

evenly we can protect the crop," he says.

But until aflatoxin contamination can be prevented, safe and effective decontamination procedures must be available, says Douglas L. Park, an associate professor of nutrition and food science and head of the Mycotoxin Research Program.

One decontamination measure involves treating contaminated products with ammonia under high pressure and high temperatures. This approach, Park says, is the most promising one. The

U.S. Food and Drug Administration has withheld approval of ammoniation as a detoxification procedure due to the lack of information about the toxicity and cancer potential of ammoniation byproducts.

Since then, a number of studies have provided new information, several of which were Park's. When 20 years of research on detoxification and biological testing of the process are viewed as a whole, he says, the safety and efficacy of ammoniation are amply supported.

The process now is permitted only in

certain areas and only for use in animal feed. California, Arizona and Texas allow ammoniation for treating cottonseed, and Texas, Alabama, Georgia and North Carolina use it for corn. Outside the United States, Mexico and South Africa permit ammoniation for corn, and France, Senegal, Sudan and Brazil use it for peanuts.

Park recently began a study for the Mexican Compañia Nacional de Subsistencias Populares (CONASUPO)—the Mexican department of agriculture—to determine whether the ammoniation

Food Safety Concerns

By Lorraine Kingdon

In survey after survey, people stress that food safety is a major concern. Many share a belief that they're being poisoned; often people blame the food industry as contributing to their lack of health. A common misconception is that the diet-cancer relationship is due entirely to carcinogens in our food supply.

"People have a chemophobia about our food supply," says Ralph Price, an associate professor in the University of Arizona Department of Nutrition and Food Science. "They typically respond in one of two ways. Either people 'go natural' or give up and eat anything because they believe 'everything makes you sick.' Both responses concern food scientists.

"We're trying to promote food safety and a varied diet that contains high-nutrient foods," Price says. He believes food scientists would answer the same surveys about food safety entirely differently from people who are concerned about their diet but are not nutrition-educated.

"Pathogenic microbes—disease-causing organisms—are the No. 1 danger in the food supply," Price says. "And lay people don't even mention this problem. Also, people need to know that natural toxicants exist in products such as teas. 'Natural' is not necessarily safe."

The growth in "health-food" products has led to using exotic and potentially dangerous herbal substances in diets. Poisonings are becoming more frequent, according to the American Association of Poison Control Centers. Naturally occurring food-borne toxins can act as neurotoxins, immunotoxins and teratogens inducing birth defects.

Toxic substances in foods also can form during cooking or other processing, but additives themselves are rarely to blame. Heterocyclic amines sometimes produced during cooking meat at high temperature are among the most potent mutagens ever described. Proteins and carbohydrates can react during baking to form mutagenic browning products. Storing agricultural commodities can result in mutagenic lipid oxidation by-products.

"It's prudent to assume that the epidemiologic associations between diet and cancer are due, in part, to initiation of the cancer process by these—and other—food-related carcinogens," Price says. About 35 percent of the variation in cancer rates among individuals and populations in the United States is related to the diet. By comparison, genetic predisposition, industrial pollution and food additives play only minor roles in human cancer rates.

"Increasing the consumption of chemoprotective agents—such as fruits and vegetables—greatly appeals as

OVERVIEW



Ralph Price examines some of the processed foods that play a large part in today's diets.

a way to reduce the rate of cancer," Price says. Scientists also are interested in the role that dietary supplements or modern molecular genetics can play, but these need to be evaluated carefully before they can be recommended. Designer foods for maximum chemopreventive safety are already being tested in human trials.

"The U.S. food supply is one of the safest in the world," Price says. "Our life spans have increased partly because we have better food, but still the battle to keep improving our diet goes on."

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