



Application Note AN N275

Spectroscopic Solutions for the Biodiesel Industry

Biodiesel is the fuel for the future. Soaring oil prices have encouraged the consumers worldwide to increase their use of biofuels made from natural resources. As an eco-friendly alternative to traditional petroleum diesel, it produces less air pollution, comes from renewable sources, is biodegradable and therefore safer for the environment. It can be blended in any ratio to conventional diesel, from additive levels to 100 percent biodiesel without compromise on quality and loss in engine performance. With biodiesel, any diesel engine can become a renewable fuel engine.

Bruker Optics offers an array of spectroscopic solutions like FT-IR, FT-NIR and TD-NMR to test the different stages of the biodiesel production, from the raw materials to transesterification and final blending. The rapid, non-destructive testing throughout the process leads to less down-time and improved quality, saving you time and money.

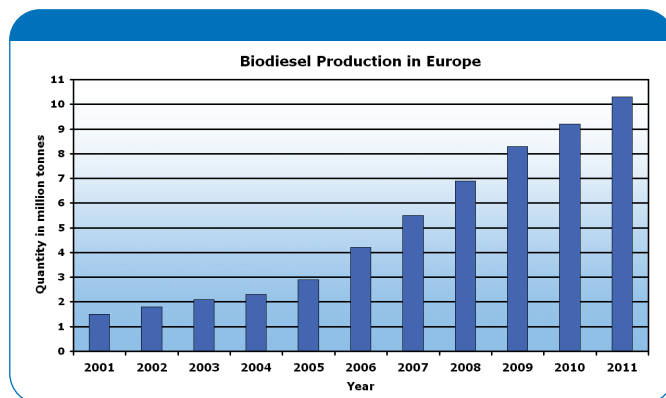
Analyzing incoming raw materials

A variety of feedstock sources such as vegetable oil, recycled cooking oils or animal fats can be converted into biodiesel. The yield of biodiesel from plant oil is however very much dependent on the quality of the incoming goods. If the raw materials contain for example higher concentration of free fatty acids (FFA), moisture, and phosphatides, the esterification process could become troublesome if those interfering components are not removed beforehand. Here, spectroscopy is a fast and accurate method to determine

identity and exact composition of the incoming raw materials - of the oils and fats as well as of grains and seeds, if the crushing process is carried out in-house.

Monitoring the transesterification reaction

Biodiesel is composed of methylesters, which are formed during the reaction of triglycerides with a methanol/catalyst mix. By closely following up the concentrations of the reagents and products, process operators can determine and influence the efficiency and cost-effectiveness of the reaction. On-line spectroscopy can provide this valuable information, automatically and 24/7. Bruker Optics offers also solutions for the methanol recycling process.



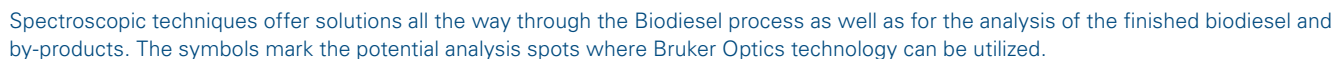
Biodiesel production in Europe with forecast until 2011.

Fuel-grade biodiesel must be produced to strict industry specifications (ASTM D6751, EN14214) in order to insure proper engine performance and avoid problems including clogging of fuel lines, injection systems and filters. Smallest quality deviations, like excess levels of glycerine can lead to costly claims for compensation.

Biodiesel is designed for complete compatibility with petroleum diesel and can be blended in any ratio, from additive levels to 100 percent biodiesel. However, some vehicle

Testing the valuable by-products.

Bruker Optics is the one-stop shop for your analytical bio-diesel tasks - and your peace of mind!



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