

DTN Weekly Distillers Grain Update  
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#### DISTILLERS GRAIN WEEKLY MARKET COMMENTS

##### DDGS Could Prove Future Source for Bio-Plastics

By Cheryl Warren  
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OMAHA (DTN) -- Research at Iowa State University could provide another use for distillers grain, according to Richard Larock, professor in ISU's chemistry department.

Larock and other ISU researchers have been conducting research for about 10 years in using soybean, corn and other bio-based oils to make plastics and composite materials. Recently, they have begun studying using DDGs as reinforcement material in these plastics.

The research team has experimented with a number of bio-based oils -- including tung oil, peanut, sunflower, fish oil, etc. -- but found the most industrially-promising materials can be made from corn and especially soybean oil, because they are the cheapest oils at about half the price of most petroleum-based materials. The bio-based oils are also naturally renewable and possess high molecular weights, making them suitable for plastics, which are high-molecular-weight products.

Besides being cheaper, the natural oil bioplastics have other desirable qualities, such as their ability to dampen noise and vibrations. Those qualities might be valuable for applications in automobile or airplane cabins, or for appliances, such as washing machines, he said.

The corn- and soybean-oil plastics also have another valuable quality in that they have shape memory. The material can be molded in one shape, heated, and the shape changed after cooling, and upon reheating the plastics will return to their original shape. Larock said this quality would be valuable, for instance, in making connections for two different-sized pipes.

Another possibly valuable attribute, though it needs more research, is that the bio-based plastics should be fairly bio-degradable.

The Larock group is working with Rockford, Ill.-based Agvantage Inc. and Muscatine, Iowa-based manufacturing company R3 Composites to build hog feeders from their bio-based plastics. Besides being tough enough to stand up to hungry hogs, the design for the feeders includes radio frequency identification technology that can monitor and record the feeding habits of individual hogs. The design is complete, Larock said, and the manufacturer is working on the mold. The product should be ready for commercialization by the end of 2007.

Part of the ISU team's research is in using materials as reinforcement to add strength to the plastics. Wanting to get away from petroleum-

based materials, one alternative that the team has used is glass fibers, since they are very cheap, he said. Plastics can also be made with wood flour, and kenaf fiber, something that is receiving a lot of attention for its strength.

Another alternative for reinforcement materials is DDGs. The fiber content in DDGs is one attribute that may be suitable for this purpose, as well as the fact that their oil content is compatible with the oil content in the plastics.

Although DDGs may be a useable alternative, they are limited in that they are not as strong as glass fiber, he said. But in spite of this, DDGS may be suitable for applications where strength is not so much an issue, such as ceiling panels and door liners.

Although Larock's team has been conducting research in bio-based plastics for about a decade, using DDGs is an option that has recently burst onto the scene.

As far as speculating on what other possible uses there may be in using DDGs in plastics, Larock said the team is just beginning to look at the possibilities.

"It's still fairly early in our work, we're not that far along," Larock said. "Right now it's hard to tell, since we don't have much information in the way of physical properties."

He said that more research is being planned on utilizing DDGS, of course, if funding is available. Currently, some of the preliminary funding is coming from a USDA grant for investigating a variety of agricultural co-products for bio-based composites.

"It's definitely worth looking into. A lot of people are interested in looking at DDGs, since they are so plentiful and so cheap," he said. "There could be a lot of interesting materials coming out of it, though it's a little early for anyone to say what that might be."

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