

Qualification of used cooking oil for recycling using the trace SN cube

Vegetable oil recycling is increasingly being carried out to produce a vegetable oil fuel. Used cooking oils can be refined into different types of biofuels used for power generation and heating.

The combustion method followed by the detection of nitrogen as N_2 using a thermal conductivity detector (TCD) is a very common method for nitrogen determination in food products. This method is not suitable for cooking oils, since they generally contain very little nitrogen (< 10 mg/kg), which is below the lower detection limit of the TCD.

Alternatively, after combustion of the sample, the nitrogen can be analyzed as NO using a chemiluminescence detector. This technique is utilized in the trace SN cube and enables a detection limit below 0.06 mg/kg.

Different cooking oils were analyzed with the trace SN cube. All samples were analyzed four times with 80 μ l injection volume. The average nitrogen content and the absolute and relative standard deviation of the measurements are presented below.

INSTRUMENT:

trace SN cube

DETAILS:

carrier gas: argon / oxygen

sample: 80 μ l cooking oil

SAMPLE	N [mg/kg]	SD [mg/kg]	RSD [%]
rape seed oil	1.07	0.01	0.85
sunflower oil	1.45	0.03	2.38
linseed oil	144	0.68	0.48
olive oil	2.61	0.09	3.52
safflower oil	0.76	0.02	2.74



All cooking oils, except linseed oil, show a nitrogen content below 3 mg/kg. The repeatability of the measurements is indistinguishable from synthetic standards or mineral oils.

A concern of nitrogen analysis using the NO method is the possible matrix-dependent transformation of nitrogen to NO. However, no matrix dependency was found in the analyzed samples.

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