

### Analysis of Butter for Fat, Moisture and Salt Using the DA 7250 SD

#### Introduction

Analysis of fat, moisture and salt is of great importance to butter plants. By accurately controlling these constituents, the producer can experience significant savings. Realizing these savings is dependent both upon the accuracy of the analyses and the availability of real-time results. 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 butter, but past instrument limitations have not allowed users to reap the full benefits of NIR. Sample presentation requirements such as glass cups 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. The stainless steel sanitary design of the instrument makes it hygienic and easy to clean.



#### Experimental

Over 200 samples of butter from more than 12 processing plants in North America and Europe

served as the calibration set. Spectral data for each sample was collected on the DA 7250 using the Disposable Cup Module. The reference chemistry for fat, moisture, and salt was supplied with the samples.



Calibrations were developed using Partial Least Squares (PLS) regression. Standard Normal Variant Transform and Savitsky-Golay 1<sup>st</sup> 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.

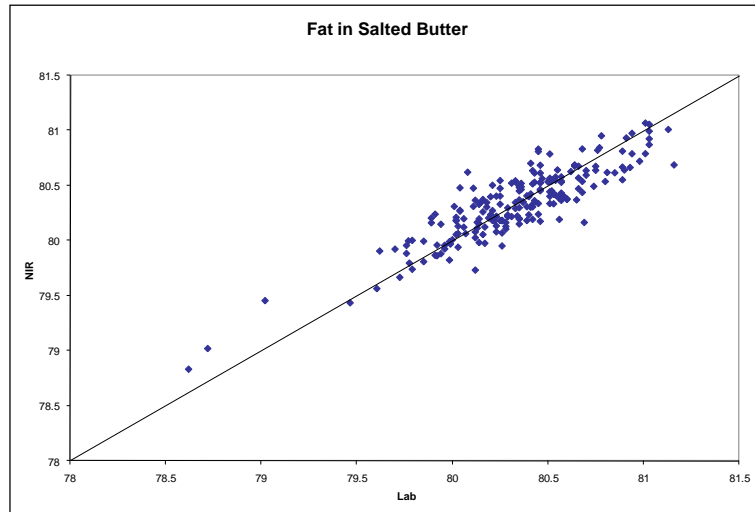
Parameter	Range	Samples	R
Fat	78.2 – 84.8	200+	0.98
Moisture	13.7 – 18.3	200+	0.95
Salt	0.1 – 2.5	200+	0.99

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 can analyze butter for the aforementioned constituents. The speed allows users to easily and accurately analyze many samples a day in nearly real time. The ease-of-use and flexibility – it can analyze dairy powders as well – make it ideal for use at dairy plants worldwide.

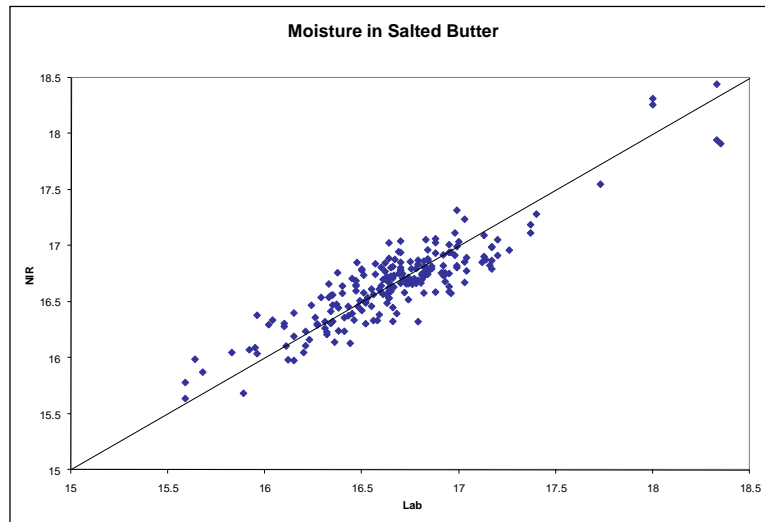
## Fat

Fat is accurately and readily measured. Fat content is often regulated by governments to ensure proper labeling.



## Moisture

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



## Salt

Salt effects taste and performance of butter in baked products.

