

Application Note 02: Cropscan 2000G Sorghum Analysis



Introduction

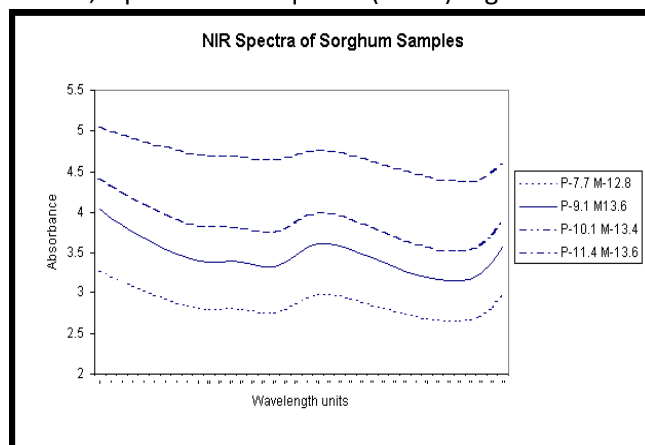
The Cropscan 2000G Whole Grain Analyser has been used to develop a calibration capable of predicting both the protein and moisture content of sorghum samples grown in Australia. Near Infrared (NIR) spectra of sorghum are shown below.

Description

52 samples of sorghum were scanned on the Cropscan 2000G between 720-1100nm using a 16mm pathlength cell. Using the software package Unscrambler, a partial least squares (PLS-1) regression was performed on the data to develop a calibration, which relates the spectral data to the prescribed protein and moisture values of the sorghum samples

Results

Ten (10) duplicate sorghum samples were used as a prediction set to determine the predictive ability of the calibration model produced. The individual samples were scanned five (5) times and the average was taken as the protein and moisture values. The results are shown below



Sample ID	Protein NIR (1)	Protein Ref (2)	Diff (1) & (2)	Moisture NIR (3)	Moisture Ref (4)	Diff (3) & (4)
1a	10.2	10.1	-0.1	11.4	11.9	0.5
1b	10.2	10.1	-0.1	11.3	11.9	0.6
2a	10.3	10.3	0	12.9	13.2	0.3
2b	10.3	10.3	0	12.9	13.2	0.3
3a	7.9	7.7	-0.2	12.9	12.8	-0.1
3b	8.2	7.7	-0.5	12.8	12.8	0
4a	9.7	9.3	-0.4	13	13.2	0.2
4b	10.1	9.3	-0.8	13	13.2	0.2
5a	9	9.5	0.5	11.9	11.8	-0.1
5b	9	9.5	0.5	11.9	11.8	-0.1
6a	9.3	9.5	0.2	12	12.2	0.2
6b	9.3	9.5	0.2	12.1	12.2	0.1
7a	8.6	8.4	-0.2	12.1	12.1	0
7b	8.6	8.4	-0.2	12.1	12.1	0
8a	9.7	10.3	0.6	11.8	11.9	0.1
8b	9.9	10.3	0.4	11.8	11.9	0.1
9a	9.2	10.1	0.9	13.4	13.4	0
9b	9.3	10.1	0.8	13.5	13.4	-0.1
10a	8	7.5	-0.5	12.4	11.8	-0.6
10b	8	7.5	-0.5	12.5	11.8	-0.7

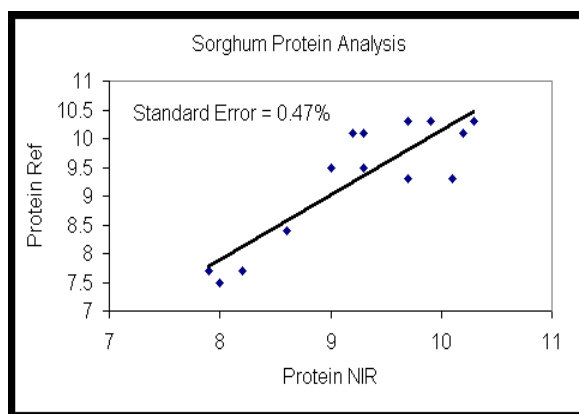
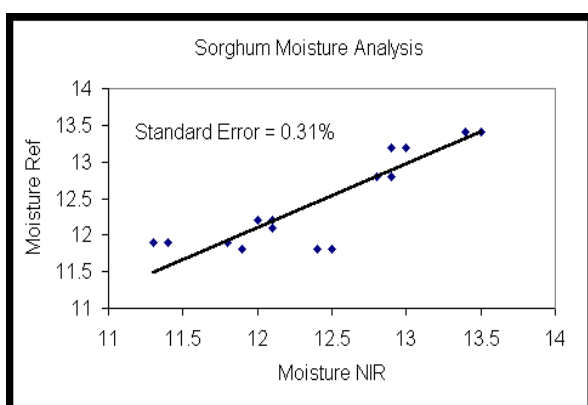
The Cropscan 2000G On Farm Analyser is portable Near Infrared Transmission Analyser designed for use by farms to measure protein, oil and moisture in whole grains of wheat, barley, oats, sorghum, rice, canola, corn, soybeans, peas and beans. The instrument use a diode array spectrometer to collect the NIR spectrum from 720-1100nm. In this region, N-H(Protein), C-H(Fat) and O-H(Moisture) absorb NIR energy. The NIR spectrum of grains can be analysed to provide rapid analyses of whole grains for protein, oil and moisture in less than 1 minute.

Statistical analyses of the above data are given in the following table

	Protein Analysis	Moisture Analysis
Bias	0.03	0.04
Standard Deviation	0.47	0.31
SDD*	0.15	0.07

* SDD = Standard Deviation of Differences between duplicate samples

A graphical representation of the data is presented below



Conclusion

The Cropscan 2000G can be used to measure the moisture content in sorghum with a good reproducibility (SDD for the duplicate samples of 0.07%) and acceptable