

Pollution Characteristics of PFAS & PFOA in Waters of Poyang Lake Basins, Jiangxi Province

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Abstract

With the rapid development of industry and agriculture, as well as the pharmaceutical industry, a large number of new compounds have been produced and entered into the water environment. The General Office of the State Council issued the Action Programme for the Management of New Pollutants, which clearly defines the concept of new pollutants including the typical representatives such as perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA). In recent years, research findings have shown that new pollutants are frequently detected in urban sewage, source water and drinking water, posing a serious threat to ecological security and the safety of drinking water quality. In this study, surface water samples were collected in Jiangxi Province within Poyang Lake Basins including Gan River, Fu River, Xin River, Rao River and Xiu River during April to June in 2024. Those samples were concentrated and purified through solid phase extraction (SPE) and then analyzed by Ultra-HPLC-MS/MS. Results show that there are certain concentration PFAS & PFOA detected in this studied region, with the total concentration of PFAS (Σ PFAS) and PFOA (Σ PFOA) in surface water ranging from 0.074 ng L⁻¹ to 28.666 ng L⁻¹ and 1.50 ng L⁻¹ to 22.868 ng L⁻¹, and the median value at and 4.87 ng L⁻¹ and 8.34 ng L⁻¹, respectively. The highest concentration was found within Rao river, and the Σ PFAS and Σ PFOA concentrations in the other sites were less than 20 ng L⁻¹. Meanwhile, we also found that the concentration PFAS & PFOA stay steadily due to the difficulty to be degraded by organism. Although the highest concentrations of PFOA and PFOS in the surface water were much lower than their limits in drinking water, the risk assessment showed that both PFOS and PFOA in surface water may pose some risk to aquatic life (RQs>0.1) under high exposure scenarios. Thus, there is urgent need for our government to promote environmental risk management for new pollutants in a coordinated manner, so as to effectively prevent the environmental and health risks of new pollutants.

Keywords

PFAS&PFOA, Poyang Lake Basins, Pollution Characteristics, Risk Assessment