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Occurrence, impact variables and potential risk of PPCPs and pesticides in a drinking water reservoir and related drinking water treatment plants in the Yangtze Estuary†



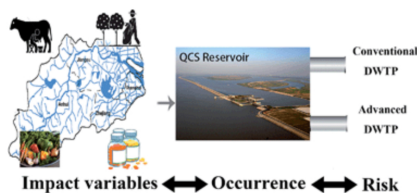
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Abstract

PPCPs and pesticides have been documented throughout the world over the years, yet relatively little is known about the factors affecting their spatial distribution and temporal change in order to know their potential risk to the ecosystem or human health in the future. In our study, 5 PPCPs and 9 pesticides were selected to study their occurrence, impact variables and potential risk in a drinking water reservoir in Yangtze Estuary and related drinking water treatment plants (DWTPs) in China. The detection results showed the presence of PPCPs and pesticides reflected in a large part of croplands and urban and built-up land in the adjacent basin. The discrepancy of concentration among the different PPCPs and pesticides was mainly decided by their application amount or daily usage. Then, the major factors regulating the occurrence of these contaminants in the surface water were found as the living expenditure attributed to food and medicine based on a correlation analysis. Also, the PPCPs were found to negatively correlate to the effectiveness of sewage management. The detection of the PPCPs and pesticides in DWTPs indicated that, except for atrazine and simazine, the removal percentages were increased significantly in advanced DWTPs. Moreover, risk assessment estimated by a Risk Quotient and Hazard Quotient showed that while caffeine, bisphenol A, estrone and simazine were at a high-risk level in the reservoir water, all of the contaminants detected posed no risk to human health through drinking water. It's possible that atrazine could pose a high risk to the ecosystem while simazine could pose a risk to human health in the future considering the increasing expenditure attributed to food.



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