OPTIMIZATION OF CHEMICAL DOSING IN WATER TREATMENT FOR ENHANCED COAGULATION/SOFTENING AS IT PERTAINS TO DBP REMOVAL

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ABSTRACT

Treatment facilities out of compliance with EPA regulations are often not using optimal chemical treatment. Determination of the most effective chemical type, combination and concentration can aid in reduction of disinfection by-product precursors. The effects of optimal chemical treatment using enhanced coagulation and enhanced softening was tested on three surface waters (two reservoirs and one lake sources), and one ground water (alluvial wells). Results indicated enhanced coagulation was more effective at removing DBP precursors from waters with higher initial UV-254 absorbance values and lower alkalinities while enhanced softening was more effective for waters with lower initial UV-254 absorbance values and higher alkalinities. In a number of cases, ferric salts outperformed aluminum salts at reducing the DBP formation potential.

Redox potential measurements were added to the list of analyses to determine trends and the feasibility of using this parameter as an additional indicator of process efficiency. It is expected that E_h will trend as the inverse of pH. However, this research presents that under constant pH conditions, the E_h readings seem to indicate the destabilization and stabilization processes expected during the coagulation step in drinking water treatment. Comparison of the E_h readings from the start of various treatment stages to the end provides some indication of the effectiveness the enhanced coagulation or enhanced softening process has on the removal of organic precursors for disinfection by-products.