Acclimatization contributes to stable anaerobic digestion of organic fraction of municipal solid waste under extreme ammonia levels: Focusing on microbial community dynamics - DTU Orbit (07/11/2019)

Acclimatization contributes to stable anaerobic digestion of organic fraction of municipal solid waste under extreme ammonia levels: Focusing on microbial community dynamics

The organic fraction of municipal solid waste (OFMSW) is an abundant and sustainable substrate for the anaerobic digestion (AD) process, yet ammonia released during OFMSW hydrolysis could result in suboptimal biogas production. Acclimated ammonia tolerant microorganisms offer an efficient way to alleviate ammonia inhibition during AD. This study aimed to achieve an efficient AD of OFMSW under extreme ammonia levels and elucidate the dynamics of the acclimated microbial community. Thus, two mesophilic continuous stirred tank reactors (CSTR), fed only with OFMSW, were successfully acclimatized up to 8.5g NH₄⁺-N/L, and their methane yields fluctuated <10%, compared to the methane yields without ammonia addition. Microbiological analyses showed that Methanosaeta concilii and Methanosarcina soligelidi were the dominant methanogens at low and high ammonia levels, respectively. Whilst, a unique metabolic pathway shift, from acetoclastic to hydrogenotrophic methanogenesis, of M. soligelidi was identified during the acclimatization process.

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