

Abstract

There are many substances of natural and anthropogenic origin at present called endocrine disruptors which may influence endocrine system of animals and humans. A complex analysis of endocrine disruptors in environmental samples is important for knowledge of their behaviour in living environment and for their risk estimation.

A complex method has been developed in this thesis for an analysis of bisphenol A, 17 α -ethinylestradiol, irgasan and 4-nonylphenol in activated sludge and soil involving ASE extraction, sludge extract cleaning with silicagel and GPC and subsequent GC/MS and HPLC/UV samples quantification. These final extraction conditions of ASE have been settled: extraction mixture DCM:acetone (3:1 v/v), temperature 60 °C, pressure 1700 psi, 3 extraction cycles. ASE yield during soil extraction has been settled in range of 93,0-116,3 % with RSD 2,7-5,7% by HPLC/UV analysis and 93,3-106,0 % with RSD 9,3-15,6 % by GC/MS analysis. The whole method yield including the cleaning steps has been settled in range of 78,2-111,2 % with RSD 4,1-10,6 % in HPLC/UV quantification and 74,6-88,9 % with RSD 3,7-18,2 % in GC/MS quantification.

The method application on the artificially contaminated sludge and soil samples analyzed after five months of storage has provided the yield of all analysts in range of 48,7-69,5 % with RSD 2,2-15,7 % in GC/MS soil analysis and 56,2-66,5 % with RSD 9,4-15,2 % in GC/MS sludge analysis.

By the method application on a real sample of activated sludge from a waste water treatment plant in the Czech Republic, bisphenol A has been analyzed in concentration 0,28 $\mu\text{g/g}$ in dry sludge, irgasan 0,85 $\mu\text{g/g}$ in dry sludge, 4-nonylphenol 0,12 $\mu\text{g/g}$ in dry sludge, 17 α -ethinylestradiol has not been detected in the real sludge sample.

Keywords: Endocrine disruptors, Bisphenol A, 4-nonylphenol, Irgasan, 17 α -ethinylestradiol, Activated sludge, Environmental samples