

Application Note 60: Demonstration of need to recalibrate for environmental changes to Canola Seeds



Introduction:

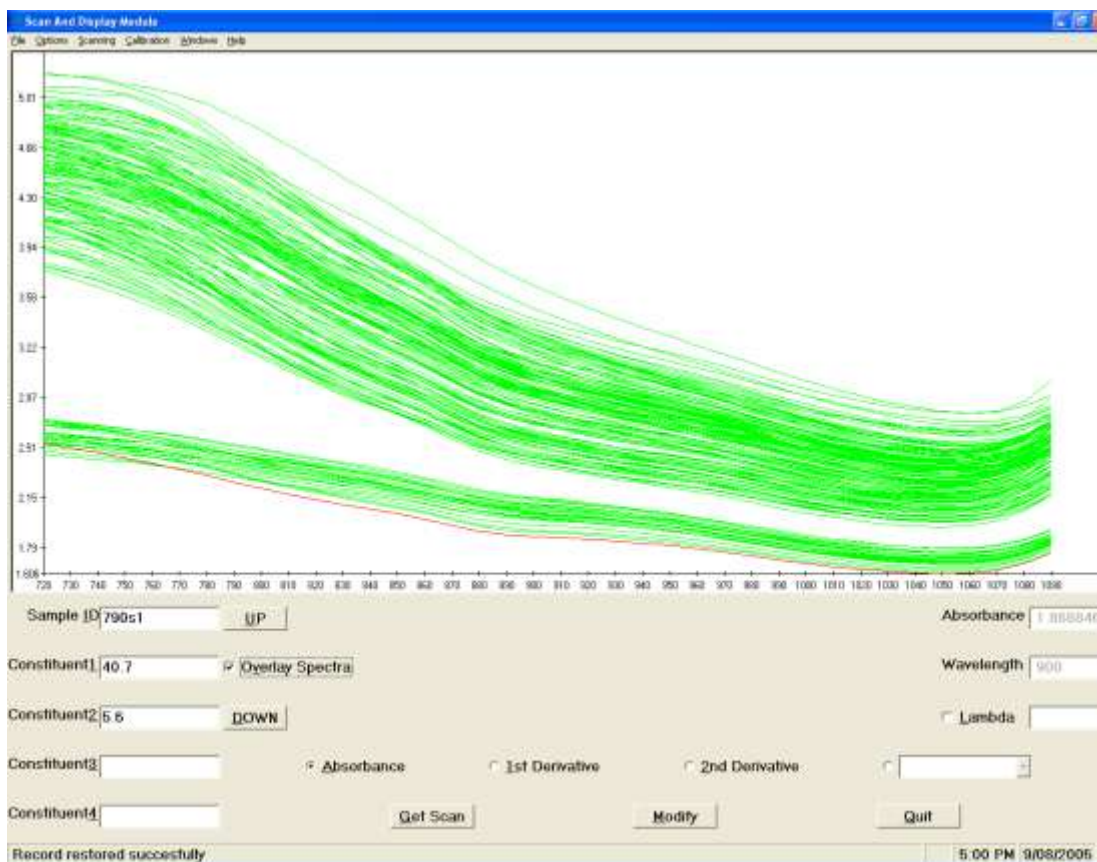
With the starting of a new harvest cycle in the Australian Canola Seed industry a number of users noticed significant changes in the readings from NIR systems used to measure moisture and oil levels in Canola Seeds.

This study was undertaken to determine the cause of the changes and to develop a new calibration to account for the changes in readings.

Description:

25 new Canola seed samples were taken and scanned 10 times over the range of 720nm to 1100nm. These scans were then compared to previously held spectra from previous years.

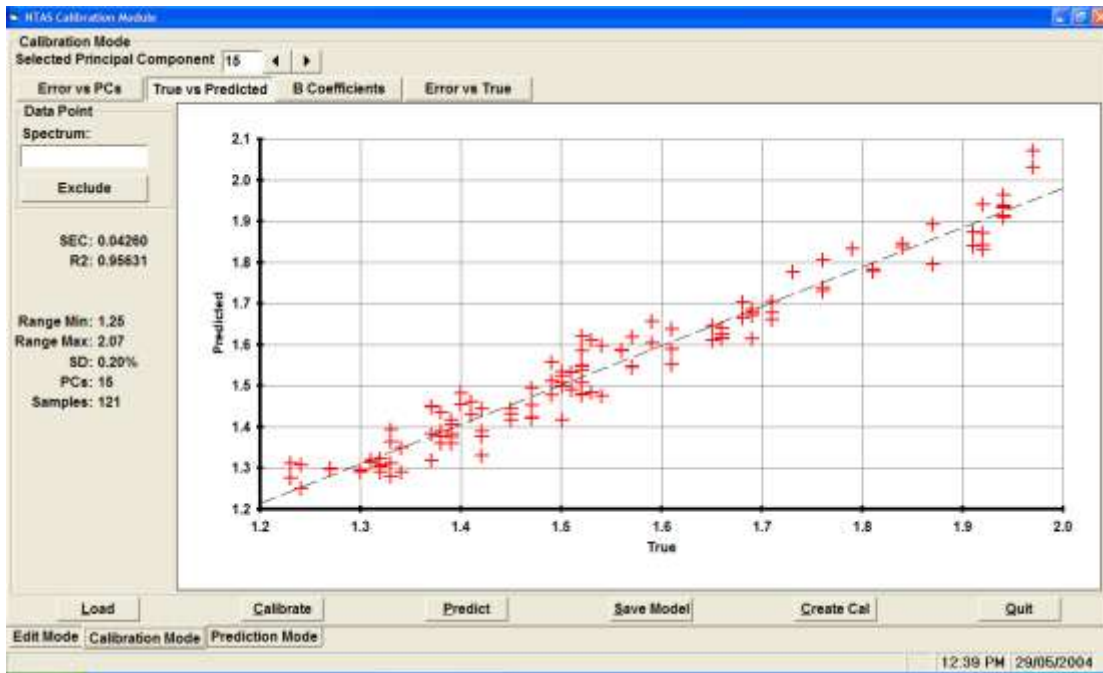
Figure 1 shows the spectra of the 25 new samples and the previous year's samples. The new samples display significantly different spectra beginning with absorbances in 2.5 to 2.8 range instead of the 4 to 5 range of previous years. It is believed that this difference is due to the ongoing drought in South East Australia as both moisture and oil levels in the seeds are also reduced on previous years.



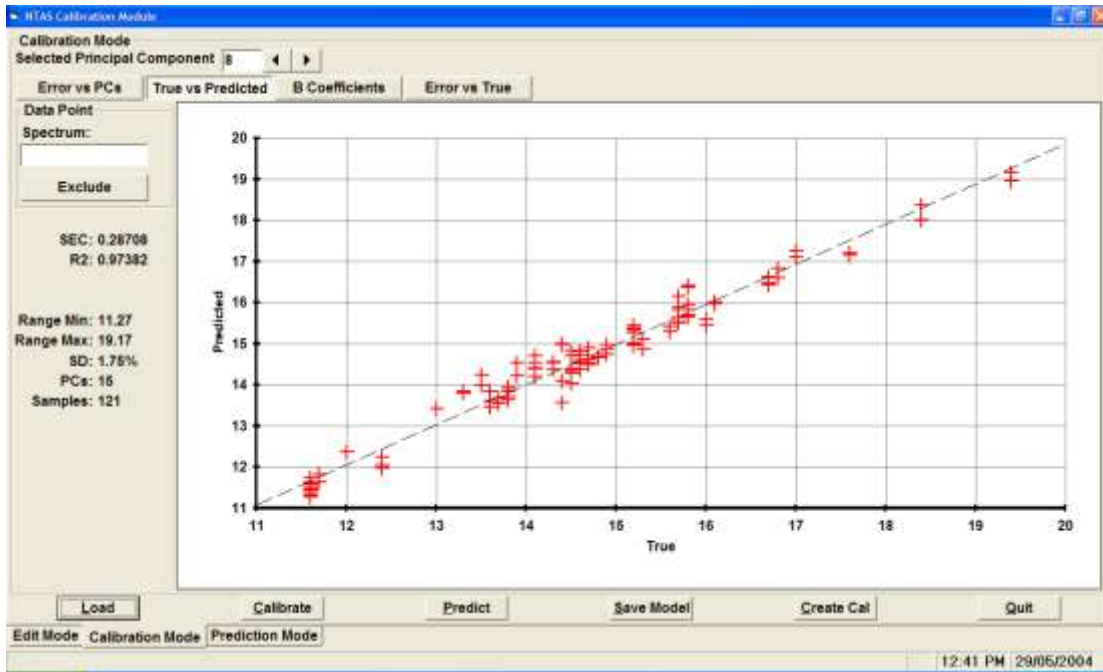
Given the change in spectra and environmental conditions a new calibration had to be created using the available new samples. An adjustment of an existing calibration would be unwise as the spectra differences are clearly too significant.

Results:

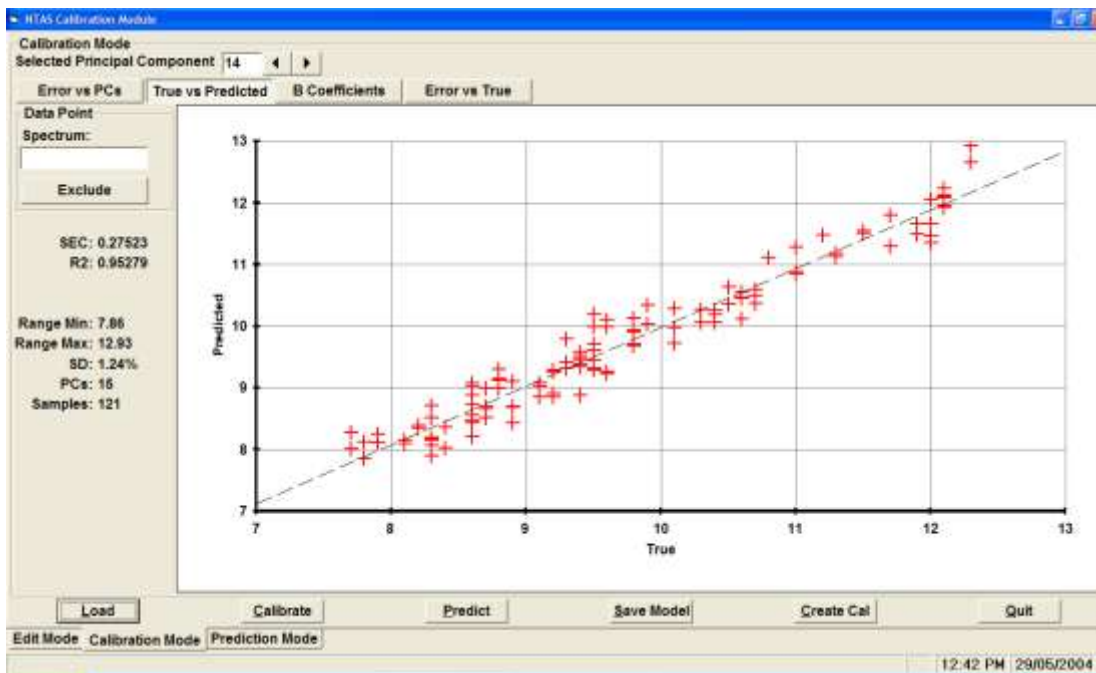
The plots below show the calibration statistics for Cropscan 2000B Serial Number 175.



Plot NIR Predicted Nitrogen vs Ref Nitrogen



Plot NIR Predicted Moisture vs Ref Moisture



Plot NIR Predicted Protein vs Ref Protein

Conclusions:

The Nitrogen and Protein data are the same except for the use of a conversion factor of 6.25. The correlation of 0.958 and SEC(Standard Error of Calibration) = 0.042 (N) and 0.27 (P), are considered to be acceptable. The number of B coefficients, ie, 14, is possibly high, however, similar models have been used for wheat and barley in other countries.

The calibration model for Moisture shows a correlation of 0.974 and SEC = 0.29%. This is considered to be acceptable.

Unfortunately there are no prediction samples available as yet. It is recommended that this calibration model be loaded into the instrument and more samples scanned so that a true prediction set can be obtained.