QUALITY CONTROL OF MILK PRODUCTS

INTRODUCTION

In order to maintain high quality of milk products, it is necessary to monitor process quality as rapidly as possible, so that a relevant technological process could be promptly corrected.
The most important quality factors of milk products are fat, protein, moisture (total solids), SNF, sugar, salt, lactose and titrated acidity.
Commonly, it takes a few hours to make such type of analyses by traditional methods. The use of an InfraLUM® NIR analyzers reduces the analysis time to a couple of minutes.

MEASUREMENT METHOD

The method is based on measuring the transmission spectrum of a sample in the near-IR spectral region and subsequent determination of the analyzed parameters/constituents using a calibration model.
Transmission measurement provides highest accuracy and reproducibility of the measurements.

ANALYZED MILK PRODUCTS AND CONSTITUENTS DETERMINED

Product	Parameters / Constituents									
	Protein, %	**Moisture / Total solids, %**	**Fat, %**	**Acidity, degree**	**Lactose, %**	**Sugar, %**	**SNF, %**	**Salt, %**	**Freezing point, degree**	**Density, g/cm^3**
Raw milk	+	+	+		+				+	+
Milk powder	+	+	+							
Various curds	+	+	+	+	+					
Curd mix	+	+	+			+				
Yoghurts	+	+	+			+				
Cheese		+	+					+		
Cottage cheese		+	+					+		
Butter		+	+				+			

These constituents can be determined within the whole possible range of content in the above dairy products. The validity of the calibration models listed in the table has been confirmed by joint tests carried out at Wimm-Bill-Dann Dairy Company's plants and by the successful operation of the InfraLUM® NIR analyzers at other QA laboratories in dairy industry during past few years.

ADVANTAGES OF THE METHOD

- Rapid analysis (simultaneous determination of all parameters in less than 2 minutes).
- No need to use special washing liquids for the cell – just common detergents.
- Simple measurement procedure.
- No sample preparation needed.
- Low cost per analysis (no reagents and consumables are needed).
- No special qualification of attending personnel is required.

EQUIPMENT

- InfraLUM® FT-12 NIR Analyzer (calibration models are developed at Customer's site by LUMEX INSTRUMENTS service engineers with Customer's samples)
- Cells with suitable path lengths
- Personal computer with SpectraLUM/Pro® software operating under Windows® 7/8

PREOPERATIONAL PROCEDURES

The following procedures should be performed before proceeding to the measurements:

Sampling and sample preparation

The samples should be used that are routinely analyzed in a laboratory for the quality control of a production process. The contents of the sample constituents should cover the whole measuring range.

Calibration of the analyzer

Basic calibration models for the specified parameters are supplied by LUMEX INSTRUMENTS.
If necessary for other parameters the calibration process involves the following steps:

- reference analysis made by standard chemical methods
- measurement of transmission spectra of the reference samples
- creation of a calibration model that establishes relation between the content of a constituent with the spectral data

As a rule, calibration is made by LUMEX INSTRUMENTS specialists or authorized representative.
The measurement range of a calibration model depends directly on the range of the constituent content, and the measurement accuracy depends on the precision of analysis by standard chemical methods.

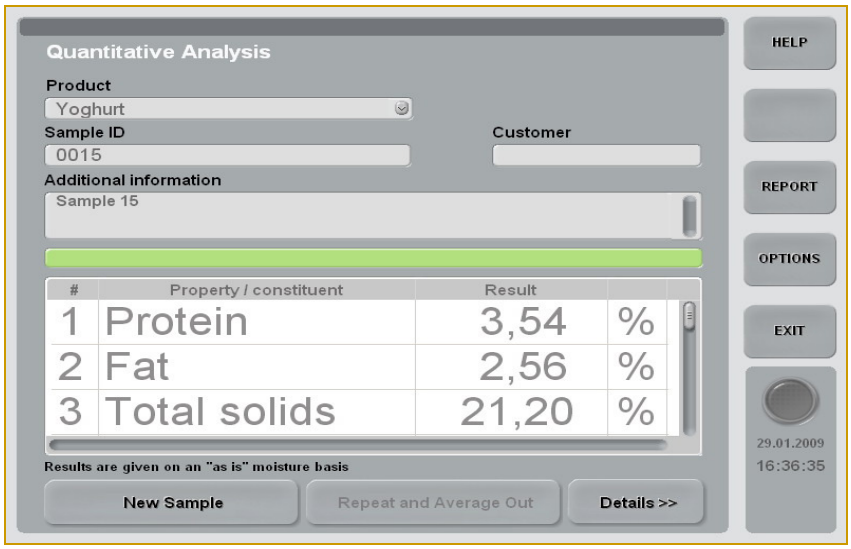
MEASUREMENT PROCEDURE

The sample is put in the cell of the InfraLUM® FT-12 NIR analyzer and the measurement is made automatically.

DATA PROCESSING

The measurement result (content of the constituents in the analyzed sample of a milk product) is calculated automatically by the SpectraLUM/Pro® software and is displayed on the PC screen.

Example of analysis of yoghurt:



The contents of this paper are subject to change without notice.

The information in this leaflet is supplemental. To get more specific information on this method, please contact the developer of this method Lumex Instruments Group.

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