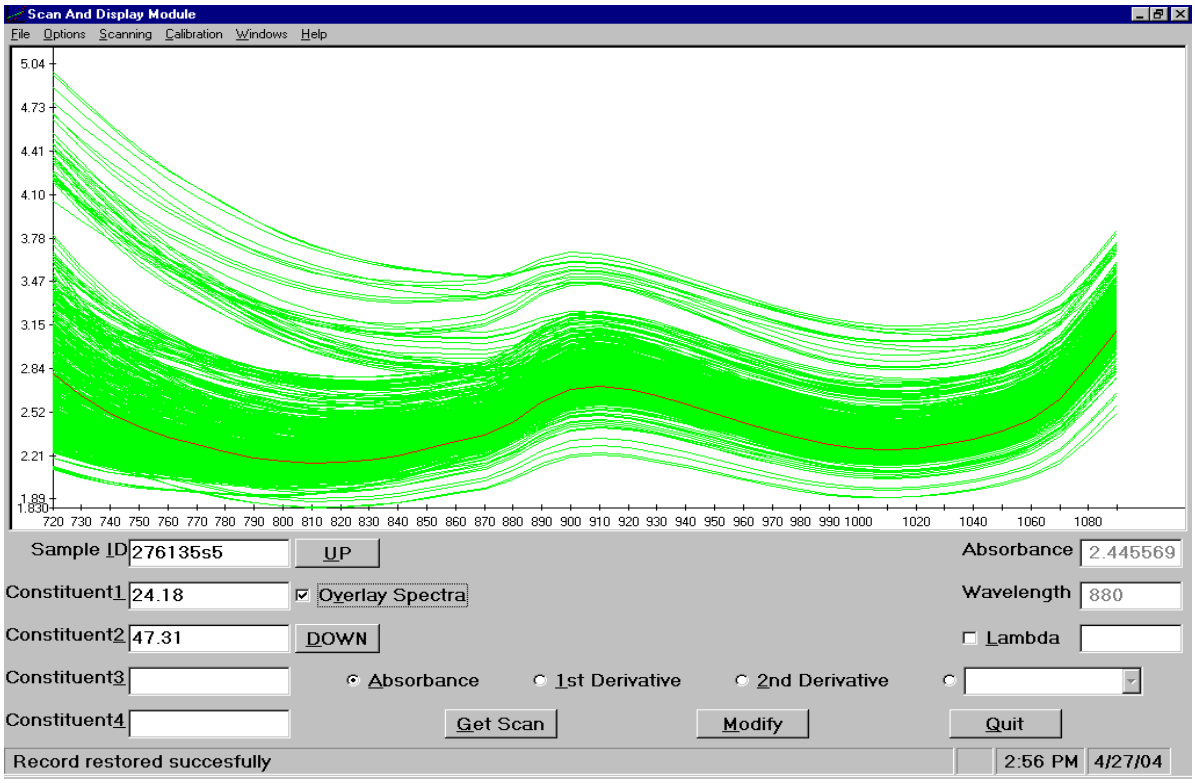
NIR Technology Systems

Application Note 31: Analysis of Olives using NIT-38 Olive Analyser

Scope: This study was designed to test the ability of the NIT-38 Olive Analyser to measure oil and moisture in olives.

Procedure: 110 samples of fresh olives were collected during the 2001 Olive campaign in Jena, Spain. The samples were crushed using a hammer mill into a homogenous paste. The pits were included in the mix. The samples were scanned using the NIT-38 Olive Analyser and a 10mm pathlength Squeeze Cell. Five scans of each sample were collected as the Squeeze Cell moved in front of the analysers light source. The spectra were up loaded into a PC and NTAS(NIR Technology Australia Software) was used to develop calibrations for oil and moisture. The reference oil and moisture values were determined using NMR and Loss on Drying.

Results: Figures 1. shows the NIT spectra of the olive paste. The major absorption band is due to the oil and moisture in the samples.



Figures 2 and 3 show the calibration data for oil and moisture.

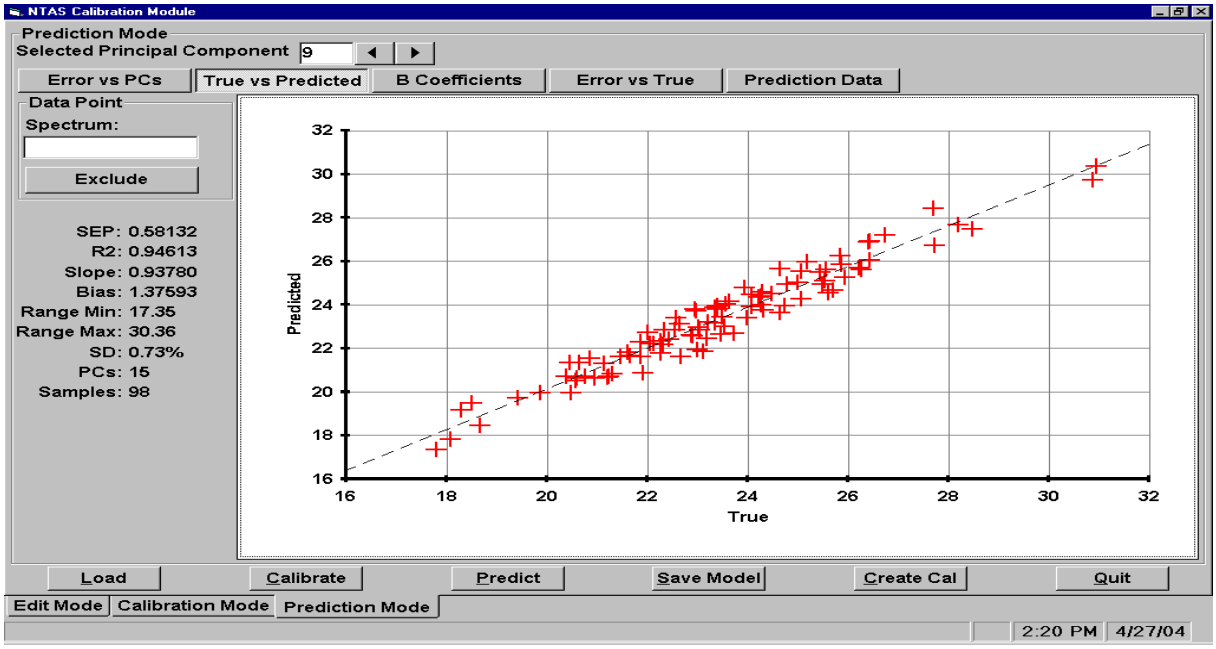


Figure 2. Oil Calibration Data

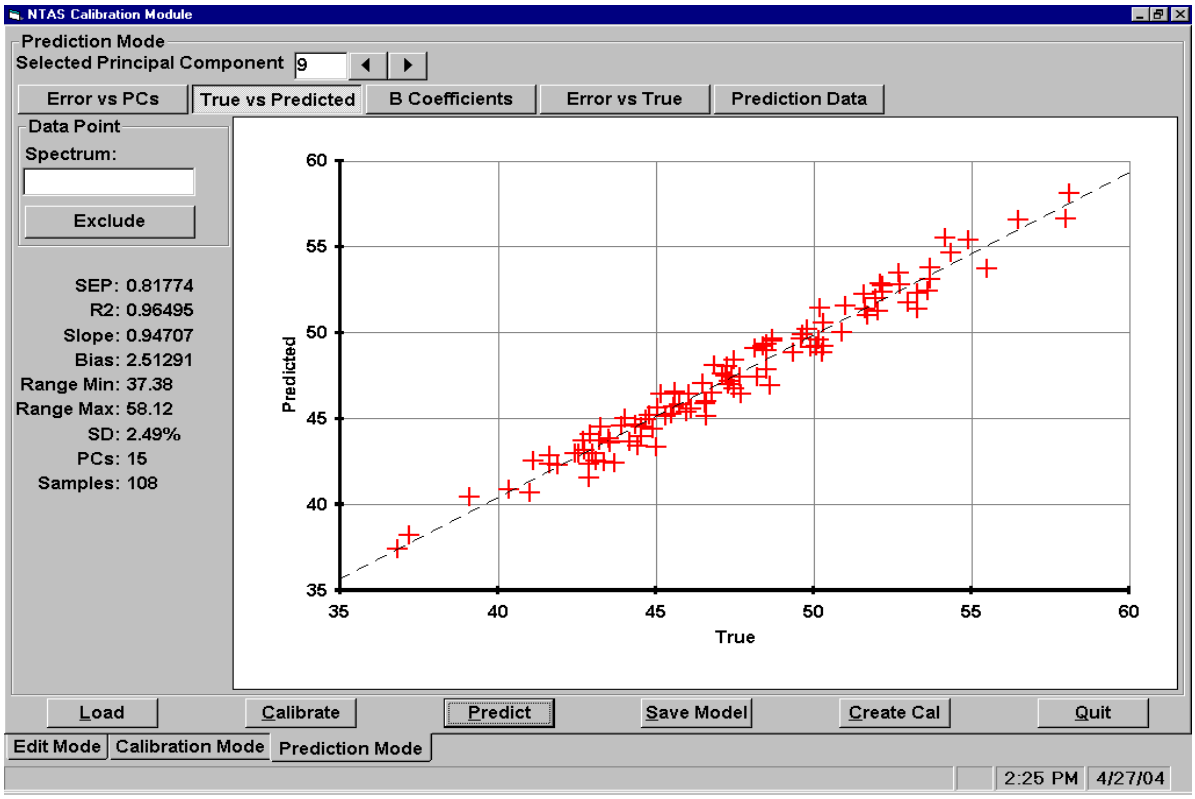


Figure 3. Moisture Calibration Data

A further 62 samples of were used as an evaluation set. The samples were scanned 5 times using the Squeeze Cell and the results were determined using the average spectra of the five scans.

These olives were collected from similar regions to the calibration set and analysed by the same laboratory for oil and moisture.

The prediction data is shown below.

Oil	SEP	=	0.48	R2 = .979
Moisture	SEP	=	0.25	R2 = .985

Conclusion: It can be seen that by averaging the spectra collected from all five scans, the prediction data is significantly improved. It was observed that the olive paste was not perfectly homogeneous and as such the reference values used for calibration were not necessarily related to the exact samples being scanned by the analyser. The reference methods uses a very small amount of sample, eg 5g, for their tests and as such the true error of analysis is not possible to determine. The NIR method uses a much larger sample amount, eg, 100g, and thus provides greater accuracy.