Application Note 67: Calibration of Protein in Pilchard and Sardine baitfish using a NIT-38 Meat Analyser.

Introduction:

The importance of baitfish in the Australian Tuna industry cannot be underestimated. The baitfish are used to prepare the Tuna for sale in domestic and international fish markets. Therefore the quality of the baitfish feed must be assured in order to keep the Tuna at a peak level of health. A means of determining the protein level of the baitfish feed is required to ensure that the appropriate feed is presented to the Tuna. A calibration was developed to determine the protein level of the baitfish.

The sample preparation for use with the NIT-38 Meat Analyser required 160 grams of baitfish to minced and placed into a standard squeeze cell with a pathlength of 5mm. This method proved to be the best and most consistent means of sampling.

This study was undertaken to demonstrate the feasibility of measuring protein in Pilchard and Sardine baitfish for the Australian Tuna Industry. The NIT-38 Meat Analyser was used for the purpose of this study.

Procedure:

21 samples of baitfish were prepared by mincing them to an even consistency. With this done the baitfish was placed in a standard squeeze cell with a pathlength of 5mm. The samples were then scanned over the wavelength range of 720nm to 1100nm collecting 10 scans per sample. The samples were then repacked and the scanning process repeated. The spectra were uploaded into NTAS (NIR Technology Australia Software) and Partial Least Squares Regression (PLS) was used to develop a calibration for Fat and Moisture.

Results:

Figure 1, below, shows the NIT spectra, over the wavelength range of 720nm to 1100nm, for the 21 samples of processed baitfish.

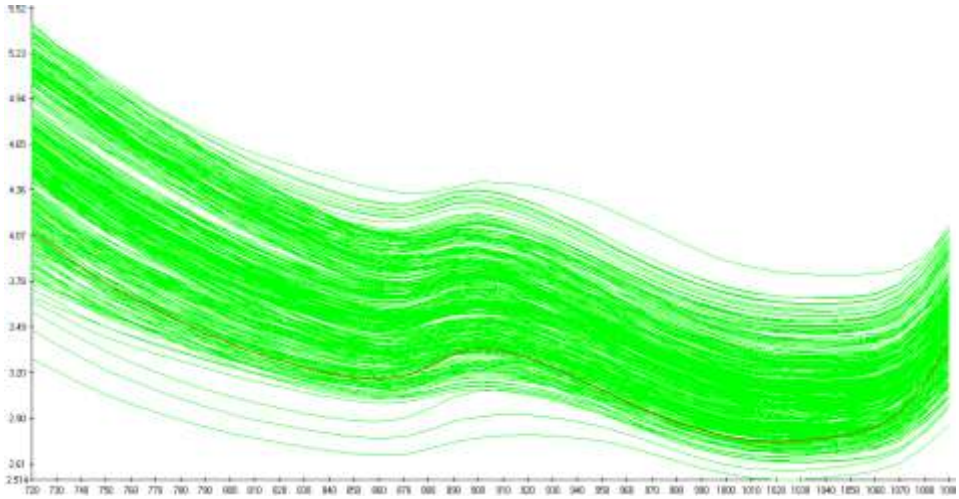

Figure 1: Plot of NIR Spectra for Baitfish.

Figure 2 shows the calibration statistics for the NIR Protein values versus the reference Protein value. The Standard Error of Calibration is 0.55% with a correlation (R^2) of 0.97.

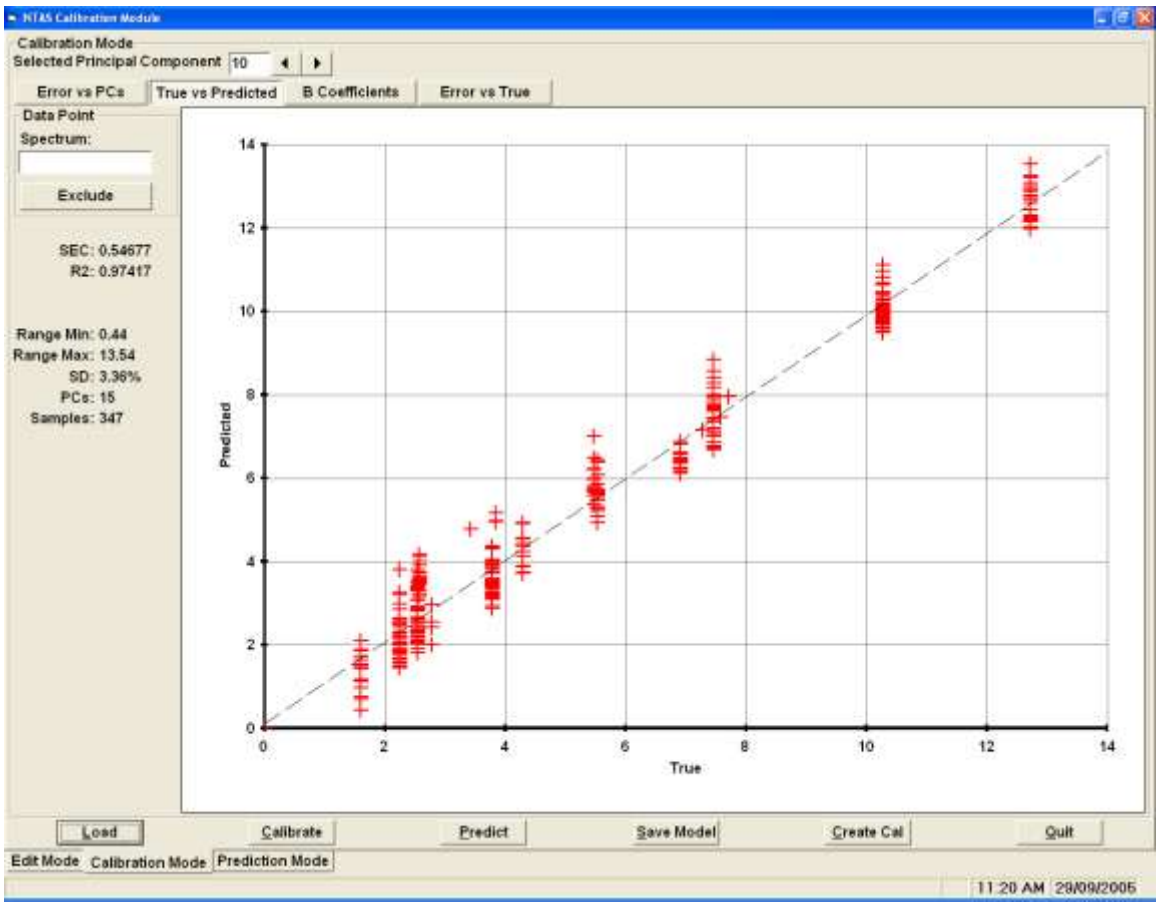

Figure 2: Plot NIR Predicted Protein value vs. Reference Protein value.

Conclusion:

It can be seen in figure 2 that the NIT-38 Meat Analyser can be calibrated to measure the protein values of processed baitfish. Whilst the sample set is sufficient to develop a calibration for protein, it is still recommend that the sample set be increased to improve the robustness of the calibration, particularly towards the high ranges of the calibration.

The available samples clearly demonstrate the ability of the NIT-38 Meat Analyser to measure protein in processed Baitfish. With additional reference data for Moisture and Fat the calibration could be expanded to include these new and useful constituents. However, the available data clearly demonstrates the ability of the NIT-38 Meat Analyser to measure the

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