

Stable Isotope Ratios Data for Tracing the Origin of Greek Olive Oils and Table Olives

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Abstract : H, C, and O stable isotope ratios were measured in different olive oils and table olives originating from different regions of Greece. In particular, the stable isotope ratios of different olive oils produced in the Lakonia region (Peloponnesse - South Greece) from different varieties, i.e., cvs 'Athinolia' and 'koroneiki', were determined. Additionally, stable isotope ratios were also measured in different table olives (cvs 'koroneiki' and 'kalamon') produced in the same region (Messinia). The aim of this study was to provide sufficient isotope ratio data regarding each variety and region of origin that could be used in discriminative studies of oil olives and table olives produced by different varieties in other regions. In total, 97 samples of olive oil (cv 'Athinolia' and 'koroneiki') and 67 samples of table olives (cvs 'kalamon' and 'koroneiki') collected during two consecutive sampling periods (2021-2022 and 2022-2023) were measured. The C, H, and O isotope ratios were measured using Isotope Ratio Mass Spectrometry (IRMS), and the results obtained were analyzed using chemometric techniques. The measurements of the isotope ratio analyses were expressed in permille (‰) using the delta δ notation ($\delta = R_{\text{sample}}/R_{\text{standard}} - 1$, where R_{sample} and R_{standard} represent the isotope ratio of sample and standard). Results indicate that stable isotope ratios of C, H, and O ranged between $-28,5 \pm 0,45\%$, $-142,83 \pm 2,82\%$, $25,86 \pm 0,56\%$ and $-29,78 \pm 0,71\%$, $-143,62 \pm 1,4\%$, $26,32 \pm 0,55\%$ in olive oils produced in Lakonia region from 'Athinolia' and 'koroneiki' varieties, respectively. The C, H, and O values from table olives originated from Messinia region were $-28,58 \pm 0,63\%$, $-138,09 \pm 3,27\%$, $25,45 \pm 0,62\%$ and $-29,41 \pm 0,59\%$, $-137,67 \pm 1,15\%$, $24,37 \pm 0,6\%$ for 'Kalamon' and 'koroneiki' olives respectively. Acknowledgments: This research has been co-financed by the European Regional Development Fund of the European Union and Greek national funds through the Operational Program Competitiveness, Entrepreneurship and Innovation, under the call RESEARCH—CREATE—INNOVATE (Project code: T2EDK-02637; MIS 5075094, Title: 'Innovative Methodological Tools for Traceability, Certification and Authenticity Assessment of Olive Oil and Olives').

Keywords : olive oil, table olives, Isotope ratio, IRMS, geographical origin

Conference Title : ICAFS 2024 : International Conference on Agroforestry and Food Security

Conference Location : Paris, France

Conference Dates : January 18-19, 2024