Removal of pharmaceuticals in biologically treated wastewater by chlorine dioxide or peracetic acid - DTU Orbit (26/03/2019)

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Removal of six active pharmaceutical ingredients in wastewater was investigated using chlorine dioxide (ClO2) and peracetic acid (PAA) as chemical oxidants. Four non-steroidal anti-inflammatory drugs (ibuprofen, naproxen, diclofenac, and mefenamic acid) and two lipid regulating agents (gemfibrozil and clofibrate acid, a metabolite of clofibrate) were used as target substances at 40 (g/L initial concentration. Three different wastewaters types originating from two WWTPs were used. One wastewater was collected after extended nitrogen removal in activated sludge, one after treatment with high loaded activated sludge without nitrification and one from the final effluent from the same plant where nitrogen removal was made in trickling filters for nitrification and moving bed biofilm reactors for denitrification following the high loaded plant. Of the six investigated compounds, only clofibrate acid and ibuprofen were not removed when treated with ClO2 up to 20 mg/L. With increasing PAA dose up to 50 mg/L, significant removal of most of the pharmaceuticals was observed except for the wastewater with the highest COD. This indicates that chemical oxidation with ClO2 could be used for tertiary treatment at WWTPs for active pharmaceutical ingredients while PAA was not sufficiently efficient.

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