Removal of pharmaceuticals in conventionally treated wastewater by a polishing Moving Bed Biofilm Reactor (MBBR) with intermittent feeding - DTU Orbit (08/12/2018)

Removal of pharmaceuticals in conventionally treated wastewater by a polishing Moving Bed Biofilm Reactor (MBBR) with intermittent feeding

Previous studies have demonstrated that aerobic moving bed biofilm reactors (MBBRs) remove pharmaceuticals better than activated sludge. Thus we used a MBBR system to polish the effluent of an activated sludge wastewater treatment plant. To overcome that effluent contain insufficient organic matter to sustain enough biomass, the biofilm was intermittently fed with raw wastewater.

The capacity of pharmaceutical degradation was investigated by spiking pharmaceuticals. Actual removal during treatment was assessed by sampling the inlets and outlets of reactors. The removal of the majority of pharmaceuticals was enhanced through the intermittent feeding of the MBBR. First-order rate constants for pharmaceutical removal, normalised to biomass, were significantly higher compared to other studies on activated sludge and suspended biofilms, especially for diclofenac, metoprolol and atenolol. Due to the intermittently feeding, degradation of diclofenac occurred with a half-life of only 2.1 hours and was thus much faster than any hitherto described wastewater bioreactor treatment.

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