

Occurrence of Illicit Drugs in Aqueous Environment and Removal Efficiency of Wastewater Treatment Plants

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Abstract : Illicit drugs are considered as emerging contaminants of concern that have become an interesting issue for the scientific community from last few years due to their existence in the water environment. A number of the literature has revealed their occurrence in the environment. This is mainly due to the fact that some drugs are partially removed during wastewater treatment processes, and remaining being able to enter the environment and contaminate surface and groundwater and subsequently, drinking water. Therefore, this paper evaluates the occurrence of key illicit drugs in wastewater (influent and effluent) samples in 4 wastewater treatment plants across Adelaide, South Australia over a 1 year period. This paper also compares the efficiency of wastewater treatment plants adopting different technologies in the removal of selected illicit drugs, especially in the context of which technology has higher removal rates. The influent and effluent samples were analysed using Liquid Chromatography tandem Mass Spectrometry (LC-MS/MS). The levels of drugs detected were in the range of mg/L - ng/L in effluent samples; thus emphasising the influence on water quality of receiving water bodies and the significance of removal efficiency of WWTPs(Wastewater Treatment Plants). The results show that the drugs responded differently in the removal depending on the treatment processes used by the WWTPs.

Keywords : illicit drugs, removal efficiency, treatment technology, wastewater

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