Monitoring of Virgin Olive Oil Volatile Compounds Evolution during
Olive Malaxation by an Array of Metal Oxide Sensors

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In addition to the sanitary aspects of production and the genetic and/or geographic origin of the drupes olive malaxation is a critical control point of virgin olive oil (VOO) production from a qualitative point of view. In particular the sensory peculiarities of malaxation are determined by the presence of C₆ and C₅ aldehydes and alcohols in the VOO head space due to lipoxygenase activity. On-line monitoring of the evolution of these substances during VOO processing could be very useful for defining the operative conditions of malaxation (i.e. time and temperature) in order to improve the VOO sensory quality according to product type.

In this study, a MOS sensor array (electronic nose) was connected to the malaxer chamber during malaxation of olive pastes for the on-line monitoring of the accumulation of volatile compounds in the head space.

To verify the validity of the electronic nose data, the same olive pastes were analyzed by HS-SPME-GC/MS for comparing sensor response and volatile compound production.

For all the varieties considered (Ogliarola, Coratina and Frantoio Cvs.), the results illustrated a high potential for gas sensor technology since a high correlation was observed between the conductivity determined by the electronic nose and the level of the most important VOO volatile compounds, such as $E$-$2$-Hexenal, Hexanal, $Z$-$3$-Hexen-$1$-ol, $E$-$2$-Hexenol.