

Analysis of Raw Meat By-Products using the DA 7250 NIR Analyzer

Introduction

For meat processors and users of meat by-products, such as pet food producers, it is important to rapidly test samples for protein and other nutritional contents.

The Near Infrared Reflectance (NIR) technology is highly suitable for these purposes. Instead of the time consuming and labor intensive traditional wet chemistry methods, with NIR the multi component analysis is done in seconds. The latest technology and software developments allows the benefits to be even further exploited with easy to use instruments and web based instrument networking.



various raw meat and organ types (heart, liver, lung, spleen and kidney.)

Samples were homogenized prior to measurement and analyzed on multiple DA 7250 instruments using open faced plastic dishes and disposable cups.



Reference methods were mainly ISO and AOAC approved methods including Soxhlet for fat, drying cabinet for moisture, Kjeldahl for Protein and muffle furnace for Ash content.

Spectra databases of the collected by-products samples were combined with databases of several thousands of raw meats and meat products samples to increase the robustness and versatility of the calibration models. Several regression techniques were evaluated for NIR calibration development, including ANN and Honigs Regression, a proprietary regression technique developed by Perten Instruments.

DA 7250 NIR Analyzer

The DA 7250 uses novel Diode Array NIR technology and performs a multi-component analysis in less than 10 seconds. During this time a large number of full spectra are collected and averaged.

As samples are analyzed in open cups, or even disposable petri dishes, no or minimal cleaning is required and there is no risk of sample cross-contamination.

The DA 7250 Sanitary Design version is IP65 rated and its stainless-steel design and open analysis area make it easy to clean and ideal for use in production areas as well as in the lab.



Results and Discussion

Using Honigs Regression it was possible combine the meat by-products samples with regular meat samples creating combined universal calibrations, without loss of performance. The DA 7250 proved to predict results very close to the results from the reference methods. Statistics are presented in the table 1 and calibration graphs for protein, fat and moisture are displayed in page 2.

Parameterer	N	Range	R
Protein % asis	4000+	0.6 – 40.6	0.99
Fat % asis	4800+	0.01 – 92.4	0.99
Moisture %	3900+	0.7 – 89.9	0.99
Ash % asis	2300+	0.04 – 5.7	0.94

Table 1.

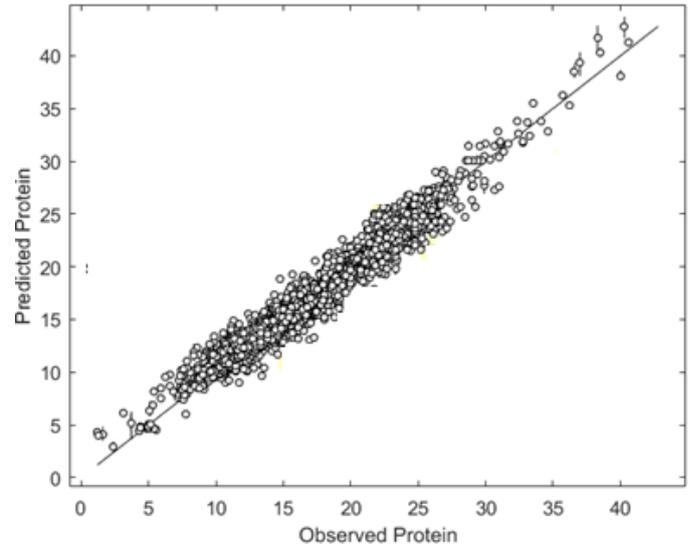
In summary it is concluded that the DA 7250 can accurately analyse protein, fat, moisture and ash raw meat by-products in less than 10 seconds using HR calibration models.

Method

More than 1000 meat by-products samples were collected throughout the world. Samples origins were from many animal and fish types and consisting of

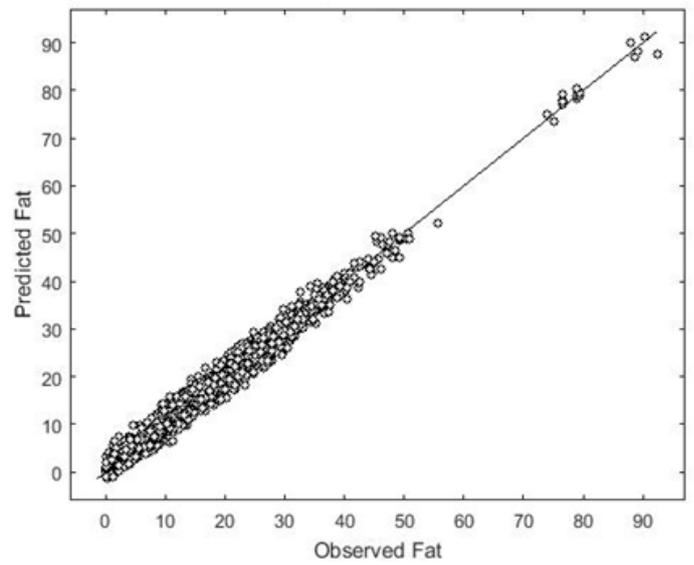
Protein

The accuracy for protein is excellent and the DA 7250 can be used to determine protein in all kinds of meat by-products.



Fat

The DA 7250 predicts very close to the wet chemistry method in a very wide fat range and makes the DA 7250 highly versatile.



Moisture

The moisture calibration predicts accurate results along the whole range from dry to wet samples .

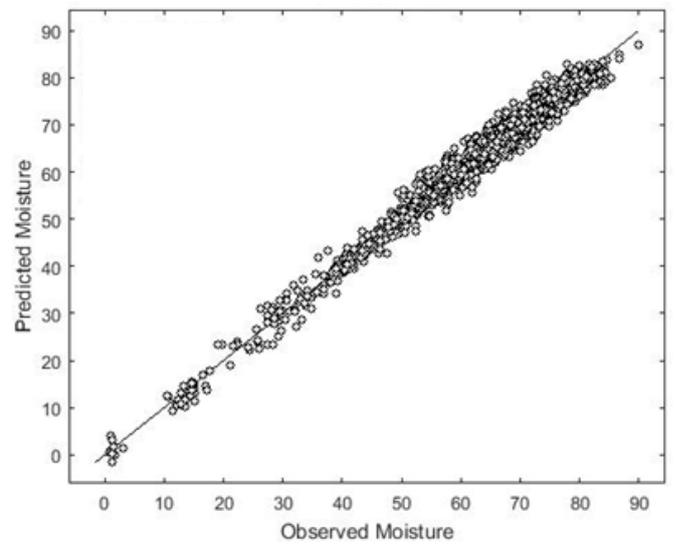


Figure 1. Reference vs NIR calibration graphs for protein, moisture and fat calibrations.