

## **DISCRIMINATION BETWEEN VIRGIN OLIVE OILS FROM CRETE AND THE PELOPONESE USING NEAR INFRARED TRANSFLECTANCE SPECTROSCOPY**

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Food adulteration is a serious consumer fraud and a potentially dangerous practice. Regulatory authorities and food processors require a rapid, non-destructive test to accurately confirm authenticity in a range of food products and raw materials. Olive oil is prime target for adulteration either on the basis of the processing treatments used for its extraction (extra virgin vs virgin vs ordinary oil) or its geographical origin (e.g. Greek vs Italian vs Spanish). As part of an investigation into this problem, some preliminary work focused on the ability of near infrared spectroscopy to discriminate between virgin olive oils from separate regions of the Mediterranean *i.e.* Crete and the Peloponese. A total of 46 oils were collected: 18 originated in Crete and 28 in the Peloponese. Oils were stored in a temperature-controlled room at 20°C prior to spectral collection at room temperature (15-18°C). Samples (approximately 0.5ml) were placed in the centre of the quartz window in a camlock reflectance cell; the gold-plated baking plate was then gently placed into the cell against the glass so as to minimise the formation of air bubbles. The rear of the camlock cell was then screwed into place producing a sample thickness of 0.5mm. Spectra were recorded between 400 and 2498nm at 2nm intervals on a NIRSystems 6500 scanning monochromator. Spectral collection took place over 2-3 days. Data were analysed using both WINISI and The Unscrambler software to investigate the possibility of discriminating between the oils from Crete and the Peloponese. A number of data pre-treatments were used and discriminant models were developed using discriminant PLS (WINISI & Unscrambler) and SIMCA (Unscrambler). Despite the small number of samples involved, a satisfactory discrimination between these two oil types was achieved. Graphical examination of principal component scores for each oil type also holds out the possibility of separating oils from either Crete and the Peloponese on the basis of districts within each region. These preliminary data suggest the potential of near infrared spectroscopy to act as a screening technique for the confirmation of geographic origin of extra virgin olive oils. The sample presentation strategy adopted uses only small volumes of material and produces high quality spectra.