

Title Microbiological quality of fresh, minimally-processed fruit and vegetables, and sprouts from retail establishments

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Abstract

A survey of fresh and minimally-processed fruit and vegetables, and sprouts was conducted in several retail establishments in the Lleida area (Catalonia, Spain) during 2005–2006 to determine whether microbial contamination, and in particular potentially pathogenic bacteria, was present under these commodities. A total of 300 samples—including 21 ready-to-eat fruits, 28 whole fresh vegetables, 15 sprout samples and 237 ready-to-eat salads containing from one to six vegetables—were purchased from 4 supermarkets. They were tested for mesophilic and psychrotrophic aerobic counts, yeasts and moulds, lactic acid bacteria, Enterobacteriaceae, presumptive *E. coli* and *Listeria monocytogenes* counts as well as for the presence of *Salmonella*, *E. coli* O157:H7, *Yersinia enterocolitica* and thermotolerant *Campylobacter*.

Results for the fresh-cut vegetables that we analyzed showed that, in general, the highest microorganism counts were associated with grated carrot, arugula and spinach (7.8, 7.5 and 7.4 log cfu g⁻¹ of aerobic mesophilic microorganisms; 6.1, 5.8 and 5.2 log cfu g⁻¹ of yeast and moulds; 5.9, 4.0 and 5.1 log cfu g⁻¹ lactic acid bacteria and 6.2, 5.3 and 6.0 log cfu g⁻¹ of Enterobacteriaceae). The lowest counts were generally associated with fresh-cut endive and lettuce (6.2 and 6.3 log cfu g⁻¹ of aerobic mesophilic microorganisms; 4.4 and 4.6 log cfu g⁻¹ of yeast and moulds; 2.7 and 3.8 log cfu g⁻¹ lactic acid bacteria and 4.8 and 4.4 log cfu g⁻¹ of Enterobacteriaceae). Counts of psychrotrophic microorganisms were as high as those of mesophilic microorganisms. Microbiological counts for fresh-cut fruit were very low. Sprouts were highly contaminated with mesophilic (7.9 log cfu g⁻¹), psychrotrophic microorganisms (7.3 log cfu g⁻¹) and Enterobacteriaceae (7.2 log cfu g⁻¹) and showed a high incidence of *E. coli* (40% of samples). Of the samples analyzed, four (1.3%) were *Salmonella* positive and two (0.7%) harboured *L. monocytogenes*. None of the samples was positive for *E. coli* O157:H7, pathogenic *Y. enterocolitica* or thermotolerant *Campylobacter*.