

Bioaugmentation with an acetate-oxidising consortium as a tool to tackle ammonia inhibition of anaerobic digestion - DTU Orbit (11/08/2016)

Bioaugmentation with an acetate-oxidising consortium as a tool to tackle ammonia inhibition of anaerobic digestion

Ammonia is the major inhibitor of anaerobic digestion (AD) process in biogas plants. In the current study, the bioaugmentation of the ammonia tolerant SAO co-culture (i.e. *Clostridium ultunense* spp. nov. in association with *Methanoculleus* spp. strain MAB1) in a mesophilic up-flow anaerobic sludge blanket (UASB) reactor subjected to high ammonia loads was tested. The co-cultivation in fed-batch reactors of a fast-growing hydrogenotrophic methanogen (i.e. *Methanoculleus bourgensis* MS2T) with the SAO co-culture was also investigated. Results demonstrated that bioaugmentation of SAO co-culture in a UASB reactor was not possible most likely due to the slow maximum growth rate ($\mu_{max}=0.007h^{-1}$) of the culture caused by the methanogenic partner. The addition of *M. bourgensis* to SAO led to 42% higher growth rate ($\mu_{max}=0.01h^{-1}$) in fed-batch reactors. This indicates that methanogens were the slowest partners of the SAO co-culture and therefore were the limiting factor during bioaugmentation in the UASB reactor. © 2013 Elsevier Ltd.

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