



Iodine Value in Milk Fat

Introduction

The iodine value is a measure of unsaturation in oils and fatty acids. Measuring the iodine value of milk fat is used for processing of dairy products and quality assurance as well as determining the effects of animal feeding regimes on the degree of milk fatty acid saturation.

Wet chemistry techniques for determining the iodine value are time consuming, costly and require trained staff. Therefore NIR analysers have replaced the traditional method as they can be operated by non-skilled personnel, do not require use any chemicals and a result is obtained in 2 minutes.

The Analyser

The Quant FT-NIR analyser system is a revolution in FT-NIR technology and user friendliness. Designed around new FT-NIR interferometer technology the Quant requires preventative maintenance at only 5 year intervals, has a small footprint, has no hygroscopic optics, incorporates a modular design allowing rapid detector changes and allows the development of unique sample handling accessories.



Figure 1: The Quant FT-NIR analyser

Liquid samples are analysed in 8mm vials that are placed in a heated sample holder.



Figure 2: Heatable liquid/oil vial holder

Calibration

The Quant is calibrated against the certified Wijs method for determination of iodine value.

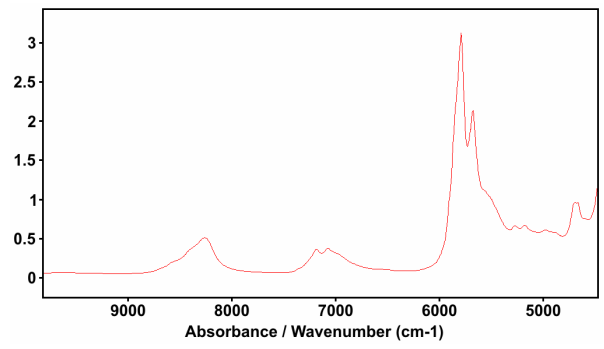


Figure 3: Typical FT-NIR spectrum of milk fat

The NIR region contains both combination and overtone information. The most sensitive band for calibration of iodine value is the C-H 2nd overtone. In order to compensate for small pathlength variations in the 8mm glass vials, all spectra were pre-processed using a thickness correction. A baseline correction was also applied on the spectra. A Partial Least Squares (PLS) model was developed based on the analytical and spectral data.

Calibration Performances

38 milk fat samples with different iodine values were measured in glass vials. Table 1 shows the performance of the calibration developed for iodine value. A repeatability test was performed measuring the same sample 10 times and calculating the standard deviation of these measurements.

Property	Range %	NIR SECV	Repeatability
Iodine Value	29.0 - 45.0	0.4	0.1

Table 1: Performance of the milk fat calibration

Conclusion

The Quant is an FT-NIR analyser that can be configured for liquid measurements. The iodine value in milk fat is obtained in less than two minutes. The system can also be calibrated for other constituents, such as Trans content, %FFA and moisture. This eliminates individual analysis on each constituent and saves on manpower, training and time. The rapid analysis benefit, in combination with highly repeatable measurements, reduces process fluctuations.

The same calibration can also be used for the determination of the iodine value in butter oil.