Application Note 46: Analysis of Fat and Moisture in Chocolate Blend Milk Powder

Introduction:

The NIT-38 Dairy Analyser provides the ability to develop calibrations for a broad range of dairy related products, eg, milk, whey powder, milk powder, cheese and yogurt. The instrument measures the NIR light transmitted through a sample of liquid, powder or semi solid. At specific frequencies, protein, fat and moisture absorb the light. Partial Least Squares calibrations can be developed and then downloaded to the instrument for routine analysis.

Description:

11 samples of Chocolate Blend Milk Powder were scanned across the wavelength range, 720-1100nm. % scans were collected for each sample in order to average out the distribution of the chocolate in the powder. The spectra were loaded into NTAS(NIR Technology Australia Software) where PLS calibrations were developed for both fat and moisture.

Results:

Figure 1 shows the NIR spectra of the Chocolate Blended Milk Powders.

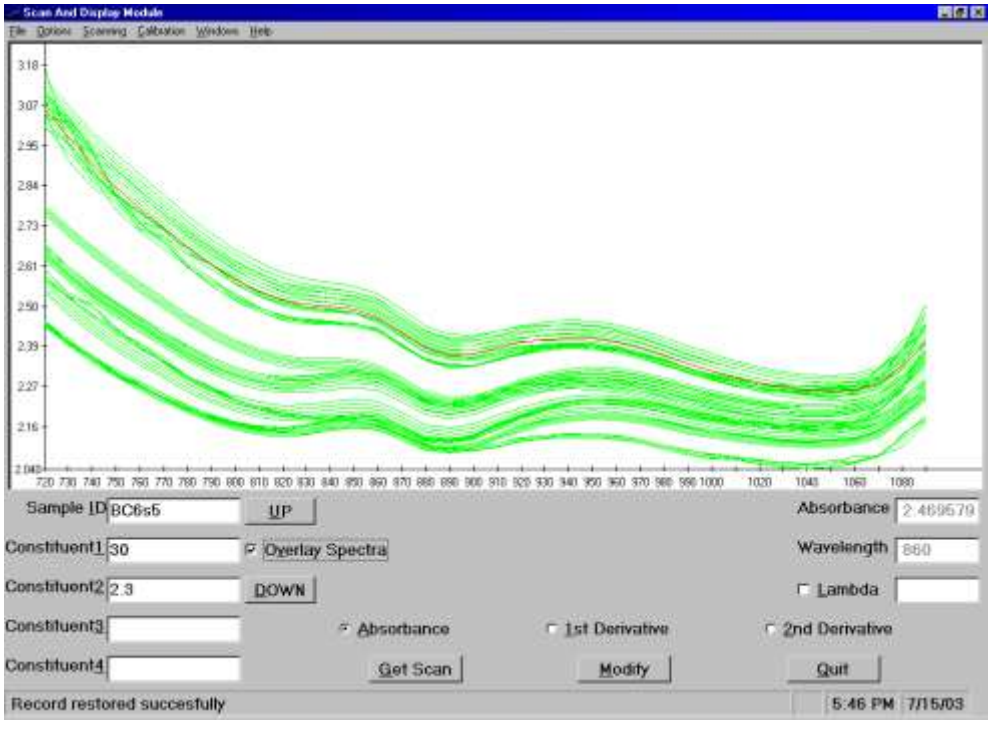

Figure 1. NIR spectra of Chocolate Blended Milk Powders

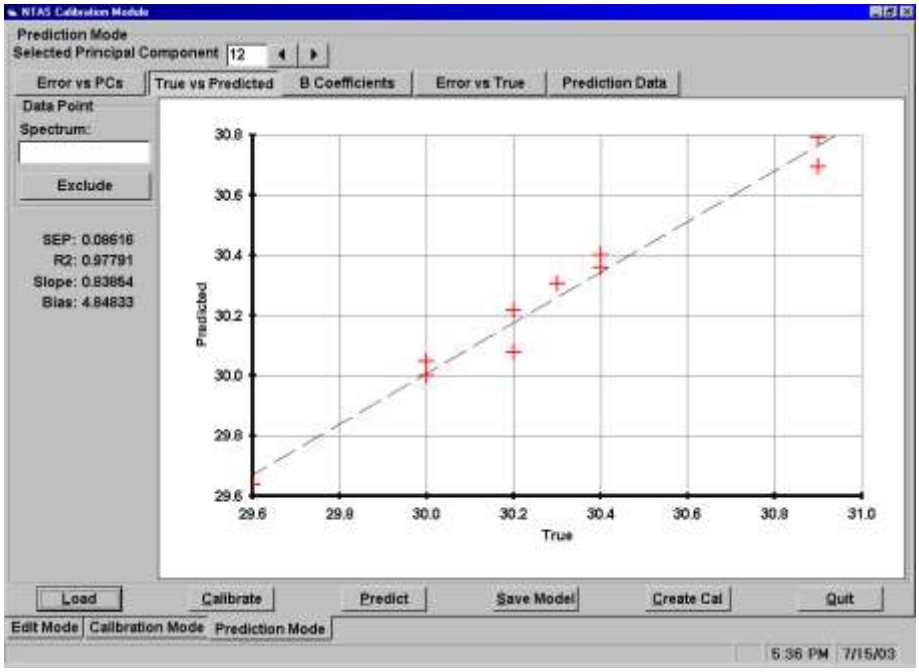

Figure 2. Plot of NIR Fat vs Ref Fat%

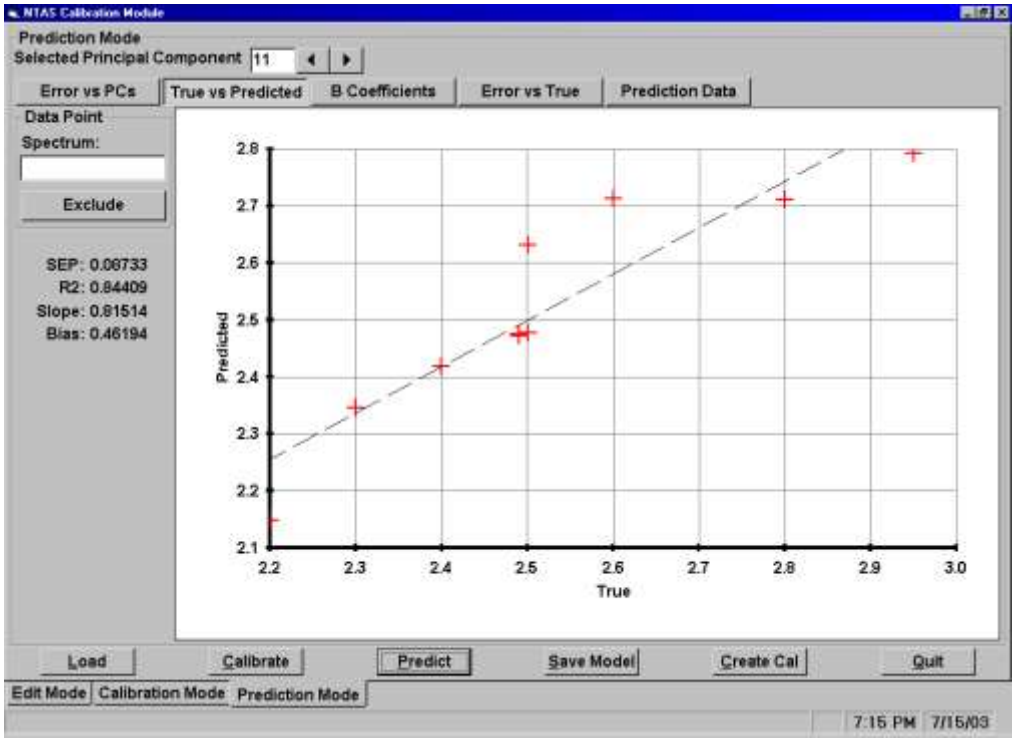

Figure 3. Plot NIR Moisture vs Ref Moisture %

Figures 2 and 3 show the plots of the Fat and Moisture calibrations.

The calibration statistics are as follows;

		Fat		Moisture
# Sample Scans		55		55
# PC's		12		15
Std Error of Cal (SEC)	0.09		0.09	
R_2		0.98		0.84

Comments:

The range of fat and moisture values for these samples is too narrow. A superior calibration will be possible with samples covering at least a +/- 2% range for each constituent. It is appreciated that production samples rarely show such variation. As such, it is suggested that samples be blended to give a broader range.

Conclusion:

Although the number of sample sis small for this study, the data shows that the NIT-38 Dairy Analyser can make measurements of milk powders with excellent agreement to the reference data. It would be expected that the NIR technique could provide an accuracy of between 0.1% and 0.2% for both fat and moisture in this type of sample.

NIR Technology Systems
366 Edgar Street, Condell Park, NSW, 2200, Australia
Tel: 612 9708 5068, Fax: 612 9708 5537
Email: nirtech@nirtech.net, Web: www.nirtech.net