

### Analysis of Dry Cheeses for Moisture, Fat, Salt, and pH Using the DA 7250 SD

#### Introduction

Analysis of moisture, fat, salt and pH is of great importance to cheese plants. By accurately controlling these constituents, the producer can experience significant savings. Using the DA 7250, production staff can perform their own analysis 24/7 and have instant access to the results. The results can be used for process optimization and to avoid costly mistakes and potential penalties.

The Near Infrared Reflectance (NIR) technique is particularly suited for measurement of cheese, but past instrument limitations have not allowed users to reap the full benefits of NIR. Sample presentation requirements such as glass samples that had to be filled properly and were difficult to clean made analyses laborious, time consuming and error-prone.

#### 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.



#### Experimental

Approximately 250 samples of different cheeses from several processing plants in the USA and Canada served as the calibration set. The variety of cheeses

included Mozzarella, Romano, Parmesan, and other dry cheeses. Spectral data for each sample was collected on the DA 7250 SD using the standard open faced sampling dishes. The reference chemistry was supplied by the customers with the samples.



Calibrations were developed using Partial Least Squares (PLS) regression. Standard Normal Variant Transform and Savitsky-Golay 1st Derivative were used as data pre-treatments to improve the calibration models.

#### 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.

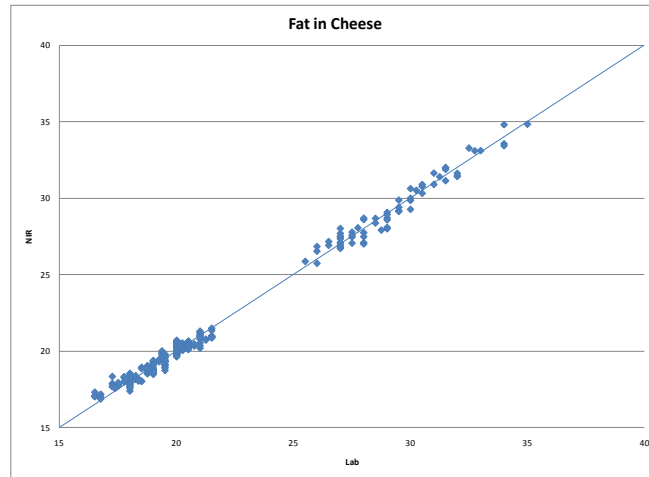
| Parameter | Range       | Samples | R    |
|-----------|-------------|---------|------|
| Moisture  | 10.3 – 30.3 | 2500    | 0.99 |
| Fat       | 24.0 – 34.1 | 300     | 0.96 |
| Salt      | 2.7 – 5.6   | 800     | 0.80 |
| pH        | 5.14 - 5.42 | 200+    | 0.82 |

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

In summary it is concluded that the DA 7250 SD can analyze cheese for the aforementioned constituents. The ease-of-use and flexibility – it can analyze dairy powders, butter etc. as well – make it ideal for use at dairy plants worldwide.

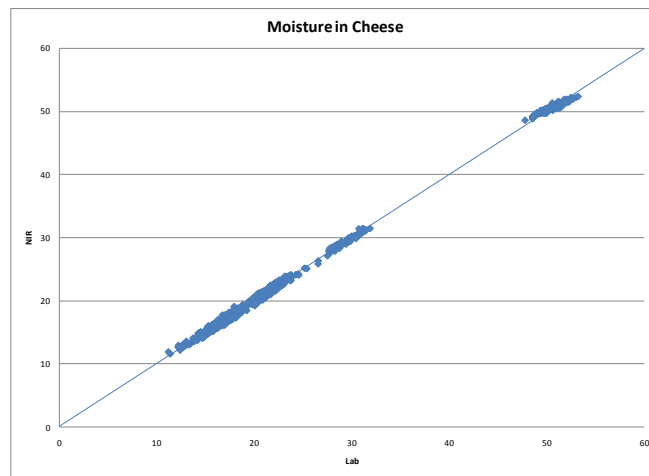
## Fat

Fat is accurately and readily measured across a wide range of values. Many different cheeses are measured by one calibration.



## Moisture

Proper moisture levels affect the profitability of the plant as well as the quality of the product.



## Salt

Salt effects taste and performance in different products.

