Louisiana State University AgCenter researchers evaluate food safety risks from contaminated seedlings.

MANAGING FOOD SAFETY RISKS

Foodborne illnesses are common and costly. In the U.S., an estimated 48 million people get sick each year, and 3,000 die, from foodborne illnesses. Related medical expenses total over $55 billion annually. Food companies feel the pain, too. In addition to damaging brand reputation and sales, food recalls can cost companies millions of dollars in direct expenses.

Preventing foodborne illnesses is possible, but difficult. A wide variety of viruses, bacteria, fungi, and parasites can cause harm, and contamination can occur at every point in the food system.

Since 2000, a multidisciplinary team of researchers and Extension educators from 39 institutions across the U.S. have worked together to address food safety concerns. This project is the first attempt to develop comprehensive risk-based strategies that control foodborne pathogens in all foods and at all points in the food system. Over the last five years, researchers formed more than 150 collaborative projects, published over 500 peer-reviewed articles, and fostered an inclusive environment in which new researchers can grow. These efforts have expanded knowledge and set the foundation for future work on food safety.

The group won the 2019 National Excellence in Multistate Research Award in recognition of their outstanding collaborative research, development, and education efforts, which will continue to improve food safety and reduce the risk of foodborne illness for years to come.

RESEARCH HIGHLIGHTS

Researchers at Michigan State University study the survival and transfer of foodborne pathogens during leafy greens processing.

Collaboration has led to inventive strategies that can help prevent food safety threats before they become dangerous and costly. Researchers have:

- Studied how microbes react to their environments and designed models that anticipate how foods might be contaminated. For example, scientists evaluated how pear firmness affects *Salmonella* transfer during mechanical slicing (Michigan), how temperature affects pathogen growth in leafy greens (New Jersey), and how glove material affects bacteria transfer during jerky production (Virginia).

- Designed devices to detect pathogens, including a low-cost disposable device that detects even low concentrations of *E. coli* (Wyoming) and a custom spectroscopy system that identifies toxic mold in single corn kernels (Illinois).

- Monitored pathogens on farms and in food processing facilities, including tree fruit packing houses (Pennsylvania), pork product manufacturers (Texas), catfish processing plants (Louisiana), and artisan cheese factories (Connecticut).

Researchers from Washington State University, University of Florida, and Louisiana State University have tested technologies for treating water applied to fruits and vegetables.

Researchers found ways to prevent or eliminate food safety threats along the entire food supply chain, such as:

- Helping growers assess the quality of their irrigation water.
- Feeding prebiotics to poultry (Arkansas).
- Dipping fresh-cut cantaloupe in aloe vera (Puerto Rico).
- Packaging fruit in edible films containing essential oils (Kansas).
- Using intense pulsed light technology to pasteurize powdered foods without heat (Minnesota).
- Spraying antimicrobials on beef and poultry products with electrostatic sprayers (Colorado).
- Preventing bacteria resistance to antimicrobials (Virginia).

Ninja Kitchen, an online game created by New Mexico State University's Learning Games Lab to teach safe food handling and storage, has been accessed 2.3 million times since 2013.

Researchers improved food safety knowledge and practices by providing learning materials and experiences for both the food industry and consumers. For example:

- Educational multimedia that teach food safety concepts were used over 1 million times in 2018 alone. Many of these products are available in Spanish, Chinese, and Navajo (New Mexico).

- 130 Extension publications translate research findings and help industry and consumers quickly adapt their practices.

- The Southern Center coordinates food safety training and technical assistance for the region's produce industry. So far, the Center has trained 400 trainers who now help the produce industry understand and comply with food safety rules (Florida and partners in 13 states and Puerto Rico).

Research is also guiding policy that prevents food contamination.

- Exhaustive water sampling and data analysis is helping the FDA set requirements that protect produce from contaminated irrigation water (New York and Florida).

PROJECT FUNDING & PARTICIPATION