Oxidation of pharmaceuticals by chlorine dioxide in biologically treated wastewater

Biologically treated wastewater spiked with a mixture of 56 active pharmaceutical ingredients (APIs) was treated with 0–20mg/L chlorine dioxide (ClO2) solution in laboratory-scale experiments. Wastewater effluents were collected from two wastewater treatment plants in Sweden, one with extended nitrogen removal (low COD) and one without (high COD). About one third of the tested APIs resisted degradation even at the highest ClO2 dose (20mg/L), while others were reduced by more than 90% at the lowest ClO2 level (0.5mg/L). In the low COD effluent, more than half of the APIs were oxidized at 5mg/L ClO2, while in high COD effluent a significant increase in API oxidation was observed after treatment with 8mg/L ClO2. This study illustrates the successful degradation of several APIs during treatment of wastewater effluents with chlorine dioxide.

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