Bioaugmentation with hydrolytic microbes to improve the anaerobic biodegradability of lignocellulosic agricultural residues - DTU Orbit (28/12/2018)

Bioaugmentation with hydrolytic microbes to improve the anaerobic biodegradability of lignocellulosic agricultural residues

Bioaugmentation with hydrolytic microbes was applied to improve the methane yield of bioreactors fed with agricultural wastes. The efficiency of Clostridium thermocellum and Melioribacter roseus to degrade lignocellulosic matter was evaluated in batch and continuously stirred tank reactors (CSTRs). Results from batch assays showed that C. thermocellum enhanced the methane yield by 34%. A similar increase was recorded in CSTR during the bioaugmentation period; however, at steady-state the effect was noticeably lower (7.5%). In contrast, the bioaugmentation with M. roseus did not promote markedly the anaerobic biodegradability, as the methane yield was increased up to 10% in batch and no effect was shown in CSTR. High-throughput 16S rRNA amplicon sequencing was used to assess the effect of bioaugmentation strategies on bacterial and archaeal populations. The microbial analysis revealed that both strains were not markedly resided into biogas microbiome. Additionally, the applied strategies did not alter significantly the microbial communities.

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