

## **Determination of polycyclic aromatic hydrocarbons in water by magnetic nanoparticles-solid phase extraction**

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Polycyclic aromatic hydrocarbons (PAHs) are colloquial descriptors that refer to different forms of organic compounds. PAHs are highly toxic pollutants that occurs in the environment exclusively as a result of human activity. Interest in PAHs measurement has been increased after the ecotoxicological effects of these compounds to non-target species became known around the 1980's<sup>1</sup>. A new analytical procedure has been developed for the determination of PAHs compounds in water samples. The method is based on the use of magnetic nanoparticles for the collection of PAHs compounds from water samples, followed by hexylation of the target matrices using a Grignard reagent and quantification by high-performance liquid chromatography. The solid phase nanoparticles concept replaces conventional solid and liquid phase extractants with nanosized particles that can be readily dispersed in aqueous samples. Analyte partitioning between the solid and liquid phases occurs as the solid moves through the sample as a colloidal sol. By tailoring the size of the particles to approximately 250 nm diameters, they can be readily recovered together with the analytes by a magnet. Recoveries of all PAHs compounds ranged from  $90.2 \pm 2.1$  -  $96.6 \pm 3.7$  in natural water and from  $913 \pm 3.2$  -  $98.1 \pm 1.7$  in sea water samples ( $n=9$  in both samples). The detection limit (the lowest detectable PAH concentration that can be reliably distinguished from zero PAHs concentration with 95% confidence) obtained was 1.5 ng /l. Repeatability (determined by analysis of 0.02 µg/ml of each compound six times consecutively) and reproducibility (determined by analysis of each compound µg/ml six times on three different days) were well below 8 % when the instrument was in routine operation. The proposed method will be very efficient in environmental monitoring programs of contaminants.

[1] E. Węgrzyn, S. Grześkiewicz, W. Popławska, and B. K. Głód Meat and Fat Research Institute, ul. Jubilerska 4, 04-190 Warszawa, Poland, modified analytical method for polycyclic aromatic hydrocarbons, using sec for sample preparation and rp-hplc with fluorescence detection. Application to different food samples