



FOOD SECURITY

Managing food-safety risks from farm to table

In the U.S., an estimated 48 million people get sick each year and 3,000 die from foodborne illnesses. Related medical expenses total more than \$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. A wide variety of viruses, bacteria, fungi and parasites can cause harm, and contamination can occur at any point from farm to table. To address food safety issues, researchers and Extension educators at land-grant universities are developing new technologies, leading trainings and creating educational materials. Better food safety practices help the food industry avoid financial and legal issues and allow people to live healthier, more productive lives. A safe food supply is also a critical factor in food security, economic stability, trade and tourism.

EXAMPLES OF LGU FOOD SAFETY WORK:

- **Ohio** researchers developed palm-sized sensors that can detect food contaminants on-site quickly, accurately and with minimal personnel, training and supplies. The sensor can connect to smart devices via Bluetooth and take advantage of internet systems for data analysis and sharing.
- **Tennessee** scientists developed molecular fingerprint and biosensor technology that detects Salmonella and other foodborne pathogens much faster than previous methods and at half the cost.
- **Minnesota** scientists developed faster, cheaper diagnostic equipment to detect harmful bacteria in foods and found new ways to control listeriosis.
- Researchers in **Tennessee** developed ultraviolet light technology that reduces harmful biological and chemical contaminants in liquid foods and lowers the cost of pasteurization and sterilization by tenfold. Because this method does not require heat, it is more energy efficient and works on microbes that have developed resistance to heat-based methods.
- Scientists in **Washington** identified sanitizers that remove listeria from apple surfaces and procedures that reduce the risk of contamination in commercial pack houses.
- Researchers in **Pennsylvania** created a smartphone app for recording observations of market vendor compliance with food safety regulations. The app allows observers to record more data —and do it discreetly, quickly and accurately.

Continued

FOOD SECURITY

- **Alabama** researchers recommended handling and harvesting practices that will reduce *Vibrio* pathogen levels in farmed oysters.
- Water sampling and data analysis by **New York** and **Florida** scientists is helping the FDA set requirements that protect produce from contaminated irrigation water.
- Researchers and designers in **New Mexico** created educational multimedia that teach food safety concepts. Many of the products are available in Spanish, Chinese and Navajo. These products were used more than 1 million times in 2018 alone.
- So far, 90% of **Louisiana** small farmers who participated in trainings have improved their food safety practices, and 22 farms have received Good Agricultural Practices certification. Farms that improved food safety practices have also seen increased sales.
- Trainings in **Ohio** and **Iowa** helped more than 560 growers and food processors comply with the Food Safety Modernization Act.
- A **Vermont** program helped more than 130 fruit and vegetable farms write food safety plans, test water quality, train workers and develop standard procedures for cleaning harvest and storage equipment. These farms cover 1,600 acres and sell about \$23 million of produce annually.
- **Kentucky** researchers trained 47 health inspectors, regulators, industry personnel and food science students to be Preventive Controls Qualified Individuals. Trained individuals can help other food processors prepare prevention-based food safety plans or implement plans within their own facilities.

- **South Carolina**'s ServSafe manager certification course and exam ensure that retail food establishments meet state requirements for preventing foodborne illnesses.

Multistate team tackles food safety risks

Since 2000, a multidisciplinary team of researchers and Extension educators from 39 institutions across the U.S. have worked together to develop comprehensive strategies that control foodborne pathogens in all foods and at all points in the food system. The group won the 2019 National Excellence in Multistate Research Award in recognition of their outstanding collaborative research, development and education efforts. As part of this project:

- 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**).
- Researchers 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**).
- Researchers developed solutions to prevent food safety threats, such as feeding prebiotics to poultry (**Arkansas**), dipping fresh-cut cantaloupe in aloe vera (**Puerto Rico**), packaging fruit in edible films that contain essential oils (**Kansas**), using intense pulsed light technology to pasteurize foods (**Minnesota**), spraying antimicrobials on beef and poultry products (**Colorado**) and treating irrigation water (**Florida, Louisiana, New York** and **Washington**).

ABOUT LANDGRANTIMPACTS.ORG

The Land-Grant University System is a uniquely American institution, and has operated successfully for more than a century. The landgrantimpacts.org website documents and demonstrates the collective and individual impacts of the national system of joint teaching, research, and extension institutions.

Prepared by the National Impacts Database Communications Subcommittee, supported by ESCOP, ECOP and USDA/NIFA.

02/2020

Photograph provided by the USDA.