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[1]Stefania-Adelina Milea, [1,2]Mihaela Timofti, [1,2]Catalina Iticescu, [1,2]Puiu Lucian Georgescu

[1]Dunarea de Jos University of Galati, REXDAN, Romania
[2]Faculty of Sciences and Environment, Department of Chemistry, Physics and Environment, "Dunarea de Jos" University of Galati, Galati, Romania

Individual and Combined Behaviors of Persistent and Emerging Pollutants in Sediments

As the possible health risks of historical and contemporary industrialization have come to light, public concern over environmental pollution has increased dramatically. The behavior and distribution of hydrophobic compounds in watery environments have drawn much attention due to their toxicity, persistence, and bioaccumulation potential. Pesticides, polycyclic aromatic hydrocarbons, polychlorinated biphenyls, and other hydrophobic substances have a strong affinity for binding to organic materials in soil and sediment. In aquatic systems, hydrophobic substances have high partition coefficients onto suspended and bottom sediments, which has a major impact on their distribution, fate, and impacts. Considered to be storage spaces for the accumulation of pollutants from the water column, sediments can vary in structure and content. Sediment is a complex matrix composed of both organic and inorganic components, such as organic matter, clay minerals, and other particles. The analysis of complex matrices necessitates a pragmatic approach, given that matrix effects are multidimensional and subject to a range of influencing factors. This paper reports an integrated framework for the extraction, determination, and quantification of 21 organochlorine pesticides, 16 polycyclic aromatic hydrocarbons, and 6 polychlorinated biphenyls. The extraction of the previously mentioned substances from the freeze-dried sediment was carried out by slightly modifying the well-known QuEChERS method. The target compounds were identified and quantified by gas chromatography combined with a triple-quadrupole mass detector. The experiment's simultaneous investigation of the three distinct classes of contaminants made it easier and better to separate and quantify each of the compounds. This strategy promotes greater analytical efficiency, the evaluation of a comprehensive contamination profile, and the comparability between different contaminants. To further understand these chemicals' effects on ecological and human health, more frequent and comprehensive monitoring of aquatic environments is necessary.

Biography

Milea Ștefania-Adelina has completed her PhD in the Food Engineering field at the age of 30, at Dunarea de Jos University of Galati. She is now a research assistant at REXDAN Research Infrastructure. She studies different types of contaminants from various complex matrices such as environmental samples, water, air, biota, food, etc., using advanced chromatography techniques. She has published more than 30 papers in reputed journals on current, interesting, and multidisciplinary topics.

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