

PREVENTATIVE TREATMENTS

MICROBIAL ANTAGONISTS OF *ESCHERICHIA COLI* O157:H7 ON FRESH AND FRESH-CUT LETTUCE AND SPINACH (M.A. Johnston, M.A. Harrison, and R.A. Morrow)

Fresh-cut lettuce and spinach can become contaminated with pathogens at numerous points from the field to the retail market. Natural microflora present on fresh produce may help reduce the pathogen load. Previous studies typically determined the presence of these competitive microorganisms at a particular stage in the handling of the product rather than following a product through typical processing and handling steps to see if the presence of these competitive microbes varies due to processing and handling. The objective of this study was to identify microbial isolates naturally found on fresh and packaged fresh-cut iceberg lettuce and baby spinach that were inhibitory to *E. coli* O157:H7 and to identify their possible modes of inhibition. Background microflora found on lettuce and spinach (aerobic mesophilic and psychrotrophic bacteria, coliforms, yeasts and molds, and lactic acid bacteria) were collected under conditions that mimicked actual practices from harvest to retail sale. These isolates were then randomly chosen for screening for inhibitory action against *E. coli* O157:H7. Isolates exhibiting inhibitory activity were characterized based on their morphological and biochemical properties and possible inhibitory activity (supernatant inhibition, acid production, and protease sensitivity). Evidence of naturally-occurring microorganisms on fresh lettuce (295 isolates) and spinach (200 isolates) with possible antagonistic activity toward *E. coli* O157:H7 was documented. Common inhibitory isolates were identified as *Pseudomonas*, *Pantoea*, *Klebsiella*, and *Enterobacter*. Inhibitory activity by several isolates was due either to acid production or bacteriocins. Isolates with inhibitory activity were isolated from every step in the processing and handling of the fresh-cut iceberg lettuce and baby spinach. The inhibitory isolates that pose no potential health threat of their own may prove beneficial. However, there would be several hurdles to overcome if antagonistic microorganisms were to be used in a biocontrol strategy with fresh or fresh-cut produce. A more realistic phenomenon would be to consider the possibilities that the natural microflora that is present provides some measure of food safety protection by inhibiting foodborne pathogens like *E. coli* O157:H7.

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