

SUMMARY

This paper attempts to assess the influence of municipal landfill sites on the quality of groundwaters located on their premises. The doctoral dissertation consists of literature and experimental study.

The literature study presents information on functioning of the municipal landfill sites, with a particular focus on the changes that take place in the landfill, the amount and composition of leachate, migration of waste from the landfill, as well as legal regulations concerning such construction facilities. The second chapter characterises selected compounds from the emerging contaminants (ECs) group. Particular attention was put on ECs sources, pathways and ECs receptors in the environment and their impact on living organisms. Literature was also reviewed for occurrence of these analytes in landfill leachate and groundwaters, as well as for issues resulting from ECs determination in environmental samples.

The experimental part consists of eight chapters. In the beginning three Municipal Solid Waste landfill sites were described (ZUOK in Hryniewicze, SOK in Uhowo and ZPiUO in Czerwony Bór), where research material was collected (landfill leachates and groundwaters). All of these facilities store waste other than hazardous or neutral and are located in Podlaskie voivodship, however, they differ in characteristics (i.a. type of insulation method used, age).

The following chapters describe used procedures as well as their analytical characteristics. Ultrasound-assisted emulsification microextraction (USAEME) and solid phase microextraction (SPME) techniques were brought closer, both combined with gas chromatography with mass spectrometry (GC-MS) were used to extract and determine analysed compounds of emerging contaminants group in landfill leachates and groundwaters. Also, procedures used to measure physiochemical parameters in analysed environmental samples were introduced. The next step of this thesis was to conduct a series of determinations of compounds from personal care products (methylparaben, ethylparaben, propylparaben, butylparaben, benzophenone-2, benzophenone-3, 4-methylbenzylidene camphor, N,N-diethyl-*m*-toluamide, triclosan), surfactants (4-*t*-octylphenol, 4-*n*-nonylphenol), pharmaceuticals and hormones (diclofenac, clotrimazole, estrone, β -estradiol and diethylstilbestrol) and plasticizers (bisphenol A, dimethyl phthalate, diethyl phthalate, dipropyl phthalate, diisobutyl phthalate, di-*n*-butyl phthalate and bis-2-ethylhexyl

phthalate) in landfill leachates and groundwaters. A series of determinations of basic physicochemical parameters was carried out (such as pH, electrolytic conductivity, chemical oxygen demand, 5-day biochemical oxygen demand, total suspended solids, total organic carbon, dissolved organic carbon, total nitrogen and total dissolved nitrogen, total phosphorus, orthophosphates) in examined environmental samples.

Based on obtained concentration values of emerging contaminants in groundwaters, it was possible to determine environmental risk connected with presence of these compounds in analysed matrices for three trophic levels (fish, invertebrate, algae and cyanobacteria).

The last step of this research was the evaluation of the impact of analysed municipal landfill sites on the quality of groundwaters. The influence was determined on the basis of both the concentration of ECs group compounds in waters flowing into the landfill and flowing out of its premises, and basic physiochemical parameters using two water quality indicators: landfill water pollution index (LWPI) and Nemerow index (PI).

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