

Application Note: D02

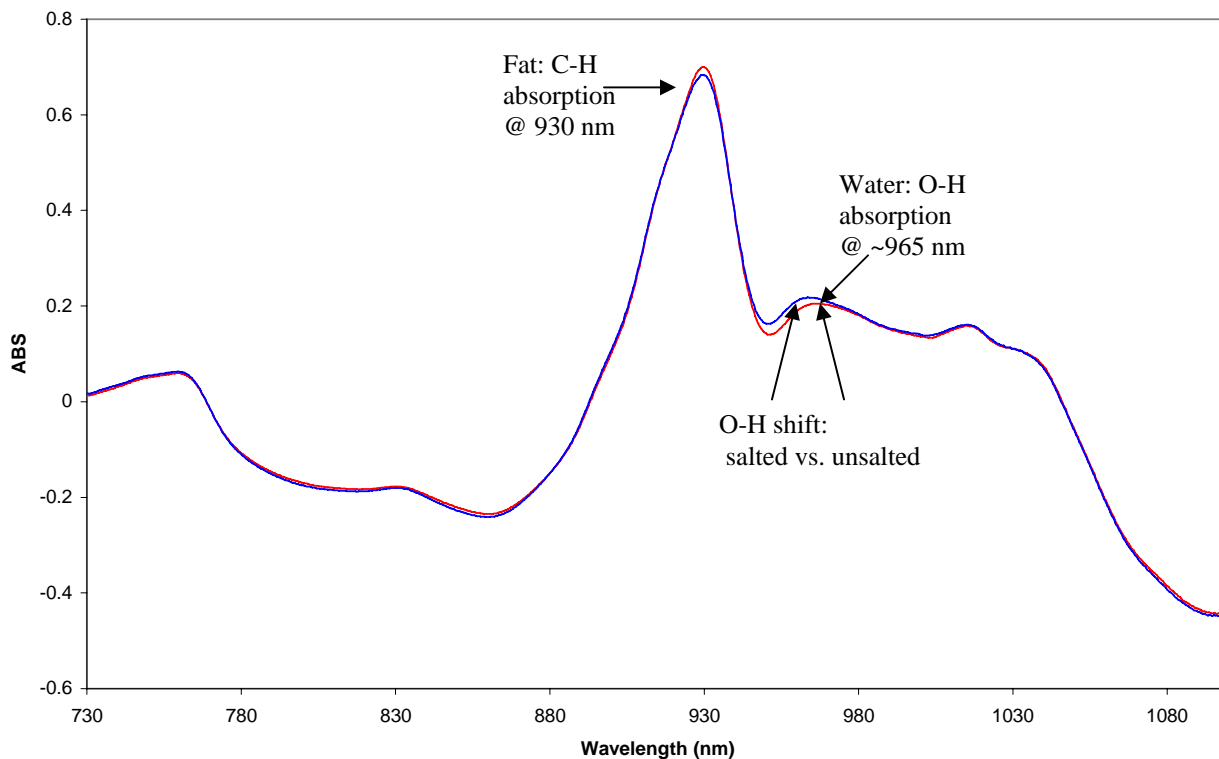
Butter Analysis by Near Infrared Transmission (NIT)

For the production of butter it is important to be within the legal specifications for butterfat, and moisture, yet not to the point where profit is lost due to product give-away. Conventional laboratory and plant tests are time consuming and, in some cases, can have high error in precision.

Near Infrared Transmission has been proven to be fast, accurate and precise. Little sample preparation is required.

The C-H absorbance band due to butterfat is clearly visible at 930 nm. The O-H band due to water is visible at 965 nm. OH shift is due to salt. Salt has a weak bond and does not absorb energy in the NIR region but it shifts the moisture absorbance band. This shifting can be correlated to salt content.

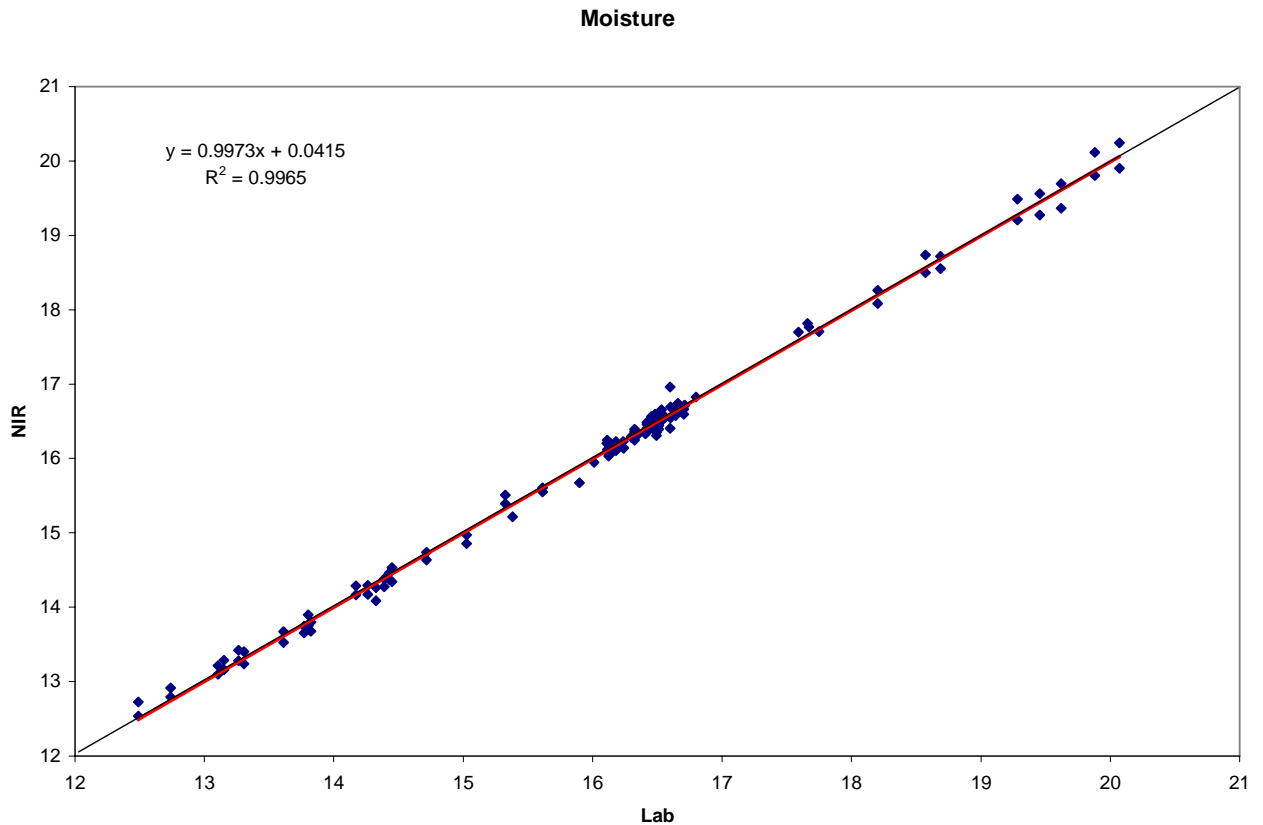
Butter Spectrum



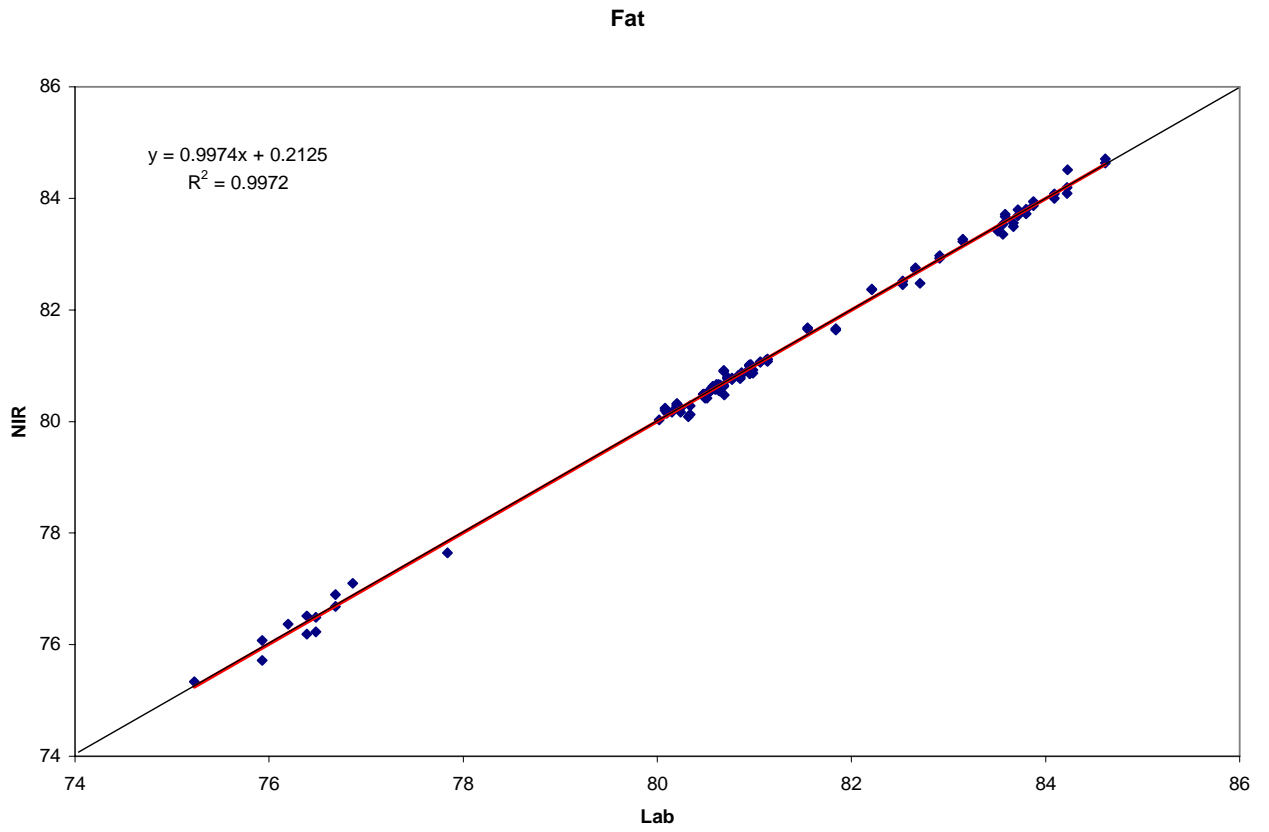
The Unity FoodCheck 1100 is configured for the analysis of products such as butter. A disposable Petri dish is filled with sample and placed in the instrument. The instrument transmits NIR wavelengths from 730-1100 nm through the product. This measurement is made on multiple positions as the Petri dish is rotated. In this operation a large amount of sample is analyzed, basically the entire contents of the Petri dish. An average result is then displayed.

Calibration Results

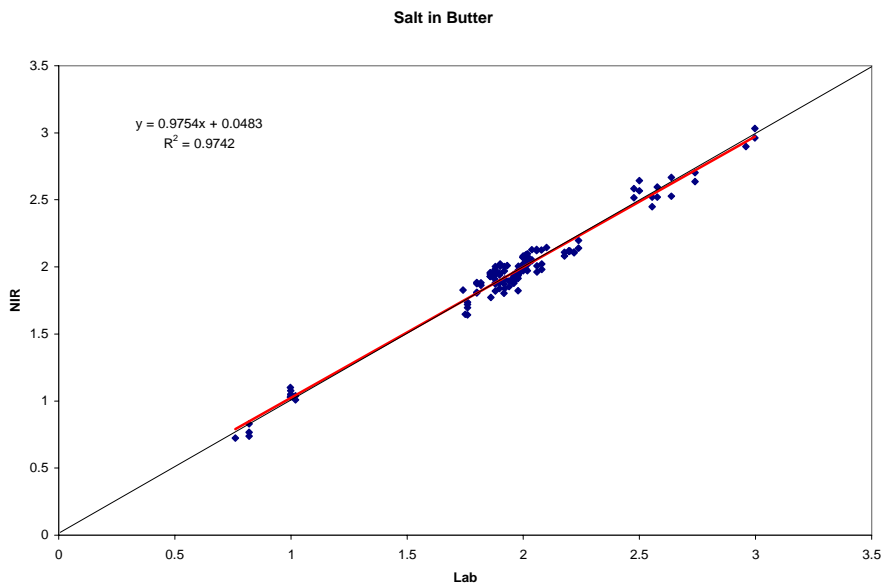
Moisture: $R^2 = 0.9965$
SECV = 0.10
N = 124 samples



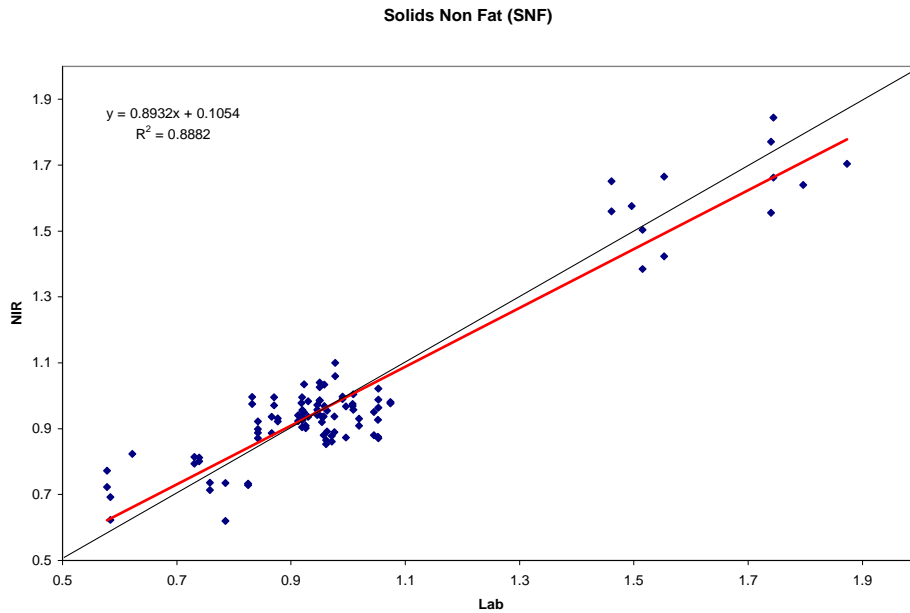
Fat: $R^2 = 0.9972$
SECV = 0.11
N = 116 samples



Salt: $R^2 = 0.9742$
SECV = 0.07
N = 120 samples



SNF: $R^2 = 0.9973$
SECV = 0.09
N = 100 Samples



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