

Application Note 16: NIT-38 Dairy Analyser - Analysis of Cream



Introduction:

To determine whether the NIT-38 Dairy Analyser is capable of detecting slight changes in dilution in order to evaluate its ability to potentially determine the fat content of real cream samples.

Procedure:

A sample of pure cream was purchased and used as a 100% sample. Dilutions were performed as follows: To the pure sample, the volume of water indicated in table 1 was added and the sample homogenised by shaking. The samples were scanned using a 5mm pathlength cell and the data was analysed as second derivative spectra.

Sample	Volume Water Added (ml)	Concentration	Sample	Volume Water Added (ml)	Concentration
1	0.0	1.00	5	8.0	0.84
2	2.0	0.96	6	10.0	0.80
3	4.0	0.92	7	20.0	0.60
4	6.0	0.88	8	25.0	0.50

Table 1: Dilutions performed to obtain a range of cream samples for NIR analysis.

Analysis:

Figure 1 shows the NIR spectral data obtained as second derivatives.

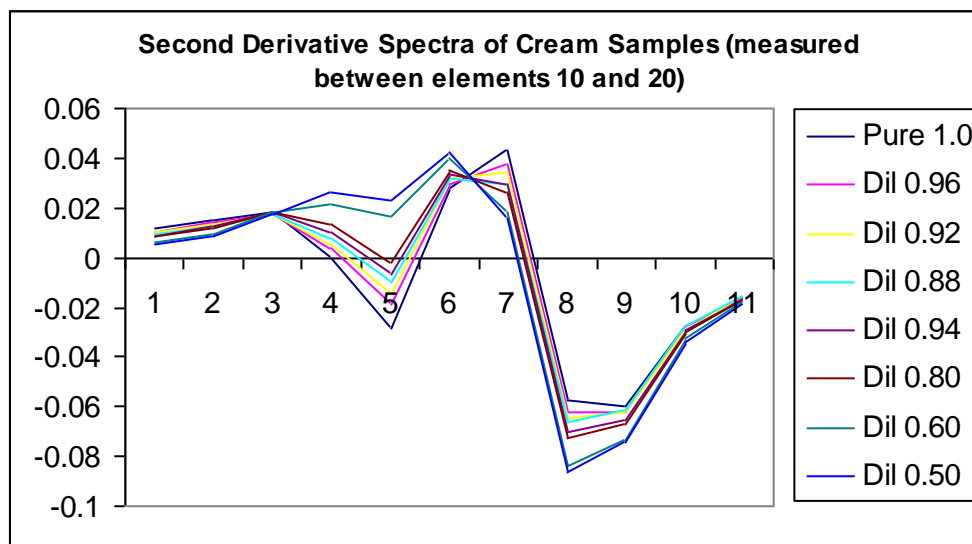


Figure 1: Second derivative cream spectra.

The above results show that the NIT-38 Near Infrared Transmission Analyser is capable of determining the changes of dilution in the samples accompanied with the corresponding shift to higher wavelengths associated with increased hydrogen bonding interactions. It especially shows a reduction in the C-H stretching portion of the spectra with successive dilutions (note changes at element 7), which become important in the determination of fat.

Conclusion:

Based on the evidence provided by the spectral data in figure 1, the NIT-38 is sensitive enough to determine dilution in cream samples. This principle should carry over to the determination of fat in cream, provided a large enough set of calibration samples; with accurate laboratory data is obtained. This set should cover a wide range of fat content to add to the robustness of the calibration.