

Title Microbial profiles of commercial, vacuum-packaged, fresh pork of normal or short storage life
Author Richard A. Holley, Michael D. Peirson, Jocelyn Lam and Kit Bee Tan
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Abstract

The microbial ecology of fresh vacuum-packed pork cuts during storage at $-1.5\text{ }^{\circ}\text{C}$ for up to 45 days was examined to characterize rates of microbial growth and pH changes in commercially prepared products of normal storage quality. Pork loins in commercial distribution with odour defects were also studied to determine a possible cause of the defects and avoid future problems. In addition, microbial profiles of pork cuts from two plants were compared, after storage for 25 days at $-1.5\text{ }^{\circ}\text{C}$, to identify possible reasons for differences in the storage life of product from the plants. The effects of a change in sanitation procedures on the microbial populations of products stored for 25 days were also studied.

With normal product, microbial growth in different packages progressed at different rates, reflecting differences in initial levels of bacterial contamination. All samples in the study reached 8 weeks without apparent organoleptic change and samples carried $5.8 \pm 1.2 \log \text{ bacteria cm}^{-2}$ (mean \pm S.D.). The flora of loins with the odour defect were predominately lactic acid bacteria (LAB) and carnobacteria, but they contained large fractions of Enterobacteriaceae <35 days after packaging. *Aeromonas* spp. and *Shewanella* spp. were likely responsible for the sulfide-putrid smell of these spoiled products, but species of Enterobacteriaceae and lactic acid bacteria could have contributed to spoilage. Comparison of microbial groups present in 16 other cuts, half from each of two commercial plants, which were stored for 25 days at $-1.5\text{ }^{\circ}\text{C}$, showed that larger fractions of Enterobacteriaceae were present in samples from the plant having difficulty achieving the desired storage life. Additional bacterial samples from 12 cuts supplied by the latter plant obtained after adoption of an acid sanitizer step in the plant cleaning regimen, and also stored for 25 days at $-1.5\text{ }^{\circ}\text{C}$, yielded few Enterobacteriaceae, *Aeromonas* or *Shewanella*. Use of an acid sanitizer in plant cleaning may be a means of controlling alkali-tolerant bacteria such as *Aeromonas* or *Shewanella* which can contaminate pork cuts and spoil vacuum-packaged product. The fraction of Enterobacteriaceae in bacteria populations on fresh pork stored for 25 days at $-1.5\text{ }^{\circ}\text{C}$ may be a useful indicator of the effectiveness of plant sanitation.