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THE EFFECT OF PH ON NITRIC NITROGEN ACCUMULATION IN A FRESHWATER DENITRIFICATION SYSTEM

Markus Raudkivi
Taavo Tenno
University of Tartu, Estonia

Abstract

Denitrification is a widely used biological nitrogen removal process, in which nitrate is reduced step-by-step to dinitrogen gas. As nitric nitrogen accumulation (one of the intermediate compounds) in a denitrification system has been previously reported by many researchers, the aim of this research was to elucidate the effect of pH on the aforementioned process. Nitrite accumulation was researched in short-term batch tests (6 hours), where pH, concentrations of acetate, different nitrogen compounds and mixed liquor suspended solids (MLSS) were measured. The results showed a spontaneous increase in the pH value towards 9.5, while the percentage of accumulated nitrite rose as well. This could be the result of pH inhibition to nitrite reductase, which cannot sufficiently reduce all produced nitrite on high pH values. As this aforementioned effect could be used together with the deammonification process to turn nitrate (a product of the anammox process) into nitrite (a substrate of the process), the knowledge obtained in the current study brings us one step closer to a complete nitrogen removal system.

Keywords

Denitrification; Nitric nitrogen accumulation; Freshwater; pH