

Title *Salmonella enterica* and Enterohemorrhagic *Escherichia coli* 0157:H7 Survival on Produce in Altered by the Presence of Epiphytic Bacteria

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### Abstract

Both *Salmonella enterica* and *Escherichia coli* 0157:H7 contaminate fresh produce. In the field, these pathogens can survive in low numbers in soil and on plants. Occasionally conditions may occur in the field or during processing that lead to an outbreak. Survival of the pathogens in the field is controlled to a certain extent by complex interactions with indigenous soil-borne and seed-borne epiphytes. Insight into the nature of these interactions may improve produce safety. Two epiphytes were isolated from pathogen infected plants that displayed opposite interactions with these pathogens. *Ralstonia paucula* enhanced the survival of *E. coli* 0157:H7 Odwalla two-fold on lettuce and had no effect on *S. enterica* Newport. In contrast, *Enterobacter asburiae* reduced the survival of both pathogens on lettuce. *E. coli* 0157:H7 Odwalla showed a 20 to 30-fold reduction in the foliage when *E. asburiae* and *E. coli* 0157:H7 Odwalla were previously co-inoculated on lettuce seed. Competition against *S. enterica* was four-fold less effective. Additionally, *E. asburiae* was also competitive against several other strains of *E. coli* 0157:H7 and *S. enterica*. Epifluorescent images of co-inoculated plants in vitro indicated that the pathogens are restricted to small, isolated colonies. Also in vitro, pathogen competition with *E. asburiae* was only seen while the bacteria grew on plant exudates. Hence, *E. asburiae* likely competes with these pathogens for nutrients found in plant exudates. Good agricultural practices that encourage the growth of competing bacteria, like *E. asburiae*, may reduce the incidence of produce contamination.