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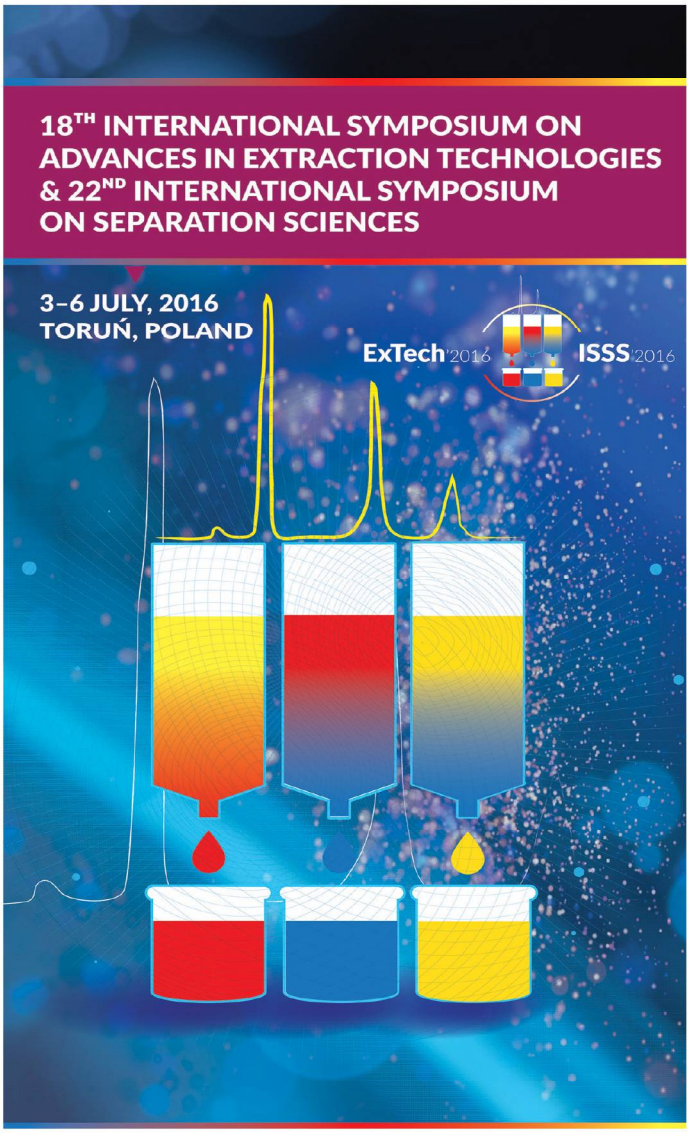

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Abstract Book

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Quantification of BTEX in soil by SPME-GC-MS using standard addition and internal standard approaches

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Solid-phase microextraction (SPME) is a promising sample preparation approach for quantification of volatile organic contaminants (VOCs) in soil. However, accuracy of VOCs quantification by SPME is impeded by matrix effects that can be controlled by standard addition (SA) [1]the fibre was desorbed in the Gas Chromatograph (GC and internal standard (IS) [2]efficient, and inexpensive analytical methods. The goal of this study was to develop a method for quantitation of the most stable transformation product of rocket fuel, i.e., highly toxic unsymmetrical dimethylhydrazine \u2013 1-methyl-1H-1,2,4-triazole (MTA methods. To improve accuracy of BTEX quantification by SPME, water is added to the sample prior to extraction [1]. However, the addition of water may enhance extraction of non-polar matrix components leading to an enhanced competition for SPME adsorption sites and decreased accuracy. The aim of this research was to compare SA and IS approaches for quantification of BTEX in soil without water addition prior to extraction. Soil samples were equilibrated at extraction temperature (40 °C) for <6 h after spiking BTEX standards in methanol. According to the obtained results, benzene-d6 cannot be recommended as IS for quantification of BTEX because relative responses of analytes and IS are different for various types of soil samples even when using very effective 85 μm Carboxen/polydimethylsiloxane fiber. However, benzene-d6 may be used to (1) improve precision of SA approach by addition to every analyzed sample at the same concentration, and (2) to decrease the number of samples which must be analyzed for achieving the proper accuracy. In this case, relative responses of analytes to IS should be plotted versus added analyte concentration. When using this approach at high analyte concentrations (>50 μg/kg), competition between BTEX and IS may lead to the decrease of IS response and decrease o accuracy. This problem may be solved by using absorptive fiber coatings or a simple standard addition approach for calculations.

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References: [1] M. Llompart, K. Li, M. Fingas, Headspace solid phase microextraction (HSSPME) for the determination of volatile and semivolatile pollutants in soils, Talanta. 48 (1999) 451–459.
[2] S. Yegemova, N. Bakaikina, B. Kenessov, J. Koziel, M. Nauryzbayev, Determination of 1-methyl-1H-1,2,4-triazole in soils contaminated by rocket fuel using solid-phase microextraction, isotope dilution and gas chromatography – mass spectrometry, Talanta. 143 (2015) 226–233.