

## UV + H<sub>2</sub>O<sub>2</sub> Advanced Oxidation: Exploration of Side Effects

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The application of UV disinfection combined with hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) in an advanced oxidation process (AOP) can destroy many contaminants such as pesticides and taste and odour-causing compounds, but little is known about potential side effects during AOP operation. Research thus far suggest that AOP treatment may have the ability to affect chlorine stability when chlorine is applied as a secondary disinfectant, and can also influence subsequent trihalomethane (THM) and haloacetic acid (HAA) formation upon secondary chlorination.

Water samples were collected from upstream and downstream of the UV+H<sub>2</sub>O<sub>2</sub> system installed at the Cornwall Water Treatment Plant. When simulating stability of chlorine in distribution systems in the laboratory, data indicated that AOP treatment can lead to an increase in chlorine demand by approximately 0.4 mg/L, meaning higher chlorine doses may be necessary to maintain target residuals (Fig. 1). Data also showed THM and HAA formation tending to change by up to 20% when waters are first treated with AOP (Fig. 2 and 3).

This work demonstrates that one should consider potential side effects when implementing AOPs.

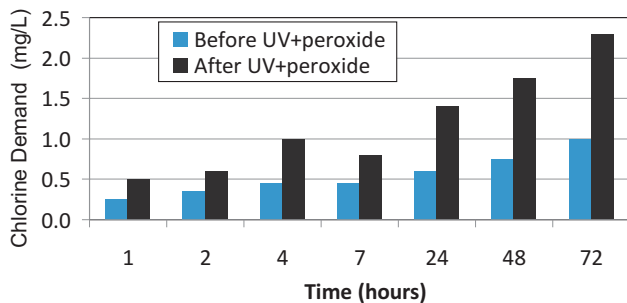


Figure 1: Increase in chlorine demand

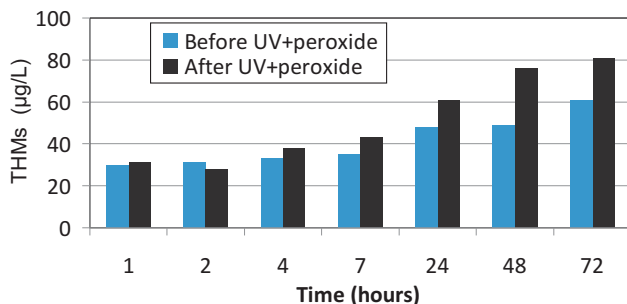


Figure 2: Decrease in THMs

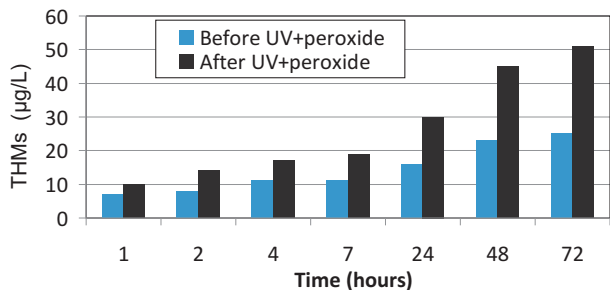


Figure 3: Increase in HAAs



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