

Perten Instruments Application Note

DA Sweetened Condensed Milk

Analysis of Sweetened Condensed Milk for Total Solids, Fat, and Sucrose Content Using the DA 7250 SD

Introduction

Sweetened Condensed Milk (SCM) is an important ingredient for many products. The total solids, fat, and sucrose quantities are key to proper performance as an ingredient. Correct quantities impart both functional and flavor characteristics. In addition, accurate control of total solids, fat, and sucrose can optimize profitability of the processor.

The Near Infrared Reflectance (NIR) technique is particularly suited to measurement of SCM, but limitations of instruments using older technology did not allow users to reap the full benefits of NIR. Sample presentation requirements such as significant dilution and use of glass sample cells 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.



Data Collection

Approximately 1200 samples of SCM from three US processing plants were analyzed in multiple DA 7250s equipped with the Disposable Cup

Module. The reference chemistry was supplied by the customers.



Calibrations were developed using Partial Least Squares (PLS) regression. During data analysis, it was determined that separate calibrations are required for in-process samples and final products.

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.

SCM - Process

Parameter	Range	Samples	R
Moisture	1.3-5.3	600+	0.99
Protein	3.8-38.7	500+	0.99
Fat	0-37.6	600+	0.99

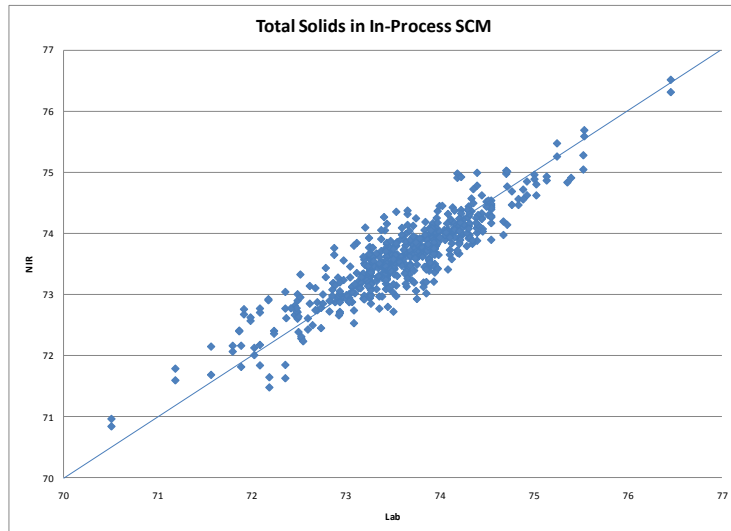
SCM - Finished

Parameter	Range	Samples	R
Moisture	1.3-5.3	600+	0.99
Protein	3.8-38.7	500+	0.99
Fat	0-37.6	600+	0.99

The differences between the DA 7250 and the reference methods 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.

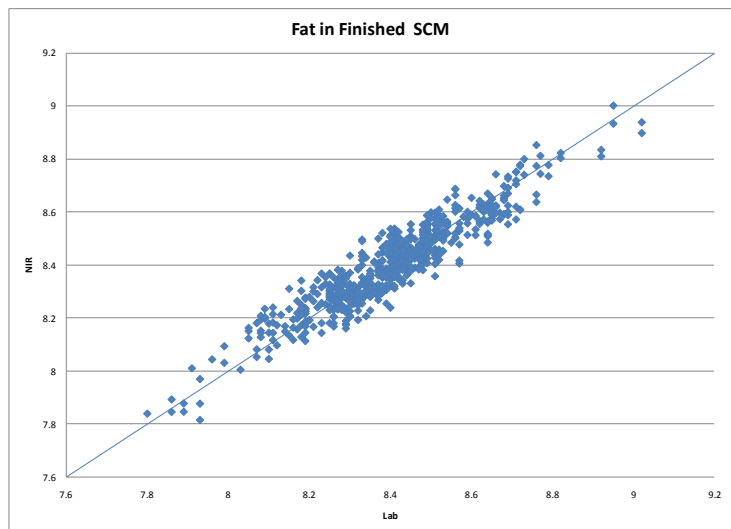
Total Solids

Total Solids is a difficult measurement in SCM with a spectroscopic technique due to crystallization effects. The DA 7250 can measure TS readily.



Fat

Fat is accurately measured across a wide range of values.



Sucrose

Sucrose is an important SCM measurement for production and product quality control.

