

Analysis of Moisture, Protein, Fat, Ash and Acidity in Fish meals using DA 7200

Introduction

Fish meal is an important source of protein, used in feed and petfood production, and rapid compositional testing is vital to both producers and users. For fish meal producers it makes it possible to optimize production and verify end-product quality. Users are enabled to verify shipments against specifications, and can improve formulations and save costs with true compositional data instead of book values.

The Near Infrared Reflectance (NIR) technique is particularly suited for measurement of fish meals, but in the past instrument limitations have not permitted users to reap the full benefits of NIR. Sample preparation requirements such as grinding or special cups made analyses laborious, time consuming and error-prone.

Diode Array 7200

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

During this time a large number of full spectra are collected and averaged. 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

Spectral data was collected on samples from several continents and represented many fish species. Reference analyses were supplied by the customers who supplied the samples. No grinding or other sample preparation was performed; samples were analyzed as received, often straight from the production line.

Calibrations were developed by Perten Instruments using Partial Least Squares (PLS) regression. Multiplicative Scattering Correction (MSC) 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.

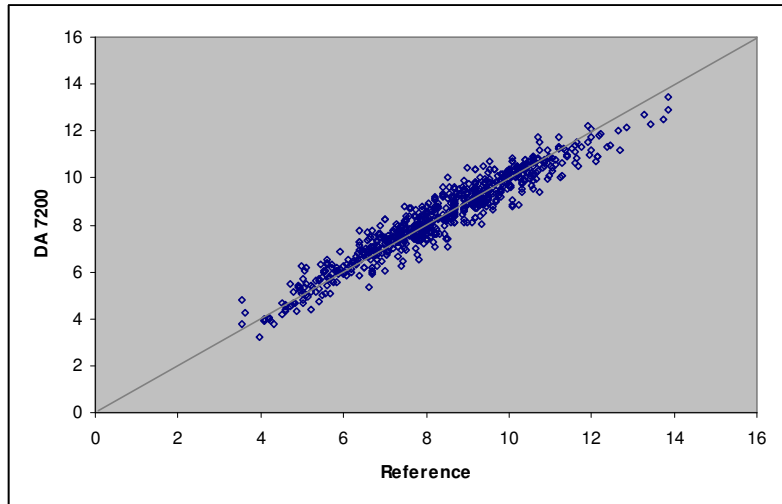
Parameter	Range	Samples	R
Moisture	3.3 – 14.9	800+	0.93
Protein	56.4 – 73.0	900+	0.83
Fat	4.3 – 17.0	400+	0.85
Ash	10.2 – 23.6	400+	0.80
Acidity	4.7 – 8.6	100+	0.85

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 much more repeatable and representative.

In summary it is concluded that the DA 7200 can readily measure moisture, protein, fat and ash in fishmeal samples in as little as 6 seconds.

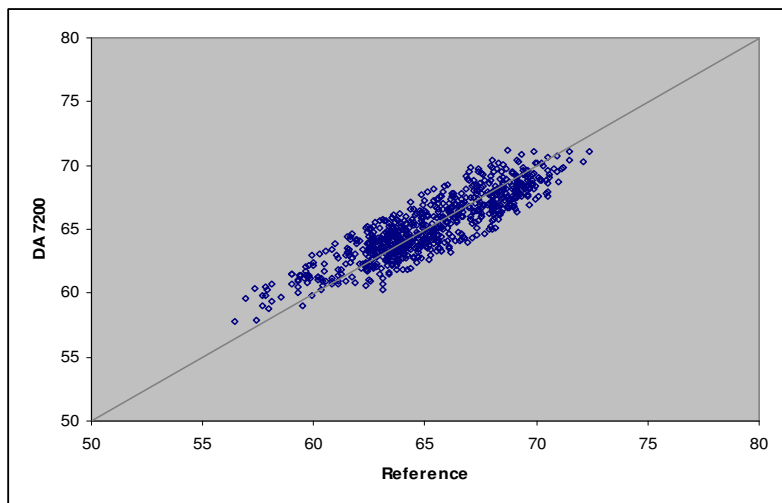
Moisture

The DA 7200 determines moisture extremely well despite the large variations included in the calibration.



Protein

From low protein contents to very high ones, the accuracy is excellent.



Fat

The fat calibration is based on slightly fewer samples, but still shows a solid performance.

