Decolorizing Textile Wastewater

When the textile industry dyes cotton fabrics, not all of the dye ends up on the fabrics. Some becomes a wastewater disposal problem. Decolorizing wastewater is expensive, but researchers hope to make the process cheaper and more environmentally friendly.

"An ideal dye adsorbent should allow the industry to reuse water rather than dump it—laden with dye and bleach—into streams after one use," says Joseph A. Laszlo. He is a chemist at the National Center for Agricultural Utilization Research in Peoria, Illinois.

Aware that a product called quaternized cellulose, although expensive, quickly binds ample amounts of acidic dyes to itself, Laszlo tried making a substitute from a crop residue instead of from purified cellulose.

Sugarcane bagasse, a cheap and plentiful byproduct of sugarcane processing, seemed a good choice. And while bagasse is bulky and expensive to ship, it is produced in textile regions in Louisiana and Florida.

Laszlo converted finely ground bagasse into a quaternized anion-exchange resin. Quaternizing is a chemical process in which ammonium compounds introduce a permanent positive charge to a material. The same chemistry is applied in dyeing some cotton fabrics.

In his studies, Laszlo treated quaternized bagasse resin with epichlorohydrin to make it more durable and capable of adsorbing more dye. During adsorption, a thin layer of dye molecules adheres to the bagasse surface.

The research showed that quaternized bagasse resin adsorbed about 28 times as much of a textile dye—Remazol Brilliant Red F3B—as did untreated bagasse. And it was 16 times more effective than activated charcoal, a decolorizer commonly used in industrial wastewater treatments. The bagasse resin adsorbs the dye within 15 minutes, versus 2 hours for the activated charcoal.

Cost of chemicals for making each kilogram (2.2 pounds) of the bagasse resin was about $2.

Typically, a dollar's worth of resin would treat 1,325 gallons of wastewater containing more than a half pound of residual dye from treating 110 pounds of fabric. Moreover, the wastewater could be recycled.

Laszlo's studies show the biodegradable resin could also be recycled several times by treating it with sodium hydroxide. But with each recycling, the resin's ability to bind dye diminishes.

To further evaluate quaternized cellulose, Laszlo is scaling up the research and seeking industrial cooperators to speed technology transfer.—By **Ben Hardin,** ARS.

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Southwest Runner Peanut Resists Blight

Peanut aficionados take note: Fluctuations in peanut prices might be avoided as researchers succeed in helping the industry avoid widespread crop yield disasters.

And here's some more good news: A new peanut variety that resists a blight caused by the soilborne *Sclerotinia minor* fungus in unseasonably cool and damp late-summer weather will soon be making its debut in the Southern Plains.

That means farmers may not have to decide between either spending about $40 per acre for each of two or three fungicide applications or not treating fields and losing up to a quarter of their crop. The fungicide typically increases production costs about 5 cents per pound.

Southwest Runner, the first *Sclerotinia*-resistant variety of the most prevalent market type of peanut—runner, is recognizable by the kernels' oblong or variable shapes.

Hassan A. Melouk, an ARS plant pathologist at Stillwater, Oklahoma, along with plant breeder James S. Kirby and colleagues at Oklahoma State University, developed the variety.

Investment in the research is expected to pay off to the tune of $12 to $14 million annually in Oklahoma and Texas, where about one-fifth of the nation's peanuts are planted. In fields that are free of the blight, the new variety produces peanuts with yield, grade, and value per acre equal to other modern varieties.

But in fields heavily infested with the *Sclerotinia* fungus, the new variety's performance is exceeded slightly by Tamspan 90.

Development of this, the first *Sclerotinia*-resistant peanut of the Spanish market type, was completed about 5 years ago by Melouk and colleagues at Texas A&M University at College Station. [See "Confronting a New Fungal Nightmare," *Agricultural Research*, November 1991, pp. 20-23.] Spanish peanuts are the small-seeded round peanuts that are popular cocktail-party fare.

As a runner-type peanut, Southwest Runner should easily merit acceptance in the marketplace, Melouk says. The researchers found the variety has flavor and chemical composition similar to others now being grown.

"From some 150,000 pounds of Southwest Runner foundation seed planted by seed companies in May of 1995, we're hopeful that farmers in Oklahoma and Texas may be able to plant more than 28,000 acres in 1996," Melouk says.—By **Ben Hardin**, ARS.

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