SAFEGUARDING THE FOOD SUPPLY

The ARS food safety research program ensures a safe food supply that meets foreign and domestic regulatory requirements. Emerging research areas focus on metagenomics, climate change and mycotoxin contamination, food adulteration and fraud, reducing foodborne pathogens during animal and crop production and food processing, and contamination of ready-to-eat foods. The following accomplishments highlight ARS advances in food safety research in FY 2020.

A novel strategy for estimating *Salmonella* contamination levels in raw ground beef. *Salmonella* is a leading cause of foodborne illness worldwide, and currently available testing methods only indicate presence or absence of *Salmonella*—they do not measure contamination levels in a tested product. ARS scientists in Clay Center, Nebraska, developed a novel strategy for rapidly estimating *Salmonella* contamination levels in raw ground beef. This new method will enable meat companies to improve their process controls, increase the safety of beef, and decrease the incidence of *Salmonella* poisoning.

A rapid test for masked toxins in wheat. Trichothecenes are fungal toxins (mycotoxins) that are toxic to humans and can contaminate oat, wheat, barley, and corn. Plants can protect themselves from trichothecenes by converting the toxins to "masked" mycotoxins, but these masked mycotoxins are still toxic to humans and are difficult for researchers to detect. ARS scientists in Peoria, Illinois, in collaboration with researchers in Bari, Italy, developed a new method to detect trichothecenes and masked mycotoxins in wheat. This rapid, sensitive, and convenient method will reduce contaminated products from the food supply.

New smartphone-based food safety spectrometer. Industry and regulatory inspectors monitor products for safety throughout food processing and production. Many food safety assays require expensive equipment found only in centralized laboratories, making it difficult to efficiently and effectively screen for contaminants. ARS-funded scientists at Purdue University have developed a $200 smartphone-based spectrometer for conducting many types of food safety assays. Inspectors can use this device at the point the sample is taken, simplifying the process and reducing the time required to obtain results.

Updated method to analyze contaminants in foods. In 2003, ARS developed a method to analyze pesticide residues in foods that has since become the worldwide gold standard. ARS scientists in Wyndmoor, Pennsylvania, have now developed an updated "quick, easy, cheap, effective, rugged, safe, efficient, and robust" (QuEChERSER) mega-method to analyze pesticides, veterinary drugs, and environmental contaminants in foods including fruits, vegetables, fish, and bovine and hemp products. QuEChERSER is expected to become the primary method used internationally for monitoring chemical contaminants in foods.

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