

Methodological Approach for the Prioritization of Different Micro-Contaminants as Potential River Basin Specific Pollutants in the Upper Tisza River Watershed

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Abstract : Taking into consideration the huge number of chemicals released into environment compartments a proper environmental risk assessment is difficult to predict due to the gap of legislation and improper toxicological assessment of chemicals compounds. In Romania as well as in many other countries from Europe, the chemical status of the water body is characterized taking into consideration the Water Framework Directive (WFD) and the substances listed in Annex X. This Annex includes 45 substances from different classes of organic compounds and heavy metals for which AA-EQS and MAC-EQS have been established. For other compounds which are not included in Annex X, different methodologies to prioritize chemicals for risk assessment and monitoring has been proposed. These methodologies take into account Predicted No-Effect Concentrations (PNECs) of different classes of chemicals compounds available from existing risk assessments or from read-across models for acute toxicity to the standard test organisms such as *Daphnia magna* and *Selenastrum capricornutum*. Our work presents the monitoring results of 30 priority substances including polyaromatic hydrocarbons, pesticides, halogenated compounds, plasticizers and heavy metals and other 34 substances from different classes of pesticides and pharmaceuticals which are not included on the list of priority substances, performed in the Upper Tisza River Watershed from Romania and Ukraine. The obtained monitoring data were used for the establishment of the list of more relevant pollutants in the studied area and to establish the potential river basin specific pollutants. For this purpose, two indicators such as the Frequency of exceedance and Extent of exceedance of Predicted no-Effect Concentration (PNEC) were evaluated. These two indicators are based on maximum environmental concentrations (MECs) of priority substances and for other pollutants is use statistically based averages of obtained measured concentration compared to the lowest PNEC thresholds. From the obtained results it can be concluded that polyaromatic hydrocarbon such as Fluoranthene, Benzo[a]pyrene, Benzo[b]fluorathene, benzo[k]fluoranthene, Benzo(g,h,i)perylene, Indeno(1.2.3-cd)-pyrene, heavy metals such as Cadmium, Lead and Nickel can be considered as river basin specific pollutants, their concentration exceeding the Annual Average EQS concentration. Other compounds such as estrone, estriol, 174- β estradiol, naproxen or some antibiotics (Penicillin G, Tetracycline or Ceftazidime) should be taken into account for a long monitoring, in some cases their concentration exceeding PNEC. Acknowledgements: This work is performed in the frame of NATO Sfp Programme, Project no. 984440.

Keywords : prioritization, river basin specific pollutants, Tisza River, water framework directive

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