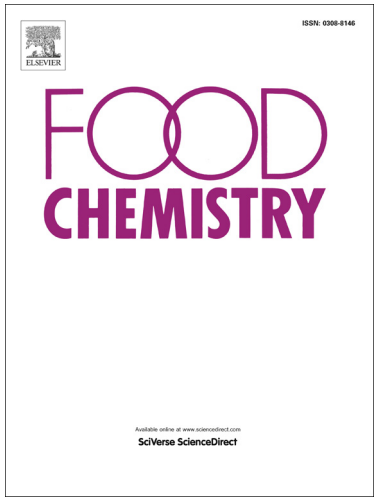

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Isotopic and elemental markers for geographical origin and organically grown carrots discrimination

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Abstract

This study proposes different markers associations for the discrimination of organically and conventionally grown carrots, as well as for the geographical origin differentiation. It was shown that one of the most powerful differentiation markers proved to be Mn content. Along with manganese concentrations, isotope ratios of nitrogen and a high number of Rare Earth-Elements (REEs) were able to differentiate the organically grown carrots samples in a percent of 83.3 % (initial classification) and 81 % (cross-validation), respectively. It was observed that some of the obtained discrimination markers were interlinked, for instance Mn content being positively correlated with some REEs (i.e. Sc, La, Ce, Pr, Nd, Lu, Th). One of the best markers that could differentiate the carrot samples grown in Transylvania, Romania, from those either grown in other side of the country or foreign samples is represented by Mn content along with another REE, particularly terbium (Tb).