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Abstract

A Simplified SPE-GC-FID Method for Detection of Adulteration of Olive Oil with Sunflower Oil †

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Abstract: The unique distribution of free and esterified minor compounds represents a promising tool for the evaluation of olive oil authenticity. For this purpose, we developed and in-house validated a simple SPE-GC-FID method for the determination of ratio patterns in free and esterified hydroxylated minor compounds of olive and sunflower oils. The methodology showed suitable repeatability relative standard deviation, which was lower than 7.5% in all cases. The method, which is intentionally based on simple instrumentations, allows the quantification of hydroxylated minor compounds in a single chromatographic run while reducing sample preparation, the employment of toxic solvents, and analysis time. Finally, the analytical approach has been used for the analysis of pure oil samples, comprising 15 authentic extra-virgin olive oils selected from different European countries, revealing different hydroxylated minor compounds profiles and the proportion of free and esterified forms in olive and sunflower oils. The SPE-GC-FID method proposed herein has been applied to the quantification of free and esterified hydroxylated minor compounds as well as their ratio in pure extra virgin olive oil mixed in different amounts to mimic olive oil adulteration with refined sunflower oil at different levels of 2, 5, 10, 15, and 20% (*w*/*w*). As a result, even the smaller addition of 2% of sunflower oil in extra-virgin olive oil led to a significant decrease in the free/esterified hydroxylated minor components ratio. This work was developed in the context of the project OLEUM 'Advanced solutions for assuring authenticity and quality of olive oil at global scale' funded by the European Commission within the Horizon 2020 Programme (2014-2020, GA no. 635690). The information expressed in this abstract reflects the authors' views; the EC is not liable for the information contained therein.

Keywords: olive oil; authenticity; sterols; hydroxylated minor compounds; purity; quality; fraud; esterified compounds; in-house validation

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Data Availability Statement: The datasets generated for this study stored in an on-line repository are available on request to the corresponding author.

Conflicts of Interest: The authors declare no conflict of interest.