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FT-Raman spectroscopy for authentication of olives from 11 different cultivars in Andalusia, Spain.

Abstract

Using an affordable spectroscopic technique and based on the characteristics of the whole olive stone, the Raman spectral fingerprint associated with molecular differences among 11 of the most common olive varieties in Andalusian groves has been obtained (figure 1). Microstructural analysis, combined with statistical evaluation, allows the detection of indicators that uniquely identify each olive variety without requiring the full spectrum; only a few components from a simple spectrum of the olive stone are necessary. The main goal of this study is to identify and classify olives by variety, either at the initial stages of olive oil production or from microscopic residues in finished products. This approach aims to provide a quality control tool within the oil production chain to verify olive variety.

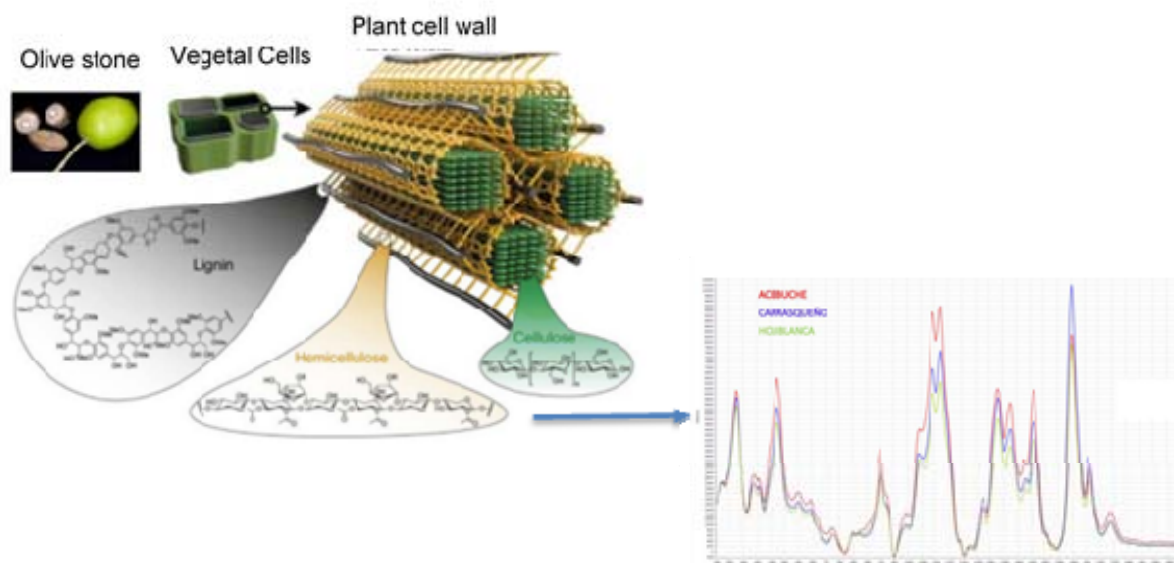


Figure 1: Main components of olive stones, including hemicellulose, cellulose, and lignin, along with their composition in proteins, fats, phenols, free sugars, and polyols and Raman spectral characteristics of olive stones in the 200-2000 cm⁻¹ range for the Acebuche, Hojiblanca, and Carrasqueño varieties.