

**49 Control of Listeria monocytogenes on pre-cooked pork chops by irradiation combined with modified atmosphere packaging.** L. Kudra\*, J. Sebranek, J. Dickson, A. Mendonca, K. Prusa, E. Larson, and J. Cordray, *Iowa State University, Ames*.

Product recalls of ready-to-eat (RTE) meat products due to contamination with Listeria monocytogenes have not only caused tremendous economic loss in the meat industry, but also indicate that this foodborne pathogen is still a potential risk for public health. While progress has been made, additional control measures are needed to eliminate this pathogen from RTE meats. Irradiation and modified atmosphere packaging (MAP) have been used for the control of pathogenic bacteria or the extension of shelf life of many food products. The objective of this study was to test the hypothesis that combining these two technologies may improve the control of Listeria monocytogenes in pre-cooked pork chops.

Enhanced pork loins (injected with water, salt, phosphate and potassium lactate) were purchased from a local manufacturer, cooked to internal temperature 72°C, and sliced to 1.5 cm thick chops. Chops were inoculated with a five strain cocktail of Listeria monocytogenes at a concentration of 5 log /gram. Chops were packaged individually with vacuum or high CO<sub>2</sub> MAP (100% CO<sub>2</sub>), and irradiated at 0 (control), 1.0, 1.5 or 2.0 kGy. The radiation sensitivity of this microorganism was observed to be similar in vacuum or MAP packaging. The D<sub>10</sub>-value was 0.59 ± 0.02 kGy in vacuum and 0.57 &plusmn; 0.02 kGy in MAP packaging. During temperature abuse ( room temperature for 48 hours), the population of this bacterium increased significantly on both irradiated or non-irradiated pork chops in vacuum packages, but only on non-irradiated chops in MAP packages. The lag phase of Listeria monocytogenes was 7-9 weeks in vacuum packaging, and at least 12 weeks in MAP packaging. Very little lipid oxidation was detected in the irradiated product from either vacuum or MAP packages. Neither irradiation nor packaging affected the pH of the product. Irradiation-induced redness was observed in precooked pork chops in vacuum packages, but not in MAP packages. Precooked pork chops from MAP packaged were less firm and juicier than from vacuum packages. Irradiated off-odor was detected in the product from both vacuum and MAP packages.

The results of this study showed that irradiation combined with high CO<sub>2</sub> MAP was more effective than vacuum packaging for control of the growth of Listeria monocytogenes during refrigerated storage or temperature abuse. High CO<sub>2</sub> MAP did not result in the redness often induced by irradiation in pork. However, strategies are needed to mitigate irradiated off-odor that occurred in both packaging types.