

Postdoctoral Research Fellowships

Project A: Strengthening good agricultural practices for reducing bacterial contamination of produce

Project B: Survival of *Escherichia coli* O157:H7 in the agricultural environment

Sponsored by:

Center for Food Safety and Applied Nutrition, Food and Drug Administration, in collaboration with the Western Center for Food Safety & Western Institute for Food Safety and Security, University of California, Davis

PROJECT GOALS

Good Agricultural Practices (GAPs) are critical for mitigating the risk associated with the potential presence of pathogens on produce. However, our ability to apply GAPs in specific situations is hampered by our poor understanding of the nature of pathogen reservoirs, modes of microbial transmission and movement, mechanisms and factors governing attachment, survival, and growth on produce, and the effects of specific production practices on the probability of bacterial contamination of produce. This work will strengthen our ability to design and validate specific practices under GAPs by clarifying our understanding of where and how bacterial contamination enters the preharvest food chain and characterizing the various parameters that influence attachment, survival, and growth of enteric pathogens such as *E. coli* O157:H7 on produce. These goals will be achieved through the following specific aims:

Project A

Specific Aim 1: Clarify the role of different animal species as reservoirs of bacterial contamination for produce in the production environment and the mechanism by which these enteric pathogens are transmitted from animal sources into the produce production environment.

Specific Aim 2: Review and evaluate specific risk management measures for reducing pathogen inputs from animal populations in the produce production environment.

Project B

Specific Aim 1: Measure the effects of factors such as pre-exposure growth conditions, lettuce variety, age of plant, growing conditions, temperature, humidity, and day length on the ability of different strains of *E. coli* O157:H7 to replicate and/or survive on lettuce. While the focus will initially be on *E. coli* O157:H7, other pathogens, particularly *Salmonella* will also be investigated as resources permit.

Specific Aim 2: Validate analytical procedures for identifying and quantifying foodborne pathogens in lettuce and environmental samples such as soil that can be used to support the evaluation of GAPs effectiveness in reducing bacterial contamination of produce.

POST-DOCTORAL TRAINING OUTCOMES

These training opportunities will allow the fellow to better understand how science-based knowledge is developed and incorporated into FDA's mission to protect the nation's food supply. In addition, depending on the project, the fellow will be able to conduct a variety of epidemiological studies into animal reservoirs of foodborne zoonotic disease and/or conduct experimental and bacterial survival kinetics both in the field and in a controlled laboratory setting. Depending on the project, training outcomes will include optimizing sensitive/specific bacterial analytical methods, modeling bacterial survival kinetics, longitudinal and cross-sectional epidemiological study design for enhancing food safety, livestock sampling and wildlife trapping techniques, and statistical procedures for quantitative

microbiology and hypotheses testing. Fellow will be expected to publish the project's findings in a peer-reviewed journal.

Physical location will be at the Western Institute for Food Safety and Security, with access to several microbiological labs at the University of California, Davis. Source of funds will be the Oak Ridge Institute for Science and Education (ORISE) Fellowship Program. The fellows will work with UC Davis faculty and CFSAN scientists through the ORISE program for a two-year duration, with the possibility of an extension. Starting salary is \$45,000 per year, plus benefits. There is a travel allowance for periodic travel to CFSAN (College Park, MD) and funds for research-related expenses.

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