

UMES

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

Project Period: 2011 to Present

Accomplishments:

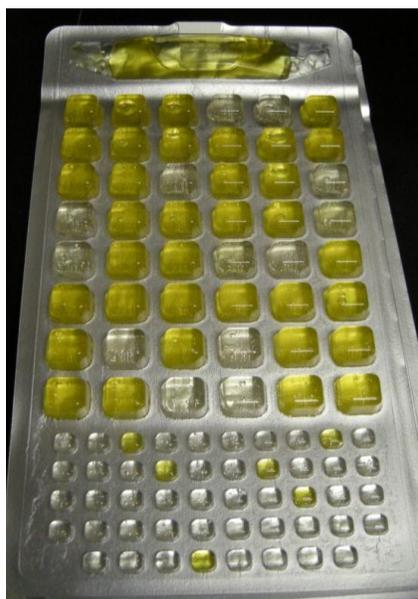
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Surface water used to irrigate fresh produce, such as leafy greens and tomatoes, may harbor pathogenic microorganisms; causing foodborne illness once the produce is consumed. Previous studies showed a connection between microbial contaminated surface 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 log₁₀ units/100 mL and 0.3-3.0 log₁₀ 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



A



B

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