Modelling Nitrogen Transformation and Removal in Primary Facultative Ponds

Author(s)

M.A. Senziaa, A.W. Mayoa, T.S.A. Mbwettea, J.H.Y. Katimaa, S.E. Jørgensenb

Abstract

This paper presents a dynamic rational model for nitrogen transformation in primary facultative ponds. The results show that, the dominant mechanism for nitrogen removal was sedimentation of organic nitrogen (9.7%). The major nitrogen transformation route was through mineralization (19.2%) followed by ammonia uptake by microorganisms (17.4%) and nitrification (2.4%). Denitrification process was another possible route for removal of nitrogen (4.1%), but volatilisation played a negligible role (0.1%). Approximately 38.8% of nitrogen flowing to primary facultative pond did not undergo any transformation. It was further found out that 8.3% of influent nitrogen was unaccounted for, which might be lost through seepage to the ground or evaporation. Nitrogen contained in microorganisms accounted for 50% of the total nitrogen in the final effluent.

Keywords

Nitrogen transformation;
Nitrogen removal;
Modelling;
Primary facultative pond