Application Note 104: Analysis of Copra for Oil and Moisture using the Series 3000 Transmission Analyser.

Introduction:

Copra is the dried ground meat from coconut. Coconut oil is extracted from this meat. The quantity of oil in the copra is important for the extraction process.

This study was undertaken to determine the ability of measuring oil in ground copra samples. The Series 3000 Transmission Analyser was used for the purpose of this study.

Procedure:

Nine (9) samples of Copra were prepared by grinding them to an even consistency and placing into a petrii dish, levelled to 5mm in depth to produce an even pathlength. The samples were then scanned over the wavelength range of 720nm to 1100nm collecting 10 scans per sample. The samples were then redone and the scanning process repeated. The spectra were uploaded into NTAS (NIR Technology Australia Software) and Partial Least Squares Regression (PLS) was used to develop a calibration for Oil and Moisture.

Results:

Figure 1, below, shows the NIT spectra, over the wavelength range of 720nm to 1100nm, for the 9 samples of Copra.

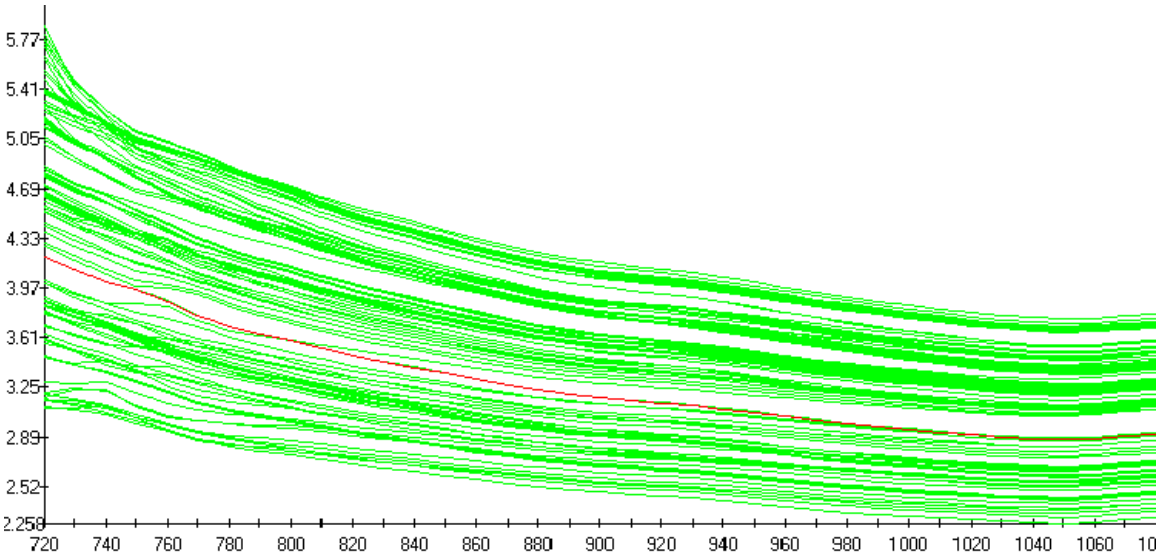

Figure 1: Plot of NIR Spectra for Copra.

Figure 2 shows the calibration statistics for the NIR Oil values versus the reference Oil value. The Standard Error of Calibration is 0.21% with a correlation (R^2) of 0.97.

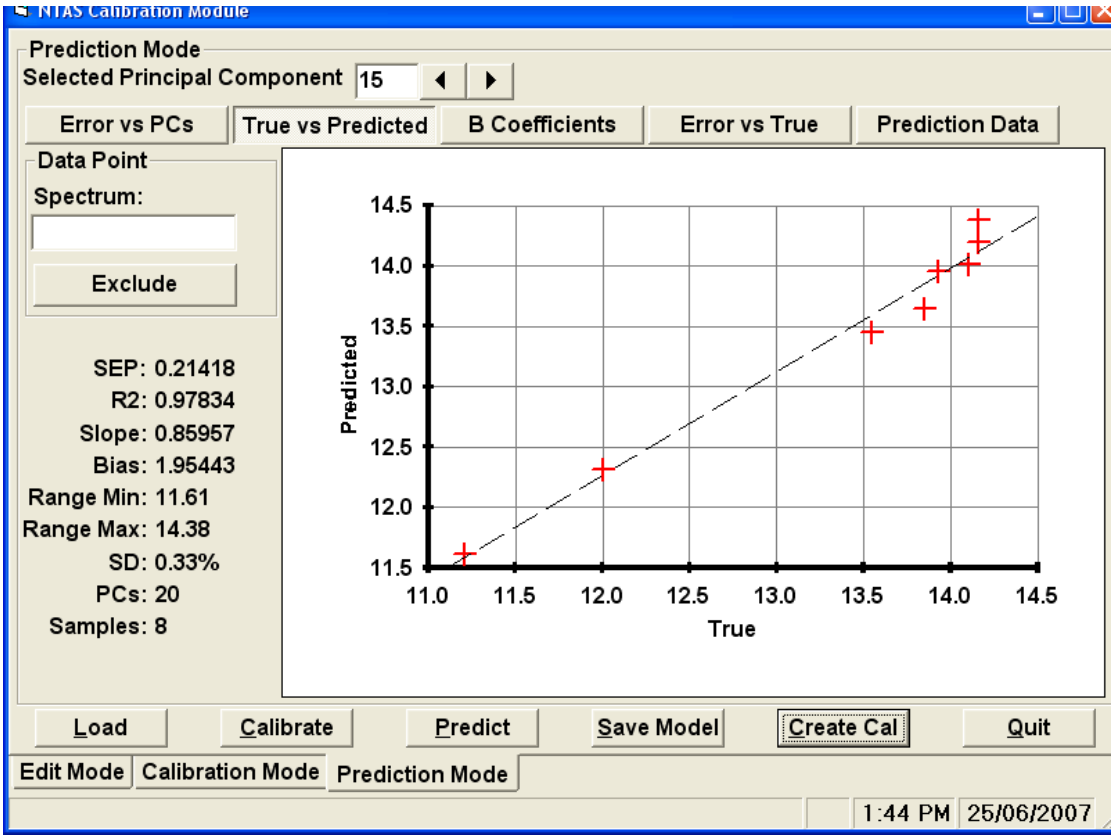

Figure 2: Plot NIR Predicted Oil value vs. Reference Oil value.

Figure 3 shows the calibration statistics for the NIR Moisture values versus the reference Moisture value. The Standard Error of Calibration is 0.21% with a correlation (R^2) of 0.97.

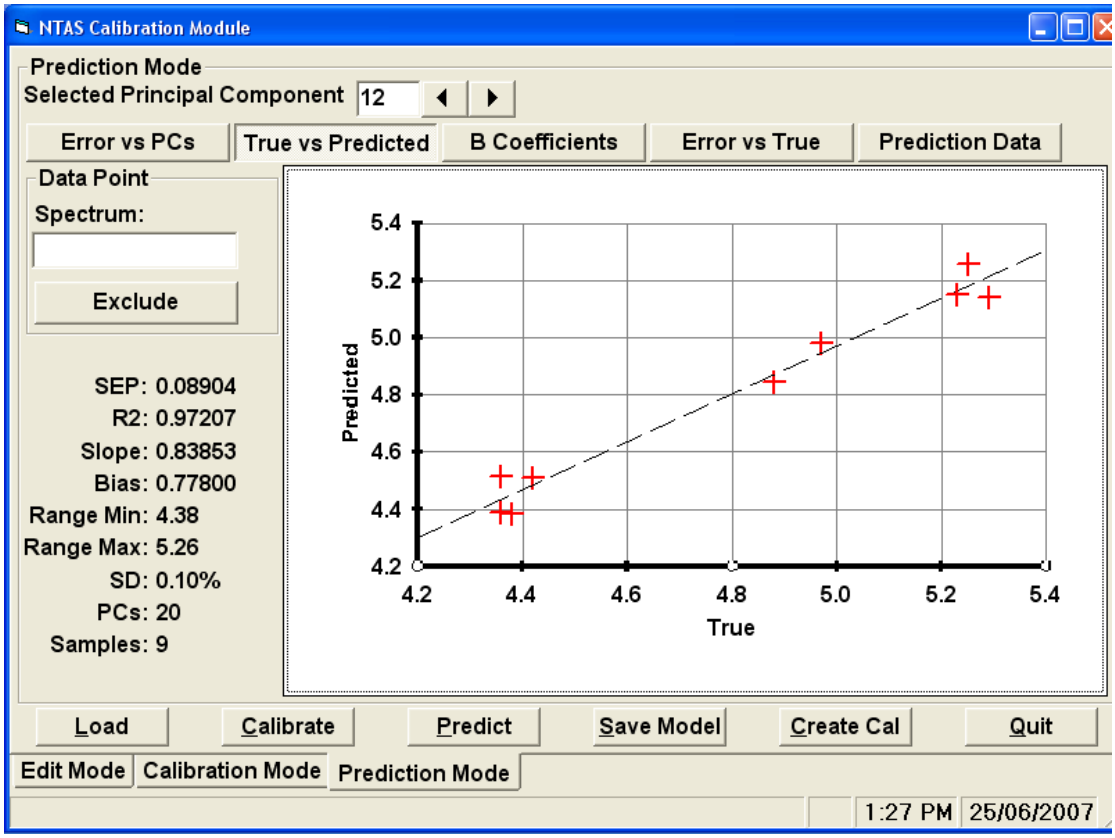

Figure 3: Plot NIR Predicted Moisture value versus the reference Moisture value.

Conclusion:

It can be seen in both figures 2 and 3 that the Series 3000 Transmission Analyser can be calibrated to measure oil and moisture values in ground copra samples. The limited number of samples available for the trail is sufficient to prove the viability of the method, however, it is not sufficient to develop a robust calibration. The range of the samples would require greater enhancement before a robust calibration could be developed.

The sample set provided also shows increasingly high absorbances in the initial regions of the spectra. This would seem to indicate that this particular samples set maybe benefit from the use of a reflectance analyser as opposed to the transmission analyser that was used.

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