

Analysis of Corn using the DA 7250 Analyzer

Introduction

Whenever corn is used as a raw material it is important to have fast and full knowledge of its composition and properties. In wet or dry milling, feed milling, ethanol production and other processing, the raw material will affect the process efficiency as well as the quality of the final product.



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 Diode Array Technology allows the benefits to be even further exploited not requiring sample grinding or special cups.

DA 7250 NIR Analyzer

The DA 7250 is a proven, full-spectrum NIR instrument designed for use in the grain and feed industry. Using novel Diode Array technology it performs a multi-component analysis in only 6 seconds. Thanks to excellent signal-to-noise ratio and advanced optical design, no sample grinding is required.

The instrument is handled by an intuitive touch screen interface and samples are measured in flexible open dishes.

As the samples are analyzed in reflectance NIR spectroscopy from above in open dishes, the problems associated with unclean sample cups are avoided and operator influence on results is minimal.



The DA 7250 instrument is IP 65 rated, allowing it to be used in the lab as well as in the production environment.

Method

A total of about 2900 corn samples from North and South America, Europe, Asia and Africa were analyzed on multiple DA 7250 instruments. The samples were analyzed as is, with no grinding or any other sample preparation. Reference analyses were performed for moisture, protein, oil and starch contents. NIR calibrations were developed by Perten Instruments using multivariate regression and scatter correcting spectra pre-treatments.



Results and Discussion

The Diode Array 7250 proved to predict results very close to the results from the reference methods. Statistics are presented in the table 1 below and graphs are displayed in page 2.

Parameter	Range (%)	Sam	R
Moisture	7.4 – 37.6	2800+	0.99
Protein, <small>dry base</small>	5.6 – 32.2	1700+	0.97
Oil, <small>dry base</small>	2.5 – 15.5	1700+	0.97
Starch, <small>dry base</small>	58.6 – 80.8	800+	0.8

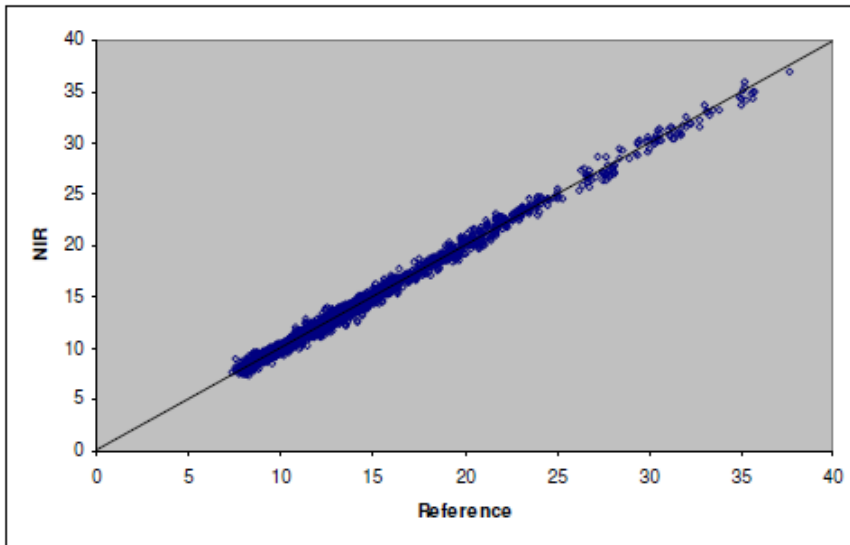
Table 1

The differences between the DA 7250 and the reference methods are of the same magnitude as typical differences between two different reference labs. The DA 7250 is more precise than the reference methods meaning that replicate analyses are much more repeatable and representative.

In summary it can be concluded that the DA 7250 can accurately determine moisture, protein, oil and starch in corn in 6 seconds without prior sample grinding.

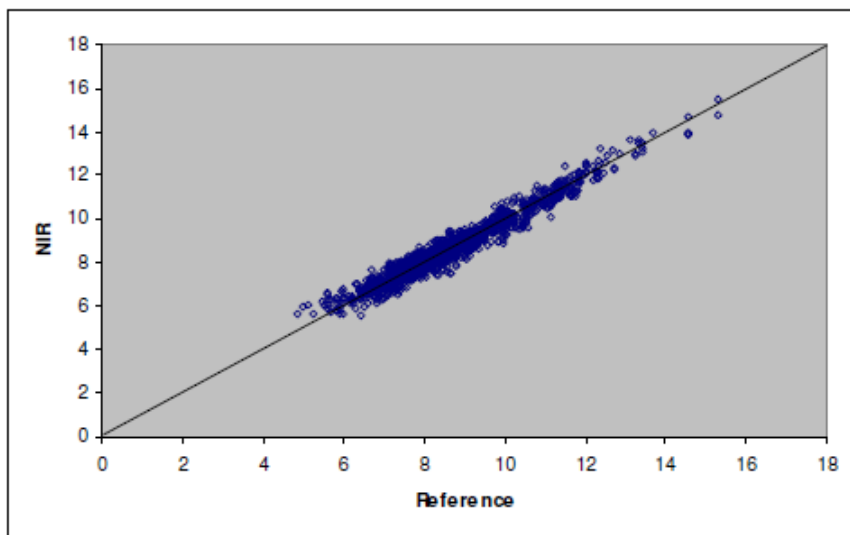
Moisture

The calibration covers a very wide range which and is applicable for stored corn as well as freshly harvested corn. The accuracy is excellent throughout the range.



Oil

The oil calibration covers a wide range and will provide accurate determination of oil content in corn.



Starch

The DA 7250 determines starch in corn with similar accuracy as the reference method

