to develop the eTuber™ sweet potato.

According to Ryan-Bohac, the eTuber is to a conventional sweet potato what a bowling ball is to a softball.

Ryan-Bohac worked as a sweet potato breeder for the U.S. Department of Agriculture's Agricultural Research Service in Charleston for 20 years until she took early retirement in 2007 to work on the eTuber.

Using conventional breeding techniques, she developed sweet potatoes with 50% more dry matter than current leading U.S. varieties, greatly increasing the ethanol-processing potential. Currently, she is incorporating multiple insect and disease resistance into this type of sweet potato.

Although the sweet potato is a minor vegetable crop in the United States, traditionally served at Thanksgiving dinner, it is the seventh most important crop in the world in terms of planted acreage, according to Ryan-Bohac.

An eTuber™ can reach bowling ball size.

Major Crop in China

Sweet potato is a major crop in China, which is the world's leading sweet potato producer, Ryan-Bohac said, adding that ethanol plants are under construction in China and Brazil which will use industrial sweet potatoes as a dedicated feedstock.

The patent-pending eTuber sweet potatoes developed by Ryan-Bohac have yielded enough starch to produce 1,500 to 1,800 gallons of ethanol an acre, if allowed to grow for 150-160 days, she said.

According to the National Corn Growers Association, a bushel of corn processed by a dry grind ethanol plant produces three gallons of ethanol. That means an acre of corn that yielded the 2010 national corn-growing average of 152.8 bushels would produce 458.4 gallons of ethanol per acre, or one-quarter to one-third as much ethanol as the eTuber.

Ethanol Processing

Because sweet potatoes grow best in the southeastern U.S., Texas, and California, where the growing season is longer, they would be a complementary feedstock for a corn-based ethanol plant, Ryan-Bohac said. The eTuber's starch can be processed in a corn ethanol plant as a blend with corn or by itself, she added.

Ryan-Bohac has been conducting on-farm growing tests in South Carolina and with researchers in Alabama, Georgia, and Florida and is testing improved methods to mechanize planting and harvesting of the industrial e-Tuber crop.

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> **- Janice Ryan-Bohac, founder and owner, CAREnergy**

She also is participating in sweet sorghum trials to evaluate that crop's potential in South Carolina and Florida.

"We would propose having a multi-feedstock ethanol plant using sweet sorghum and sweet potatoes," she said. "They have a good crop rotation and both crops produce a significant amount of ethanol per acre. We can squeeze the sugar from the sorghum plant, and then use the biomass to run the plant, like they do with sugar cane in Brazil."

Jerry Perkins, editor