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# Ammonium reduction kinetics in drinking water by newly isolated *Acinetobacter* sp. HITLi 7 at low temperatures

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ABSTRACT

The *Acinetobacter* sp. HITLi 7 was isolated from the Songhua River and shown to be capable of heterotrophic nitrification ability at 2°C. To predict the ammonium reduction performance in drinking water at low temperature, the kinetics of strain HITLi 7 were investigated using Monod kinetic models. The results of calculations showed that the substrate half saturation constant $K_s$ was 9.9 mg/L of total ammonium, and the maximum specific rate $\mu_{max}$ was $7.9 \times 10^{-4}$ $h^{-1}$ at 8°C, C/N 2, pH 6.0 while shaking at 100 r/min. The effects of temperature (2, 5 and 8°C), C/N (2, 4, and 10), and pH (6.0, 7.0, and 7.5) on kinetic parameters were also evaluated. $K_s$ and $\mu_{max}$ increased consistently with an increase in temperature and decreased as C/N ratio increased. The specific affinity $a^0$ ($a^0 = \mu_{max}/K_s$) for ammonium was the highest for a C/N of 10. This value was 2.1-fold higher than the affinity observed for a C/N of 2. The results demonstrated that the affinity of HITLi 7 for ammonium was higher when a sufficient carbon source was present. The maximum ammonium reduction rate was 0.18 mg $NH_4^+$-N/L/h at a C/N of 10. These results suggest that HITLi 7 may be used for ammonium removal in drinking water at low temperatures.

*Keywords:* Heterotrophic nitrification bacterium; Kinetics; Low temperature; Drinking water

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