Abstract

Identification of Emerging Contaminants in the Estonian Aquatic Environment †

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Internationally agreed long-term monitoring indicators do not consider the risks of new synthetic substances. Screening a wide range of chemical substances gives early identification data about substances that exceed ecotoxicological effect values in the aquatic environment. This work summarizes the pollutants found in the Estonian water environment, which can cause both short-term and long-term effects on aquatic life. Data have been collected within the period of 2016–2023 in the framework of various projects, including Estonian national environmental monitoring [1]. Information on substances is collected both with substance-group-based multi-methods (ca 300 substances using HPLC/MS; GC/MS), with wide-scope target screening (2500 substances using LC-ESI-HRMS and GC-APCI-HRMS), and with non-target suspect screening (more than 65,000 compounds in each of the samples including their semi-quantification using LC-ESI-HRMS) [2]. In the screening results, both completely new substances that were not previously associated with environmental risk and substances that have already been regulated and considered an important risk factor were found. In Estonian waters, 10 substances were found in all sea fish and shellfish samples examined. Five of these substances also exceeded the PNEC value on all samples (5’-Methylthioadenosine; 1-Eicosanol, phosphate, compd. with 2,2’-iminobis[ethanol]; Misoprostol; Butyl acrylate; 1-(4-dodecyl phenyl)-2-hydroxy-2-methyl-). PAHs and PFASs still pose an environmental risk. The screening identifies regional peculiarities. Not all substances are spread all over the Baltic Sea. Some have significant effects only in Estonian waters. Screening studies of man-made substances found in the environment with the latest analytical methods and knowledge, taking into account the latest scientific developments, will be necessary in the future in order to prevent long-term environmental problems. The presence of substances in the environment depends on the properties of the substance, and therefore it is important to monitor different matrices (water, sediment, biota).

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References

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