

Zeolite stimulates the activity of microbial enrichments converting butyrate to methane

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Conductive materials have been tested as a strategy to improve methane production (MP) in anaerobic digestion (AD) processes (1,2). The effect of zeolite (0.5 g/L) towards microbial enrichments converting butyrate (10 mmol/L) to methane was investigated and compared with a microbial enrichment in the absence of the material. The enrichments were initiated with granular anaerobic sludge from a brewery WWTP as inoculum. Incubations were carried out under strict anaerobic conditions (at 37 °C) and periodically transferred to fresh medium.

The results showed that, after an initial adaptation period (3 transfers), the presence of zeolite significantly accelerated the total conversion of butyrate to methane, since it took approximately 30d with zeolite and around 45d without zeolite. However, both enrichment cultures after extended adaptation (more than 8 transfers) behaved similarly, degrading butyrate in approximately 15d. Nevertheless, zeolite addition to active butyrate enrichment cultures without previous contact with zeolite, slightly accelerated MP, while the highly adapted zeolite-enrichment decreased activity when incubated without zeolite.

Thus, the presence of zeolite showed to stimulate the microbial activity enhancing MP from butyrate degradation. This material possess natural ion-exchange properties, absorptive capacity and could function as a support for biomass which makes its application very attractive to AD processes (3).

References

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