Removal of pharmaceuticals in biologically treated wastewater by chlorine dioxide or peracetic acid - DTU Orbit (11/12/2018)

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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, 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 ﬁlter 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.

General information
State: Published
Organisations: Environmental Chemistry, Department of Environmental Engineering, Lund University
Contributors: Hey, G., Ledin, A., La Cour Jansen, J., Andersen, H. R.
Pages: 1041-1047
Publication date: 2012
Peer-reviewed: Yes

Publication information
Journal: Environmental Technology
Volume: 33
Issue number: 9
ISSN (Print): 0959-3330
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 1.61 SJR 0.503 SNIP 0.675
Web of Science (2017): Impact factor 1.666
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 1.6 SJR 0.569 SNIP 0.802
Web of Science (2016): Impact factor 1.751
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 1.63 SJR 0.656 SNIP 0.786
Web of Science (2015): Impact factor 1.76
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 1.39 SJR 0.646 SNIP 0.789
Web of Science (2014): Impact factor 1.56
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 1.3 SJR 0.504 SNIP 0.68
Web of Science (2013): Impact factor 1.197
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 1.47 SJR 0.663 SNIP 0.879
Web of Science (2012): Impact factor 1.606
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1