

Research examines food safety risks at the fresh produce-animal interface

A number of food safety guidances recommend at least 400 feet between produce fields and animal operations. But what type of food safety risks arise from small-scale sustainable operations that have produce and animals within the same small confines? That is the situation that [Dr. Siddhartha "Sid" Thakur](#), an Associate Professor of Molecular Epidemiology in North Carolina State University's College of Veterinary Medicine, hopes to better understand through his two-year research project.

"The produce-animal interface has always been sort of a gray zone for people looking at food safety, so this grant is focused on the diversified sustainable farms that are selling their produces locally at the farmers market," Thakur said. "They're very passionate about what they're doing, and we want to provide accurate scientific information and facts that enhance their food safety programs".

Joining Thakur is co-investigator [Dr. Eduardo Gutierrez Rodriguez](#), an Assistant Professor and Extension Specialist in NCSU's Fresh Produce Food Safety, Bioprocessing and Nutrition Science Office. Other collaborators include [Dr. Christopher Gunter](#), an Associate Professor and Vegetable Production Specialist in NCSU's Department of Horticultural Science. Thakur will be presenting their findings at the Center for Produce Safety Research Symposium, June 23-24, in Atlanta.

Their research actually involves two parts. The first segment examines the buffer zone size required between livestock and crops to minimize cross-contamination risks from indicator organisms (*E. coli*, coliforms and *Enterococcus* spp) and pathogens including Salmonella, Shiga-toxin producing *E. coli* O157:H7 and non--O157:H7 STEC.

The researchers chose to conduct their work at the Piedmont Research Station near Salisbury, N.C., so they could have control over the crop and animal variables. Various produce crops were planted downwind and at distances, ranging from 50 to 400 feet from dairy cattle or poultry. Once the crops had germinated and were growing, the researchers sampled them for the indicators and the three organisms. In plots that involved dairy cattle, researchers detected STEC in 20 to 50 percent (depending on the month of sampling) of the produce samples collected 400 feet away. The three indicators also were isolated from produce samples on a regular basis within 400 feet of the poultry and dairy operations.

The second part of the project involved visiting smaller-scale sustainable farms in North Carolina and Tennessee to collect produce and animal fecal samples for a better picture of what was actually occurring. The duties in Tennessee were handled by collaborator [Dr. Irene Hanning](#), an Assistant Professor at the University of Tennessee's Department of Food Science and Technology in Knoxville.

No matter the size of or the geographic location of an operation, doing experimentation on a commercial farm is always challenging. In these experiments, gaining access to the farms was similarly an obstacle, Thakur said. Owners were often reluctant to participate, fearing that pathogen detection could result in an order to destroy the entire crop. The sample size also was an obstacle, he said. Collecting 100 pieces of produce from a large operation goes unnoticed. But those 100 pieces may be the entire day's harvest at a small operation.

As part of the research, samples of fecal matter and filth flies were collected from some of the small-scale operations to examine the role these insects may play in transmitting pathogens. At one farm, for example, only one chicken fecal sample was positive for Salmonella, but 36 fly samples were positive for the pathogen. Researchers don't yet know whether the flies actually contaminate the produce.

The results have sparked his interest, and Thakur said he'd like to delve deeper in future research into the roles flies can play in transfer of human pathogens onto fruit or vegetable commodities.

View the research abstract proposal: "Food safety risks at the fresh produce-animal interface: identifying pathogen sources and their movement on diversified farms".

http://www.centerforproducesafety.org/researchproject/367/awards/Food_safety_risks_at_the_fresh_produceanimal_interface_identifying_pathogen_sources_and_their_movement_on_diversified_farms.html>

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