Sesquiterpene fingerprint for olive oil authentication: same tool, different approach

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In view of the EC Regulation No 510/2006, regulating IGP and PDO agricultural products and foodstuffs, and EU Regulation No 29/2012, stating as mandatory the origin labeling for VOO and EVOO, the verification of the label-declared geographical origin of EVOO has become crucial to ensure protecting consumers from misleading information. In spite of the large number of studies performed about EVOO geographical authentication, suitable and specific markers are not available.

The present study focuses on the search of suitable markers of EVOO geographical origin. Sesquiterpenes (ST) are semi-volatile compounds present in olive oil, originated from secondary metabolism in olive fruit. The fact that the ST profile is under genetic and environmental control, and that it is scarcely influenced by oil extraction conditions, suggests that these compounds would be able to become authenticity markers of olive oil's geographical origin (1, 2). The analysis of semi-volatile compounds was traditionally based on a targeted approach. However, the state-of-the-art strategy in food analysis consists in finding specific patterns in highly dimensional analytical data, known as fingerprints. For this reason, our purpose is to apply and compare targeted ST analysis and non-targeted ST fingerprinting to discriminate among EVOOs of different geographical origin. EVOO samples produced in Croatia, Italy, Spain, Slovenia and Turkey were analysed by SPME-GC/MS. Data obtained by each approach were subjected to PLS-DA and the discrimination efficiency of the statistical models were compared. The results showed that both strategies are suitable for the purpose, but the untargeted approach is a less time-consuming and automated process.

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1. Vichi et al. (2006) J. Chromatogr. A, 1125(1), 117–123.

1. 2. Damascelli & Palmisano (2013) Food Anal. Meth., 6, 900–905