Application Note 105: Fat and Total Solids Analysis in Ice-cream Mixes

Introduction:

In order to adjust fat and solids content during the production of ice-cream it is beneficial to know these parameters as soon as possible. The Series 3000 Food Analyser was calibrated to measure fat and total solids in white mixes, chocolate mix and water based mix. Reference values for fat were based on the Gerber method and a moisture balance gave reference values for total solids (TS), no duplicates were carried out. The water based mix (WBM) only contained solids, no fat. 250 white mix samples were scanned with 10 scans taken through the plate.

1) Fat in ice-cream mixes

Figure 1 shows the calibration plot for fat in white ice-cream mix and figure 2 shows the prediction plot. The linearity is satisfactory. Due to the two main products, high and low fat ice-cream, there is little distribution among the middle range. A separate low fat calibration is most likely needed.

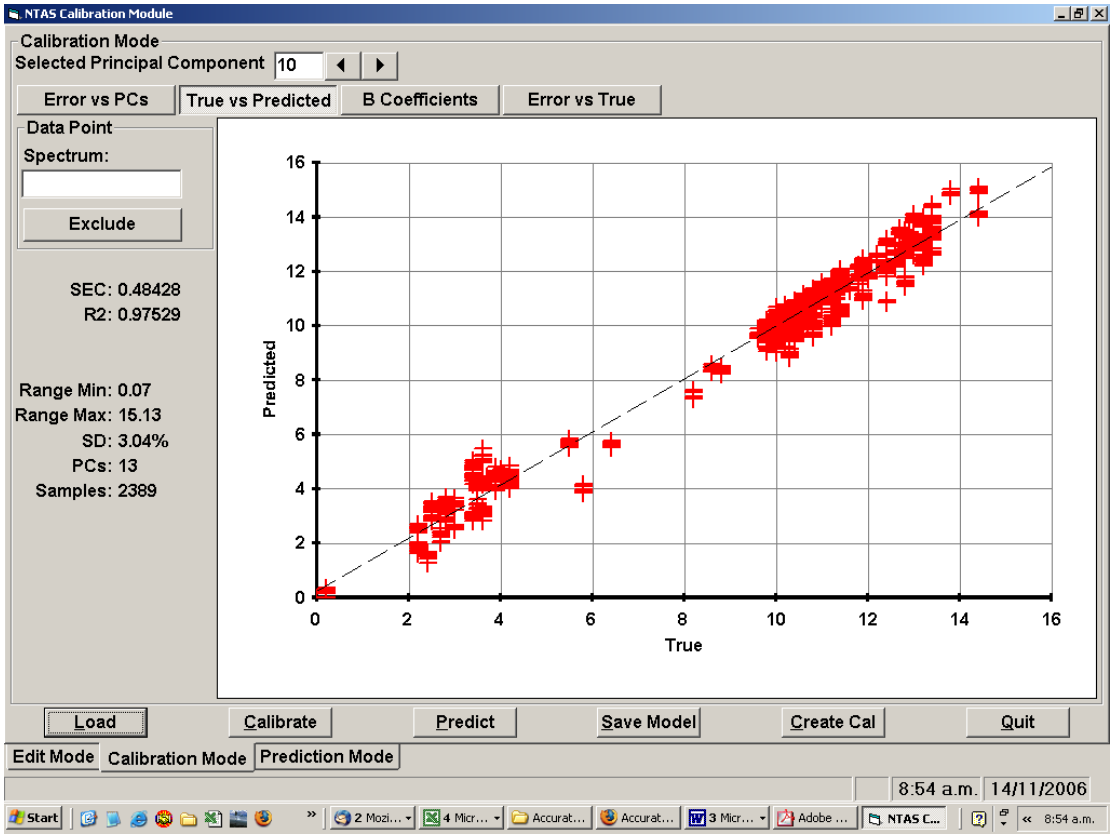

Figure 1: Calibration plot for fat in white mix

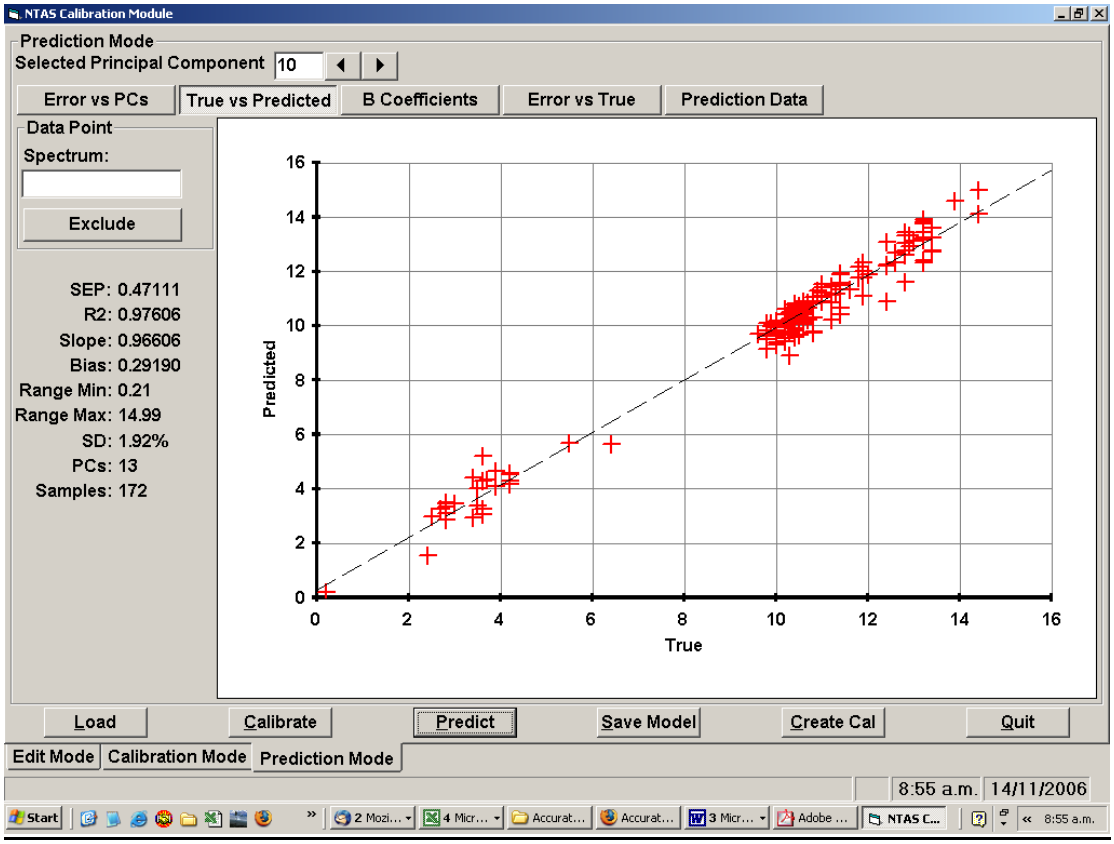

Figure 2: Prediction plot for fat in white mix

2) Solids in White Mix

There was a good sample distribution over the solids range. The SEP of 0.86 was considered sufficient by the customer for their purposes.

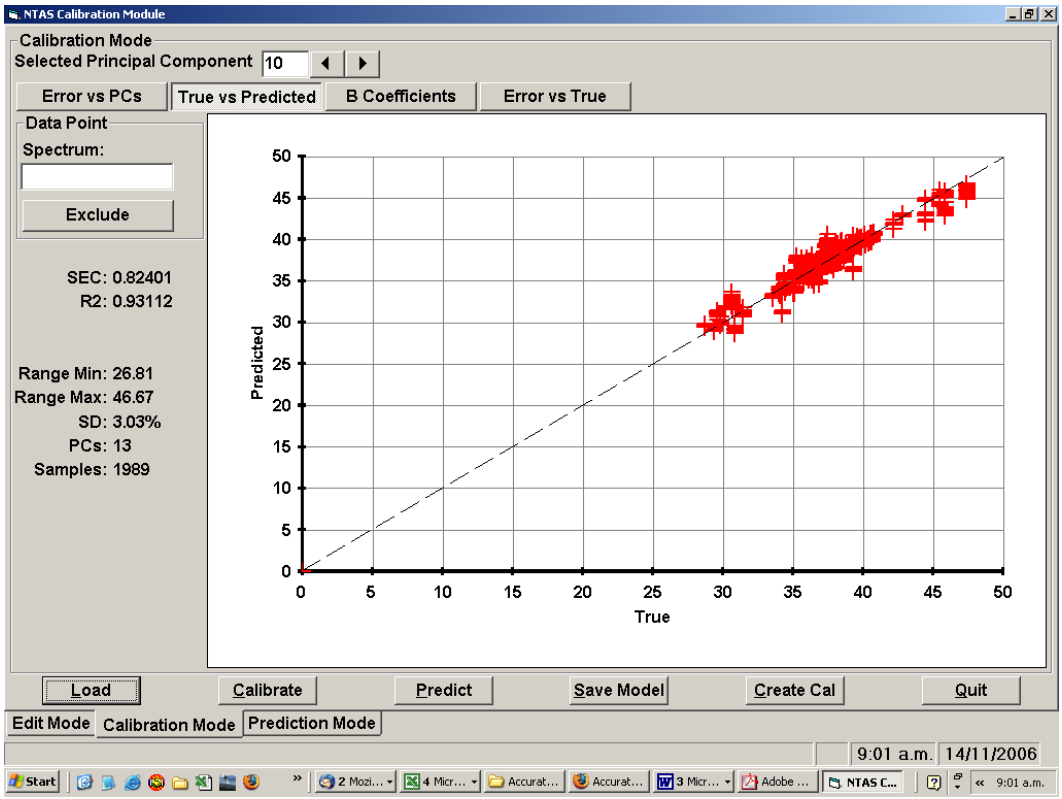

Figure 3: Calibration plot for Solids

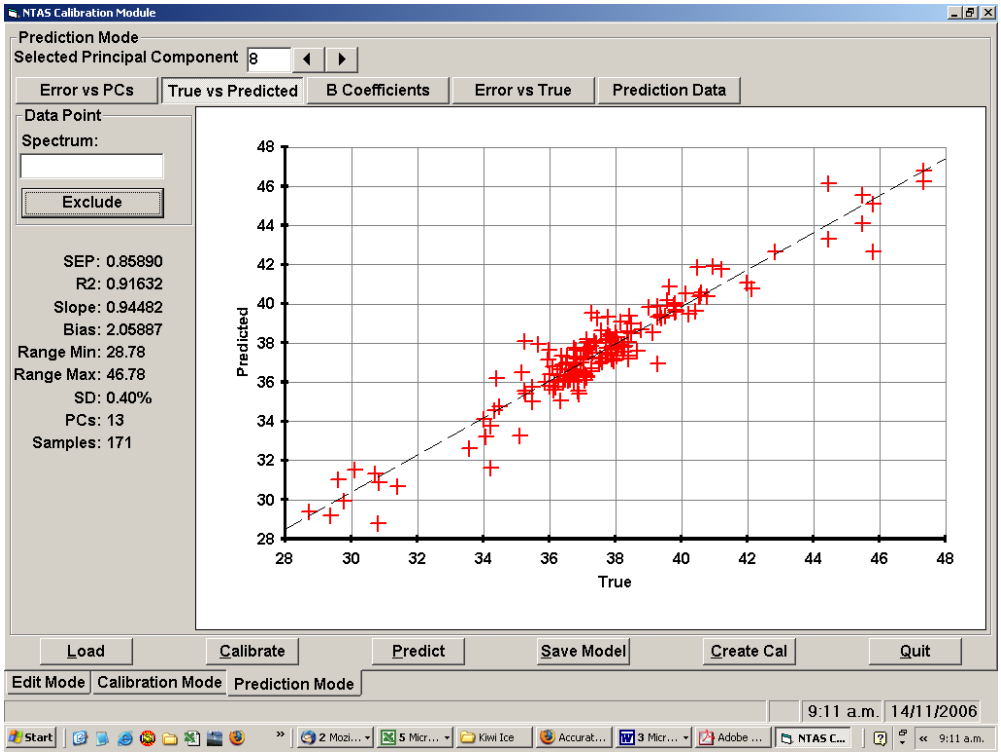

Figure 4: Prediction Plot for Solids

Separate calibrations were carried out for chocolate mix and low fat and are not shown in this report.

3) Water Based Mix

The WBM sample set consisted of samples of different colours. Scans were done in liquid mode. Figure 5 shows the calibration plot, which is very linear and so is the prediction plot, Figure 6.

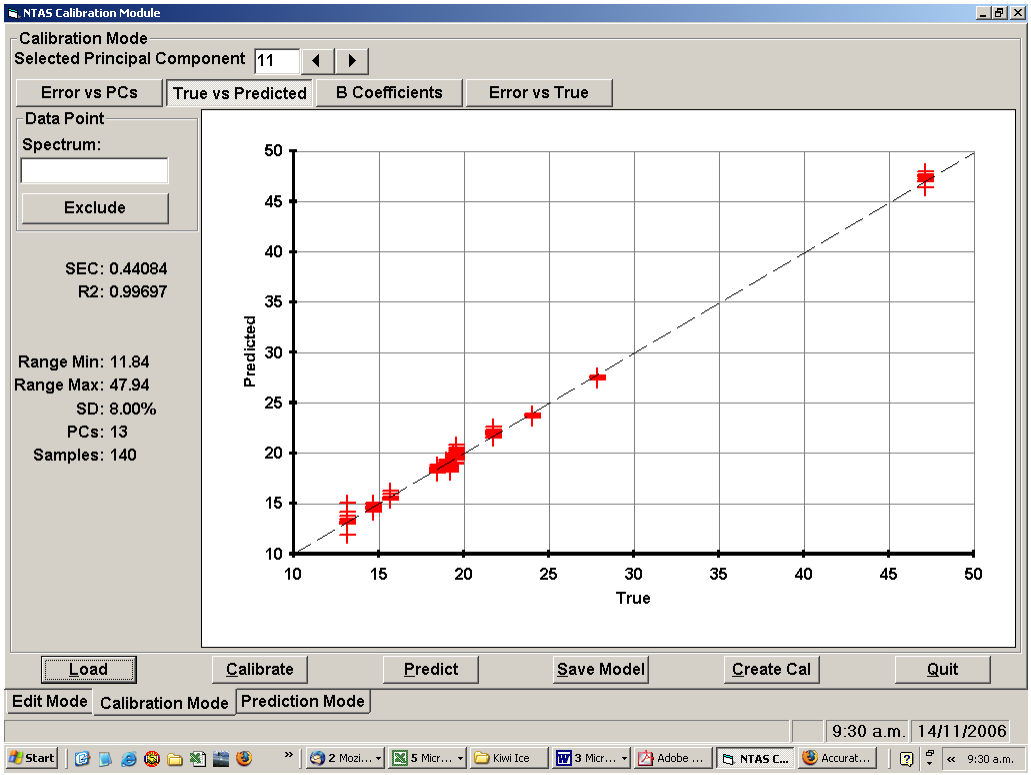

Figure 5: Calibration Plot Solids, WBM

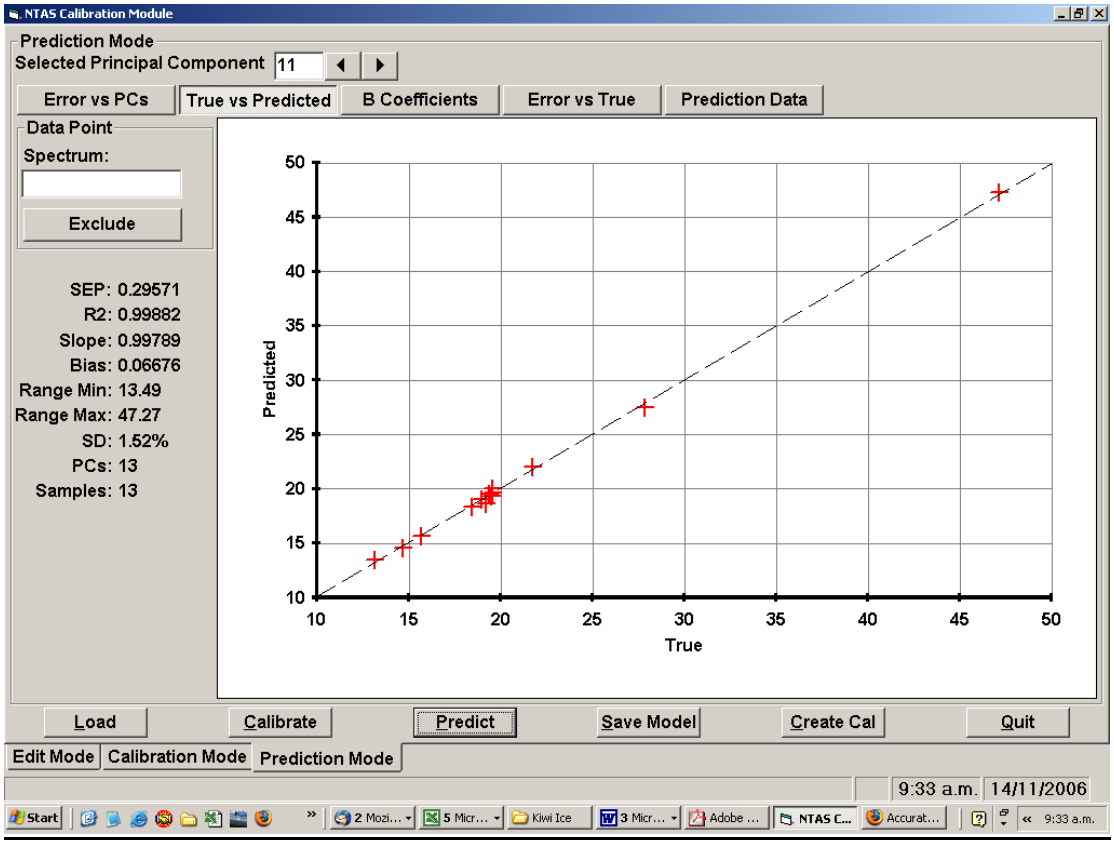

Figure 6: Prediction Plot Solids, WBM

4) Conclusion

The majority of white mix samples scanned with this calibration were within +/- 0.2 of value of reading of the reference method. Taking into account the resolution of the Gerber method, which is only in steps of 0.2 g, this is an acceptable result. The main solids discrepancy was +/- 2.07 of reading, which was considered acceptable by the customer but will still be improved over time. The WBM mix calibration does not contain enough samples at present but due to its very homogenous nature and simple composition promises to give a robust calibration.

NIR Technology Systems
366 Edgar Street, Condell Park, NSW, 2200, Australia
Tel: 612 9771 5444, Fax: 612 9771 5255
Email: nirtech@nirtech.net, Web: www.nirtech.net