NIR-based Sensory Classification of Virgin Olive Oil

M.C. Gómez-Almenar, José A. García-Mesa, IFAPA
Mengíbar, Jaén, Spain

Virgin olive oil (VOO) classification is based on physicochemical and sensory analysis. The latter is carried out by experts in a panel by using pre-established protocols. Nevertheless, the number of available official panels is not enough to fulfill the analysis of all the marketed VOO. Therefore, the development of instrumental tools for VOO sensory characterization would be very valuable.

In this work, the sensory classification of VOO based on Near Infrared Spectroscopy (NIRS) is proposed. NIRS has been widely used on VOO compositional analysis and purity determination (detection of mixtures with other edible oils). To our knowledge, this technique has not been applied to sensory analysis in VOO.

Taking into account the low concentration of compounds responsible for VOO taste and aroma, a previous preconcentration step was carried out. This preconcentration step was carried out by solid-phase extraction (SPE). The SPE sorbent retained most of flavoring compounds, whereas lipid matrix was removed. The flavoring compounds were not eluted from the column, but NIR spectrum of sorbent+analytes was recorded. The reflectance spectra of a series of VOO with different sensory profile (extra virgin olive oils and “lampante” virgin olive oils with several defects) were acquired by this procedure. These spectra were analyzed by classification algorithms. Chemometric models allowed a satisfactory classification of VOO samples according to their main sensory attribute.

The proposed methodology opens a new technology for VOO sensory analysis by instrumental techniques. This methodology is simple, rapid and easy to automate.