



Major mechanism(s) of chloramine decay in rechloraminated laboratory scale system waters

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ABSTRACT

Traditionally it is believed that nitrification was solely responsible for the widely observed chloramine loss under nitrifying conditions. On the contrary, recent results have shown that an unidentified agent (soluble microbial products or modified natural organic matter) chemically accelerates chloramine decay in rechloraminated nitrifying samples which were filtered to eliminate microbes. However, how those agents accelerate chloramine decay is not known. Mildly and severely nitrified samples were collected from a laboratory scale system and microbes were separated through filtration and then rechloraminated. To understand the mechanism, simple stoichiometry was employed. In all samples, rechloramination induced ammonia loss possibly by auto-decomposition, especially in the initial stages. In severely nitrified samples, accelerated auto-decomposition and nitrite oxidation were found to be the major mechanisms chemically accelerating the chloramine loss indicating that the agent did not demand appreciable chloramine. However, in the mildly nitrified water, a large discrepancy in chloramine demand what is explainable by stoichiometry was seen. The natural organic matter (NOM) oxidation was suspected to be the dominant mechanism during the prolonged incubation of mildly nitrified samples. The identification of the agent is important as it highly accelerates chloramine decay.

Keywords: Auto-decomposition; Chloramine; Nitrification; Nitrogenous species; Nitrite oxidation

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