Treatment of water contaminated with methyl tertiary butyl ether using UV/chlorine advanced oxidation process

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\textbf{ABSTRACT}

Methyl tertiary butyl ether (MTBE) is a widely used gasoline additive to improve the air quality by increasing the oxygen content of the fuel. After extensive use for some years in the USA, it was recognized as a groundwater contaminant. Several remediation techniques are available for the removal of MTBE from contaminated water systems. However, the inherent limitations of each removal technique makes further research promising. The aim of this study was to investigate the MTBE degradation in water with chlorine-based advanced oxidation process (AOP). A bench scale study was carried out by varying the experimental conditions such as UV radiation intensity, pH, chlorine doses, and treatment time. Free chlorine was used as a chemical oxidant in combination with low-pressure (LP) and medium-pressure (MP) mercury lamps to degrade MTBE in water. LP and MP UV/chlorine were able to degrade more than 99\% of MTBE in deionized water within 15–30 min at pH 5 and 7, respectively. The MTBE removal in groundwater sample with LP UV/chlorine and MP UV/chlorine is greater than 99 and 90\% after 30 min respectively. The electrical energy per order estimated for LP UV/chlorine and MP UV/chlorine to treat ground water sample was 4.01 and 54.67 kW h/m\(^3\) respectively. Chlorine-based AOP could be a promising technique for treating water contaminated with MTBE.

\textit{Keywords:} MTBE; AOP; Ultraviolet; Chlorine; Ground water

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