Oil Spill Cleanup Product Made From Sugar Byproduct

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Louisiana marshlands of tall grasses, soft soils and shallow water make ideal habitats for scores of birds, fish, reptiles and mammals. But when an oil pipeline or a barge leaks and spews its contents on the water, the marsh itself becomes a major obstacle to cleanup equipment.

But a biodegradable product that can clean up spilled oil in those hard-to-get-to places now is on the horizon, thanks to the work of a researcher at the Louisiana State University Agricultural Center.

Dr. Gary Breitenbeck, a soil microbiology and environmental researcher in the agronomy department of the LSU Ag Center, used milled bagasse -- the fibrous leftovers from sugar production -- to soak up spilled oil and create an environment that sustains the bacteria that digest the goo.

"The oil transportation industry needed something to trap spilled oil. And because of the difficulty of recovering such material from marshes and similar wetlands, it had to be disposable," Breitenbeck says. "This product can be applied to vegetated wetlands and promote oil disappearance without having to be recovered later."

As he was looking for a material that had a natural absorbency to attract the oil, Breitenbeck discovered milled bagasse has the properties he was looking for. And it's a waste byproduct of the sugar industry, besides.

"It's naturally absorbent and has an uncanny ability to absorb the same amount of oil whether it's wet or dry," Breitenbeck says. "And treating it with ammonia creates a nitrogen-rich environment for the 'bugs' that digest the oil."

Milled bagasse fibers from 1/2-inch to 1 inch long are spread over the water where oil has been spilled. The fibers create a mat-like form when they get wet, and they don't dissipate and sink in the water, Breitenbeck explains. They also maintain their effectiveness for a significant time after they're treated with ammonia, so the material can be put in storage and be ready to go when it's needed.

"With ammoniated bagasse, 98 percent of spilled oil will be gone within 90 days," Breitenbeck says. "It holds the oil and doesn't let it be displaced by water. And, it's self-composting and actually turns crude oil into humic material -- soil."

Breitenbeck's process puts the bagasse, along with ammonia and air, in a reactor and pumps up the pressure to 1,000 pounds per square inch. The high pressure drives the ammonia into the fibers and produces nitrogen compounds the microbes use to convert the hydrocarbons into humic material.

"The ammonia also acts as an oxidizing agent to help form more sites where the hydrocarbons can attach to the bagasse," he says.

Now that the ammoniated bagasse has been shown to be effective in creating an environment for bio-remediation, Breitenbeck is testing inoculants to improve the effectiveness of the process. "Adding microbes to the material can improve the efficiency of the process, especially in sandy areas where they aren't as prevalent," Breitenbeck says.

"Inoculating the bagasse with powerful microbes can even increase the effectiveness where naturally occurring microbes live in marsh mud," he adds.