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Efficiency of WWTP to remove emerging pollutants in wastewater

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Recently some compounds that are extensively used are considered emerging pollutants since are at low concentrations and have been little studied. Pharmaceuticals and personal care products are classified as this kind of pollutants and most of these are excreted through urine or feces and come to end up to treatment plants. Recent studies indicates that pharmaceuticals, personal care products or illicit drugs from Waste Water Treatment Plants (WWTP) are a considerable chemical pollution in surface [1, 2]. The purpose of this study is to determine the removal efficiency for two WWT of Pinedo I and II, Valencia (Spain). After obtaining the results of analysis by an Agilent 1260 HPLC in tandem with a 6410 MS/MS triple quad, a simple mathematical operation with the influents and effluents is performed. This operation consists in subtracted from the influent, the effluent, divided by the result of the influent and this multiply by 100. Results are expressed as a percentage with its 95 % confidence interval (CI).
The influent and effluent of the samples were filtered with a 0.50 μm glass fiber filter of 90 mm by Advantec (Minato-ku, Tokyo, Japan). After filtration, 250ml of this water is extracted through a SPE. SPE was performed with Strata-X 33U Polymeric Reversed Phase (200 mg/6 mL) from Phenomenex. These cartridges were conditioned with 6 mL of methanol and 6 mL of distilled water. Extracts were eluted with 6mL of Methanol and evaporated with compressed air. The residue was reconstituted with 1 mL of methanol–water (30:70, v/v).
The removal efficiencies depend on the type of the compound, these rates remain between 23% and 100%. In some cases, removal efficiency is negative since some compounds are accumulated in the sludge and these have more concentration. Tertiary treatment including UV disinfection could efficiently reduce most of the residual pharmaceuticals below their quantification limits.

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References
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