Analysis of Linseed for Moisture, Protein and Oil using the DA 7200 NIR analysis system

Introduction

When handling and processing linseed, it is important to have accurate information on its composition. Moisture, oil and protein levels determine its value and how to use and process it.

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 and time consuming.

Diode Array 7200

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

Approximately 100 linseed samples were analyzed in a DA 7200. The samples were analyzed in duplicates with no prior sample preparation such as grinding.

Calibrations were developed by Perten Instruments using Partial Least Squares (PLS) regression. Multiplicative Scattering Correction (MSC) and Savitzky-Golay 1st derivatives were used as data pre-treatment to improve the calibration models.

Results and Discussion

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

Parameter	Range	Samples	R
Moisture	6.1 – 8.7	100	0.97
Protein	19.3 – 23.8	100	0.83
Oil	37.7 – 44.5	100	0.94

The differences between the DA 7200 and the reference method are even lower than typical differences between two different reference labs. The DA 7200 is also more precise than the reference methods meaning that replicate analyses are much more repeatable and representative.

In summary it is concluded that the Diode Array 7200 can analyze linseeds for moisture, protein and oil.
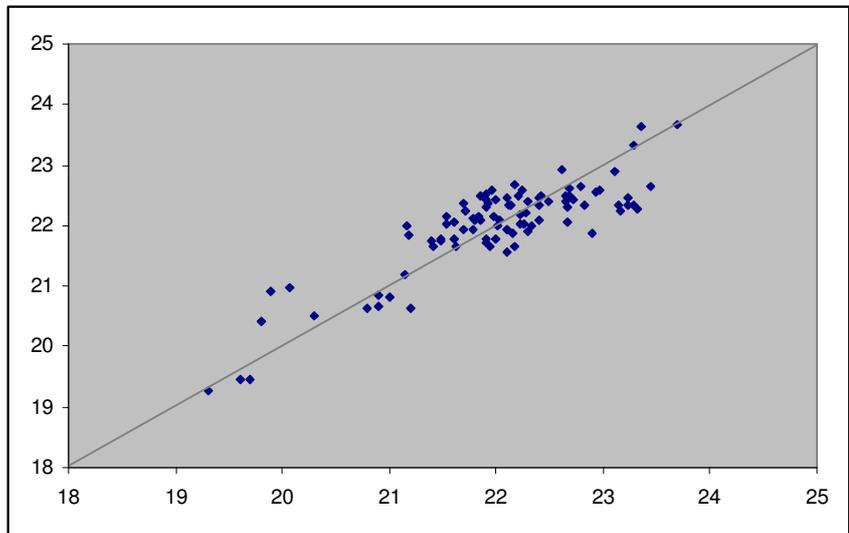
Moisture

The DA 7200 determines moisture with an excellent accuracy. While the range is narrow, it can easily be expanded to cover higher moisture samples.
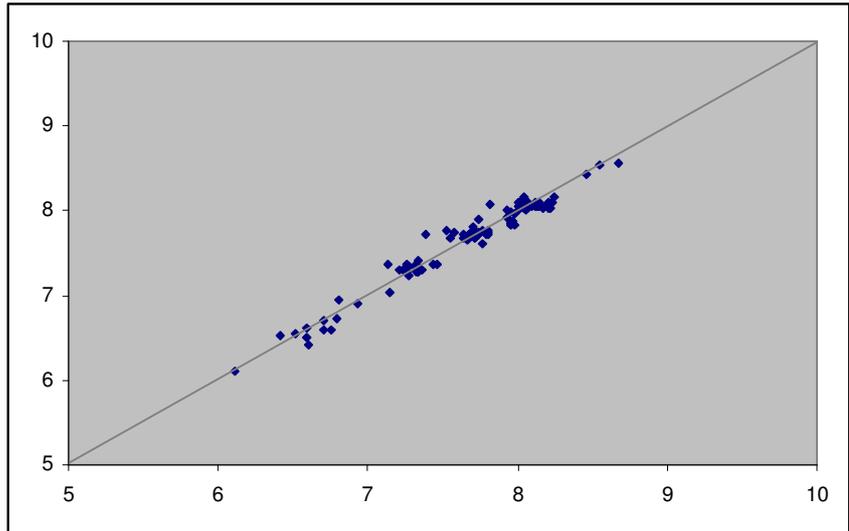
Protein

The DA 7200 accurately determines protein throughout the range, enabling processors and users of linseed to quickly test for protein.

Fat

Fat analysis is performed with a similar accuracy to that of the reference method. The rapid analysis means results are available almost instantly.

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