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Multi-compound isotope profiling: An approach to differentiate the varietal origin and harvest year of wines

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Differentiation of grape cultivars is a topic of interest for both wine producers and consumers since the value of a wine is often influenced by the individual perception and taste for a particular vine variety. In an attempt to classify wines according to grape varieties and harvest year, stable isotopes ratios of the main bio elements (C, H and O) were investigated in this work for 63 wine samples produced in a selected region from Romania, from two vine varieties (Cabernet Sauvignon and Merlot), in three successive years (2012, 2013 and 2014). The results related to the determinations of $d18O$, $d13C$, (D/H)I and (D/H)II have been reported. Chemometric techniques were applied to the analytical results as a multi-criteria decision and the predictive abilities of different classification methods were evaluated. High recognition (98.83%) and a more satisfactory predictive ability (100%) of the developed LDA model proved that the proposed approach is a powerful tool and appropriate for detecting the two grape cultivars and harvest year for the unclassified wine samples. The $\delta13C$, $\delta18O$ and D/H ratios were identified as providing the maximum discrimination between the wine samples across different harvest years and categorized on the basis of the selected vineyard. The present study achieved two main objectives: Assuring the authenticity by developing a classification model able to precisely discriminate between the two grape varieties and; ensuring the typicality of stable isotopes ratio as harvest year classifiers, highlighting its high ability of discrimination.

Biography

Botoran Oana-Romina is pursuing her PhD in Chemistry at Politehnica University of Bucharest, Faculty of Applied Chemistry and Material Science (CSIII) and her research focuses on "Identification of stable isotopes as origin markers by spectrometric methods". She has an experience in "Applying stable isotope techniques for food and beverage authentication" and she is specialized in fingerprinting methods application by NMR and IRMS. She has published more than 20 papers and was involved in several national and international projects with the aim to develop analytical methods for quality control and origin authentication of food.

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