Partial Nitrification of Ammonium-rich Wastewater by SHARON Process

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Partial nitrification techniques have been denoted for quite a while as very promising for improving sustainability of wastewater treatment. Up to now, the SHARON (Single reactor High activity Ammonia removal Over Nitrite) process is the only reported process in which partial nitrification of ammonium to nitrite is successfully maintained in practice over a long time period[1-2]. Recently, the coupling of the SHARON process with a so-called Anammox (anaerobic ammonia oxidation) process, in which ammonium and nitrite are converted to nitrogen gas under anoxic conditions by autotrophic bacteria, finds increasing support in the search for sustainable wastewater treatment techniques. The main condition for the coupling of the two processes is that the effluent of the SHARON reactor has a 1:1 molar ratio of ammonia:nitrite, because this is the desired influent ratio for the Anammox process.

In this study, a 4 L lab-scale CSTR reactor has been operated for about one year under conditions of a very short retention time and high temperature (35℃) to enrich *Nitrosomonas* species. Over 75% of the inlet nitrogen load is now converted to nitrite. In the near future, we're going to control either oxygen concentration or pH in the reactor to obtain an optimal effluent within the stoichiometric requirements for subsequent anaerobic ammonium oxidation.

References

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