

Treatability of OFMSW (organic fraction of municipal solid waste) digestates by the anammox process

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Abstract

The liquid fraction of digested material is rich in ammonium and requires nitrogen removal prior to its final disposal. The aim of this research was to evaluate the applicability of the anammox process for the biological N removal from the supernatant coming from the anaerobic digestion of the organic fraction of municipal solid waste (OFMSW).

The short term inhibitory potential of this concentrated wastewater was evaluated by means of fed batch tests in terms of specific anammox activity (SAA) reduction. For comparison, a set of fed batch test was conducted to evaluate the inhibitory potential of synthetic media with comparable salinity level. A total of 11 samples were tested originating from 4 full scale AD plants treating either 100% OFMSW or in codigestion with municipal excess sludge.

The comparison between synthetic and real wastewater indicated the salinity as main inhibiting factor. The activity reduction was between 73% and 89% in the presence of undiluted real wastewater. Nevertheless, the specific activity was in the range 0.05-0.25 g N₂-N/gVSS/d and, after the initial reduction, it remained stable for 6-7 days, thus suggesting the potential treatability of this type of wastewater.

A lab-scale anammox granular sludge SBR is currently in operation treating undiluted liquid fraction of digested OFMSW to assess the long term feasibility and adaptation phenomena.