Non-targeted multivariate methods using NIR sensors for increasing sampling during on-siteofficial inspections of virgin olive oils

Mar Garrido-Cuevas1\*, Paolo Oliveri2, Ana Garrido-Varo1, Dolores Pérez-Marín1

1 Faculty of Agriculture & Forestry Engineering, Department of Animal Production, University of Cordoba, Campus Rabanales, Ctra. Nacional IV-Km 396, 14071, Cordoba, Spain. \*margarridocuevas@hotmail.com

2 Department of Pharmacy (DIFAR), University of Genova, Viale Cembrano 4, 16148 Genova, Italy.

Despite the huge amount of efforts invested in research into physic-chemical and sensory methods for determining the quality, purity and authenticity of virgin olive oils (VOOs), the adulteration of VOO with low-quality oil remains a major international problem. One of the main reasons for the recurrent frauds episodes is that the volume of VOOs officially inspected is low, due to reduced national budget for the analysis of the inspected samples by the International Olive Council (IOC) and European standardised wet chemistry methods. Near Infrared Spectroscopy (NIRS) technology has shown its potential both for the prediction of quality and purity parameters in olive oil and for its classification into commercial categories. Portable NIRS sensors, machine learning methods and ICT could offer a radical new approach for *on site* official inspections. However, there is still a wide field of research before offering olive oil Official Inspectors a ready-to-use portable NIRS instrument and on-site applications. The first author is in the first year of her PhD studies and her research is in the framework of a large national R & D project entitled *“NIRS technology and IoT platforms for ensuring the integrity of high added value Spanish products: Iberian cured ham and Extra-virgin olive oil”*

A short-term scientific mission (CA19145) has been approved to be carried out during July 2022, under the supervision of Prof. Paolo Oliveri. The main goal of the STSM is to improve the chemometric skills, on novel mathematical pattern recognition algorithms for the development of non-targeted applications, to undertake real-time on-site analysis of a large volume of VOO samples. To accomplish that goal, it will be used a database of about 500 olive oil samples already analysed in several NIRS instruments of different optical configurations.

**Keywords:** PortableNear infrared spectroscopy, pattern recognition methods, non-targeted spectral methods, Virgin Olive Oil integrity.

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