# Analysis of Blood meal for Protein, Moisture and Ash

## Introduction

For processors as well as users of blood meal it is essential to be able to test samples for nutritional composition and rapid analysis of parameters such as moisture, oil and protein are of great benefit.

The Near Infrared Reflectance (NIR) technique is particularly suited for measurement of these types of samples, but past instrument limitations have not permitted users to reap the full benefits of NIR. Sample preparation requirements such as packing special cups and carefully cleaning between samples made analyses laborious, time consuming and error-prone.

## Diode Array 7200

The DA 7200 is a proven full-spectrum, NIR instrument designed for use in the rendering and feed industries. Using novel diode array technology it performs a multi-component analysis in only 6 seconds with no or little sample preparation required.

During these 6 seconds, a baseline is collected, noise monitored, wavelength accuracy is standardized, and a large number of full spectra are collected. As the sample is analyzed in an open dish, the problems associated with sample cups are avoided and operator influence on results is minimal.

## Experimental

More than 100 samples of blood meal were analyzed in a DA 7200. Calibrations were developed by Perten Instruments using The Unscrambler chemometrics software by Camo. The regression method used was Partial Least Squares (PLS). Standard Normal Variate (SNV) Detrend and Savitsky-Golay 1st derivatives were used as a data pre-treatment to enhance some of the calibration models.

## Results and discussion

The DA 7200 results are very accurate when compared to the results from the reference methods. Statistics for the respective parameters are presented in the table below and graphs are displayed on page 2.

| Parameter | Range | Samples | R |
|-----------|-------|---------|---|
| Protein | 90.94 – 97.94 | 100+ | 0.94 |
| Moisture | 6.05 – 12.74 | 100+ | 0.99 |
| Ash | 1.38 – 2.14 | 100+ | 0.94 |

The differences between the DA 7200 and the reference method are of the same magnitude as typical differences between two different reference labs. The DA 7200 is more precise than the reference methods meaning that replicate analyses are generally more repeatable and representative.

In summary it is concluded that the Diode Array 7200 can determine protein, moisture and ash in blood meal for the aforementioned constituents
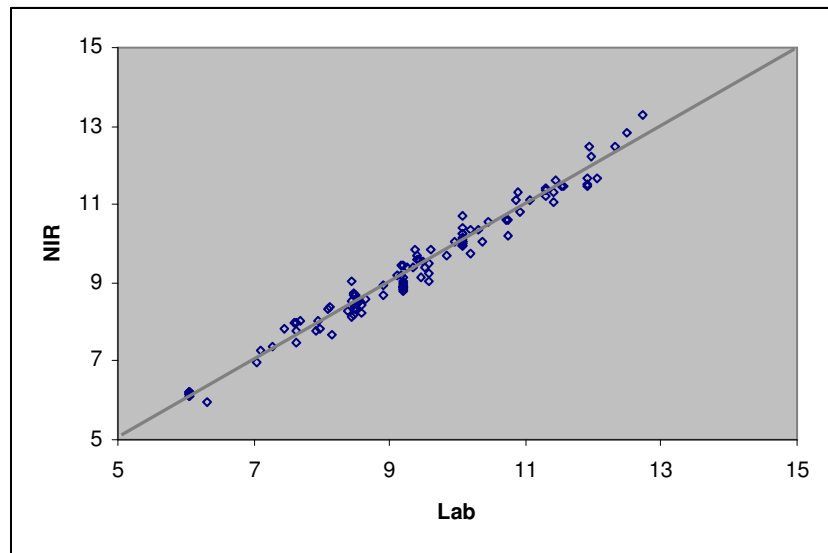
## Protein

The calibration for protein enables processors to optimize production, and blood meal users an easy method to test for formulation purposes.
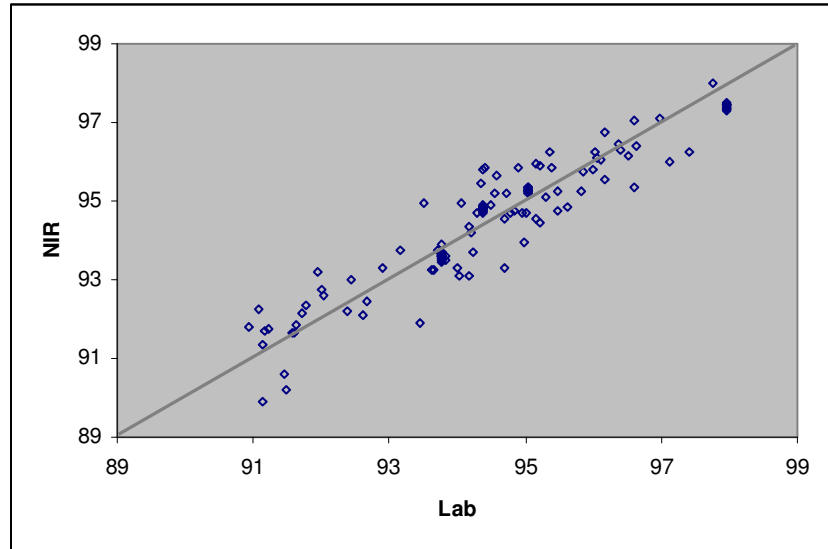
## Moisture

Proper moisture levels affect the profitability of the plant as well as the quality of the product. The DA 7200 is highly accurate and the calibration covers a wider range.

## Ash

Although ash is not a traditional NIR parameter, it can determined with a good accuracy.