

Isolation of Indicator and Foodborne Pathogenic Bacteria from Non-traditional Irrigation Water Sources in Arizona

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The agricultural industry is exploring alternate sources of irrigation water due to drought conditions being anticipated in the future. The quality of alternative non-traditional irrigation water sources could have a potential impact on the safety of agricultural production. The objective of this study was to evaluate the microbiological quality and safety of potential non-traditional irrigation water sources in Arizona by testing for the presence of indicator and pathogenic bacteria in water samples collected from these sources. Reclaimed water, rainwater, reverse osmosis (RO) reject water and return flow water samples (n=66) were collected from 10 sites in Arizona. Standard membrane filtration methods were used for the detection of indicator bacteria- *Escherichia coli*, total coliforms and enterococci. Water samples were filtered through cellulose ester membrane filters and bacterial populations were enumerated by placing them on selective agar. For detection of pathogens (*Salmonella enterica*, *Listeria monocytogenes* and Shiga toxin-producing *E.coli*), water samples were filtered through Modified Moore swabs and enriched in Universal Pre-enrichment Broth, followed by selective enrichment broth for each pathogen. The enriched broth was streaked onto agar media selective for each pathogen. Presumptive colonies were confirmed by PCR/real-time PCR. Among the 66 samples analyzed, the ranges in populations of *E. coli*, total coliforms, and enterococci were 0-530, 0-103000, and 0-2900 CFU/100 mL, respectively. *L. monocytogenes* and *E. coli* O157 levels were below the detection limit (0.03 MPN/L; no colonies on selective media) in all the water samples. Seventeen return flow samples were positive for *Salmonella* (range from 0.03 to >11 MPN/L). One return flow sample was positive for *E.coli* O145. The findings from this study showed that some non-traditional irrigation water sources could potentially be used as alternative sources for the irrigation of food crops.