

Abstract

Recently the use of biofuels has increased following new trends in traffic. Biocompounds used for such purposes have significant effect on physico-chemical characteristics of the fuels and consequently they affect the fate of the fuels in the environment. For these reasons the changes of fuel characteristics attracted a high regard. There is also a need for a development of analytical methods useful for biofuel studies.

This work is focused on the optimization of the headspace injection method for GC/MS with special regard on the use of a liner in the injector VARIAN 1077, time of sample incubation, temperature gradient and sample volume. Using the optimized analytical method a higher solubility of fuels in water after the addition of biocompounds was measured. In case of diesel fuel the solubility increased about 4 - 20 % depending on the amount of methyl ester of rape oil used. 23 - 289 % increase to solubility was observed with petrol and similarly to the diesel fuel the solubility increase depended on the amount of ethanol and MTBE added to the fuel.

Higher mobility of biofuels compared to normal untreated fuels was also observed in this work. In case of viscose diesel fuel the effect on fuel mobility was delayed in time compared to petrol. No effect of biocompounds on the natural biodegradation of biofuels in soil was detected. Biofuel degradation studies with different soils showed that the fuels were degraded faster in the soils with higher content of organic carbon. According to the results of PLFA analysis, the higher organic carbon content in soil corresponded to higher microbial biomass potentially responsible for the fuel biodegradation.

Keywords

Biofuels, headspace, biofuel solubility, biodegradation, biofuel mobility