Isolation of *Salmonella* and Detection of Generic *E. coli* from South Florida Surface Waters

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The microbial quality of agricultural water may be influenced by a variety of factors. *Salmonella*-contaminated surface waters may lead to pre-harvest produce contamination if water contacts the harvestable portion of the crop. The Produce Safety Rule (PSR) under the Food Safety Modernization Act (<http://www.fda.gov/Food/GuidanceRegulation/FSMA/ucm334114.htm>) requires covered growers to establish a Microbial Water Quality Profile (MWQP) based on the presence of generic *Escherichia coli* as an indicator of fecal contamination. Agricultural water that is applied directly to growing produce must not exceed a geometric mean of 126 (2.10 log) CFU generic *E. coli* in 100 mL of water and must not exceed a statistical threshold value of 410 (2.61 log) CFU generic *E. coli* in 100 mL of water. The purpose of this study was to: i) establish baseline levels of *Salmonella enterica* in South Florida surface waters, ii) determine the environmental factors associated with *Salmonella* presence, and iii) gather preliminary data to evaluate the microbial quality of South Florida surface waters.

Water samples (1 L) were collected monthly for twelve months at eight study sites from bridges or outcroppings along canals in South Florida. Samples were analyzed with portable instruments for physical and chemical characteristics, including turbidity, air temperature, water temperature, pH, and oxidation-reduction potential. Climate data, including precipitation and relative humidity, were collected from the Florida Automated Weather Network (<fawn.ifas.ufl.edu>). Samples were enumerated for total aerobic plate count (TPC) by plating serial dilutions on tryptic soy agar and incubating for 24 h at 35 °C. Total coliform and generic *Escherichia coli* were enumerated by calculating the “Most Probable Number” (MPN). Samples (100 mL) were evaluated for presence of *Salmonella*. Briefly, 100 mL of samples were enriched 1:1 in 100 mL of double-strength lactose broth for 24 hours at 35 °C. Following non-selective enrichment, samples were transferred to 9 mL of tetrathionate (TT) broth and Rappaport-Vassiliadis (RV) broth (1 mL and 0.1 mL, respectively). Aliquots of 100 μL from each TT and RV selective enrichment were plated to XLT-4 and Chromagar *Salmonella*. Presumptive *Salmonella* colonies were confirmed by invA PCR. *Salmonella* was isolated from 26% of the 100 mL samples (25/96), including at least once from each of the eight sample sites. The concentration of *Salmonella* ranged from 0.5–3.0 log MPN/100 mL. Populations of generic *E. coli* ranged from less than the limit of detection (0.0 log MPN/100 mL) to 2.8 log MPN/100 mL. Populations of coliforms ranged from 2.6–5.2 log MPN/100 mL. Aerobic plate counts were 3.8–6.1 log CFU/100 mL. *Salmonella* detection was not associated with *E. coli* or coliform populations or chemical or physical water characteristics. The geometric mean and statistical threshold values were determined for each study site using *E. coli* MPN population estimates from the 12 monthly samples. Geometric means ranged from 0.88–1.82 log MPN *E. coli*/100 mL. Statistical threshold values ranged from 1.59–2.47 log geometric mean (GM) and standard threshold value (STV) with a minimum of 20 samples and comparing the different laboratory methods used in this study versus those required by the PSR.