HOLLOW FIBER LIQUID-PHASE MICROEXTRACTION FOR PRECONCENTRATION OF PHTHALATES

A method of extraction of phthalates from water samples, based on the preconcentration of target compounds using hollow fiber liquid-phase microextraction, has been developed for gas chromatographic determination with flame ionization detector. Using this technique, target analytes are extracted from aqueous samples, through a supported liquid membrane of a porous polypropylene hollow fiber, into acceptor solution placed inside the lumen of the hollow fiber. After extraction, the acceptor solution is directly subjected to chromatographic analysis. The parameters of this microextraction procedure such as extraction solvent, agitation of the sample, salt addition and extraction time have been optimized. The results showed, that toluene was the most suitable extraction solvent because the highest analytical responses were obtained. In addition, toluene combined low loss of solvent during the extraction process and, compared to other tested organic solvents, it had the ability to be easily immobilized in the pores of the membrane. An agitation of the sample enhanced the extraction, and the analytical responses reached maximum at agitation speed 850–950 rev./min. Addition of inorganic salt leads to decrease of the analytical responses of phthalates, except in the case of the most polar dimethylphthalate. The extraction was more effective with increasing of exposure time, and optimal time was used 20 min. This time was chosen because of solvent loss was higher with growth of the extraction time. Using the optimum microextraction conditions the enrichment factors for phthalates were 69–107 and limits of detection reached 8–11 μg/l. During the concentration range from 40 to 200 μg/l the repeatability of the method was below 7–9%.

Key words: hollow fiber liquid-phase microextraction, phthalates, gas chromatography.