

Application Note 13: NIT-38 Meat Analyser – Analysis of Smallgoods



Introduction

The measurement of fat, moisture and protein in meat and processed meat is expensive and time consuming by wet chemical techniques. Near Infrared Transmission (NIT) is a rapid technique suitable for measuring protein, fat and moisture in a broad range of materials, including dairy, meat, dough and grains. This application note looks at the application of NIT to the analysis of smallgoods mixes.

Description:

19 samples of smallgoods premixes were scanned using the NIT-38 Meat Analyser. Approximately 70 grams of sample was loaded into a Squeeze Cell with a 10mm pathlength. The two halves of the Squeeze Cell are brought together to form a slab of material between two glass windows. The Squeeze cell is then placed into the instruments Sample Transport Module which lowers the cell passed the light beam. 5 portions of the slab of material are scanned between 720-1100nm. Each sample was sampled at least twice. The NIR spectra were averaged and the calibration models applied to the spectra. The instrument can measure up to 4 constituents at one time.

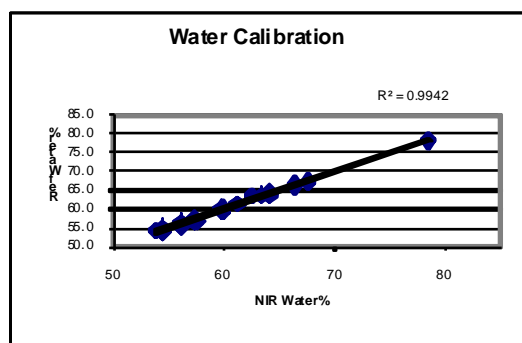
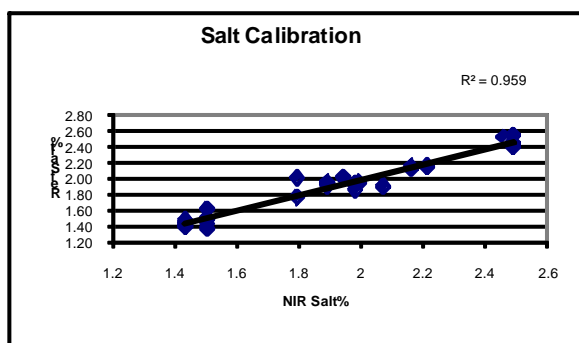
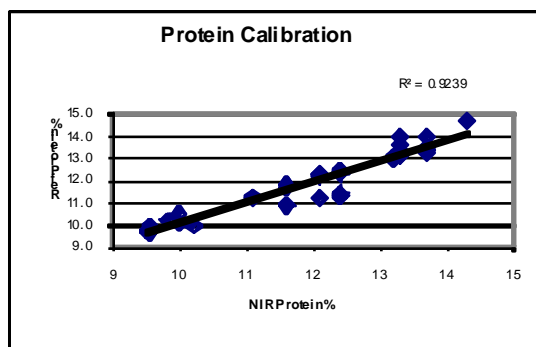
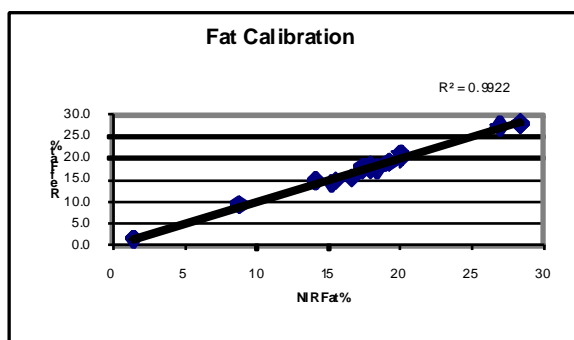
The 19 samples were analysed for protein, fat, water and salt using traditional wet chemical methods. The NIR spectra and the corresponding laboratory results were loaded into a NTAS (NIR Technology Australia Software) to perform a Partial Least Squares calibration for each constituent.

Results:

Table 1. presents the calibration statistics for the 19 samples. The graphs show the correlation between the NIT-38 and the reference methods.

Constituent	SEC	R2
Fat	0.62	0.99
Protein	0.4	0.92
Water	0.46	0.99
Salt	0.07	0.96

Table 1. Calibration Data



Conclusion:

This study is a preliminary evaluation of the measurement of processed meat using the NIT-38 Meat Analyser. The results of the calibration show high correlations between the NIT spectra and the reference methods. The calibration errors illustrate that the NIT-38 has the ability to measure protein, fat and moisture in smallgoods to an accuracy equivalent to existing techniques. Although Salt does not absorb in the NIR spectral region, it is known that salt concentration affects the Hydrogen bonding within a sample and as such can be measured indirectly. The data shown above indicates the ability to make a rough salt measurement at the same time as measuring protein, fat and water.