

## Analysis of Moisture, Oil and Acidity in Olives using DA 7200

### Introduction

For the olive industry it is important to be able to rapidly and accurately determine moisture, oil and acidity in the olives, as these parameters define the amount of oil that can be extracted as well as the quality of the oil.



The Near Infrared Reflectance (NIR) technique is highly suitable for this purpose, but in the past instrument limitations have not permitted users to reap the full benefits of NIR. Sample preparation requirements like grinding or special cups made analyses laborious and time consuming.

### Diode Array 7200

The DA 7200 is a new full-spectrum, NIR instrument designed for use in the grain and feed industries. Using novel diode array technology it performs a multi-component analysis in only 6 seconds with no sample preparation required.



During this time about 300 full spectra are collected and averaged. As the sample is analyzed in an open dish, the problems associated with sample cups are avoided and operator influence on results is minimal.

### Experimental

About 180 samples of olives from a Spanish olive oil producer were analyzed in a DA 7200. The samples were analyzed as they were, with no grinding or any other sample preparation. Each sample was repacked 5 times in order to minimize sampling error. Reference results were provided by the olive oil producer.

Calibrations were developed by Perten Instruments using Partial Least Squares (PLS) regression. Multiplicative Scattering Correction (MSC) and Savitzky-Golay derivatives were used as data pre-treatment to improve the calibration models.

### Results and Discussion

The DA 7200 results are very accurate when compared to the results from the reference methods. Statistics for the respective parameters are presented in the table below and graphs are displayed on page 2.

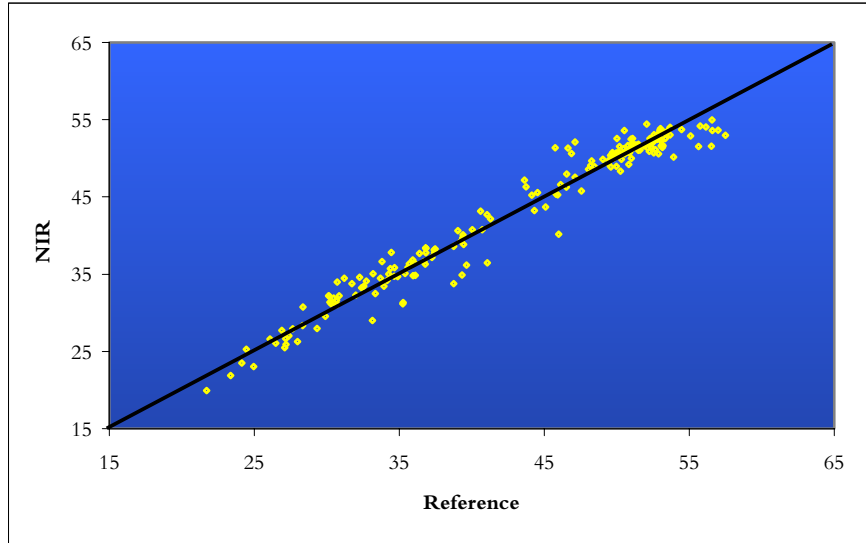
Parameter	Range	Samples	R <sup>2</sup>	SECV <sup>*</sup>
Moisture	21.7-57.5	181	0.97	1.8
Oil	14.9-36.5	180	0.89	1.6
Acidity	0.3-3.6	165	0.87	0.3

The differences between the DA 7200 and the reference method are of the same magnitude as typical differences between two reference labs. The DA 7200 is more precise than the reference methods meaning that replicate analyses are much more repeatable and representative.

In summary it is concluded that the Diode Array 7200 can analyze olives for the aforementioned constituents. It should be noted that the olives were not ground prior to analysis, but were analyzed as they were.

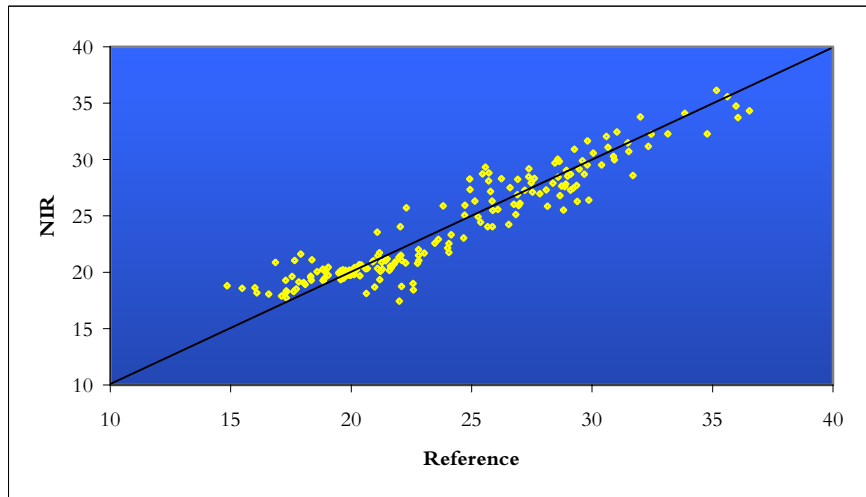
**Moisture**

The moisture results are very accurate across the range. DA 7200 will be an excellent tool for rapid and accurate determination of moisture in olives.



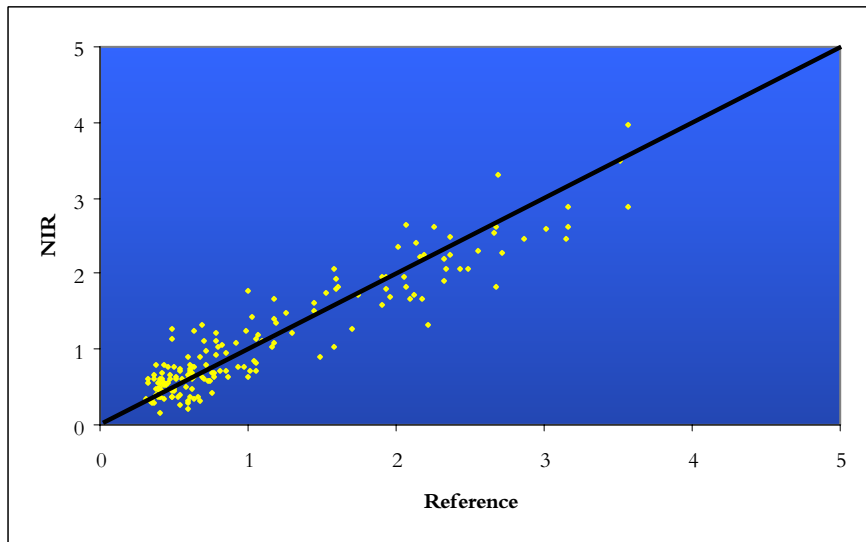
**Oil**

The range is very wide and the results show an excellent correlation with reference data. The DA 7200 is highly accurate on oil in olives.



**Acidity**

Although there are more samples at the lower end of the range, the performance is good also for samples with higher acidity.



\* SECV is the standard deviation between NIR and Lab data calculated in a way that describes the future performance of the calibration.