

## Analysis of Moisture, Protein, Soluble Protein and Color in Barley malt using the DA 7200 NIR Analyzer

### Introduction

Rapid and accurate analytical methods are critical in brewing. The quality of the malt has a tremendous impact on the brewing process, and knowledge of key malt characteristics is vital.

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 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

More than 300 barley malt samples were analyzed in the DA 7200. Calibrations were developed by Perten Instruments using the Grams chemometrics package. The calibration method was PLS1 with MSC and Savitsky-Golay derivatives data pretreatment.

### Results and Discussion

The Diode Array 7200 proved to predict results very close to the results from the reference methods. Statistics are presented in the table below and graphs are displayed in page 2.

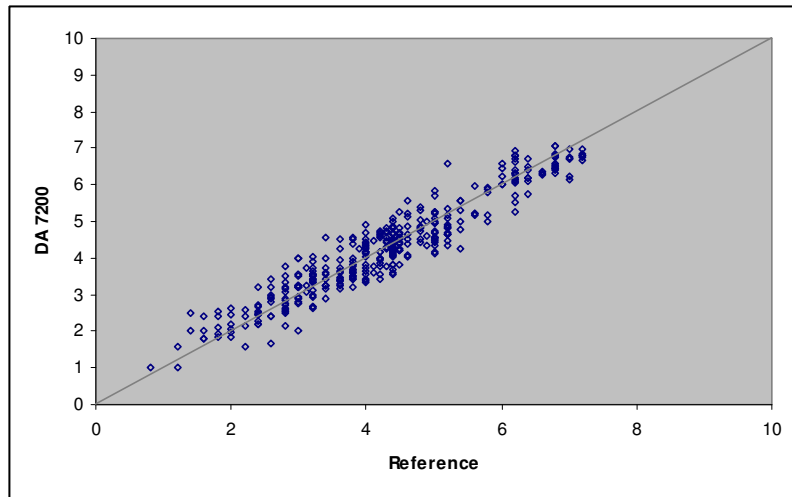
Parameter	Range	Samples	R
Moisture	0.8 – 7.2%	300+	0.95
Protein	9.7 – 14.7%	200+	0.90
Soluble protein	3.5 – 6.2%	200+	0.84
Color	0.1 – 18.6	200+	0.96

The differences between the DA 7200 and the reference method are of the same magnitude as typical differences between two different reference labs. The DA 7200 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 7200 can determine moisture, protein, soluble protein and color in barley malt, with the same accuracy as the respective reference method.

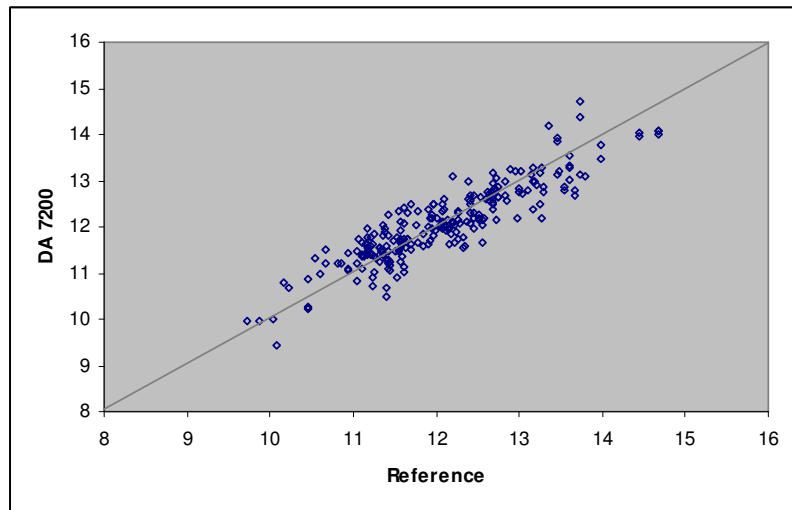
**Moisture**

The moisture calibration covers a very wide range. It will be valid under all but the most extreme conditions, and performs very well.



**Protein**

The performance of the protein calibration is excellent and gives accurate information.



**Color**

The DA 7200 determines malt color with good accuracy, and helps the brewer define this key characteristic.

