Characterization of the planktonic microbiome in upflow anaerobic sludge blanket reactors during adaptation of mesophilic methanogenic granules to thermophilic operational conditions

Upflow anaerobic sludge blanket (UASB) technology refers to reactor technology where granules, i.e. self-immobilised microbial associations, are the biological catalysts involved in the anaerobic digestion process. During the start-up period, UASB reactors operate at relatively long HRT and therefore the liquid phase of the reactor becomes a favourable environment for microbial growth. The current study aimed to elucidate the dynamicity of the suspended microbial community in UASB reactors, during the transition from mesophilic to thermophilic conditions. High throughput 16S rRNA amplicon sequencing was used to characterize the taxonomic composition of the microbiome. The results showed that the microbial community was mainly composed by hydrolytic and fermentative bacteria. Results revealed relevant shifts in the microbial community composition, which is mainly determined by the operational conditions and the reactor performance. Finally, shared OTUs between the microbial consortia of the suspended and the granular sludge showed that planktonic microbiota is significantly influencing the granule microbial community composition.

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