

### Analysis of Moisture, Oil/Fat, Protein, Amino Acids and More in Soymeal Using the DA 7250 NIR Analyzer

#### Introduction

For soybean processors knowledge of the soymeal composition provides valuable information for process control. For feed producers it is vital to have full control over the nutritional value of raw materials, especially important ones such as soymeal.



The Near Infrared Reflectance (NIR) technique

is highly suitable for this purpose, but in the past instrument limitations have not permitted users to reap the full benefits of NIR. Sample preparation requirements like grinding or special cups made analyses laborious, time consuming and error prone.

#### DA 7250 NIR Analyzer

The DA 7250 is a proven, full-spectrum NIR instrument designed for use in the agricultural industries. Using novel diode array technology it performs a multi-component analysis in only 6 seconds. Thanks to excellent signal-to-noise ratio and solid state optics no grinding is 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

More than 2000 samples of soymeal from several continents were analyzed on multiple DA 7250 units.

Calibrations were developed by Perten Instruments using Partial Least Squares (PLS) regression, a method which gives robust and stable calibrations. Savitsky-Golay 1st derivative and SNV data pretreatments were used to improve the calibration models.

#### Results and discussion

The DA 7250 proved to predict results very close to the results from the reference methods. Statistics for the respective parameters are presented in the table below and graphs are displayed in page 2.

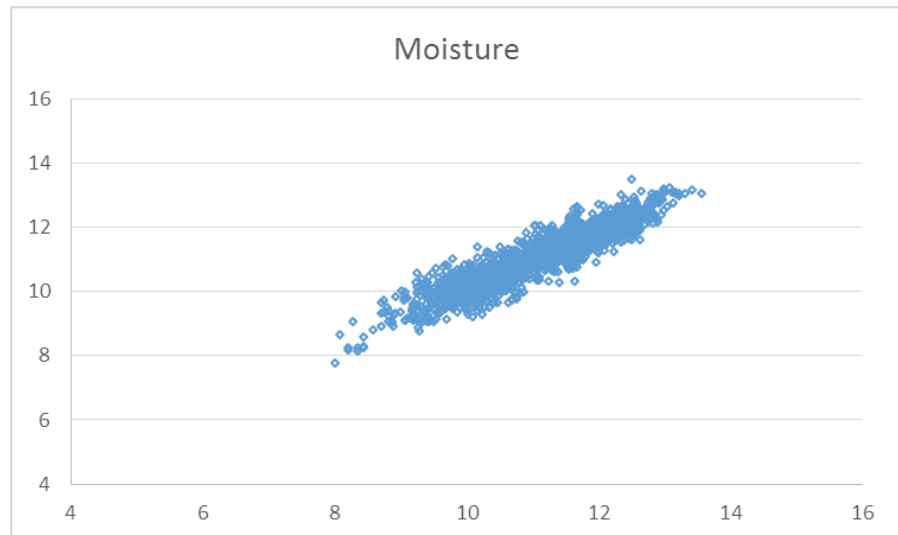
Parameter	Range	Samples	R
Moisture	9.2 -14.6	1700+	0.91
Protein	41.1 - 51.6	2200+	0.97
Fiber	1.8. - 10.2	1300+	0.94
Oil/Fat	0,2 - 3.3	1600+	0.9
Ash	5.4 - 7.5	500+	0.68
Lysine	2.5 - 3.7	1800+	0.87
Methionine	0.6 - 0.8	1800+	0.80
Additional amino acids available			

The differences between the DA 7250 and the reference method are of the same magnitude as the typical differences between two reference labs..

In summary it can be concluded that the DA 7250 can analyze soymeal with excellent results, without any sample preparation.

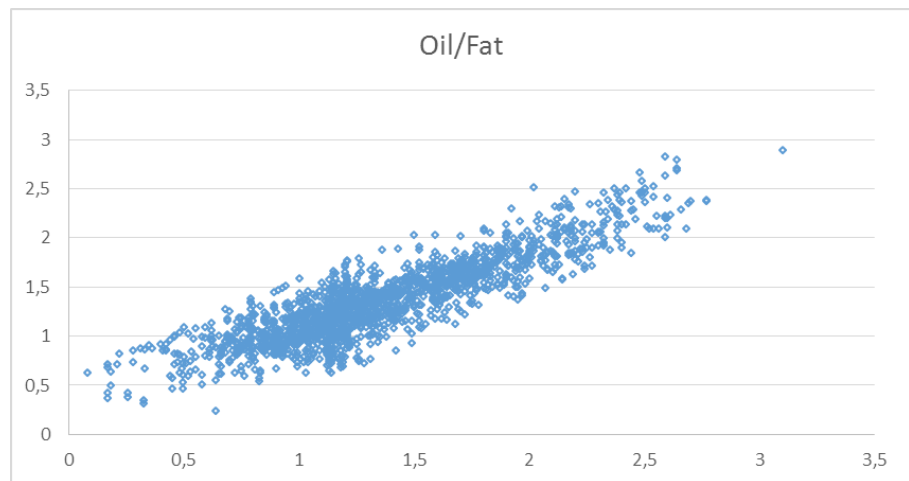
### Moisture

With moisture content ranging from 8-14% this calibration will predict moisture very well on all soymeal samples. The wide range in moisture also means that the other parameters will be predicted well regardless of moisture content.



### Oil/Fat

The calibration for fat has a very low error and can successfully be used both for process control in soybean crushing and for formulation at the feed mill.



### Protein

The protein calibration has a very good performance from 43-52%. This means that it will enable accurate least-cost formulations for all types of soymeal, regardless of their specifications.

