Science Update

Fowl Air Could Fly the Coop

A simple scrubber for cleaning air exhausted from poultry houses and swine facilities has now been patented. It reduces levels of potentially harmful ammonia, dust, and disease-causing microbes in the exhaust. Ammonia is especially troublesome in winter, when farm buildings are closed up to conserve heat. Not only is ammonia's odor offensive, high levels of it can harm agricultural workers as well as poultry and swine. And if vented off into the atmosphere, ammonia can contribute to acid rain and buildup of nitrogen in fragile aquatic systems.

This innovative "wet scrubber" sends a solution of alum—aluminum sulfate and water—cascading down a series of wooden slats, grabbing ammonia, dust, and pathogens as it falls. Since discovery of its antipollution power nearly 15 years ago, alum has become a proven ammonia and phosphorus combatant that's often used during production of around 700 million chickens annually in the United States. Other new air-cleaning and -filtering technologies are also under development. *Philip A. Moore, USDA-ARS Poultry Production and Product Safety Research Unit, Fayetteville, Arkansas; phone (479) 575-5724, e-mail philipm@uark.edu.*

Antioxidant Relativity

Efforts are under way to ascertain just how consumption of different fruits affects our antioxidant status. Researchers measured the plasma (blood) antioxidant capacity (AOC) immediately after volunteers consumed blueberries, cherries, dried plums (prunes), dried-plum juice, grapes, kiwis, or strawberries. They found the various fruits' free-radical-busting compounds to be complex and not uniformly absorbable. For example, though plums have a high antioxidant content, they didn't raise plasma AOC levels in volunteers. That may be because a major phytochemical in plums, chlorogenic acid, isn't readily absorbed by humans. And while consumption of grapes and kiwifruit led to noticeable spikes in plasma AOC, it's not yet clear which fruit compounds led to the increased levels.

This research is a first step toward establishing recommendations for dietary antioxidants. *Ronald L. Prior, USDA-ARS Arkansas Children's Nutrition Center, Little Rock, Arkansas; phone (501) 364-2747, e-mail priorronaldl@uams.edu.*

How Cowpeas React to Attack

Lacking as they do the sensory organs of animals, it's been a mystery how plants perceive perils in their environments. Now research has shown that cowpeas *(Vigna unguiculata)* detect and respond to degradation products when their tissues are chewed on by fall armyworms. This is the first time the researchers observed such plant response to insect attack, although they'd previously noted the ability of certain plants to indirectly perceive, and respond to, assaults from pathogenic microbes.

Armyworms *(Spodoptera frugiperda)* defoliate a wide range of crops, causing extensive damage and economic loss. The scientists isolated and identified a small peptide, called "inceptin," from armyworm larvae's oral secretions. The peptide triggers production of ethylene and a series of other defense-related phytohormones in cowpeas. Such defense responses may impede the pests' growth or promote advantageous interactions with beneficial organisms. Researchers hope to eventually intensify this defense response, to boost the plants' ability to protect themselves. *Eric A. Schmelz, Chemical Research Unit, USDA-ARS Center for Medical, Agricultural, and Veterinary Entomology, Gainesville, Florida; phone (352) 374-5858, e-mail eric.schmelz@ars.usda.gov.*

A Quick Check for Xylella

Detecting the various strains of the *Xylella fastidiosa* bacterium—best known for causing Pierce's disease in grapes, but responsible for other plant maladies as well—has been tedious and challenging.

Now a two-step method for extracting and analyzing bacterial DNA from inside an insect can be completed in under a day. One step relies on a commercially available DNA-extraction kit, the other on a DNA-amplification protocol that uses primers to prove the presence of a particular *Xylella* strain. The new method is also more powerful than the currently used ELISA test, which can't recognize low levels of the bacterium. *Qi Huang, USDA-ARS Floral and Nursery Plants Research Unit, Beltsville, Maryland, part of the U.S. National Arboretum, Washington, D.C.; phone (301) 504-9159, e-mail qi.huang@ars.usda.gov.*

Having It Both Ways in Ethanol Production

Researchers are hard at work on refining new food and feed products from the large quantities of nutritious residue generated by energy processing from farm crops. Called "distillers dried grains"—or "distillers dried grains with solubles," DDGS—the material comprises protein, fat, fiber, unconverted starch, and ash.

Flour ground from this material is higher in protein and lower in starch than regular flour. Work is under way to perfect an acceptable functional flour substitute from the DDGS flour—a resumption of efforts begun in the 1980s and abandoned for lack of interest. Many new ethanol plants can be designed for production of food-grade ingredients, which is critical for producing acceptable DDGS-based foods.

Another potential significant use for DDGS is as pelletized feed for livestock. There's also considerable interest in blending DDGS with corn and soy flour, as well as other ingredients, to make pelletized fish food for aquaculture production. Such a product would add value to the low-value DDGS while reducing pressure on wild-caught species currently fed as fishmeal. *Kurt A. Rosentrater, USDA-ARS North Central Agricultural Research Laboratory, Brookings, South Dakota; phone (605) 693-5248, e-mail kurt.rosentrater@ars.usda.gov.*