Title: Growth of bacteria on pork carcasses and cuts following application of different chilling procedures and after being subjected to temperature abuse during distribution and by consumers.
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Abstract

This study investigated the responses of *Campylobacter jejuni, Escherichia coli* O157:H7, *Salmonella* spp., *Yersinia enterocolitica* and *Listeria monocytogenes* inoculated on fresh pork products subjected to cold (0^oC) storage under vacuum and subsequent aerobic temperature abuse (15.6, 21.1 and 26.7^oC for 3 or 6 h), and short-term, limited temperature abuse. Ground pork and pork loin chops samples were inoculated with mixed strain cultures of each organism and held in plastic bags at 0, 3.3, 6.7 or 10^oC for 24 and 48 h or vacuum packaged and stored at 0^oC for 18 days (ground pork) and 20 days (pork loin chops). Pork in vacuum packages, following storage (0^oC), was repackaged into styrofoam trays simulating retail display packages. One set of samples was abused immediately following storage, while another set was held overnight (4.4^oC) before temperature abuse. Duplicate samples were analyzed for aerobic plate counts, for total coliform counts and for each pathogen using two selective agar media per pathogen. *Campylobacter jejuni* counts were reduced (0.5-1.5 log CFU/g or cm^2) during vacuum storage at 0^oC, while subsequent aerobic abuse counts fluctuated slightly in ground pork and increased (approximately $\leq$1.4 log CFU/cm^2) in pork chops. During short-term, limited temperature abuse, *C. jejuni* showed no major changes or minor reductions in populations, while *L. monocytogenes* showed inconsequential variation in populations. However, in vacuum packaged/retail storage, populations of *L. monocytogenes* tended to increase more in ground pork than in pork chops. Populations of *Salmonella* spp. and *Y. enterocolitica* showed slight increases (0.4-0.8 log CFU/g and 0.1-2.1 log CFU/g, respectively) in ground pork during storage at abusive temperatures, while for pork chops, populations of *Y. enterocolitica* increased 0.5-1.2 log CFU/cm^2. Populations of *E. coli* O157:H7 showed minor fluctuations in pork chops and increased by 0.6-1.4 log CFU/g in ground pork at abusive temperatures. These results further emphasize the importance of minimizing microbial contamination at the production stage as well as maintenance of proper refrigeration temperature during handling, while verifying that temperature abuse may promote proliferation of pathogens and demonstrate also the importance of consumer education in safe food handling practices. Furthermore, the results should be useful in risk assessment studies for enhancement of fresh pork safety.