^{1}H-NMR fingerprinting of olive oils for geographical origin characterization

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Olive oil is of significant impotance as a high added value agricultural product for the European Union, in both commercial and nutritional terms. Spain, Italy and Greece, account for 79% of the world production and 71% of the world consumption. Protected Denomination of Origin (PDO) olive oils are sometimes subject to adulteration with olive oils that do not fulfill the PDO requirements. Therefore, validated methods to guarantee the authenticity and traceability of PDO olive oils are required. The authentication of olive oils with respect to their geographical, botanical and varietal origins has been studied using various analytical approaches: NMR (^{1}H, ^{13}C, ^{31}P), NIR spectroscopy, IRMS, LC-MS, GC-MS [1, 2, 3, 4]. However, most of these considered a limited number of samples and geographical areas.

BEVABS (JRC-IHCP) in collaboration with other partners (TRACE project (http://www.trace.eu.org), scientific contacts) has collected a statistical significant number of authentic PDO extra-virgin olive oils from EU and non EU countries (316 samples): Italy (225 (62 from Liguria), Spain (42), Greece (26), Turkey (14) and France (9). The Italian samples are representative of the olive oil producing areas, which are markedly influenced by climatological factors from North to South of the country.

^{1}H-NMR fingerprints of these PDO olive oils, obtained by a high throughput NMR approach and multivariate data treatment, afforded a good classification of the olive oils according to their geographical origin (Ligurian and non-Ligurian olive oils). Regarding Italian PDO olive oils, preliminary results indicate the ability to distinguish between samples from different regions/areas (Liguria, Garda, Centre area, South area).

References

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