Application Note 29: NIR Measurement of Protein, Oil and Moisture in Whole Peanuts

Introduction:

The analysis of whole peanuts for protein, moisture and oil offers peanut processors and buyers the ability to quickly assess the quality of the peanuts at the recieval dock. The problem with this type of mesurement is the variability in the nut size and shape. To evaluate this application, the NIT-38 NIR Transmission Analyser with a Sample Transport Module was used, so that a large volume of nuts might be scanned and thereby averaged.

Description:

30 samples of blanched, roasted and raw peanuts were scanned in a 28mm pathlength sample cell, using the NIT-38 Analyser. Five scans were collected for each sample and the analyses were performed in duplicate with reloading the sample for the duplicate analysis. The scans were saved and transferred to NTAS(NIR Technology Australia Software) where PLS calibrations were developed.

Results:

Figure 1 shows the moisture calibration, figure 2, the oil calibration and figure 3, the protein calibration. The Moisture calibration is the strongest, as would be expected. The Oil and Protein calibrations are acceptable, although more samples would help to reduce the errors. If we increase the averaging to 9 scans instead of 5 scans, then I would expect to see a reduction in the errors, although the repeat analyses were pretty close.

We can also increase the number of Principle Components used in the calibration models, however with a limited number of samples it was not justified. Also no outliers were removed from the calibration. In the protein data there is possibly one sample which is suspect. However it is felt that .55% SEC on whole nuts is probably a realistic figure since the variation in the nuts would be large, as such the errors between the NIR and the Lab results can just be that we are not measuring the same peanuts.
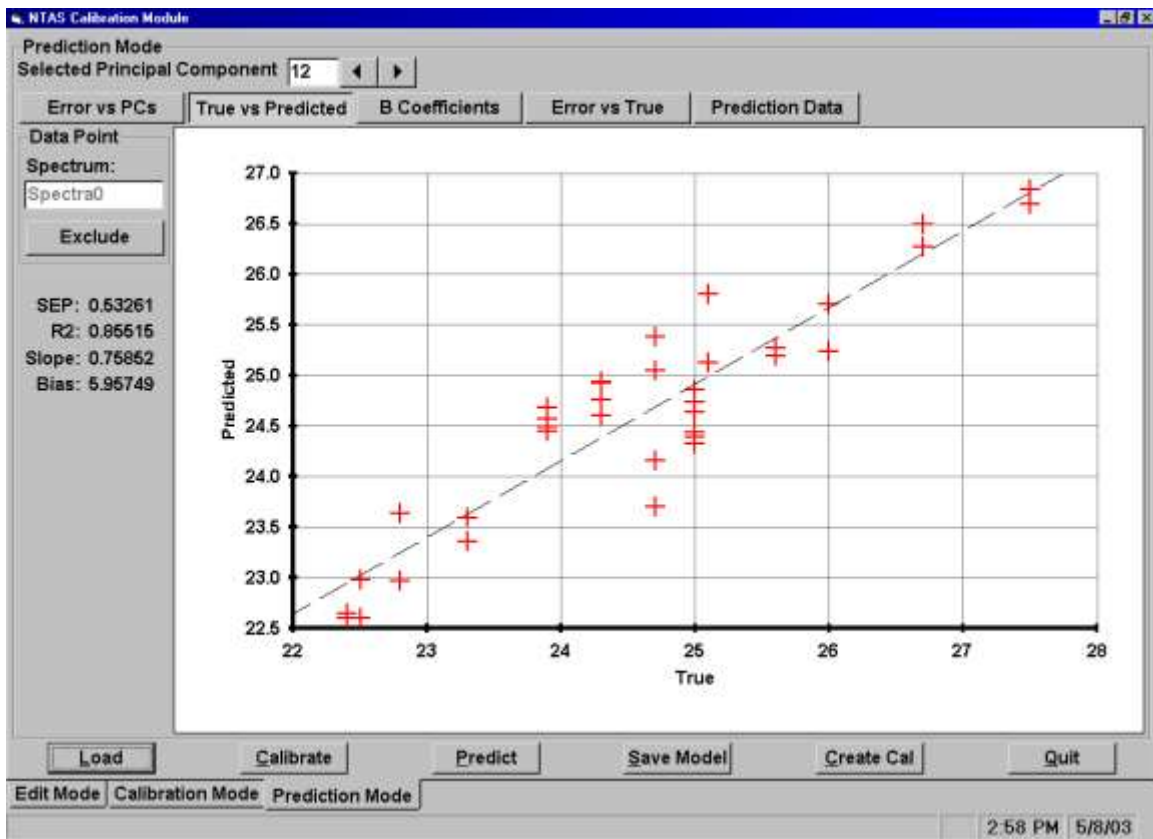
Conclusion:

This study demonstrates the feasibility of measuring whole peanuts using the NIT-38 Analyser.
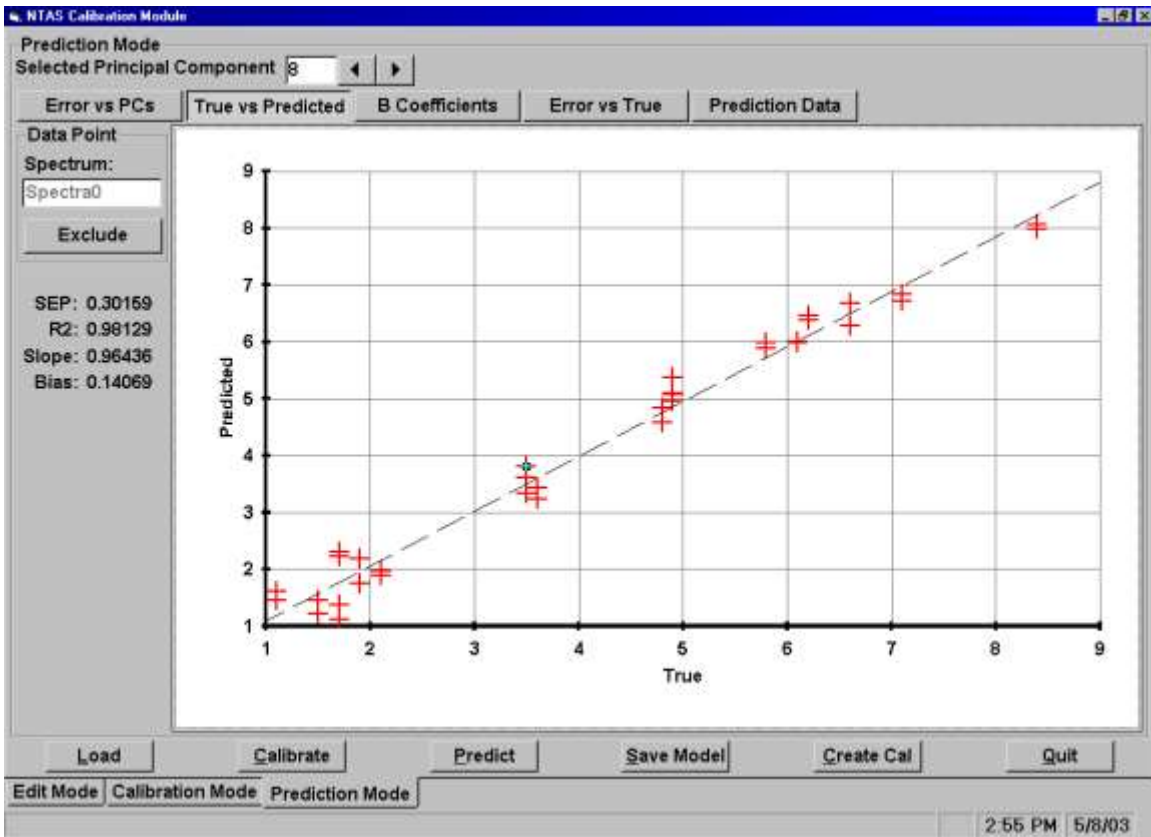
Moisture Calibration
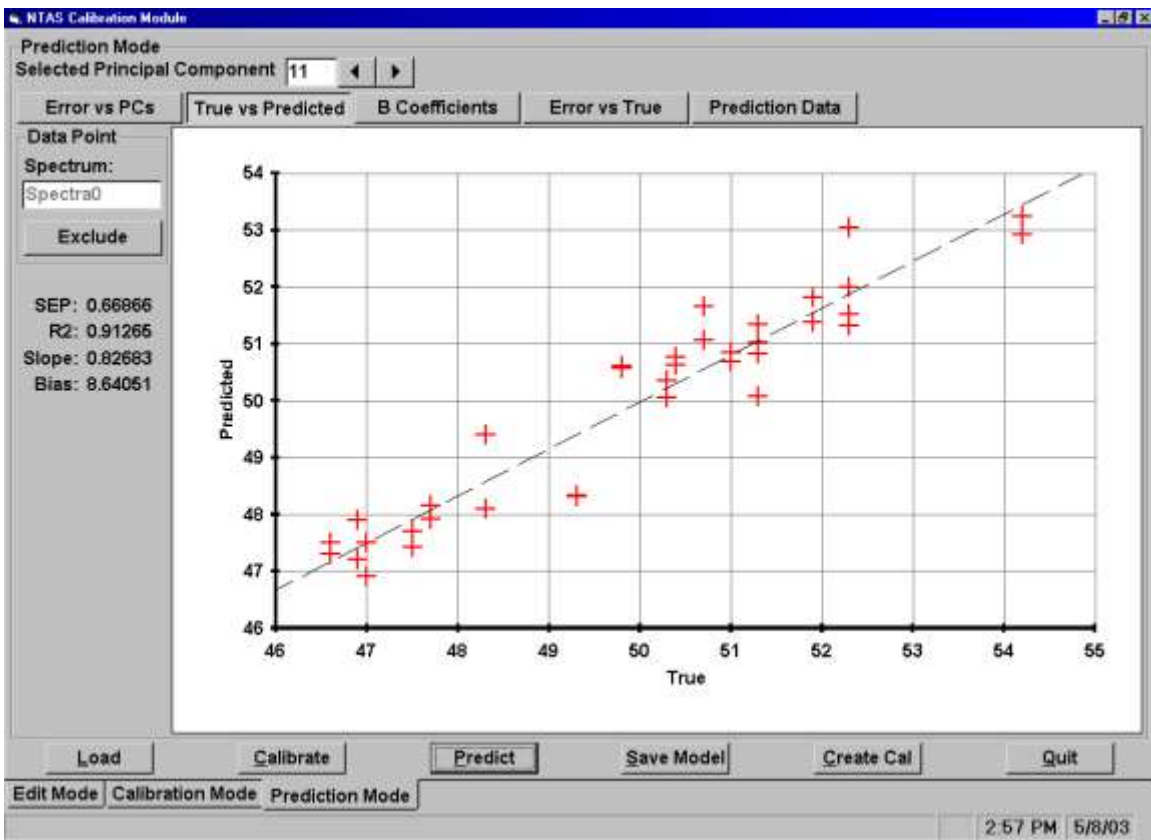
Oil Calibration

Protein Calibration