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Rapid Lab-Scale Microwave-Assisted Extraction and Analysis of Anthropogenic Organic Chemicals in River Sediments

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ABSTRACT

An Ethos EZ Microwave Lab Station is employed in the development of a robust and efficient microwave extraction method for organic contaminants of anthropogenic origin in river sediments. The extraction method is designed for a small, representative set of target compounds encompassing a range of physicochemical properties. Listed in order of gas chromatography elution they are para-cresol, indole, 4-tert-octylphenol, phenanthrene, triclosan, bisphenol-A, carbamazepine, and benzo [a] pyrene. The sediments samples are extracted wet, which reduces preparation time, and allows the ambient moisture of the sediments to aid in microwave energy absorption and the extraction process. The microwave can hold up to 12 samples that can be simultaneously extracted allowing for rapid sample preparation. Utilizing the pressurized vessels, microwave energy, and a unique mixture of three organic solvents allows for multiple samples to be extracted rapidly with minimal solvent consumption. The final extracts are quantified by gas chromatography/mass spectrometry. Recoveries of the 8 target compounds in sediment range from 49% to 113%, and method detection limits range between 14 and 114 μg kg^{-1}, which are comparable with other more time consuming methods.

KEYWORDS

Microwave Assisted Extraction, Para-Cresol, Phenanthrene, Bisphenol-A, Triclosan, Ben-zo[a]pyrene

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