



Coagulation optimization for low temperature and low turbidity source water using combined coagulants: a case study

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ABSTRACT

Coagulation optimization using coagulants of ferric chloride (FeCl_3), polymer–polyaluminum ferric chloride (PAFC) and their combinations (FeCl_3 /PAFC) was evaluated by performing jar tests for treating source water with low temperature ($<10^\circ\text{C}$) and low turbidity (1.5–8 NTU) in a typical North-China water treatment plant (WTP), Tanggu WTP. The results indicated that compared to single coagulant, the combined coagulants showed superior coagulation performance in terms of turbidity, UV_{254} , COD_{Mn} , iron, and aluminum removal. The optimal dosage was determined as 20 mg/L using the combined PAFC/ FeCl_3 (3:1 by mass) and dosing PAFC with a 5–20 s interval followed by FeCl_3 . Scanning electron micrographs further showed that the coagulations combination can form a more compact structure that increases the settleability of the flocculation flocs.

Keywords: Combined coagulant; Coagulation optimization; Low turbidity and low temperature source water

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