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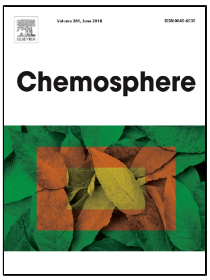

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Fate and impact of phthalates in activated sludge treated municipal wastewater on the water bodies in the Eastern Cape, South Africa

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Abstract

The concentration and fates of six priority phthalate esters (PAEs); dimethyl phthalate (DMP), diethyl phthalate (DEP), di-n-butyl phthalate (DBP), benzyl butyl phthalate (BBP), di(2-ethyl hexyl) phthalate (DEHP), and di-n-octyl phthalate (DOP) in wastewaters from the wastewater treatment plants (WWTPs) which adopted the activated sludge technology in the Amathole Municipality, Eastern Cape, South Africa were investigated. The six PAEs were detected in all the influents and in almost all the WWTP effluent of which DBP was the most abundant in the influent followed by DEHP. Influent concentration of DBP in the three WWTPs ranged between 2.7 – 2488 μgL^{-1} and the average effluent concentration was 4.90 – 8.88 μgL^{-1}. On average, the concentration of PAEs in WWTP effluents were higher than PAEs in the upstream and downstream of the discharging point suggesting PAE impact on the receiving water. The concentrations detected in the sludge of which DEHP and DBP were more pervasive ranged between 130-1094 µg/g dry weight. The average removal capacity; 27.3-99.5% suggested more adsorption on settling particles and sludge than biodegradation as high significant correlation was found between PAEs removal, total suspended solid and turbidity. Removal of high