

***FT-IR Spectroscopy and Multivariate Analysis for the Detection of Irradiated Hazelnut (Corylus avellana L.)***

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Gamma irradiation is used to manipulate nutrient utilization and availability by improving hygienic quality in the food industry [1]. The objective of this work was to evaluate the potential of Fourier transform infrared spectroscopy (FTIR) for the discrimination of irradiated and non-irradiated hazelnuts. Many alterations in the spectral parameters, such as frequency, signal intensity and peak area were observed in irradiated hazelnuts compared to the control samples [2]. Multivariate statistical analysis (principal component analysis (PCA) and hierarchical cluster analysis (HC)) was performed to identify molecular spectral differences and verify the possibility of differentiation among 1,5 kGy, 3 kGy, 10 kGy irradiated and control hazelnut samples. A clear separation among different dose irradiated and control hazelnut samples was observed based on HC and PCA analyses of the second derivative vector normalized spectra. The results showed that radiation doses of 3 and 10 kGy were produced structural and compositional changes in hazelnut. No significant alterations were observed at the radiation of 1,5 kGy. Such results indicate that FTIR spectroscopy combined with an effective multivariate statistical analysis has potential for the development of a reliable, fast and simple routine methodology for separation of irradiated and non-irradiated food samples like hazelnut.

References

- [1] R. Bhat and A.A. Karim, *Comprehensive Reviews in Food Science and Food Safety* 8, 44–58 (2009).
- [2] A. Dogan, G. Siyakus, F. Severcan, *Food Chemistry* 100, 1106-1114 (2007).