

Analysis of Moisture, Protein, NDF and Ash in Oats using DA 7200

Introduction

Whenever oats is used as a raw material it is important to have full knowledge of its composition and properties. In feed milling 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) 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 new 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 about 300 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

About 60 samples of oats were analyzed in a DA 7200. Samples were analyzed in duplicates, with no grinding or any other sample preparation. Reference results were provided by a commercial Swedish grain and forage lab. Some of the samples were only analyzed for moisture.

Calibrations were developed by Perten Instruments using Partial Least Squares (PLS) regression. Multiplicative Scattering Correction (MSC) and Savitzky-Golay 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 for the respective parameters are presented in the table below and graphs are displayed on page 2.

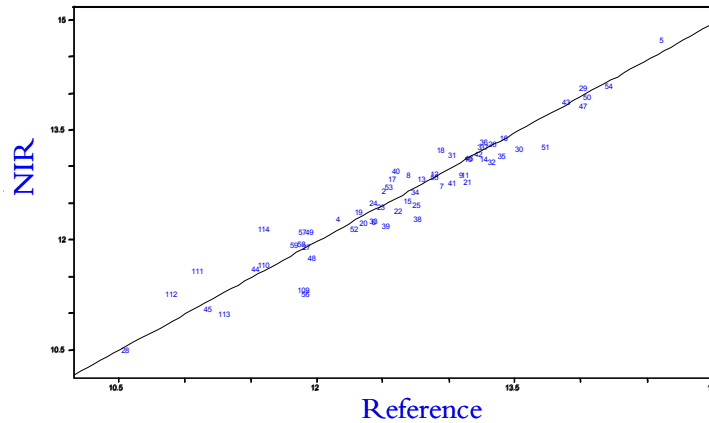
Parameter	Range	Samples	R ²	SECV [*]
Moisture	7.8-14.6	64	0.92	0.23
Protein	9.4-13.9	46	0.83	0.47
NDF	22.1-36.2	47	0.51	2.4
Ash	27.6-41.1	48	0.56	2.1

The differences between the DA 7200 and the reference method are very similar to the reference method errors specified by the reference lab. For example, for NDF a relative error of 10% is specified, which corresponds very well to an SECV of 2.4 in the range 22-36%. 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 Diode Array 7200 can analyze oats for the aforementioned constituents.

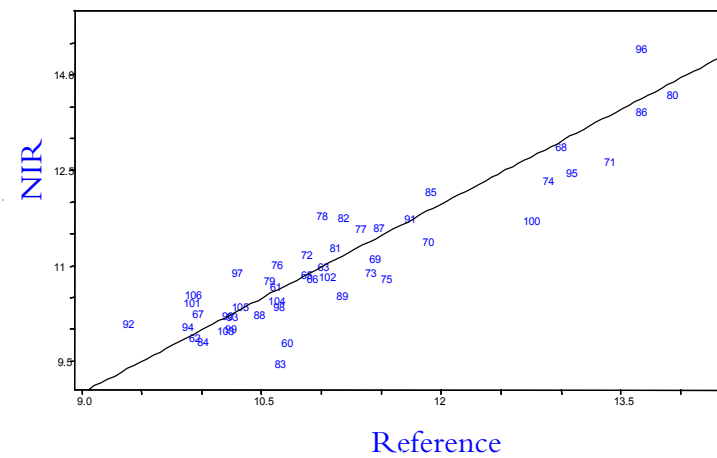
Moisture

The moisture results are very accurate across the range. DA 7200 will be an excellent tool for rapid and accurate determination of moisture in oats.



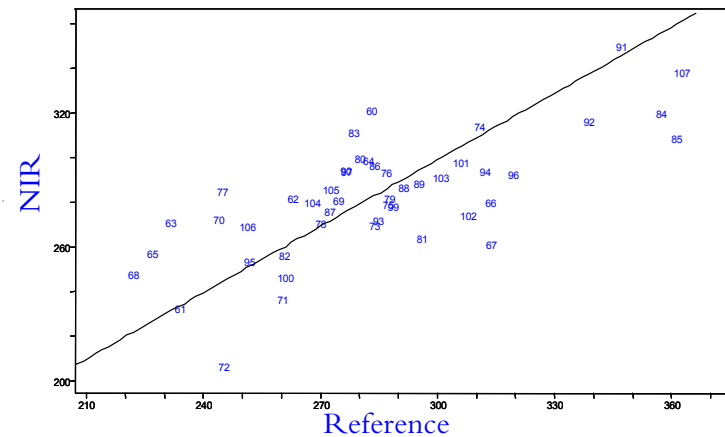
Protein

The DA 7200 is slightly less accurate for protein than for moisture. This is due to the protein reference method which is less reproducible. The performance of the DA 7200 matches that of the reference method very well.



NDF

The DA 7200 can be used to estimate NDF values for oats. The difference between NIR and reference is very similar to the reference method error specified by the lab that performed the analyses.



* SECV is the standard deviation between NIR and Lab data calculated in a way that describes the future performance of the calibration.