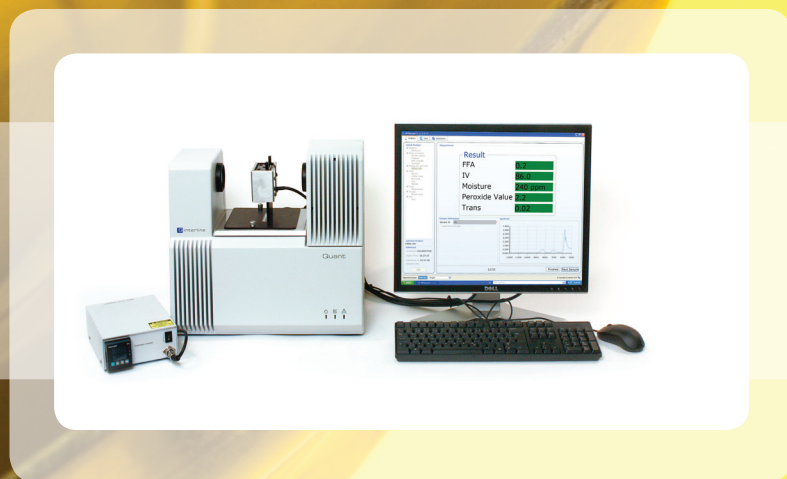


Application Note

Edible Oils and Fats



Introduction

NIR analysis can quickly and cost-efficiently measure components such as Iodine Value (IV) %Trans, FFA, OH, water, acid value, saponification value and oxidation. The chemical analysis is time consuming and too costly, whereas the analysis time with this NIR analyser is only one minute after the sample has reached constant measurement temperature. The analyser can be placed in the production area and can be operated by plant personnel.

Analyser: LipidQuant

The LipidQuant is based on the latest generation FT-NIR technology and has the following main features:

- Cutting edge spectral performance and best signal to noise ratio on the market
- Very easy to operate and maintain
- Optimised software package with InfraQuant and Horizon QI
- Very low maintenance costs. The LipidQuant has no scheduled maintenance and the light source has an expected lifetime of 10 years.

The sample is analyzed by transmission measurement in inexpensive glass vials, which are disposed off after analysis

Analysis:

The oil to be analysed is poured into a glass vial. The vial is placed in the heated vial holder to obtain the desired analysis temperature. When the sample has reached the right temperature the sample is analysed and the result is obtained in less than a minute.

See a video presentation of the LipidQuant on our homepage: www.q-interline.com and experience how easy it is to perform the analysis on the LipidQuant.

Calibration

The LipidQuant can be used with either customised calibrations, optimised to the customer's own products, or with global models from ABB. The global IV models are calibrated against the certified Wijs method for determination of IV and a capillary GC method for %Trans. A typical FT-NIR spectrum of edible oil can be seen on the cover of this application note. The NIR region contains both combination and overtone information. The most sensitive band for calibration of IV and %Trans is the C-H 2nd

overtone. In order to compensate for scattering effects and small path length variations, all spectra are pre-processed using normalisation, baseline correction and mean centring. Partial Least Squares (PLS) models were developed based on the analytical and spectral data.

To obtain the highest accuracy different models were developed for different intervals (see table 1).

Calibration Performances – global models

The global IV and %Trans calibrations are based on more than 1200 samples from all over the world. The different types of oils and fats are:

Canola, Cocoa Butter, Palm Kernel, Corn, Milk Fat, Coconut, Crude Tallow, Palm Olein, Olive, Beef Tallow, Cottonseed, Sunflower, Palm Stearin, Rapeseed, Fish, Soybean, Castor, Linseed, Crude Palm, Margarine Blend, Walnut, Almond Safflower.

Property	Range	SEP	Repeatability
IV	0-190	0.25-0.82	0.08-0.15
%Trans	0-15	0.7	0.1
	15-60	1.6	0.6
Moisture %	0-0.5	0.05	0.01
Acid	150-450	0.5-1.1	0.12
FFA%	0.05-5.0	0.12	0.03

Table 1: Performance of global calibrations.

Conclusion

The LipidQuant FT-NIR analyser is designed for liquid measurements. Iodine Value (IV), %Trans, FFA, moisture, acid value, saponification value and oxidation can be measured in edible oils and fats in less than one minute. It is a very robust method for rapid quality control.

The analyser can be operated with global models from ABB or with customised models for specific customer products. The latter are easy to optimise and maintain, since the models become a property of the customer.