Application Note: 41 Cropscan 2000B Malt Barley Calibration:

Introduction

The analysis of barley for protein and moisture content is another application suitable for measurement by NIR techniques. The Cropscan 2000B Whole Grain Analyser is provided with a calibration capable of measuring these properties in barley so as to allow a method for growers to separate their crop on the basis of either feed or malting grade (9-12.5% protein).

Description

74 samples of Australia barley were scanned nine times on the Cropscan 2000B between 720-1100nm using a 15mm pathlength cell. The samples were collected from Victoria and include Schooner and Gardner varieties. Approximately half of the samples had been graded as feed quality even though they were malting varieties.

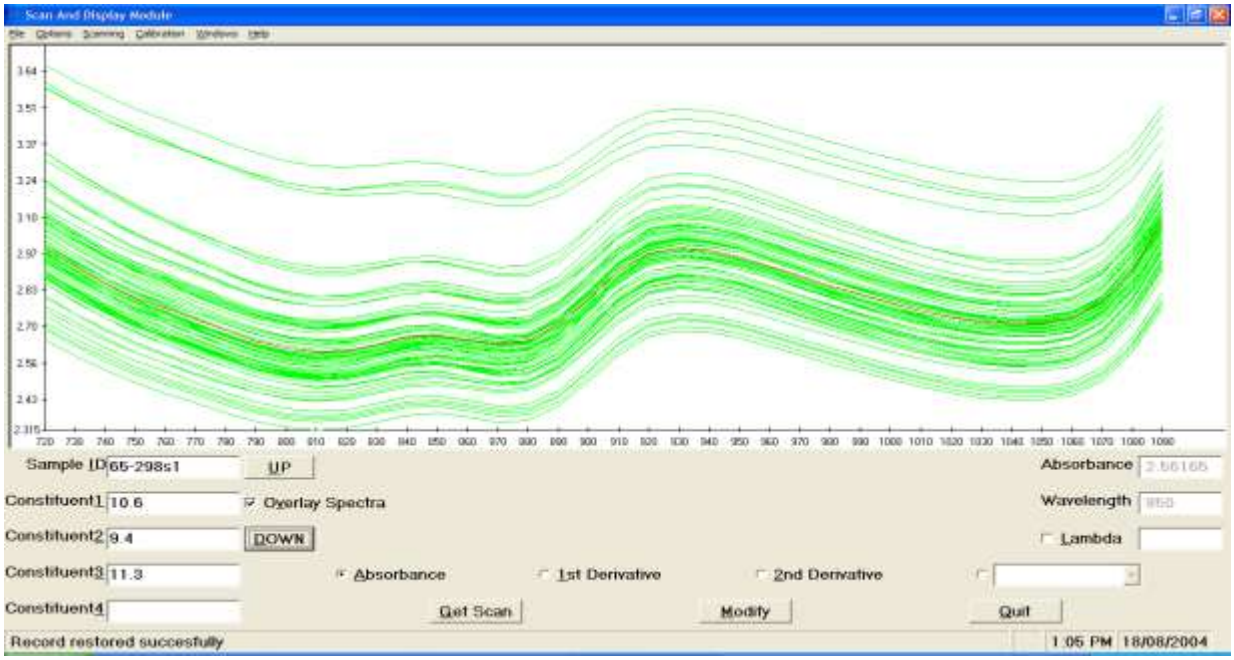


Figure 1. shows the NIR spectra of the 74 barley samples.

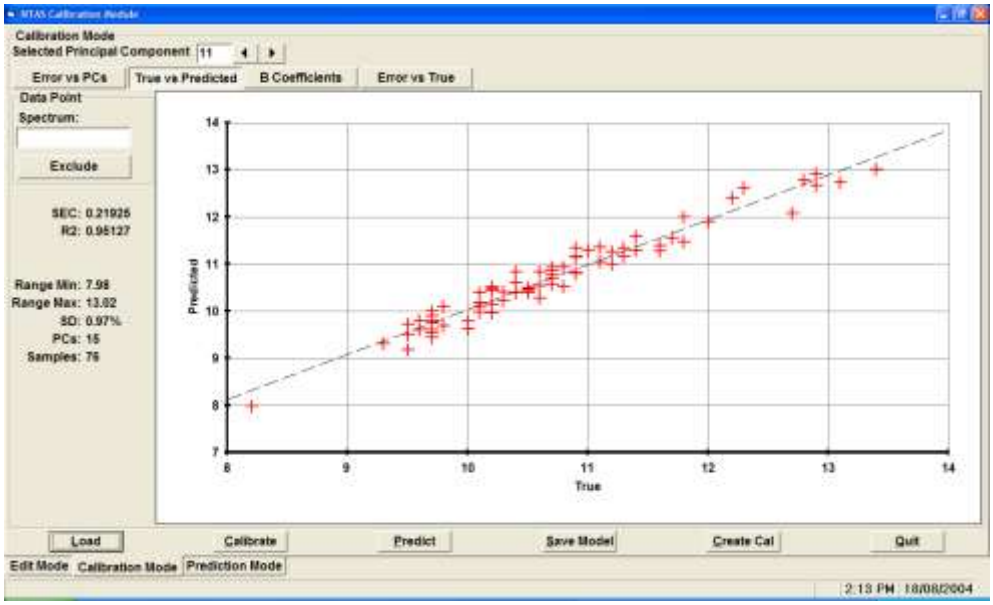
A calibration model was developed using partial least squares regression (PLS-1 algorithm in the software package NTAS).

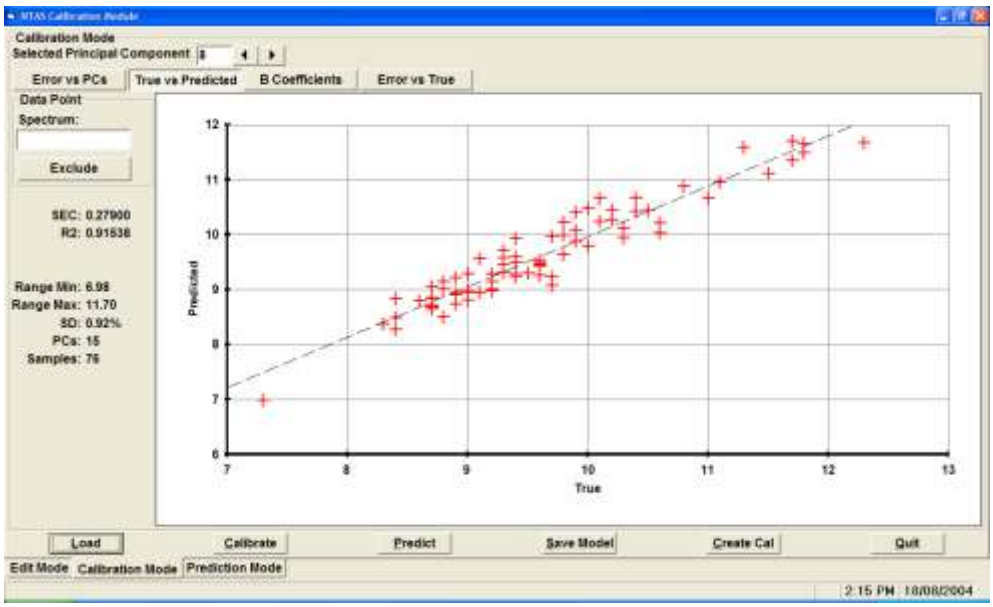
Results

The regression statistics for the calibrations are given below

	Number of elements (n)	Range (%)	Number of Principal Components (PC's)	Correlation (R)	Standard Error of Determination (SED)
Barley Calibration					
Protein	74	8-13.5	11	0.95	0.21
Moisture	74	8-12	11	0.91	0.27

A graphical representation of the calibration data is presented below





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Conclusion

The data above illustrates the ability to calibrate the Cropscan 2000B to measure the protein and moisture content of barley samples. Variety and colour of barley can effect NIR calibrations. Within the sample set used for this calibration, there were no samples, which exhibited strong absorbances ie. Above 3.5 abs units. Samples, which do absorb above this level generally, have poor agreement with laboratory data. A shorter pathlength cell eg. 16mm can be used to overcome this problem. Alternatively, the Cropscan 2000G can be set up to identify outliers which exceed the 4.5 absorbance unit range

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