

# Application Note

## Milk Powder



## Introduction

FT-NIR analysis can quickly and cost-efficiently measure components such as protein, fat, and moisture in various types of milk powder e.g. skimmed or whole milk powder. The chemical analysis is time consuming and costly, and for the fat analysis, ether extraction is often used. This can be avoided using FT-NIR where the analysis time is 30 seconds and there is no need for sample preparation. The analyser can be placed directly in the production area and can be operated by plant personnel.

## Analyser: DairyQuant B3

The DairyQuant B3 is based on the latest generation FT-NIR technology and has the following main features:

- Cutting edge spectral performance and best signal to noise ratio on the market
- Very easy to operate and maintain
- Optimised software suite with InfraQuant and Horizon QI
- Very low maintenance costs. The DairyQuant B3 has no scheduled maintenance

## Analysis:

The sample is analysed in a petri dish by reflection measurement. The sample is poured into the petri dish, which is then placed on the analyser. The petri dish is rotating during the analysis, securing that the analyser is seeing a large part of the sample and that effects from product inhomogeneity is reduced.

The petri dishes can be made of either glass or Teflon. Analysis in Teflon petri dishes eliminates issues with glass and plastic in the production area.

See a video presentation of the DairyQuant B3 on our homepage: [www.q-interline.com](http://www.q-interline.com) and experience how easy it is to perform the analysis on the DairyQuant B3.

## Calibration

The DairyQuant can be used with customised calibrations, optimised to the customers own products. Customised calibrations are made by adding a number of samples from the actual production line to a set of starter calibrations from Q-Interline. The reference methods used for chemical analysis are Kjeltex for protein, Rose Gottlieb for fat and oven drying for moisture.

## Calibration Performances, Example

The starter calibrations are based on a set of samples containing skimmed milk powder and whole milk powder with a fat content ranging from 4% to 27%. The sample set contains both regular and instant milk powder. The performance of the different calibration models can be seen in table 1.

| Product type | Property | Range     | secv  | Repeatability FT-NIR | Repeatability Lab |
|--------------|----------|-----------|-------|----------------------|-------------------|
| Regular      | Protein  | 24.4-25.2 | 0.08  |                      |                   |
| Regular      | Fat      | 25.7-26.7 | 0.08  |                      |                   |
| Regular      | Moisture | 2.7-3.3   | 0.035 |                      |                   |
| Instant      | Protein  | 24.4-24.9 | 0.06  | 0.042                | 0.051             |
| Instant      | Fat      | 2-27      | 0.14  | 0.051                | 0.057             |
| Instant      | Moisture | 2.7-4.2   | 0.075 | 0.02                 | 0.036             |

Table 1: Performance of the DairyQuant B4

## Conclusion

The DairyQuant B3 analyser is designed for analysis of powders and solids. Protein, fat and moisture content in various types of milk powders can be measured in 30 seconds and the method is very robust for rapid quality control.

The DairyQuant B3 can be placed in the production area or in the lab. The intuitive software interface means that the analyser can be operated by plant personnel with limited or no lab education.