The development of new rapid techniques to characterize aspects of the quality of olive oils is of great interest, specially when they do not depend on the use of solvents and reagents. Two main areas of application of these techniques are 1) determining the varietal origin and 2) olive oil authentication against fraudulent mixtures of plant oils. In this work we have developed predictive models based on spectroscopy Vis/NIR that allow analysis of the composition of fatty acids (FAMEs) in olive oil and accurately estimating their triglyceride composition.

### INTRODUCTION

Olive oils are complex mixtures of free fatty acids (FFAs) and triglycerides. Spectroscopy methods have been widely used in the food industry as a rapid, non-destructive, and non-toxic alternative to traditional methods for qualitative and quantitative analysis of fats and oils. Visible and Near-Infrared spectroscopy (Vis/NIR) is a powerful tool for the analysis of food products due to its ability to provide rapid and non-destructive measurements of the composition of the sample. This technique is based on the absorption of light by the sample, which is proportional to the concentration of the components present in the sample. The resulting spectra can be used to develop predictive models that can estimate the composition of the sample, such as the content of triglycerides and free fatty acids in olive oil.

### MATERIAL AND METHODS

#### OLIVE OILS

FAMEs, N = 233
Triglycerides, N = 166

#### INSTRUMENTATION

- **Labspec (ASD, USA)**
- **Transmittance** (Ocean Optics, USA)

#### SOFTWARE AND MODELING

- **Models** The Unscrambler 9.7 (CAMO, Norway)

### RESULTS

- Table 1. Statistical data from the calibration and validation sets

### CONCLUSIONS

This work demonstrates the feasibility of determining FAMEs, and estimating the olive oil triglyceride composition by Vis/NIRS, using multivariate models. The predictive exercises for estimating dioleolinolein and dioleolinolein+dipalmitolinolenin provided r = 0.94 and 0.81, and for ECN46 and ECN50 provided r = 0.85 and 0.73. The proposed techniques are fast, non-destructive and potentially multi-parametric. The goodness of statistical models and the evaluation tests shows that these techniques can be useful together other methods for analyzing these quality parameters of olive oil.

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