

Perten Instruments Application Note

DA 7250 Analysis of Fresh Forages

Analysis of Fresh Forages using the DA 7250 Analyzer

Introduction

Fresh forage such as grasses, hay, corn silage and others are an important feed and it is vital to have fast and accurate nutritional analysis information.

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 unique optical design, no sample grinding is required.



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

As the samples can be 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.

Method

More than 1000 samples of various types of fresh forages from North America and Europe were analyzed on multiple DA 7250 instruments and by wet chemistry methods for reference values on moisture, protein, ash, NDF, ADF, crude Fiber and energy contents. The samples included corn silage, grass silage, alfalfa and green forage. The samples were cut or chopped into pieces of a few centimeters' length and then placed in an open-faced sample dish for NIR analysis in the DA 7250. Compression plates or analysis in rotating closed quartz glass can also be used to facilitate the handling on springy forages types. Calibrations were developed by Perten Instruments using multivariate regression and scatter correcting spectra pre-treatments



Results and Discussion

The calibrated DA 7250 results proved to be very close to the results from the reference methods. Statistics of developed calibrations are presented in the table 1 below and graphs for protein, moisture and NDF NIR calibrations are displayed in page 2.

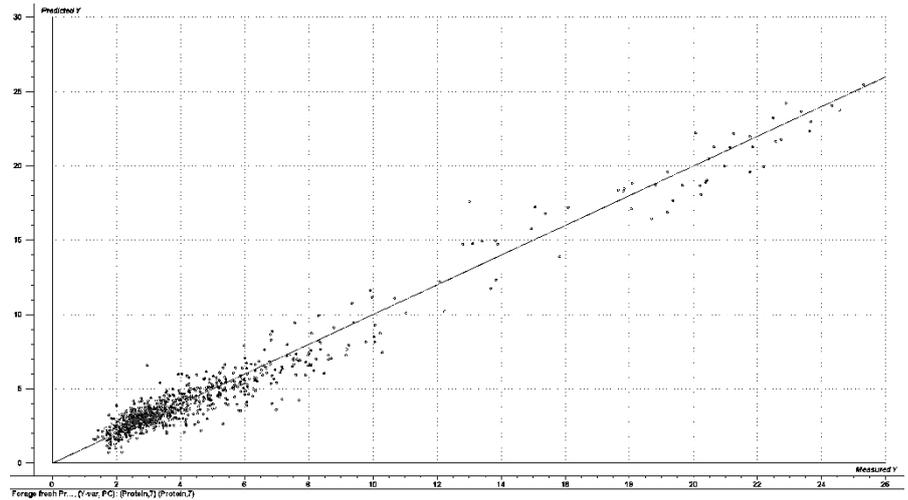
| Parameter | Range | Samples | R |
|------------------------------|-------------|---------|------|
| Moisture | 21.7 - 88.2 | 800+ | 0.96 |
| Protein _{as is} | 1.3 - 25.3 | 800+ | 0.98 |
| Ash _{as is} | 0.5 - 7.7 | 600+ | 0.88 |
| NDF _{as is} | 5.0 - 67.1 | 400+ | 0.97 |
| ADF _{as is} | 18.5 - 41.4 | <100 | 0.84 |
| Crude fiber _{as is} | 4.6 - 12.0 | 100+ | 0.78 |
| Energy, (MJ/kg) | 7.3 - 12.5 | 300+ | 0.86 |

Table 1

In summary it is concluded that the DA 7250 can accurately analyze fresh forage in 6 seconds.

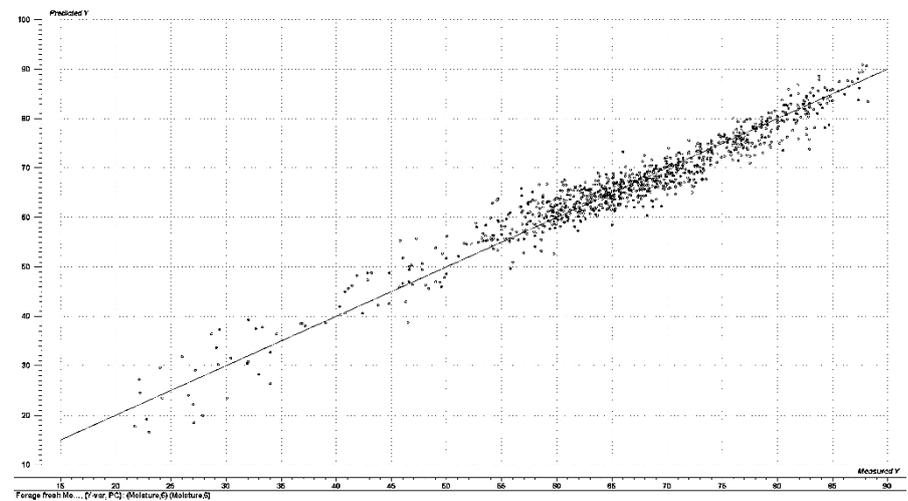
Protein

Protein is determined with a high level of accuracy with calibrations including large variability in types of fresh forage.



Moisture

From relatively dry forages to very high moisture ones, the DA 7250 readily predicts the moisture content, which can also be expressed as dry matter if required.



NDF

The calibration includes a wide variation and covers NDF from around 5-70.

