

Application Note 135: Calibration of Peanut Butter for Fat and Moisture using the Series 1000 Analyser.



Introduction:

This study was undertaken to establish if a calibration for fat and moisture in peanut butter was possible using the Series 1000 Near Infrared Transmission Analyser.

Procedure:

A number of samples of peanut butter samples were acquired from a local store and allowed to equalise to room temperature before being placed in the 10mm squeeze cell. They were then placed in the Series 1000 analyser and scanned over a wavelength of 860nm to 1010nm. This was repeated 10 times repacking the cell between scans. The spectra were uploaded into NTAS (NIR Technology Analysis Software) and Partial Least Squares Regression (PLS) was used to develop calibrations for fat and moisture.

Results:

Figure 1, below, shows the NIT spectra for the peanut butter samples.

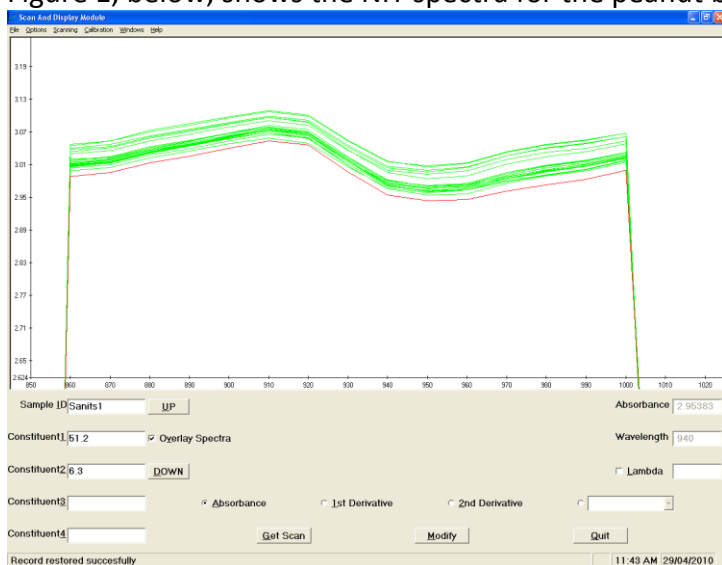


Figure 1: Plot of NIR Spectra for peanut butter.

Figure 2 shows the calibration statistics for the NIR fat values versus the reference values. The Standard Error of calibration is 0.4% with a correlation (R^2) of 0.91. It should be noted that the reference values were obtained from the packaging and may be less than 100% accurate.

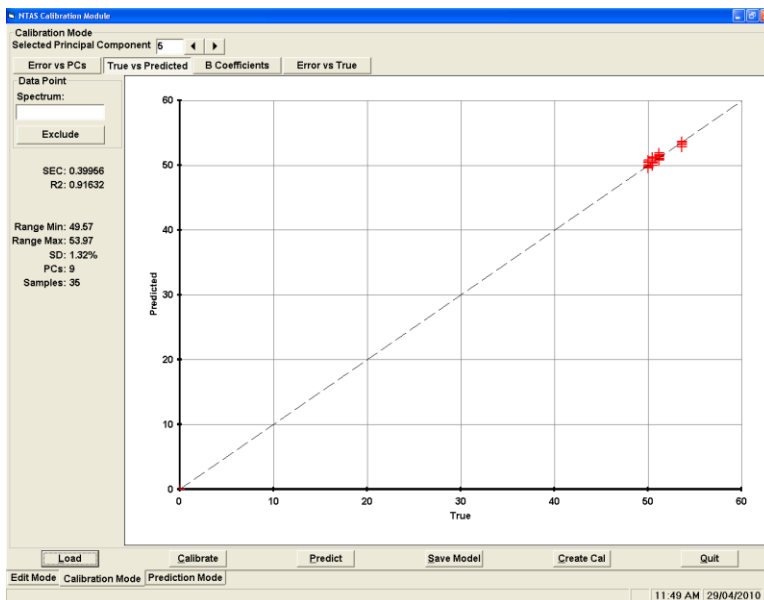


Figure 2: Plot NIR predicted fat values vs. reference fat values.

Figure 3 illustrates the calibration statistics for the NIR Moisture against the reference values. The standard error of calibration is 0.45% with a correlation (R^2) of 0.92

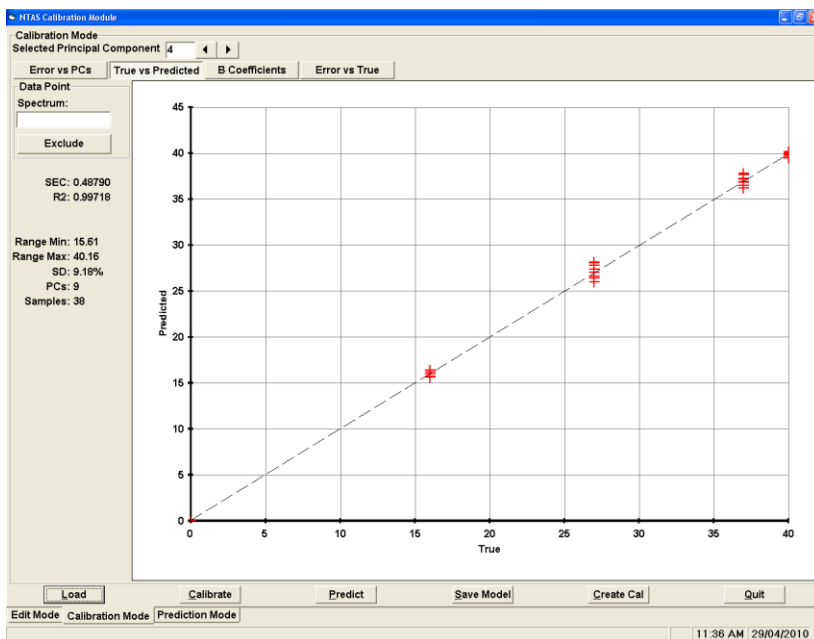


Figure 3: Plot of NIR moisture vs. reference moisture values.

Conclusion:

As illustrated in the above plots the Series 1000 Analyser is able to analyse the fat and moisture in peanut butter samples with an acceptable level of correlation. The standard errors of calibration having been based on the package would be improved by use of a more accurate reference test. The correlations would likely improve as well with the addition of more samples across a wider range of reference values.