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REMOVAL EFFICIENCY OF PAHs IN WASTEWATER: STATISTICAL EVALUATIONS WITH CHEMICAL-PHYSICAL INDICATORS

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Abstract

Polycyclic aromatic hydrocarbons (PAHs) are very hazardous compounds. This investigation is the third in a series of three experiments carried out in conventional wastewater treatment plants with regard to PAHs. The first experiment regarded the analysis of PAHs in a municipal wastewater sewage system and in the wastewater treatment plant (WWTP) effluent, followed by a comparison between the observed removal efficiency and FATE model (US-EPA) predictions. The second experiment was carried out in the same WWTPs and showed no evident degradation of PAHs after applying a mass balance estimation between the various types of sludge. The aim of the third experiment described in this paper, was to study PAHs in a more extensive area of wastewater, (with a higher population density and with higher PAH values in the wastewater). The evaluations were carried out in different periods of the in order to estimate the removal efficiency of PAHs. The concentrations measured were well below the legal limits, however in a few cases a statistical analysis was carried out in order to identify possible correlations between various chemical-physical indicators, such as $\log K_{ow}$ and $\log K_H$, and PAH removal yield, verified at different stages of the different treatment plants. A strong correlation resulted between the mechanical treatment removal yield and $\log K_{ow}$ and a very good correlation between yield measures after secondary sedimentation and $\log K_H$. This is because the process is strongly influenced by volatilization induced by air insufflation in the oxidation reactor.

Key words: environmental indicators, PAHs, removal, wastewater treatment plant

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