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MEETING ABSTRACT OP

Discrimination of botanical and geographical origin of Greek olive oil cultivars by SPME-GC-MS and ATR-FTIR spectroscopy combined with chemometrics

Petros A. Tarantilis*

Department of Food Science & Human Nutrition, Agricultural University of Athens, Iera Odos 75, Athens 118 55, Greece

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Abstract: Ensuring the authenticity of olive oil regarding its botanical and geographical origin is a major concern for both consumers and authorities. This study aimed to develop robust chemometric models for the differentiation of three commercial Greek olive oil cultivars (Koroneiki, Megaritiki, and Amfissis). Two analytical techniques were employed: solid-phase microextraction coupled with gas chromatography-mass spectrometry (SPME-GC-MS) for volatile compound analysis, and Fourier transform infrared spectroscopy (FTIR). The results demonstrated that the integration of these techniques with advanced statistical methods, such as linear and quadratic discriminant analysis (LDA and QDA), provided high classification accuracy. Specifically, the correct classification scores reached 97.4% to 100% for volatile data and 96.1% for mid-infrared spectra. Furthermore, the methodology was successfully applied to the geographical classification of the Koroneiki cultivar (Heraklion, Lakonia, Messinia) with success rates exceeding 90%. This integrated approach offers a rapid, cost-effective, and reliable tool for the routine authentication of Greek olive oil in industrial settings.

Keywords: Olive oil authenticity, chemometrics, SPME-GC-MS, FTIR spectroscopy, cultivar discrimination

ORCID

Petros A. Tarantilis: 0000-0002-5853-4780

*Corresponding Author: Petros A. Tarantilis. Email: ptara@aua.gr

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