Effect of salinity on nitrogen removal by simultaneous nitrification and denitrification in a sequencing batch biofilm reactor

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ABSTRACT

A sequencing batch biofilm reactor (SBBR) was operated at different salinities with focus on reactor performance and nitrogen removal by simultaneous nitrification and denitrification (SND). The SBBR contained suspended-growth sludge and biofilm attached to synthetic fibrous carriers. When salinity increased from 1.4 to 4.2 g NaCl/L, it increased the NH$_4^+$-N and total nitrogen removal efficiencies, the nitrification rate (NR), and denitrification rate (DNR). A slight drop in nitrogen removal, NR, and DNR was observed, when the salinity was increased from 4.2 to 9.8 g NaCl/L. Efficient SND occurred in the reactor and the SND efficiency was above 90.7%. Nitrification was the main contribution of the suspended sludge, while the major role of biofilm was denitrification in the SBBR at the salinity of 9.8 g NaCl/L.

Keywords: Salinity; Simultaneous nitrification and denitrification (SND); Sequencing batch biofilm reactor (SBBR); Biofilm; Suspended sludge