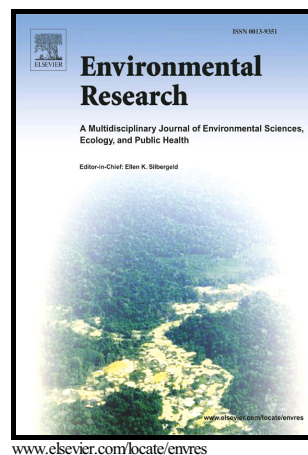


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Application of advanced oxidation processes and toxicity assessment of transformation products

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ABSTRACT

Advanced Oxidation Processes (AOPs) are the techniques employed for oxidation of various organic contaminants in polluted water with the objective of making it suitable for human consumption like household and drinking purpose. AOPs use potent chemical oxidants to bring down the contaminant level in the water. In addition to this function, these processes are also capable to kills microbes (as disinfectant) and remove odor as well as improve taste of the drinking water. The non-photochemical AOPs methods include generation of hydroxyl radical in absence of light either by ozonation or through Fenton reaction. The photochemical AOPs methods use UV light along with H_2O_2 , O_3 and/or Fe^{+2} to generate reactive hydroxyl radical. Non-photochemical method is the commonly used whereas, photochemical method is used when conventional O_3 and H_2O_2 cannot completely oxidize organic pollutants. However, the choice of AOPs methods is depended upon the type of contaminant to be removed.

AOPs cause loss of biological activity of the pollutant present in drinking water without generation of any toxicity. Conventional ozonation and AOPs can inactivate estrogenic compounds, antiviral compounds, antibiotics, and herbicides. However, the study of different AOPs methods for the treatment of drinking water has shown that oxidation of parent compound can also lead to the generation of a degradation/transformation product having biological activity/chemical toxicity similar to or different from the parent compound. Furthermore, an increased toxicity can also occur in AOPs treated drinking

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