

Biofuels production:

Real time non-destructive analysis using portable NIR

By Ian Laidlaw, Analytik Ltd

From characterisation of oil content of soybeans and other crops, to quantification of key parameter levels in Biofuels processing and quality analysis of final product, the use of near-infrared (NIR) spectroscopy is rapidly increasing throughout the growing Biofuels industry. The escalating use of NIR is directly attributable to the operational convenience and speed of analysis, combined with the non-destructive and reliable nature of the technique.

NIR can reliably and accurately quantify levels of many key parameters in raw fuel material, including:

- Moisture
- Glycerin
- Fatty acid ethyl esters (FAEEs)
- Fatty acid methyl esters (FAMEs)

NIR is ideally suited to the measurement of combination and overtone absorptions of C-H, O-H, and N-H, bonds, common in nearly all organic systems. The near-infrared technique is, therefore, applicable to almost all qualitative (identification) and quantitative (concentration) analyses of organic systems.

By using NIR to measure biolipid parameters, processors can make the necessary adjustments during the process to account for variations in levels of moisture and Free Fatty Acids (FFAs).

Through precision measuring of moisture prior to purification, the necessary amount of drying agent and/or the correct timing to heat the biolipid (oil or fat) to remove free water can be assessed more accurately. Any remaining water in the process can promote the saponification reaction and inhibit the transesterification reaction.

After purification, NIR can be used to measure Free Fatty Acid (FFA) content. By measuring FFA, process engineers can more accurately control the amount of base (typically NaOH) required for the neutralisation of the FFA, therefore greatly increasing production quality, and eliminating unnecessary NaOH waste.

Extreme performance whatever the conditions – ASD's truly portable LabSpec[®] VIS/NIR systems (see Fig. 1) have gone the distance to provide research laboratory quality data wherever and whenever it is needed.



Fig. 1 – ASD LabSpec[®]

Benefits of LabSpec[®] VIS/NIR Technology include:

- Flexible system configurations for portable, laboratory, and on-line analysis
- Rugged and robust
- Real-time analysis for process control
- Simultaneous determination of multiple components per measurement
- No sample preparation
- Precise and accurate
- Simple operation
- Non-destructive - no waste or pollution

Note: LabSpec[®] spectrometers can provide coverage of the Visible Spectral Region allowing colour analysis to also be utilised.

LabSpec[®] - Quantitative and Qualitative Analysis, When You Need it, Where You Need it!

To learn more about the ASD LabSpec[®] and other portable NIR spectroscopy solutions please visit www.analytik.co.uk (UK and Ireland) or alternatively visit www.asdi.com.