Nitrate removal by a combined bioelectrochemical and sulfur autotrophic denitrification (CBSAD) system at low temperatures

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ABSTRACT

A newly combined bioelectrochemical and sulfur autotrophic denitrification system was developed and steadily operated to treat nitrate polluted water at 10°C for 270 d. The parameters hydraulic retention time (HRT) and current were continuously adjusted to achieve better nitrate removal efficiency. Results demonstrated that the sulfur autotrophic denitrification part (S-part) efficiency was effectively improved by adjusting the parameter HRT, while current was the key control parameter for the electrochemical part (E-part) at low temperatures in this CBSAD reactor. This CBSAD system had the ability to maintain pH balance, and the effluent SO$_4^{2-}$ concentration could be effectively controlled at cold temperatures in this combined autotrophic system.

Keywords: Nitrate; CBSAD; Cold temperature