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Stable isotope ratio analysis of different European berries

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Within the past years, the analyses of the stable isotope ratios of bioelements, like hydrogen, oxygen, carbon and nitrogen, have been successfully used to determine the genuineness and geographical origin of different classes of food. On the other hand, the stable isotope ratios of berries were never extensively been explored. In this work, the isotopic values of strawberry and different species of soft fruits are presented and discussed. The aim of the study was to define and characterize the variability ranges of the isotopic values for the different berries. Two strawberry cultivars and several cultivars of soft fruits, in particular red raspberry and blackberry (*Rubus spp.*), highbush blueberry (*Vaccinium corymbosum L.*), and red currant (*Ribes rubrum L.*) produced in the Northern Italian region Trentino and in two sites in Romania and Poland, were collected in two harvest years. (D/H)I of the alcohol obtained by the fermentation of the fruits as well as $^{18}\text{O}/^{16}\text{O}$ of juice water, $^{13}\text{C}/^{12}\text{C}$ of sugar, acid and pulp fractions and $^{15}\text{N}/^{14}\text{N}$ of pulp were determined in all the samples by Site specific Natural Isotopic Fractionation – Nuclear Magnetic Resonance (SNIF-NMR) and Isotopic Ratio Mass Spectrometry (IRMS), respectively. Here, the results of this study will be presented in order to carry out a preliminary evaluation of the effectiveness of the isotopic analysis as a method to characterize and authenticate the geographic origin of soft fruit (strawberry, raspberry, blueberry, blackberry and currant) present on the market.

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Novel instrumental analytical methods for quality control of frozen desserts: A review

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Physicochemical analyses are commonly used for measuring quality aspects of ice cream and related products. However, these methods are time consuming, need large quantity of sample and lots of pollutant reagents and in some cases, obtain limited knowledge of properties of the products. Consequently, there is a growing demand of the food industries and research institutes to have new means of measurements with higher capabilities. Alternative techniques have been introduced to characterize frozen desserts as complex foods, including rheometry, spectroscopy, X-ray, electro-analytical techniques, ultrasound and laser, however their application is few. This review discusses the potential of destructive and non-destructive methodologies in determining the quality and characteristics of ice cream and similar products such as emulsions and foams. Determining the interfacial properties, droplet size distribution, influence of formulation on ice cream structure and thermo-mechanical properties, visualization of the 3D microstructure, control of freezing, detection of microbial concentration, quantification of different populations of protein in an emulsified system, etc., are of potential applications of novel techniques in ice cream testing. Some of the techniques have demonstrated considerable potential for transferring to the dairy plants as either on- or in-line methods and may be applied non-destructively. However, an accurate determination of the quality and/or identity of frozen dessert seem feasible only when a combination of all parameters is considered and different tests are used.

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