

Analysis of Sunflower Meal Using the DA 7250 Analyzer

Introduction

For sunflower seed processors and feed manufacturers alike, rapid and accurate quality control of sunflower seed meal is important to ensure nutritional specification on the meal is correct.

The Near Infrared Reflectance (NIR) technology is highly suitable for this purposes. NIR is an indirect analytical method, where the relationship between reference values and the spectra of the samples are related using multivariate calibrations. 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.

DA 7250 NIR Analyzer

The DA 7250 is a Near Infrared Reflectance (NIR) instrument designed for optimal use on agricultural products. Using novel Diode Array technology, the DA 7250 is unique in its measurement speed, versatility and accuracy.

The instrument is handled by an intuitive touch screen interface and in less than 10 seconds samples are measured in flexible open dishes. Most sample types can be measured as they are without any preparation or as an alternative be grinded and measured as powder or coarse meal.



Method

More than 1700 sunflower meal samples were collected in different countries in Europe and Africa. Samples were measured on multiple DA 7250 instruments. The samples were analyzed as they were, with no grinding or any other sample preparation. Each sample was re-packed once in order to maximize measured surface and reduce sampling error. Reference chemistry results were provided by different laboratories.



Calibration models were developed to model the relationships between the instruments NIR spectra and the reference chemistry results. Model development were done using scatter correcting spectra pre-treatments and multivariate Partial Least Squares PLS regression.

Results and Discussion

The differences between the results of the calibrated DA 7250 and the reference methods are of the same magnitude as the typical difference between two laboratories. Statistics of developed calibrations are summarized in table 1.

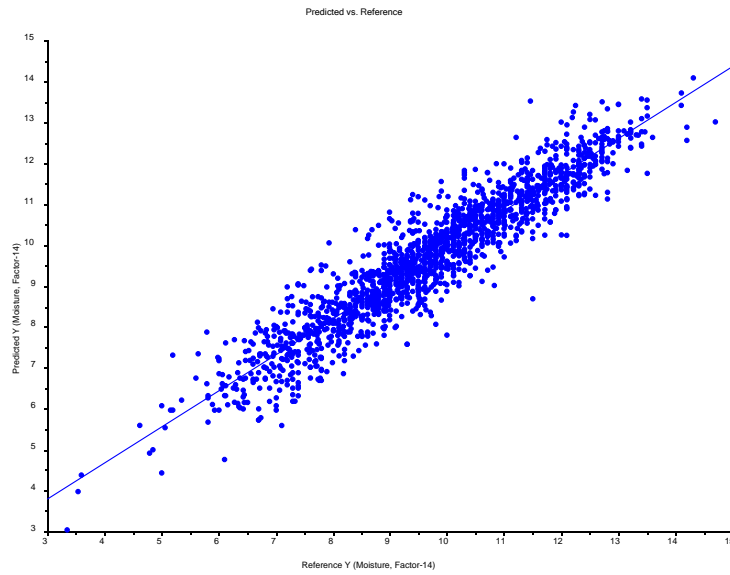
Parameter	Range %	Samples	R
Moisture	3.3 – 14.7	1700+	0.92
Protein % asis	23.1 – 43.3	1700+	0.92
Oil % asis	0.3 – 19.8	1200+	0.89
Fiber % asis	6.9 – 29.8	900+	0.82
Ash % asis	5.2 – 9.5	100+	0.89

Table 1

In summary it is concluded that the DA 7250 accurately can analyze moisture, protein, oil, fiber and ash in sunflower seed meal.

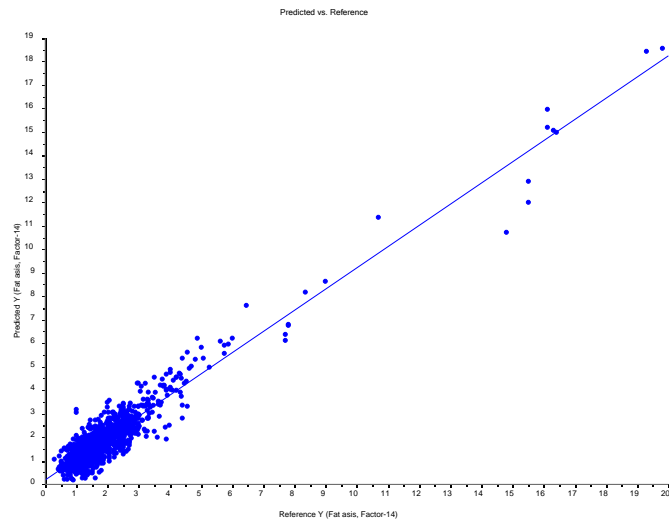
Moisture

The DA 7250 is very accurate for moisture. The calibration covers a wide range which makes it suitable both for optimizing the drying process as well as for verifying product moisture.



Oil

The calibration covers mostly low oil samples, but the DA 7250 is accurate from the low oil contents found in the commercial product up to the higher oil contents found in process intermediates. This makes it a good tool both for processors and feed manufacturers.



Protein

The samples span a very wide range, and the correlation between the DA 7250 and the reference results is excellent.

