

Analysis of Moisture in Breakfast Cereals Using the Diode Array 7200

Introduction

In production of breakfast cereals the moisture content is an important control parameter. Rapid moisture determination will make it possible to quickly adjust the process, which saves money and improves the 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 food industry. Using novel diode array technology it performs a multi-component analysis in only 3 seconds with no sample preparation required. During this time 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

85 breakfast cereal samples of muesli type from Cerealia, a Swedish manufacturer of breakfast cereals and other grain-based foods, were analyzed on the DA 7200. The data included 5 different products, representing considerable variation in both ingredients and composition. Each sample was analyzed with 2 repeats and 3 repacks. Reference analyses were performed by Cerealia.

Calibrations were developed by Perten Instruments using Partial Least Squares (PLS) regression, a method which gives robust and stable calibrations. 1st derivative data pretreatment as well as Multiplicative Scattering Correction was used to improve the calibration models.

Results and Discussion

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

Parameter	Range	Samples	R ²	SECV
Moisture	2.3-7.7	85	0.9	0.30

The differences between the DA 7200 and the reference method are of the same magnitude as the typical differences between two reference labs.

In summary it can be concluded that the Diode Array 7200 can determine moisture in muesli type breakfast cereals with excellent results, using the same calibration for several different products.

Moisture

Most samples have a moisture content of 3-5%, but the calibration predicts well all through the range 2-8% which ensures that out-of-spec samples are detected.

