Title: Assessment of Fecal Indicators and Pathogens in Creek Water Used to Irrigate Fresh Produce

Project Period: 2011 to Present

Accomplishments:

Authors: Tamador Khairi*, Corrie P. Cotton, and Fawzy M. Hashem, Department of Agriculture, Food, and Resource Sciences, University of Maryland Eastern Shore, Princess Anne, MD 21853

Surface water used to irrigate fresh produce, such as leafy greens and tomatoes, may harbor pathogenic microorganisms; causing foodborne illness once the produce is consumed. Previous studies showed a connection between microbial contaminated surface water used for irrigation and the transmission of pathogenic microorganisms to fresh fruits and vegetables (Selma et al., 2007). Improving food safety and reducing foodborne illness are high priority national concerns. The purpose of this study was to characterize the microbial content of fresh water used to irrigate fresh produce crops in the Delmarva Peninsula. During 2011-2012, monthly water samples were collected from 10 locations along a tributary of the Manokin River and from a ditch near poultry farms that feeds into the tributary. Samples were assayed for fecal coliforms, generic E. coli, E. coli O157:H7, and Salmonella spp. In addition, water samples were also collected and analyzed after major rainfall events. A Most-Probable Number approach, IDEXX Quanti-Tray TM2000 system incubated at 44.5°C for 18 hrs, was used to determine the presence of generic E. coli and fecal coliforms. After incubation, samples were extracted from wells of the Quanti-Tray and streaked onto MacConkey Sorbitol Agar (CTSMAC) to detect the presence of E. coli O157:H7. Water samples were also enriched separately then streaked onto Xylose-Lysine-Tergitol 4 (XLT4) to detect Salmonella. Fecal coliforms and E. coli were present at each sampling event in almost all locations; however, their concentrations varied depending on location and time of sampling. Concentrations of fecal coliforms and generic E. coli ranged from 2.13-3.0 log_{10} units/100 mL and 0.3-3.0 log_{10} units/100 mL over the summer of 2011 and increased with increasing ambient temperatures, but decreased in samples collected after major rainfall events. E. coli O157:H7 was not detected and Salmonella was detected sporadically in July 2011. These findings suggest that use of fresh surface waters in the Delmarva region should involve disinfecting pre-treatment prior to use in irrigation or preparation of agricultural sprays on fresh produce crops.

*Graduate student
Ms. Tamador Khairi (graduate student) prepares water samples

Detection of fecal coliforms (dark yellow wells, A) and generic *E. coli* (florescent wells, B) in water samples using the IDEXX system