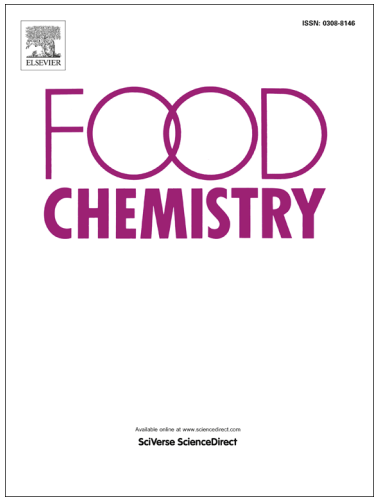

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Determination of irradiation dose and distinguishing between irradiated and non irradiated fish meat by real-time PCR

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Abstract

In this study, the effects of gamma irradiation on the DNA of fish (*Oncorhynchus mykiss*) by real-time PCR were studied. Fish (Oncorhynchus mykiss) were exposed to radiation doses of 0.250, 0.500, 1, 3, 5, 7, and 9 kGy in a gamma cell. Primers were designed for regions with different lengths of both nuclear and mitochondrial DNA, and each primer was used to amplify the DNA from irradiated samples. The amplicon curves for mitochondrial and nuclear DNA, and the correlations among the curves, were obtained. The Ct values for a 519 bp region of the 18S RNA gene on nuclear DNA correlated appropriately. Radiation doses applied to the fillets were estimated using the standard curve data obtained from the correlation values, and the DNA damage caused by each dose was calculated. As a consequence, a molecular methodology to analyze irradiated fish meat qualitatively and also for the estimation of administered dose was developed. This method allowed analysis of irradiated fish, which had been stored for up to three months with a dose limit of approximately 0.5 kGy.

Keywords: Irradiation, DNA damage, dose estimation, real-time PCR, fish meat