

EXTRACELLULAR POLYMERIC SUBSTANCES: ARE THEY PRESERVED DURING ANAMMOX GRANULES STORAGE BY FREEZING?

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Abstract: Anaerobic ammonium oxidation (Anammox) is an effective biological route to nitrogen removal under anoxic conditions. Despite the advantages when compared with Nitrification/denitrification process, the slow growth of Anammox and high sensitive to environmental conditions are some of the drawbacks of this technology. Anammox granules preservation (low-temperature (4 °C) and freezing (-2 °C) with NaNO₃) stand-outs as technique for fast reactor start-up and improvement of it performance. However, the integrity of granules by the amount of Extracellular Polymeric Substances (EPS) must also be maintained during the preservation period. At the present work was evaluated the amounts of EPS (protein (PN) and polysaccharides (PS) ratio) from Anammox granules preserved under 2 to -2 °C with NaNO₃ (100 mg L⁻¹), to evaluate the stability of it to be used to inoculate full-scale reactors. The PN/PS ratios from the preserved sludge (0.07) were 79 times lower then Anammox sludge from continuous reactor (5.53), with high amounts of PS (43.59 mg L⁻¹). The lower PN/PS ratio can be associated with bacteria starvation, cell lysis and dissolution of cellular compounds into the liquid phase. With higher PS and lower PN, granules show low stability for reactors start-up. Denitrification reactions can also occurs in parallel during the preservation period, due to the high PS concentration. Thus, freezing conditions do not show feasibility to Anammox granules preservation and stability.

Keywords: Nitrogen removal process, process stability, fast start-up, bacteria starvation.



Video presentation