

# ***Surface Water Irrigation Disinfection in Lettuce Production***

Mara Massel, North Carolina State University, Raleigh, NC; Chris Gunter, North Carolina State University, Raleigh, NC; Garry Grabow, North Carolina State University, Raleigh, NC; Jose Grazon, North Carolina State University, Raleigh, NC; Trevor Phister, North Carolina State University, Raleigh, NC

## ***Introduction***

Irrigation water has been implicated in a number of produce related food borne illness outbreaks, most recently with *Salmonella* Saintpaul on fresh market tomato and pepper outbreak.

## ***Purpose***

In this study, we examine the use of calcium hypochlorite delivered via the PPG Accutab<sup>®</sup> Chlorination system to treat agricultural surface water used for drip and sprinkler irrigation.

## ***Methods***

Lettuce beds were prepared using standard methods on the university research farm. Irrigation was applied through either the use of drip tape under black plastic mulch or sprinklers (overhead). In the overhead irrigation portion of the study, drip irrigation was used to apply fertilizers to the developing plants and to eliminate the possibility of confounding results due to fertilizers contacting developing fruit. Treatments included overhead irrigation with and without chlorination and drip irrigation with and without chlorination, for a total of four unique treatment combinations. Each treatment was replicated three times. Fecal coliform levels in the irrigation water and on the fruit were tested using either a ten tube or three tube MPN as outlined in the FDA Bacterial Analytical Manual. Free chlorine levels were monitored at the furthest end of the treatment application (either the last drip tape or the furthest sprinkler) and were maintained at a level of 1-3 ppm free chlorine.

## ***Results***

While the fecal coliform levels in the water were low, the levels reached reaching >1600 MPN/100 mL during the season in the non-chlorinated irrigation water. The levels in both chlorinated systems remained <1.8 MPN/100mL.

## ***Significance***

The results suggest that this system is effective in controlling irrigation water contamination. While fecal coliforms were monitored on the fruit, their levels were low and the only discernable contamination did not correlate to irrigation method or chlorination. These studies will be repeated in the 2009 growing season using tracer organisms to follow the transfer rates from water to fruit.