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## GC-MS AND 2DGC-MS/TOF VOLATILE PROFILE OF MONOVARIETAL EXTRA VIRGIN OLIVE OILS

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Extravirgin olive oil (EVOO) is worldwide appreciated also for its taste and aroma that is characterized by various volatile compounds: aldehydes, alcohols, esters, hydrocarbons, ketones, furans and other unidentified volatile compounds [1,2]. Both positive attributes and sensory defects in olive oil can be associated with volatile organic compounds (VOCs). The unique and delicate EVOO flavor depends on the interaction of hundreds of compounds and the GC-MS technique applied to VOCs allows for their characterization and quantification, as relative abundance, in food samples. SPME (solid-phase microextraction) technique is very efficient and able to evaluate most of the VOCs related to the EVOO flavor and off-flavor [3,4]. SPME seems particularly appealing since it also eliminates problems associated with chemically and thermally unstable samples where generation of artifacts can be problematic as in the case of oil. We selected the DVB/CAR/PDMS fiber since it proved to be the most universal assembly for sufficient isolation of compounds with different physico-chemical properties [5]. Two monovarietal EVOOs (Frantoio and Leccino cvs.) were analyzed by GC-MS and 2DGC-MS/TOF. An Agilent 7890a GC equipped with a 5975C MSD was used and GCxGC analyses were carried out on an Agilent GC-MS 7890B, with GC 2D system, coupled to an TOF-DS Markes detector. The analyte separation was achieved with a HP-5MS UI column coupled with a InnoWAX column. A tentative compounds identification was performed by comparing Mass spectra of each peak with those reported in mass spectral databases. HS-SPME and GCxGC-MS fingerprint analysis are ideal tools to analyze complex volatile matrices, and provide a sensitive method for the direct comparison and chemical visualization of food volatile components. HS-SPME GCxGC-TOF-MS analysis of the complex volatile fraction of EVOO was submitted to advanced fingerprinting analysis of 2D chromatographic data. Biophenols characterization was also performed by HPLC-DAD-MS technique.

### References

- [1] Kalua et al., *Food Chemistry* 100 (2007) 273–286
- [2] Vichi et al., *Journal of Agricultural and Food Chemistry* 51 (2003) 6572–6577
- [3] Angerosa et al., *Journal of Chromatography A* 1054 (2004) 17–31
- [4] Cavalli et al., *Journal of Agricultural and Food Chemistry* 51 (2003) 7709–7716
- [5] Cui et al., *Journal of Chromatography B: Analytical Technologies in the Biomedical and Life Sciences* 877 (2009) 901–1906