Measuring Soil Components—in the Field

An instrument designed to provide in-field analysis of key soil constituents may be on the horizon. A prototype has been built and tested for mechanical durability by Veris Technologies, part of Kejr, Inc., of Salina, Kansas. It consists of a thick soil shank with a sensor that uses near-infrared-reflectance spectroscopy to take readings through a sapphire "window" on its bottom. Initial field trials have demonstrated an ability to measure moisture, organic carbon, and total nitrogen in soils.

Data from on-the-go soil analyses—particularly of important components like nitrogen and carbon—could help growers and land managers adjust their field applications of fertilizer and pesticides for optimal agricultural benefit and minimal environmental harm. The device can also be used to measure in-soil carbon storage, a topic of growing interest because of the potential for soils to help reduce the buildup of greenhouse gases in the atmosphere.

Laboratory analyses of soil samples and interpretation of data are being completed under a cooperative research and development agreement with Veris Technologies. *David A. Laird, USDA-ARS National Soil Tilth Laboratory, Ames, Iowa; phone (515) 294-1581, e-mail laird@nstl.gov.*

High-Fiber Fat Replacement May Help Trim Waistlines

Z-trim, a natural food ingredient made from crop-processing byproducts, such as oat, soybean, or rice hulls, may be on its way to commercialization. It has been found to act as a satisfactory fat replacement in many processed foods, helping to give them pleasing texture, mouth feel, body, and moisture retention.

Tests have shown that Z-trim works well in dairy products, baked goods, pasta, snack foods, ground meats, and nutritional drinks. It adds no calories and provides insoluble fiber that aids digestion.

Developed in 1995 and patented in 1998, it was originally licensed by FiberGels Technologies, Inc., and more recently was acquired by Circle Group Internet, Inc., of Mundelein, Illinois. With demand for carbohydrate-based fat replacements rising, the company plans to seek commercial food processors to help market Z-trim. Forecasts have predicted a potential $360 million market by 2004. *George E. Inglett, USDA-ARS National Center for Agricultural Utilization Research, Peoria, Illinois; phone (309) 681-6363, e-mail inglett@ncaur.usda.gov.*

Temperature Rise Might Stall Seed Yield

Although higher carbon dioxide levels expected from global changes under way may increase forage and seed crop yields under optimum temperatures, global warming might also leave seed crops partly sterile. What's most threatening to cereal grains and legumes is the potential rise in temperatures. Research has shown that for every 2˚F the temperature increases above ideal levels, seed productivity decreases about 10 percent. But photosynthesis and plant size aren't much affected until much higher temperatures are reached.

Elevated-temperature studies have shown that either pollination of individual flowers fails completely or seeds of some crops develop poorly, even when fertilization is successful. Breeders hope to use traditional techniques to build in tolerance to hot environments, if high-yielding wild relatives—or even current cultivars—can be identified. Cultivars that shed pollen earlier in the day, when temperatures are cooler, would be more likely to flourish. Genetic engineering could help scientists introduce desirable genes for such traits from other plants. *L. Hartwell Allen, Jr., USDA-ARS Crop Genetics and Environmental Research Unit, Gainesville, Florida; phone (352) 392-6180, e-mail lhajr@gnv.ifas.ufl.edu.*

Activated Carbons From . . . Poultry Litter?

The billions of chickens raised annually by U.S. growers produce a lot of manure-laden litter. It's worth about $3 to $10 a ton when sold for use as fertilizer. But the topical application of manure to farm fields can lead to a leaching of nutrients that contributes to costly pollution of rivers and streams. And unused poultry litter presents a very large waste-disposal problem.

Scientists have long searched for uses that would not only solve the manure-disposal problem, but would also generate revenue. Now, a way has been found to convert poultry litter into activated carbons that can be used to soak up environmental pollutants. Bituminous coal and coconut shells are the two materials most commonly used to manufacture activated carbons today. Coal is an expensive and nonrenewable resource, and coconut shells are not readily available here. But poultry manure is plentiful and cheap.

When pelletized and activated under specific conditions, poultry litter becomes a highly porous material with a large surface area. Early tests showed that these activated carbons perform well in adsorbing copper, which suggests that they may do well as a wastewater filter for other metal ions. Their adsorption capacity may also make them more cost effective than activated carbons on the market. Researchers are seeking a commercial partner to further develop this innovative technology. *Isabel M. Lima, USDA-ARS Commodity Utilization Research Unit, New Orleans, Louisiana; phone (504) 286-4475, e-mail imlima@srrc.ars.usda.gov.*