

## NITROGEN LOADING RATE AS FEASIBLE STRATEGY TO ANAMMOX SLUDGE PRODUCTION

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**Abstract:** Anammox bacteria are autotrophic organisms that use  $\text{NH}_3$  as their energy source to directly reduce  $\text{NO}_2^-$  into  $\text{N}_2$ , with  $\text{NO}_3^-$  as a by-product, therefore an alternative to wastewater treatment plants conventional. However, short doubling time and sensitivity to environmental alterations are some of the weaknesses of the Anammox process. Historically, studies relate that the doubling time of Anammox cells (intrinsic) been around 11 days (d) and according with the reactor operation, it can be reduced or extended. Values are quite varied and different strategies can be applied to reduce the doubling time increase Anammox sludge production in reactors. In the present work was evaluated the effect of the increment of nitrogen loading rate (NLR) in continuous Anammox reactor, as an approach to reduce the sludge apparent doubling time it and produce biomass granular. For such, in expanded granular sludge bed reactor were evaluated the NLR of 0.8, 2.4, 3.7 and 4.9  $\text{g-N d}^{-1} \text{Lreactor}^{-1}$ . According with the obtained results, with the increment of the NLR, the sludge doubling time were reduced (211, 89, 67 and 58 d, respectively), quantified by the increase of biomass mass in the reactor. The Monod model was predictive for these values, being suitable to describe the growth of the reactor sludge, with a high affinity for the substrate ( $K_s = 5.12 \text{ g-N L}^{-1}$  and the theoretical minimum doubling time of 28 d). The increase in NLR (519%) caused a 73% decrease in Anammox sludge doubling time.

**Keywords:** Sludge apparent doubling time, expanded granular sludge bed reactor, high affinity for the substrate.



**Video presentation**