



# FRI Newsletter

FOOD RESEARCH INSTITUTE

UNIVERSITY OF WISCONSIN-MADISON

## DIRECTOR'S REPORT

The past few months have brought a flurry of activity to FRI. At our Annual Meeting in April, we were glad to see many of you and give tours of the new Microbial Sciences building. With Eric Johnson and his research staff moving to MSB in June, all of FRI is back under one roof!

This year we had a booth at the IAFP meeting in Texas. We appreciated the chance to talk with many sponsors and others who have worked with FRI, and to tell others about the advantages of working with us in the future. The red Wisconsin badges we handed out at the booth were a big hit. The many attendees "getting the red out" showed the importance of the University of Wisconsin-Madison and FRI working with the food industry.

A project jointly funded by the American Meat Institute and the Grocery Manufacturers Association and directed by Kathy Glass, Chuck Kaspar, Andy Milkowski, and Jeff Sindelar has kept many in FRI busy investigating the effects of processing conditions on the survival of seven Shiga-toxin-producing *E. coli* strains in pepperoni. This project is an excellent example of the ability of FRI to rapidly respond to a request and put together a creative team to address an important food safety issue. One of our new sponsors, ALKAR (Lodi, Wisconsin), provided smokehouse facilities for conducting part of this research.

As you know, we are living in harsh economic times. We at FRI are relatively fortunate that funds from our sponsors and other sources provide us with the

resources we need to operate effectively and explore strategic new opportunities. We are working to develop a hands-on workshop for food safety in the meat industry, similar to the better process cheese workshops conducted by Kathy Glass. We would also like to welcome Maple Leaf Farms and Kemin Food Ingredients as new sponsors.

As summer draws to a close, I hope you enjoy time with family and friends as well as complete the professional goals you set for the summer. I look forward to seeing many of you at the FRI Fall Symposium, which will focus on risk attribution in food safety. Kathy Glass is putting together an exciting program.

Two of our FRI affiliate faculty, Stacey Schultz-Cherry and Veronika Somoza, will be leaving the Madison campus at the end of the summer—both, however, will continue to collaborate with scientists at the University of Wisconsin-Madison and we expect to see them back in Madison from time to time.

— Charles Czuprynski, Director  
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### Wm. C. Frazier Memorial Award



Dr. Robert Brackett (left) receives the Wm. C. Frazier Memorial Award from FRI Director Charles Czuprynski.

*This award is presented annually to an individual who has made outstanding contributions in food microbiology. The awardee is invited to present a lecture in conjunction with the Food Research Institute Annual Meeting on a subject that is or will impact food microbiology. Dr. Brackett's presentation title: "Interaction and Collaboration between Government, Industry and Academia to Address Food Safety Concerns."*

### Table of Contents

FRI Annual Meeting Summary .....	2
Food Import Safety Meeting Summary .....	5
Short Subjects: New Sponsors .....	7
Publications .....	7

# MEETING SUMMARIES

## Annual Meeting of the Food Research Institute, 2009

The Food Research Institute hosted its annual meeting April 29–30, 2009 in Madison, Wisconsin, with over 80 scientists from university, industry, and government in attendance. Updates on various food safety issues were presented. Session topics addressed: (a) Basics of Epidemiological Investigations, (b) Government Emergency Response and Decision Making, (c) Control and Detection of Bacterial Foodborne Pathogens, (d) Parasites and Viruses, and (e) Toxicology and Bioactive Compounds. A poster session highlighted results of recent research projects conducted by faculty and graduate students.

### Epidemiology Basics

Experimental studies are epidemiological tools to study events in populations to obtain information on associations between exposures and outcomes. As Craig Hedberg (University of Minnesota) pointed out, these associations do not prove a causal relationship but do help identify new hazards, prioritize new interventions and assess effectiveness of safety systems. The latest report from FoodNet indicates that food safety trends in the U.S. have reached a plateau, but there is significant variability across the country in the investigation and reporting of foodborne disease.

Relative risk factors are often generated from observational studies of diet and cancer or cardiovascular disease. David Klurfeld (USDA) noted that the World Cancer Research Fund recently concluded that consumption of red and processed meats was convincingly linked to colon cancer even though the relative risk was 1.2. (By comparison, the relative risk for consumption of aflatoxin-contaminated food and liver cancer is 6.0, and the risk for lung cancer for smokers vs. non-smokers is 10.)

Not only is the relative risk of developing colon cancer from eating red meat small, there are inherent inaccuracies in assessing dietary intakes and there are confounding factors such as varying genetic susceptibility, importance of different cooking methods, and correlations of high meat intake with high dietary fat and low intakes of vegetables and fiber.

Investigations of foodborne illness outbreaks in Minnesota were described by Benjamin Miller (Minnesota Department of Agriculture). Rapid response teams have been organized to quickly interview reported cases of foodborne infections and ascertain common exposures. When a common factor is identified, such as consuming sandwiches with sprouts at a particular restaurant, Minnesota epidemiologists have the regulatory authority to look at invoice and distribution records from restaurants and food producers to trace foods back to their source. Recalls can then be initiated to prevent further distribution of contaminated foods. Minnesota played an important role in identifying vehicles of infection in recent outbreaks traced to sprouts, peppers, and peanut butter.

### Government Emergency Response and Decision Making

Eleven outbreaks of foodborne salmonellosis with confirmed vehicles were investigated by CFSAN between 2007 and early 2009. According to Jack Guzewich (FDA, CFSAN), some were due to unexpected vehicles: fish and low moisture products including peanut butter, cereal, and ground white pepper. State and local public health agencies (most of which are underfunded) are responsible for surveillance and epidemiological investigations. Once a vehicle has been identified, FDA traces

the food back to identify the source of contamination and ensure that contaminated product is removed from the market. These efforts were hampered by poor record keeping, co-mingling of produce, and difficulties in coordinating investigations carried out by local, state, and federal agencies.

FERN (Food Emergency Response Network) integrates and coordinates food-testing laboratories across the country to detect, identify, respond to, and recover from emergencies/large outbreaks involving the food supply. Don Burr (FDA) described how FERN is activated by FSIS or FDA usually in response to a surge in samples requiring analysis—for example during the outbreaks involving spinach, melamine in pet foods and dairy products, and *Salmonella* in peppers/tomatoes and peanut butter. FERN also aids analytical laboratories by providing training, standards and reagents, and developing methods.

Traditional roles played by government, academia, and industry in ensuring food safety are changing as both collaborative and adversarial interactions are evolving in response to societal changes, changes in food processing and packaging, and the globalization of the food supply. Dr. Robert Brackett (GMA), in his Frazier Memorial Award lecture, described barriers to collaborative interactions, including legal issues, fears of uncertainty and taking leadership, and protection of information and turf. Some recent examples of positive interactions are the guidance documents for produce created by CFSAN and produce associations and improved labeling for microwaveable frozen dinners resulting from cooperation among industry, academia, and government.

## Control and Detection of Bacterial Foodborne Pathogens

Detection of botulinum neurotoxin (BoNT) by the mouse lethality assay is still the standard, but the assay has several drawbacks. Eric Johnson (FRI, Bacteriology, University of Wisconsin–Madison) described a highly sensitive primary spinal cord culture assay, developed in his lab, that detects and quantifies BoNT and also can be used to detect serum neutralizing antibodies. New assay platforms, including stem cells, are also being investigated.

*Clostridium difficile* has been known as a nosocomial pathogen for about 30 years, but more recently it has been associated with greater morbidity and with community cases and outbreaks. Glen Songer (University of Arizona) reported some surveillance data indicating that *C. difficile* was present in >40% of uncooked and RTE meats purchased at retail stores. Many of these isolates were very similar to strains isolated from human cases, indicating that some *C. difficile* infections may be foodborne.

Antibiotics are widely used in agriculture—from streptomycin sprayed in apple orchards to growth-promoting antibiotics in animal feed. These compounds are a selective pressure driving the evolution of antibiotic-resistant microbes. Jo Handelsman (Bacteriology, University

of Wisconsin–Madison) noted that each year about 18,000 deaths in the U.S. are traced to antibiotic-resistant bacteria and discussed the potential for transmission of these organisms from livestock to humans. In particular, there has been a troubling increase in methicillin-resistant *Staphylococcus aureus* in swine and in humans.

Non-O157:H7 verotoxin-producing *E. coli* (VTEC) are of increasing concern to public health authorities as more cases and outbreaks are identified and some strains have caused serious illness. Elin Doyle (FRI) described some recent outbreaks and vehicles of infection reported in the literature.

Mathematical models for the emergence and persistence of VTEC in calves were developed by Dörte Döpfer (UW–Madison School of Veterinary Medicine) based on 25 weeks of sampling of beef calves. Fecal samples were analyzed weekly for VTEC and it was found that once calves acquired these bacteria, they tended to persist. Such models can be useful in assessing interventions to prevent acquisition of VTEC.

Outbreaks of salmonellosis traced to fresh produce are on the rise. Certain vegetables and fruits are more likely to carry *Salmonella*, and Jeri Barak (Plant Pathology, University of Wisconsin–Madison) is investigating why this is so. Produce is usually contaminated in the field by *Salmonella* in irrigation water or

carried by animals, including insects, birds, pigs, cattle, and iguanas (which are common in cantaloupe fields in Mexico). Once contamination occurs, the bacteria often lodge below the surface of the fruit or vegetable and it may be impossible to wash them off without damaging the produce.

Several recent *Salmonella* outbreaks have been traced to low moisture foods and there is some evidence that the infectious dose of these bacteria is lower in low moisture than in high moisture foods. Amy Wong (FRI, Bacteriology, University of Wisconsin–Madison) reports that salmonellae exposed to desiccation form long filaments and induce stress response systems to survive adverse conditions. Infectivity and virulence of these filamentous forms are currently being investigated.

Kathy Glass (FRI) reported on new NACMCF guidelines for conducting challenge studies on growth inhibition and inactivation of bacteria in a variety of foods. Studies should be designed with the best available methods and an understanding of the preparation of the product, variability in procedures, and likely storage conditions. An expert microbiologist in a qualified lab should guide experimental procedures and use statistical methods in designing studies and evaluating data.

## Awards presented at FRI 2009 Spring meeting



Undergraduate Research Award was presented to Steven Molinarolo for work mentored by FRI affiliate faculty member Dr. Jeri Barak. His poster: "Identification of 'Function Unknown' Genes with a Role in the Ability of *Salmonella* to Survive in Water."



The Edward J. and Katherine L. Schantz 2009 Undergraduate Traineeship in Food Safety was presented to Regina Whitemarsh. She will be working with Prof. Charles Kasper in his lab on research related to the underlying mechanisms associated with the survival of *Salmonella* in dry or low-moisture foods.



The 2009 Michael and Winona Foster Wisconsin Distinguished Fellowship Award was presented to Lori Neal; she will join the laboratory of FRI affiliate faculty member Dr. Laura Knoll.

### Parasites and Viruses

Coccidia, including *Toxoplasma* and *Cryptosporidium*, are obligate intracellular parasites that infect both humans and domestic animals. Since *Toxoplasma* grows well in cell culture, it has been used as a model system for studying virulence. Laura Knoll (Medical Microbiology, University of Wisconsin–Madison) described experimental work in her lab to isolate and characterize mutants of *Toxoplasma* that do not form infectious cysts and may be a useful base for a vaccine. An interesting consequence of infection with these cyst-deficient mutants is that mice gain large amounts of weight. This suggests that an animal's microflora may have a significant effect on body weight.

Although noroviruses cause annually about 23 million cases of illness in the U.S., there are, as of yet, no reliable methods for cultivating these viruses to produce sufficient amounts of the virus for studies on virulence and intervention techniques. Since noroviruses are closely related to other caliciviruses that were first described from marine organisms, Kathy Kurth (Wisconsin Veterinary Diagnostic Lab) has been testing several cell lines from aquatic organisms for propagation of noroviruses. Some positive results were obtained with tissues derived from blue gills and from oysters, and efforts are in progress to optimize growth of the cultures for viral production.

Astroviruses are RNA viruses that cause enteric disease in humans and birds. These viruses are difficult to culture and detect and are resistant to some environmental stresses, including heat and bleach. Stacey Schultz-Cherry (Medical Microbiology, University of Wisconsin–Madison) has studied virulence of turkey astrovirus, which causes severe diarrhea and growth depression and kills many young birds. The virus causes the intestine to become more permeable, allowing the virus to spread throughout the body, including to the skeletal muscles. In fact the viral coat protein itself can act as an enterotoxin and cause diarrhea even in the absence of viral replication.

### Toxicology and Bioactive Compounds

Traditional methods of controlling fungal pathogens have not effectively controlled mycotoxin contamination of cereals. Nancy Keller (FRI, Medical Microbiology, Bacteriology, University of Wisconsin–Madison) has developed double-stranded RNAs targeted to interfere with mycotoxin synthesis in *Aspergillus* and *Fusarium*. These interfering RNAs do inhibit toxin production in the fungi and they have now been inserted into corn plants. Preliminary experiments have demonstrated reduced mycotoxin production in infected transgenic plants.

In vitro and cell culture studies have demonstrated that tannins are bioactive in disease processes such as inflammation, oxidation and microbial adherence. Since tannins are complex mixtures of polyphenolic compounds and are not well absorbed, health promoting effects likely occur in the gastrointestinal tract. Jess Reed (Animal Sciences, University of Wisconsin–Madison) is investigating the effects of proanthocyanidins in cranberries and hydrolysable tannins in pomegranates. Some of these compounds protect ruminants from bloat and aggregate bacterial cells, thereby preventing infection of cultured cells. These compounds may act in vivo on gut-associated lymphoid tissue.

Non-enzymatic reactions between sugars and proteins during heating produce numerous Maillard reaction products. One of these compounds, carboxymethyllysine (CML), has been shown to have a pro-inflammatory effect on cultured cells. Volunteers who consumed a diet containing grilled, fried, and toasted foods were found to have higher CML levels in plasma and urine and higher total cholesterol and fasting glucose levels. Heating of some other foods, such as coffee beans, may produce beneficial compounds, as reported by Veronika Somoza (Food Science, University of Wisconsin–Madison).

— M. Ellin Doyle

# FOOD IMPORT SAFETY MEETING 2009

The Food Research Institute and other groups at the University of Wisconsin–Madison, including Center for World Affairs and the Global Economy (WAGE) and the College of Engineering, co-sponsored a meeting on Food Import Safety in May 2009. Speakers from academia, industry, and government addressed the complex regulatory, economic, scientific, and industrial quality-control issues related to safety of food imports.

## Understanding the Scope of the Problem

*China: The Emerging Food Consumption and Export Superpower; Wenran Jiang (University of Alberta).*

China's economy has grown rapidly since the 1970s to become the largest food exporting country. Several food safety regulations were enacted recently, including the 2009 Food Safety Law, but they are not uniformly enforced. The food production system is very competitive, it has slim profit margins and is very decentralized (70 percent of production/processing facilities employing 10 or fewer people). Lack of oversight has increased the temptation to cut corners and use cheaper ingredients—a problem not unique to China. The government is addressing these issues, but more contamination incidents may occur before the food safety system is stabilized.

*Experiences with Food Imports in New York State; Joe Corby (Association of Food and Drug Officials).*

Nearly a third of food imported into the U.S. enters through the state of New York, either in large shipping containers or by truck. Inspections are done by federal agents at the point of entry, but at least 80 percent of domestic food safety work is done at the state and local level. States can respond rapidly to violations and have some enforcement powers (to seize foods, issue injunctions, and require recalls) that FDA does not have. One significant issue is inadequate information sharing among various state and federal agencies. Some import violations detected in New York included illegal colors and sweeteners, antibiotic residues, excess sulfite, lead-soldered cans, heavy metals in fish and candy,

unlabeled allergens, low-acid foods with inadequate levels of salt, and “bush meat” from Africa.

## Management of Imported Ingredients by Industry

*Panel presenters: Scott Hood (General Mills, Inc.); Dale Morton (Quaker Tropicana Gatorade and Pepsi Cola North America); Gale Prince (Food Product Safety Pioneer); Joe Shebuski (Cargill, Inc.).*

American manufacturers import many ingredients, either because they are less expensive or because they are no longer produced in the U.S. Recent outbreaks associated with melamine-contaminated wheat gluten and *Salmonella*-contaminated peanut butter illustrate the potential for a single unsafe ingredient to severely impact numerous products and brand names. There has been at least a 75 percent increase in food imports since 2001. At the same time the FDA has lost funding and staff to monitor and inspect imported items.

Companies have devised supplier quality-control programs to assess imported products and their manufacturers. These include examination of facilities, procedures, and supply chains at overseas plants; targeted testing of products for the most likely contaminants or defects; adequacy of packaging; and consumer complaints about the products. Human resources, health and safety issues, and environmental practices of suppliers are also considered by some companies. Suppliers may be ranked, with some requiring more frequent audits than others based on their track record. Good communication between buyers and suppliers can prevent misunderstandings and unexpected problems. Ultimately, companies are responsible for their own products and cannot completely rely on foreign government inspectors or third-party auditors to ensure authenticity and safety of imported materials.

## Issues in Detection and Enforcement

*Intelligent Sampling of Fresh Produce; William Nganje (Arizona State University)*

U.S. Customs and Border Protection uses an automated targeting system that

incorporates data on cargo to indicate which shipments are of greatest risk. Their primary emphasis, however, is to detect drugs and human trafficking. To expedite transport of food across the border, government–business programs certify shipments at packing and processing plants so that border inspection is not necessary. In Mexico, however, trucks with certified cargo have been diverted to carry drugs or people. More integrated and intelligent inspection systems were discussed.

*Testing and Detection Technologies; Wayne Ellefson (Covance, Inc.)*

New analytical challenges constantly arise from food contamination incidents. Melamine contamination of pet foods and infant formula was unexpected and not detected because analytical methods simply measured nitrogen levels. More-specific tests to detect melamine in pet food and infant formula were quickly developed (by Covance and others) in response to the crises involving sick animals and people. Alternative methods for protein analysis are being developed. Covance worked with AOAC, Pepsi, and Coca-Cola to develop extremely sensitive detection methods for pesticides in soft drinks in response to concerns of the Indian government. Future episodes of economic adulteration may involve virtually any compounds or materials that give a producer a cost advantage. Increased levels of testing are limited by the capacity of certified laboratories to test much larger numbers of samples.

*Counterfeit Products and Food Fraud; John Spink (Michigan State University)*

Trade in counterfeit goods is estimated to be a \$500 billion market. Only 5 to 10 percent of counterfeit goods are luxury items, a graver concern is that allergens, pathogens, poisons, and inactive preservatives may be present in counterfeit foods. While some fake products have a limited distribution, others are produced on an industrial scale and are associated with organized crime groups. Prevention of food fraud and its detection are extremely multidisciplinary endeavors because counterfeiters are smart people and adapt to circumvent new control strategies.

## How to Achieve Stakeholder Cooperation

*Moderated discussion:* Effective responses to incidents of food fraud and food contamination are complicated by policies that restrict flow of information among government agencies, the food industry, and the public. Concern about potential lawsuits, proprietary information about ingredients and their sources, and protection of turf by regulators impedes collaboration. Examples of successful information sharing include investigation of workplace accidents by OSHA, of medical errors in hospitals, and the Rapid Alert system in the EU. Risk communication to consumers and some strategies for keeping informed and anticipating future problems were also discussed.

## The Way Forward

*Food Safety, Trust, and the European Union; Miriam Haritz (University of Maastricht, Netherlands)*

Mismanagement of the BSE outbreak in the EU caused a crisis in consumer confidence in food safety systems. In response, the General Food Law was passed in 2002. A new independent regulatory agency, EFSA, was created and transparency, risk management involving stakeholders, and independent scientific expertise became part of the new food protection strategy.

*Experience of Food Safety Authorities in Europe; Rhodri Evans (Food Safety Authority of Ireland)*

In 2008, Ireland experienced a large contamination incident traced to dioxins in pig feed. It was first detected in November in routine testing of a pig

fat sample. Subsequent analyses demonstrated dioxin levels as high as 200 times the EU legal limit in fat and very high concentrations in some pig feed. The European Rapid Response System for Food and Feed quickly traced the distribution of pigs from affected farms through slaughtering facilities and export to numerous other countries. Seventeen days after the initial positive test, the decision was made to recall all pork products produced since September. Such a rapid recall prevented serious health effects, and open communication with the public quickly restored confidence in Irish pork after this incident.

*The Regulation of Food Imports: Past, Present, and Future; Neal Fortin (Michigan State University)*

Global trade in agricultural commodities and processing of foods have increased rapidly in the past 30 years, presenting more opportunities for adulteration. Intentional adulteration of foods has occurred for centuries and food laws were enacted in response to the worst abuses. Our current food regulatory system is grossly underfunded, fragmented, and not very effective in dealing with imports. Food Law is again at a crossroads with rapidly increasing trade, more incidents of adulteration, unstable markets, and public outrage at contamination incidents. Proposed changes in current law were discussed.

*The Role of Public-Private Partnerships on Access to Fresh Produce Export Markets for Small Latin American Producers; Belem Avedaño (International Food Policy Research Institute, Baja, Mexico)*

In 1990, Mexico was the largest exporter of melons to the U.S. with 61 percent of the market. However, following an FDA ban on Mexican cantaloupes because of unhygienic conditions in the fields and associated *Salmonella* contamination, exports dropped precipitously as did acreage planted to cantaloupe. When exports were again allowed into the U.S., many smallholders were excluded from the export market because they didn't comply with the new standards. Some public-private partnerships were established to help small farmers reduce input costs, understand new regulations, and afford improvements in water treatment and packing facilities.

*Global Food Protection: A New Organization Is Needed; William Sperber (Cargill, Inc.)*

A number of challenges face the global food supply: population growth, climate change, shrinking resources (including fresh water), diversion of crops to bio-fuels, and political instability and inaction. Individual countries, including the U.S. with its highly fragmented system and the world as a whole, need better and more effective systems for ensuring production of safe food. A global Food Protection Organization under the auspices of the U.N. has been proposed. This organization would be proactive and could, for example, require use of HACCP systems to prevent contamination and establish uniform audit procedures and traceability systems.

*Emerging Global Food System Risks and Potential Solutions; Shaun Kennedy (University of Minnesota)*

As the world food supply becomes more interconnected, intentional threats may increase due to a greater emphasis on value-added exports, greed and the global economic crisis, and terrorist or extremist groups. Interventions to address these challenges to food safety and security should address supply chain issues such as verification programs, better risk assessment for different commodities, identification of potential economically motivated adulteration, and improved detection methods.

— M. Elin Doyle

Save the date:

## FRI FOCUS ON FOOD SAFETY SYMPOSIUM

### “Developing Risk-Based Food Safety Regulations”

Thursday, November 12, 2009

Pyle Center, 702 Langdon Street, Madison, Wisconsin

Details and registration available on the FRI web site: [fri.wisc.edu](http://fri.wisc.edu)

# SHORT SUBJECTS

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## New Sponsors for FRI

### Maple Leaf Farms, Inc.

Maple Leaf Farms, Inc. is a family-owned company that produces duck products in North America. The company offers cooked and ready to cook duck products and also produces some chicken products such as breaded chicken entrees. Its products are sold through grocery stores and specialty retailers. Maple Leaf Farms and their family-farm partners strive to maintain a healthy environment for their ducks and follow strict biosecurity standards. Maple Leaf Farms, Inc. was founded in 1958 and is based in Milford, Indiana. [www.mapleleafarms.com](http://www.mapleleafarms.com)

### Kemin Industries, Inc.

Kemin Industries, Inc. is a privately held corporation founded in 1961 with headquarters in Des Moines, Iowa. A nutritional ingredient manufacturer, Kemin's products include antimicrobials, anti-oxidants, functional food ingredients, nutrients, nutraceuticals, palatants, and mold inhibitors. It serves food, agricultural, and pet food industries. The company has manufacturing facilities in China, Singapore, Thailand, India, South Africa, Belgium, Brazil, and the United States. [www.kemin.com](http://www.kemin.com)

### Alkar-Rapid Pak, Inc.

Alkar-Rapid Pak, Inc. is a private company located in Lodi, Wisconsin. Established in 2001, Alkar-RapidPak, Inc. develops, manufactures, markets, and services equipment for cooking and food preparation in commercial and institutional kitchens, restaurants, and food preparation companies in the United States and internationally. The company's core products are batch and continuous cooking and chilling systems, post-packaging pasteurization, and they provide expertise in meat science, process development, plant layout and custom equipment design. Alkar-RapidPak, Inc. is owned by The Middleby Corporation in Elgin, Illinois. [www.alkar.com](http://www.alkar.com)

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**FRI at IAFP**

The Food Research Institute hosted a booth at the International Association for Food Protection 96th annual meeting in Grapevine, Texas July 12–15, 2009. Chuck Czuprynski, Roxanne VonTayson, Kathy Glass, Lindsey McDonnell, and Amy Wong (*left to right*) were present to acquaint attendees with the research, training and outreach, and services provided by the FRI. In addition to visitors who were not familiar with FRI, many current and past sponsors, friends, and alums stopped by to gather information, learn about new developments at FRI, or reminisce. A good time was had by all.

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