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Analysis of pharmaceutical residues from the Danube river in the period 2021-2023

Abstract: The continuous development of the pharmaceutical industry and the high consumption of pharmaceutical substances can represent a real problem for the environment. Continuous discharges of pharmaceutical residues into the aquatic ecosystem from municipal wastewater treatment plants, animal farms, and effluents from pharmaceutical industries contribute to the contamination of water, sediments, and biota with this class of emerging pollutants. According to worldwide statistics, in 2023, the pharmaceutical industry ranked 4th in the ranking of the most profitable industries, a fact that requires continuous monitoring regarding the analysis of this class of emerging pollutants in aquatic ecosystems. The main objective of this study is to investigate the presence of different classes of pharmaceutical substances in surface waters sampled from the Danube River in the period 2021-2023 using Liquid chromatography coupled with high-resolution mass spectrometry. The obtained results highlighted the fact that different classes of pharmaceutical substances were identified in the analyzed water samples with the following frequency: Caffeine with a frequency of 100%, Carbamazepine with a frequency of 95%, Metformin with a frequency of 87%, Sulfamethoxazole with a frequency of 60%, Trimethoprim with a frequency of 60%, Clindamycin with a frequency of 42%, Ketoprofen with a frequency of 39%, Diclofenac with a frequency of 25% and Clarithromycin with a frequency of 20%.

Biography: Valentina – Andreea Călmuc defended her doctoral thesis on September 20, 2024 at the "Dunărea de Jos" University of Galați, Romania. She is currently a research assistant within the REXDAN Infrastructure where she is the head of the chromatography laboratory and her main research field is the analysis of pharmaceutical compounds from environmental samples. She has published 16 papers in Web of Science indexed journals. Until now, she has been part of the implementation team of 13 national and international projects.