

6th Global Summit and Expo on FOOD & BEVERAGES August 03-05, 2015 Orlando-FL, USA

Application of foodomics for the detection of gamma irradiated food: A case study on dry nuts

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G amma-Irradiation is a processing methodology broadly applied to food items. Although irradiated food or individual ingredients must be labeled, many products, packaged or in bulk, are imported without the appropriate labelling. Thus, there is an increasing research interest towards the development of new methods and markers for the detection of irradiated food items. The global lipid profile of macadamia nuts and walnuts has been examined and used as a template for the detection of alterations caused by gamma irradiation. 60Co-irradiation was applied in increasing doses from 0.5 up to 13 kGy using different packaging and storage conditions in order to monitor changes in their lipid profile. Multivariate statistical analyses on the GC–FID, TLC–FID and NMR results managed to differentiate samples according to irradiation doses. Furthermore trends were explored in sample classification according to the storage or the packaging effect. The role of PUFA decrease with the parallel increase of irradiation dose has been signified. Minor lipid components (such as β -sitosterol, C18:2 n–6, C18:3 and sn1, 2 and sn1, 3 DGs) have shown high discriminant power over the samples. Correlation of storage and packaging effects with dry nuts' freshness has been also achieved.

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Fungal PCR and mutated strains

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Many food commodities are contaminated with filamentous fungi. These organisms affect the organoleptic qualities of the food and/or produce mycotoxins with high economic and health-related costs. Fungi are isolated from food by basic methods and PCR is increasingly used in identifications of the species. However, the PCR methods employed suffer from an inadequate understanding of problems that may arise. For example, internal amplification controls (IAC) overcome false negative results which are the worst possible results as dangerous fungi may be considered safe. However, IAC will not be a suitable control method for mutated strains, as recently been suggested which indicates incomprehension of the issues of mutated strains and inhibition. Mutated strains may arise from mutagens, in food contaminated with mutagenic mycotoxins, produced by co-isolated microorganisms during fungi isolation, added to growth media in the form of antibiotics and self-produced by target fungi. This paper will clarify the issues and offer solutions.

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