Abstract

Perfluorinated compounds (PFCs) are considered as persistent organic pollutants. Their extensive use in various products leads to increase of their occurence in surface and ground water, soil, air and, generally, in the global ecosystem. In this diploma thesis, method for detection and quantification of 19 perfluorinated compounds was developed. This method was used for analysis of real drinking water and sewage sludge samples from Czech Republic. It is based on pre-extraction step and consecutive liquid chromatography with mass spectrometry, using negative chemical ionization (LC-MS). We developed a method for analysis of water samples, using solid-phase extraction (SPE). Using this method, concentrations of PFCs in 8 samples of drinking water from Czech Republic were evaluated. Total concentration of analyzed PFCs was 4 – 23 ng/L. Processing of sewage sludge samples using accelerated solvent extraction (ASE) showed matrix effect, which influenced ionization and led to false positive/negative results. For supression of the matrix compounds, we used SPE Envi-Carb columns. Using this optimised method, 23 sewage sludge samples from different locations in Czech Republic were analyzed. The most represented PFC in the environment, perfluoroctane sulfonate (PFOS), was detected in concentrations 5 – 386 ng/g. Total concentration of C4-C14 perfluorinated carboxylic acids in sewage sludge samples reached 126 ng/g. The highest concentrations of PFOS and PFOA were connected with water treatment plants in vicinity of industrial production.

Key words: fluorinated compounds, PFOS, determination, monitoring