



Review

Advanced oxidation process-mediated removal of pharmaceuticals from water: A review

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ABSTRACT

Pharmaceuticals, which are frequently detected in natural and wastewater bodies as well as drinking water have attracted considerable attention, because they do not readily biodegrade and may persist and remain toxic. As a result, pharmaceutical residues pose on-going and potential health and environmental risks. To tackle these emerging contaminants, advanced oxidation processes (AOPs) such as photo-Fenton, sonolysis, electrochemical oxidation, radiation and ozonation etc. have been applied to remove pharmaceuticals. These processes utilize the high reactivity of hydroxyl radicals to progressively oxidize organic compounds to innocuous products. This review provides an overview of the findings from recent studies, which have applied AOPs to degrade pharmaceutical compounds. Included is a discussion that links various factors of TiO₂-mediated photocatalytic treatment to its effectiveness in degrading pharmaceutical residues. This review furthermore highlights the success of AOPs in the removal of pharmaceuticals from different water matrices and recommendations for future studies are outlined.

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Contents

1. Introduction	189
2. Status of pharmaceutical pollution	190
3. Advanced oxidation processes (AOPs) as a tool for the degradation of pharmaceuticals	192
3.1. Ozonation	192
3.2. Fenton and photo-Fenton	196
3.3. UV and UV/peroxide processes	197
3.4. Sonolysis	198
3.5. Electrochemical oxidation	198
3.6. Radiation	199
3.7. Combined AOPs	199
4. TiO ₂ photocatalytic degradation of pharmaceuticals	200
5. Conclusions and future outlook	203
Acknowledgements	204
References	204

1. Introduction

Pharmaceuticals (drug products) containing active pharmaceutical ingredients (APIs), despite being designed to treat a variety

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