

Preliminary Evaluation of the Application of Low-Resolution Raman Spectroscopy for Quality Control of Virgin Olive Oil

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The aim of this work is to evaluate the potential of low-resolution Raman spectroscopy for monitoring the oxidation status of virgin olive oil. This monitoring will be studied by means of primary and secondary oxidation parameters such as Peroxide Index, K232 and K270.

The low-resolution Raman spectra of a set of 138 virgin olive oil samples from 0 to 2800 cm^{-1} were measured. These spectra were collected directly in the samples through the wall of the vial by using a laser probe. By combination of Raman spectra (after some data treatment) and laboratory values of the studied parameters several PLS calibration models were obtained. The best results obtained in validation tests were $R^2=0.96$, $\text{RMSECV}=1.3$ for Peroxide Index; $R^2= 0,92$, $\text{RMSECV}= 0,18$ for K232 and $R^2=0.93$, $\text{RMSECV}=0.05$ for K270.

According to these results, low-resolution Raman spectroscopy can be a useful approach for the evaluation of the oxidation level in virgin olive oils. This technique allows the determination of common oxidation parameters in a fast, non-destructive and direct way, providing reliable results.