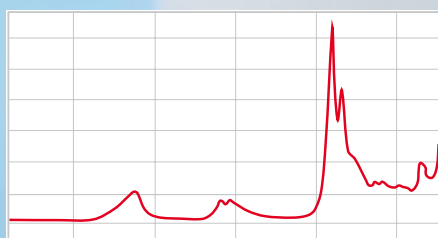
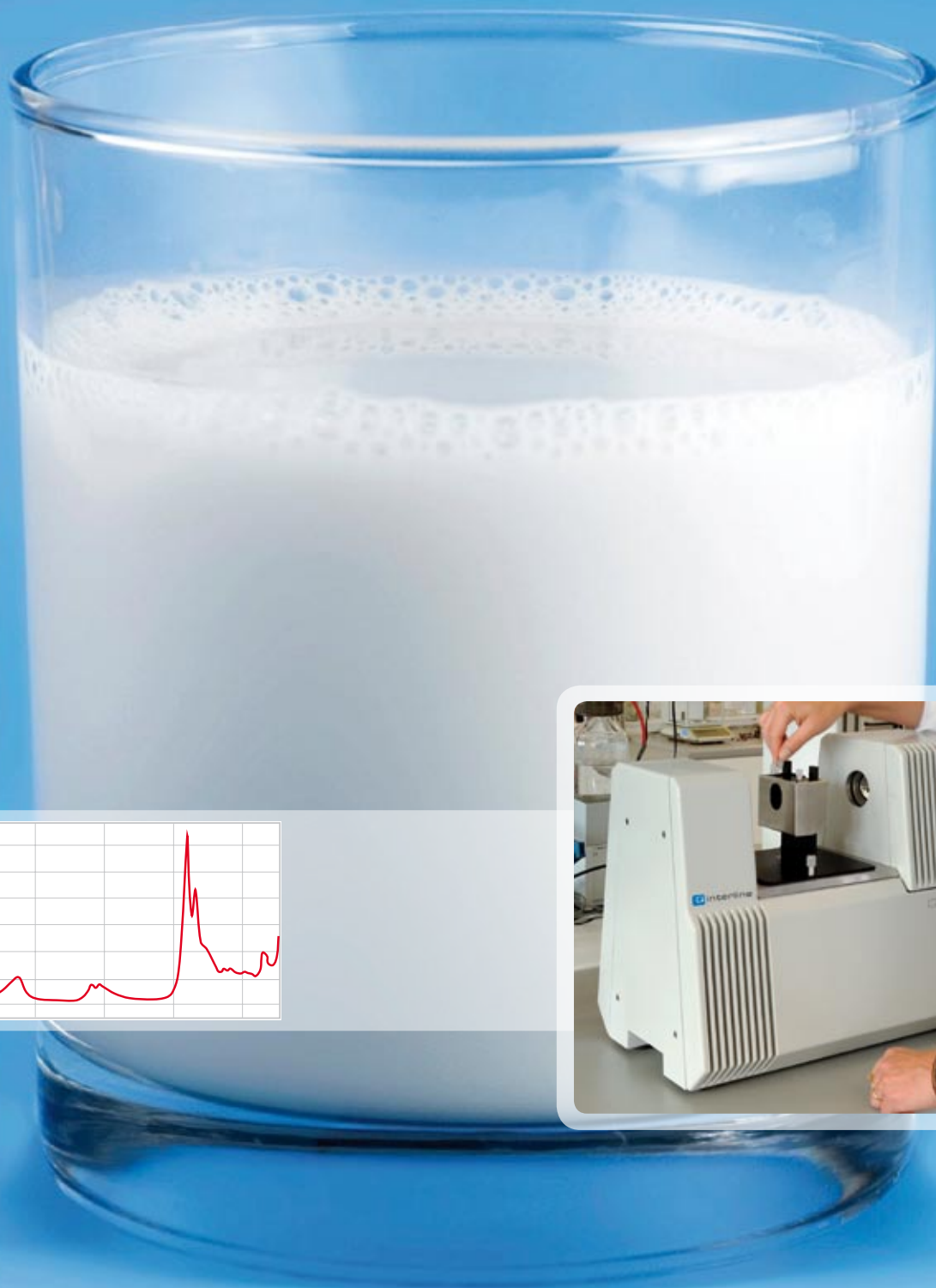


Application Note

Iodine Value in Milk Fat



Introduction

Determination of the quality of milk is important to the milk industry. The iodine value in milk fat is an example of these quality parameters. The milk fat is obtained from the milk by means of a solvent extraction. NIR analysers can be placed in the production laboratory and can be operated by plant personnel. The analysis time is less than two minutes.

Analyser: The FT-NIR LipidQuant

The LipidQuant FT-NIR analyser is used for non-destructive analysis of liquid samples. The sample is poured into 8 mm lidded glass vials to avoid changing during the process and placed in the heating vial holder. The sample can be kept due to the sealed vial.

The LipidQuant is powered by the latest ABB Bomem FT-NIR technology and measures the entire spectrum of the sample, i.e. in the range 14000-3800 cm⁻¹ (700-2600 nm). It generates a large amount of high-quality spectral data, which makes it possible to precisely determine multiple components.

With no scheduled maintenance for five years, the LipidQuant is practically maintenance-free. It is equipped with parts with a long lifetime. For instance, the laser and NIR source have an expected lifetime of ten years.

LipidQuant is operated with the InfraQuant software, which makes it easy for everybody to work with analyses. Two clicks with the mouse is enough to make the analysis. Among the features is a wizard that guides the operator through the program, spectra are displayed right away, and sample information and trends can be reviewed easily.

Calibration

The LipidQuant is calibrated against the certified Wijs method for determination of iodine value.

The NIR region contains both combination and overtone information. The most sensitive band for calibration of iodine value is the C-H 2nd overtone. To compensate for small path length variations in the 8 mm glass vials, all spectra were pre-processed using a thickness correction. A baseline correction was also applied on the spectra. A Partial Least Squares (PLS) model was developed based on the analytical and spectral data.

Calibration Performances, Example

38 milk fat samples with different iodine values were measured in glass vials. Table 1 shows the performance of the calibration developed for iodine value. The Wijs method has been used as chemical reference analysis. A repeatability test was performed measuring the same sample ten times and calculating the standard deviation of these measurements.

Property	Range %	NIR SECV	Repeatability
Iodine Value	29.0 - 45.0	0.4	0.1

Table 1: Performance of the milk fat calibration

Conclusion

The LipidQuant FT-NIR analyser is designed for liquid measurements. Iodine value in milk fat is obtained in less than two minutes.

The system can also be calibrated for other constituents like %Trans, %FFA and PV. All analyses can be done by taking one spectrum of the sample. This eliminates individual analysis on each constituent and saves manpower, training and time resources.

The rapid analysis benefit combined with highly repeatable measurements reduces process fluctuations.

The same calibration can also be used for the determination of the iodine value in butter oil. Butter oil is, from a chemical point of view, the same product as milk fat.

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