**MULTIPHASE DISTRIBUTION OF PERFLUOROALKYL ACIDS IN A PLAIN RIVER NETWORK AND THEIR REMOVAL BY SUBMERGED MACROPHYTES**

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Perfluoroalkyl acids (PFAAs) in aquatic environment have merged as global concerns due to their abundance, persistence, bioaccumulation, and toxicity. This study aims to explore the multiphase distribution of PFAAs on dimension of plain river network and PFAA removal by submerged macrophytes. In present study, a typical plain river network was selected to investigate the distribution of PFAAs in multi-matrices, including sediment, suspended particles, colloidal phase, and soluble phase. 14 of PFAAs were prevalently detected with perfluorooctanoic acid and perfluorooctane sulfonic acid predominated. PFAAs were more likely to transport via dissolved phase and accumulated into sediment. Colloids carried 45.6–62.6% of PFAAs in overlying water, suggesting their crucial role in preloading PFAAs. Interactions between colloids and PFAAs were further excavated, and fulvic-like substances in colloids were identified as the most crucial factors affecting PFAA variability. The capture of PFAAs (except perfluorohexanoic acids) by colloids was significantly correlated with the perfluoroalkyl chain length (*r* = 0.975, *p* < 0.001). Moreover, the removal capacity, pathways, and mechanisms of PFAAs from water by typical submerged macrophytes (including rooted *Potamogeton wrightii*, and rootless *Ceratophyllum demersum*) were explored. PFAA removal in treatments with submerged macrophytes were 0.63–22.8% higher than those without macrophytes. PFAAs could be removed via not only sediment sorption or phytoextraction but also by the bioaccumulation of microbiota (especially biofilm). The adsorption/uptake was significantly correlated with the perfluoroalkyl chain length (*p* < 0.05), except for the uptake of biofilms in *C. demersum.* Mass balance underlined considerable contributions of submerged macrophytes and microbial community in removing PFAAs*.* Our results were helpful for understanding the fate of PFAAs in aquatic environment and their linkages with PFAA properties, thus further providing insight into the management and removal of emerging contaminants.