

Volatile fingerprinting for the verification of virgin olive oil sensory quality

Quintanilla-Casas B^{1*}, Bustamante J¹, Guardiola F², García-González DL³, Barbieri S⁴, Bendini A⁴, Gallina Toschi T⁴, Tres A², Vichi S¹

¹Department de Nutrició, Ciències de l'Alimentació i Gastronomia, XaRTA, INSA-UB, Campus De l'Alimentació Torribera, Universitat de Barcelona, Barcelona, Spain.

²Department de Nutrició, Ciències de l'Alimentació i Gastronomia, XaRTA, INSA-UB, Campus Diagonal, Universitat de Barcelona, Barcelona, Spain.

³Instituto de la Grasa, Sevilla, Spain.

⁴Alma Mater Studiorum - Università di Bologna, Bologna, Italy.

*Presenting author

Background and objectives:

Sensory quality, assessed by trained panels following a standardized method¹, is one of the parameters defining virgin olive oil (VOO) commercial category. Taking into consideration the need of reducing the number of samples to be assessed by the sensory panels and to decrease the number of cases related to an uncertain or debated classification, the setting up of instrumental methods could represent a solution for achieving a preliminary rapid screening and supporting the sensory panels in the discrimination of boundaries samples. Volatile profile analysis could be the fit-for-purpose tool, because volatile fraction is responsible for VOO positive and negative sensory attributes².

A state-of-the-art strategy in food analysis is finding specific patterns in highly dimensional analytical data, known as fingerprints. Thus, a preliminary fingerprinting approach on the volatile profile was applied to verify the quality grade of VOOs. The capability of this approach to grade VOOs sensory attributes was also evaluated.

Methodology:

The volatile profile of 94 VOOs graded as Extra Virgin, Virgin or Lampante by six EU sensory panels, was analyzed by HS-SPME-GC-MS³.

Data analysis was performed after alignment of GC-MS signal, by applying shrinkage statistical methods for data exploration and development of classification models.

Results and conclusions:

PCA showed that samples tended to group according to VOO commercial category, then PLS-DA classification models were developed following two strategies: one model with three categories and

two sequential models with two categories. Classification results were satisfactory for both strategies, although further optimization of chromatogram alignment and external validation are necessary.

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References:

¹COI/T.20/Doc. No15/Rev.8, November 2015.

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