Oxidation stability of biodiesel (fatty acid methyl esters, FAME)

Increasing demand for renewable energies

Fuels **from renewable vegetable sources** have seen an impressive increase in use. Unlike fossil fuels, biogenic fuels neither contribute to the accumulation of CO2 in the atmosphere nor to global warming. In addition, alternative fuels such as biodiesel are biodegradable and thus less environmentally harmful.

What is biodiesel?

Fatty acid methyl esters have gained considerable economic importance as alternative fuels. Also known as **biodiesel or FAME (fatty acid methyl esters)**; they are usually obtained from oil seeds and are mainly used in their pure form or mixed with conventional diesel fuel in the transport sector.

Oxidation stability as a quality criterion for biodiesel

Transestrification of vegetable oils with methanol produces the methyl esters of the fatty acids (together with glycerol as a byproduct). These have only a limited shelf-life as they are slowly oxidized by atmospheric oxygen. The resulting oxidation products can cause damage to combustion engines. This is why oxidation stability is an important quality criterion for biodiesel, which needs to be regularly determined during production. With the **873 Biodiesel Rancimat** this determination can be carried out quickly and simply. Oxidation can be delayed by adding antioxidants. The 873 Biodiesel Rancimat can also be used to determine the effectiveness of the antioxidants.

International Standards on Biodiesel Quality

The oxidation stability of fatty acid methyl esters has been included in various test methods as a standard parameter used to define the minimum quality requirements of biodiesel:

- EN 14214 «Automotive fuels – Fatty acid methyl esters (FAME) for diesel engines – Requirements and test methods»
- EN 14112 «Fat and oil derivatives – Fatty acid methyl esters (FAME) – Determination of oxidation stability (accelerated oxidation test)»
- EN 15751 «Automotive fuels – Fatty acid methyl esters (FAME) fuel and blends with diesel fuel –Determination of oxidation stability by accelerated oxidation method»
- ASTM D6751-06b «Standard specification for biodiesel fuel blend stock (B100) for middle distillate fuels»

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