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USE OF NEAR-INFRARED SPECTROSCOPY TO PREDICT OIL CONTENT COMPONENTS AND FATTY ACID COMPOSITION IN OLIVE FRUIT

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The University of Córdoba conducts since 1991 a breeding program to obtain new olive cultivars from intraspecific crosses. The objective is to obtain new early bearing and high-quality cultivars. In plant breeding, many seedlings must be tested to increased the chance of getting desirable genotypes. Therefore, fast, cheap and accurate methods of analysis are necessary. The conventional laboratory techniques are costly and time-consuming. Near Infrared Spectroscopy (NIRS) can satisfy the characteristics requested by plant breeders and offers many advantages such as the simultaneous analysis of many traits and cheap cost. The objective of this work was to asses the performance of NIRS to estimate oil fruit components (fruit weight, flesh moisture, flesh/stone ratio and oil flesh content in dry weight basis) and fatty acid composition in olive fruit.

Genotypes from reciprocal crosses between 'Arbequina', 'Frantoio' and 'Picual' cultivars have been used in this study. A total of 287 samples, each from a single plant, were scanned using a DA-7000 Diode Array VIS/NIR Analysis System (Perten Instruments), which covers the visible and NIR range from 400-1700 nm. All samples were analysed for fatty acid composition (gas chromatography) and 220 for oil fruit components (oil content by nuclear magnetic resonance). 70% and 30% of samples were randomly assign for the calibration and validation sets respectively.

The preliminary results shows that calibration for palmitic, oleic and linoleic acids were highly accurate with calibration and validation values of r^2 from 0.85 to 0.95 and 0.76 to 0.91 respectively. Calibration for palmitoleic and estearic acids were less accurate, probably because of the narrow range of variability available for these fatty acids. For the oil fruit components, calibration were high accurate for flesh moisture and oil flesh content in dry weight basis (r^2 higher than 0.90 in both calibration and validation sets) and less accurate for the other characteristics evaluated.

The first results obtained indicate that NIRS analysis could be an ideal technique to reduce the cost, time and chemical wasted necessary to evaluate a large number of genotypes and it is accurate enough to use for pre-selecting genotypes in a breeding program.