

Title Quantification of contamination of lettuce by GFP-expressing *Escherichia coli* O157:H7 and *Salmonella enterica* serovar Typhimurium

Author Eelco Franz , Anna A. Visser, Anne D. Van Diepeningen, Michel M. Klerks, Aad J. Termorshuizen and Ariena H.C. van Bruggen

Citation Food Microbiology, Volume 24, Issue 1 , February 2007, Pages 106-112

Keywords *E. coli* O157:H7; *Salmonella* Typhimurium; Lettuce

Abstract

The primary objective of this study was to determine the possibility of internalization of GFP-expressing *Escherichia coli* O157:H7 and *Salmonella enterica* serovar Typhimurium (*S. Typhimurium*) strains MAE 110 (multi-cellular morphology) and 119 (wild type morphology) into lettuce seedlings (*Lactuca sativa* cv. Tamburo) grown in an inoculated hydroponic and soil system. The second aim was to quantify the level of contamination with the use of a proper surface sterilization method. Silver nitrate was superior in reducing the number of viable bacteria on leaf surfaces compared to sodium hypochlorite and ethanol. With the hydroponic system internal colonization of lettuce only occurred at high densities with *S. Typhimurium* MAE 119. With the soil system *E. coli* O157:H7, *S. Typhimurium* 110 and *S. Typhimurium* 119 were found at considerable densities in sterilized leaf samples (respectively, 3.95, 2.57 and 2.37 log cfu/g on average) with prevalences of 0.29, 0.23 and 0.15, respectively. No statistical differences were observed between the *Salmonella* strains. A negative correlation was observed between shoot weight and leaf contamination. The observed presence of the pathogens in lettuce, after thorough surface sterilization, demonstrates the possible presence of human pathogens in locations where they are unlikely to be removed by the actions of consumer washing and therefore pose a serious threat when occurring in field situations.