

LONG TIME STORAGE OF ANAMMOX BIOMASS AS AN APPROACH TO REACTOR START-UP

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Abstract: The ANAMMOX (Anaerobic Ammonium Oxidation) process is a shortcut to the natural cycle of nitrogen, using bacteria with ANAMMOX activity to convert ammonium (NH_4^+) and nitrite (NO_2^-) into nitrogen gas (N_2). The low rate of bacterial duplication can be a limiting factor to the implementation of full-scale ANAMMOX reactors to wastewater treatment plant, since the low production of biomass results in a long startup period. One alternative to this impediment is the use of biomass preservation and reactivation methods. Thus, the present work evaluated the viability of preserving bacteria with ANAMMOX activity through freezing (-2°C) in a potassium nitrate solution (100 mgN L^{-1}) for eleven months. Approximately 20 L of biomass were taken from a continuous scale bioreactor with ascendant flow that was feeding with 200 mgN L^{-1} ($100\text{ mgNH}_3\text{-N L}^{-1}$ and $100\text{ mgNO}_2\text{-N L}^{-1}$) at Embrapa Suínos e Aves (microorganism bank BRMSA 0323). The stored biomass was re-inoculated with culture medium at a concentration of 100 mgN L^{-1} ($50\text{ mgNH}_3\text{-N L}^{-1}$ and $50\text{ mgNO}_2\text{-N L}^{-1}$). The 55 first days after the startup was analyzed. Until the twentieth day, the nitrogen removal rate (NRR) was below 4% indicating that there was no anammox activity. On subsequent days was observed an increase on NRR with an efficiency of up to 57%. In this way, the storage method presented is promising in the preservation of biomass and enables to restart-up the ANAMMOX process with efficiency.

Keywords: Potassium nitrate solution, preservation and reactivation, freezing.



Video presentation