APPLICATION BRIEF

Near Infrared Spectroscopy

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Analysis of Yogurt Using the DA 7250 NIR Analyzer

Introduction

For yogurt manufacturers, fat and dry matter 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 important.

The Near Infrared Spectroscopy (NIR) technique is particularly suited for yogurt analysis. The latest developments in NIR technology allow samples to be measured faster and in an easier way than ever, eliminating the need to analyze in vials, glass or plastic cups that require thorough cleaning between each analysis.

DA 7250 NIR Analyzer

The PerkinElmer DA 7250™ is a proven NIR instrument designed for use in the food industry. Using novel diode array technology, it performs a multi-component analysis in less than ten seconds. Measurements are done in open cups or disposable petri dishes without risk of non-clean cups interfering with results.

The DA 7250 instrument is IP 65 rated and available in sanitary design version, allowing it to be used in the lab as well as in the production environment.

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Method

Around 1000 different yogurt samples from processing plants in Europe, North America and Asia were analyzed on multiple DA 7250 instruments. Collected NIR spectra were combined with fat and dry matter reference chemistry results. The calibration set included full fat and lower fat yogurts from various types such as traditional yogurts with or without fruit pieces, fruit yogurts, crème fraiche and Greek yogurt.

Measurements on the DA 7250 were done with open faced plastic cups, disposable petri dishes or disposable plastic cups.

Calibration algorithms where developed to model the relationships between the instruments NIR spectra and reference chemistry results using multivariate PLS and Perten proprietary HR calibration methods.

Results and Discussion

The developed calibrations showed high correlation and low error, even combining all yogurt types in same calibration models. Table below summarizes statistics of developed calibrations. Correlation strength is denoted R and range the variability of each parameter. Reference vs NIR calibration graphs are displayed in Figures 1 and 2.

Table 1. Statistics of developed calibrations.

Parameter	N	Range	R
Dry Matter %	12.4 – 37.7	>1000	0.99
Fat % asis	0.1 – 21.6	>900	0.98

The differences between the DA 7250 and the reference method are of the same magnitude as typical differences between two different reference labs.

In summary it is concluded that the DA 7250 can analyze yogurt in less than ten seconds with high accuracy. Including inhomogeneous samples such as fruit pieces and without the need to clean sample cups, vials, tubes or similar in between measurements.

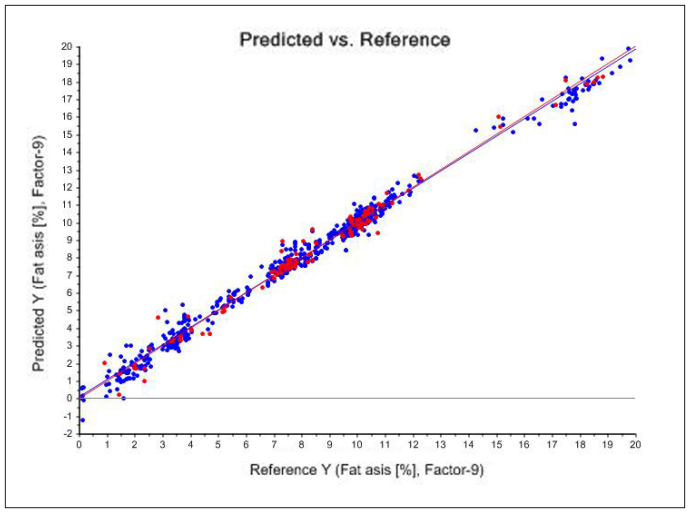

Figure 1. **Fat:** The DA 7250 is highly accurate on fat content determination in yogurt.

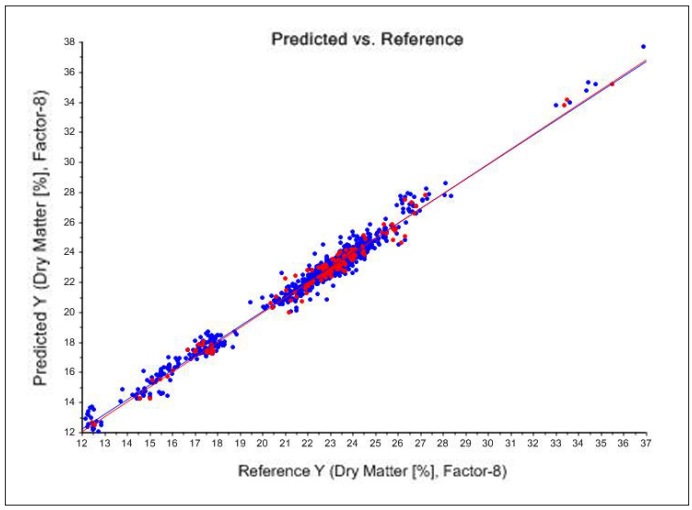

Figure 2. **Dry Matter:** The DA 7250 analyze dry matter with high linearity over a wide calibration range.

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