



Removal of 17- β estradiol from wastewater: comparison between a laboratory scale conventional activated sludge and a membrane bioreactor

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ABSTRACT

This work reports the performance of a laboratory scale membrane bioreactor (MBR) and a conventional activated sludge (CAS) treating a real industrial–municipal mixed wastewater, spiked with 17- β estradiol (E2) in micrograms amounts. In order to compare the steady-state conditions of both systems, different sludge retention times (SRT) of 10 and 20 days were applied, while the other operational parameters were maintained unchanged. Results regarding the removal of chemical oxygen demand (COD), nitrogen and E2 have been assessed with statistics analysis using the Mann–Whitney test. MBR outperforms the CAS treatment in terms of COD and nitrogen removal, and the increase in the SRT generally improves the performance of each system. However, E2 was almost completely eliminated in both systems and SRTs applied, leading to removal rates above 99%. Thus, this study shows that the biological elimination of E2 is not directly related to the nitrification rate, and other process or operational parameters should be of importance.

Keywords: 17- β estradiol; Membrane bioreactor; Conventional activated sludge; Sludge retention time; Statistics

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