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PHARMACEUTICALS IN WATER CYCLE: A REVIEW ON RISK ASSESSMENT AND WASTEWATER AND SLUDGE TREATMENT

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Abstract

Pharmaceuticals in the environment are considered as emerging contaminants which are particularly persistent and which could represent a threat both for animals and humans following long-term exposure. Pharmaceuticals include, among others, antibiotics, anti-inflammatory drugs, steroid hormones, antidepressants, β-blockers and lipid regulators. Excretion from humans is considered the main source of release of such compounds in the environment. The excreted compounds reach wastewater treatment plants (WWTPs), which demonstrated to be generally ineffective in removing emerging contaminants in the absence of advanced treatments. Due to the importance of the topic, which still represents an issue of great concern, this review analyses the scientific literature with the aim of investigating the role of different sources of release, the fate of pharmaceuticals in WWTPs, their typical levels in the aquatic environment, the estimated risk levels for the aquatic fauna and the potential effects on humans. In the last part of this study, different options to effectively reduce the concentrations of pharmaceuticals in effluents from WWTPs are reviewed and discussed, in order to provide environmental agencies and local administrators with an overview of the advanced treatments that are currently available to mitigate the impact of pharmaceuticals in downstream water bodies.

Key words: emerging contaminants, risk assessment, sewage sludge, treatment options, wastewater

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