Pre-study - Analysis of Fat and Moisture in Yoghurt Using the DA 7250 SD

Introduction

For yoghurt manufacturers, fat and moisture contents are important quality parameters that define the properties of the end product. With a large number of samples, high sample throughput and accurate determination of these parameters is of great benefit.

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, special cups or extensive clean up requirements made analyses laborious and time consuming.

DA 7250 SD

The DA 7250 SD is a proven NIR instrument designed for use in the food industry. 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. Disposable petri dishes can be used, eliminating the need for cleaning between samples. The stainless steel sanitary design of the instrument makes it hygienic and easy to clean.

Experimental

48 samples of Yoghurt from one Czech manufacturing facility were analyzed with the DA 7250, and results compared to standard laboratory methods. The sample was simply poured in top the open-face dish, and the excess struck off. Each sample was measured once.

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

Reference methods : Moisture by oven drying. Fat by Gerber.

Results and discussion

The DA 7250 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
Dry Matter	24.1 – 28.1	<100	0.99
Fat	7.3 – 8.8	<100	0,98

The differences between the DA 7250 and the reference method are of the same magnitude as the typical differences between two reference labs. The DA 7250 is more precise than the reference methods meaning that replicate analyses are much more repeatable and representative.

In summary it is concluded that the DA 7250 SD can analyze yoghurt for the aforementioned constituents.

Moisture

The calibration covers a sufficiently wide range with the sample moisture content evenly distributed, and generally shows a very good accuracy. As more samples are added, the calibration will perform even better.
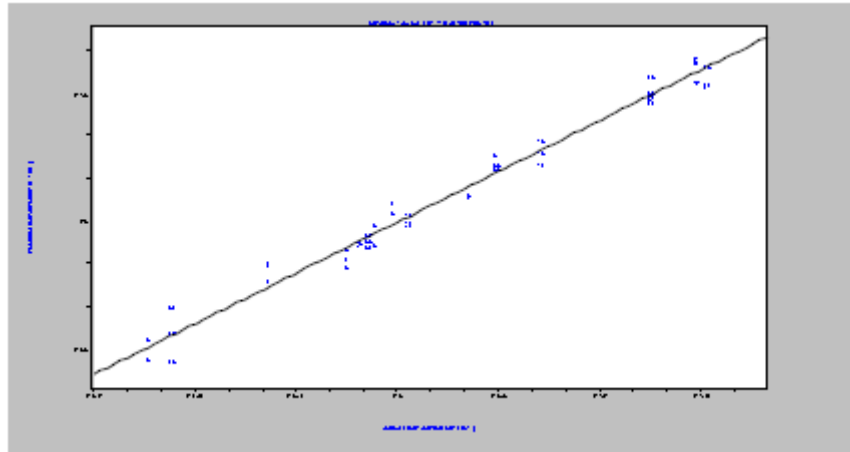
Fat

The DA 7250 is highly accurate on fat content in yoghurt. The majority of the samples are in the upper end of the range, but the results on the low fat samples clearly show that the calibration has a linear behavior. Adding further samples with low fat content will improve the accuracy even further.