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Effect of particle size distribution in wastewater on the performance of nutrient removal process

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ABSTRACT

The present investigation aims to explore the effect of particle size distribution in wastewater on the performance of sorption denitrification phosphorus removal process (S-DN-P process). The wastewater was obtained from the Wassmansdorf sewage plant in Berlin, which was denoted as the wastewater (WW). Further, the filtrates of wastewater fractions, obtained by sequential filtration using different pore size filters i.e. 3, 0.45, and 0.1 μm, were denoted by WW(3), WW(0.45), and WW(0.1). The P-removal was obtained to be 16.6, 9.0, 6.2, and 8.0 mg/L, respectively, for the wastewater samples WW, WW(3), WW(0.45), and WW(0.1). P-removal was decreased with decreasing pore size, except for the fraction WW(0.1). It was further observed that the ratios, COD:NO3-N:Acetate:P, were found to be 8.04:1.93:3.55:1, 19.94:2.82:6.88:1, 16.29:3.26:10.23:1 and 13.50:2.54:7.41:1, respectively, for the fractions WW, WW(3), WW(0.45), and WW(0.1). Moreover, approximately 3.5 mg acetate/mg P removed for WW, 7 mg acetate/mg P removed for WW(3) and WW(0.1), and 10 mg acetate/mg P removed for the WW(0.45).

Keywords: Biodegradation; Particle size distribution; Sorption denitrification phosphorus removal process; Sequencing batch biofilm reactor; Wastewater treatment

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