

PORK QUALITY

Title: Analysis and Characterization of Volatile Components Responsible for the Off-flavor Development in Irradiated Pork - **NPB #98-175**

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ABSTRACT

Irradiated muscle strips produced more 2-thiobarbituric acid reactive substances (TBARS) than nonirradiated only in aerobic packaging during storage. Irradiation had no effect on the production of volatiles related to lipid oxidation, but produced a few sulfur-containing compounds not found in nonirradiated meat. This indicates that the major contributor of off-odor in irradiated meat is not lipid oxidation, but radiolytic breakdown of sulfur-containing amino acids. Many of the irradiation-dependent volatiles reduced to 50 to 25% levels during the 5-d storage under aerobic conditions. Irradiated muscle strips produced stronger irradiation odor than nonirradiated, but no irradiation dose or storage effect was found. Irradiation had no negative effect on the acceptance of meat, and approximately 70% of sensory panels characterized irradiation odor as barbecued-corn-like odor.

Oil emulsions containing amino acids, glutathione, bovine serum albumin, gelatin, or myofibrillar proteins were prepared. The emulsions were irradiated at the 0, 2.5, 5.0, or 10.0 kGy absorbed dose and analyzed for volatile compounds. Irradiation increased the production of aldehydes (e.g. hexanal, heptanal, octanal, and nonanal) indicating that lipid oxidation of oil emulsion was accelerated by irradiation. Irradiation produced new volatile compounds from oil emulsions containing leucine, valine, isoleucine, phenylalanine, methionine, or cysteine by radiolytic degradations. This indicated that both radiolyses of proteins and lipid oxidation were important for off-odor generation in irradiated meat. However, the generation of new volatile compounds by irradiation suggested that radiolytic degradation of proteins was more important than lipid oxidation on the off-odor production in irradiated meat.

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