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Effect of Electron Beam and X-Ray Irradiation on Bacterial Pathogens and Physicochemical Properties in Semi-Moist Pet Foods

Sethukali Anand Kumar*, Hag Ju Lee, Dongbin Park, Hyun Jun Kim,
Dong Gyun Yim, Hyun Jung Lee, and Cheorun Jo

Department of Agricultural Biotechnology, Seoul National University, Seoul, Korea

This study was aimed to optimize the irradiation source and dose level to control bacterial pathogens in semi-moist pet foods. Commercial semi-moist pet foods were inoculated with *Escherichia coli* O157:H7 and *Salmonella* Typhimurium, and subjected to electron beam (EB) and X-ray (XR) irradiation at absorbed doses of 0, 2.5, 5, and 10 kGy. The samples were analyzed for bacterial reduction, color, lipid oxidation, and volatile basic nitrogen (VBN) levels during 60 days of storage at 20-day intervals. The results showed that the higher doses of irradiation led to a higher bactericidal effect against both *E. coli* and *S. Typhimurium* with 10 kGy exhibiting the highest bacterial reduction. However, it also accelerated lipid oxidation and protein degradation. Compared to EB, XR at 5 kGy expressed a better bactericidal effect against the pathogens and minimized physicochemical changes in the semi-moist pet foods over the entire storage period. When considering the changes in microbiological quality and physicochemical properties of different types of irradiation and their doses, a dose of 5 kGy XR could be considered for the irradiation of semi-moist pet foods.