

Feasibility of nutrients removal and its pathways using integrated anaerobic-aerobic sequencing batch reactor

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Abstract

This research is a continuous work for a previous study, which contemplates the performance of the proposed bioreactor called integrated anaerobic-aerobic sequencing batch reactor (IAASBR) regarding the nutrients removal. This investigation is accomplished by two schemes; firstly, choosing the best anoxic/oxic time ratio in the Anx/O SBR compartment, secondly, changing the anaerobic hydraulic retention time (HRT_{an}) to enhance the nutrients removal and sludge maintaining in it. The overall removal efficiencies of SCOD and NH₃-N were high ($94 \pm 4\%$ and $91 \pm 10\%$ as average) comparing with the overall removal efficiencies of TN and PO₄³⁻, where they were 38% and 6%, respectively in the best operating condition (Anx/O = 3.5 h/1.5 h). Nitrate removal by means of endogenous respiration is the most likely pathway. Furthermore, a conceptual corrigendum; DO concentration in the anoxic phase cannot be maintained at the level below 0.5 mg/L in the SBR unless there is an addition of organic matters.