Microbial electrolysis contribution to anaerobic digestion of waste activated sludge, leading to accelerated methane production - DTU Orbit (08/11/2017)

Microbial electrolysis contribution to anaerobic digestion of waste activated sludge, leading to accelerated methane production

Methane production rate (MPR) in waste activated sludge (WAS) digestion processes is typically limitedby the initial steps of complex organic matter degradation, leading to a limited MPR due to sludgefermentation speed of solid particles. In this study, a novel microbial electrolysis AD reactor (ME-AD) wasused to accelerate methane production for energy recovery from WAS. Carbon bioconversion wasaccelerated by ME producing H2 at the cathode. MPR was enhanced to 91.8 gCH_4/m^3 reactor/d in themicrobial electrolysis ME-AD reactor, thus improving the rate by 3 times compared to control conditions (30.6 gCH_4/m^3 reactor/d in AD). The methane production yield reached 116.2 mg/g VSS in the ME-ADreactor. According to balance calculation on electron transfer and methane yield, the increasedmethane production was mostly dependent on electron contribution through the ME system. Thus, theuse of the novel ME-AD reactor allowed to significantly enhance carbon degradation and methaneproduction from WAS.

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