

REFERENCE

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Recovery of acetoclastic activity in anaerobic granular sludge, monitored by methanogenic activity measurements and image analysis

Abreu, A. A., Costa, J. C., Araya-Kroff, P., Ferreira, E. C. and Alves, M. M.

Departamento de Engenharia Biológica, Universidade do Minho, Braga

E-MAIL : angela_abreu@deb.uminho.pt

The specific acetoclastic activity (SAA) of anaerobic granular sludge was recovered in a lab scale EGSB reactor. The inoculum presented a very low acetoclastic activity (0.81 ± 2.48 mg COD-CH₄/gVSS.day). Ethanol was fed at a COD concentration of 1.5 g/L, as sole organic carbon source to promote the biogas production through the hydrogenophilic pathway. During the operation period the specific methanogenic activity (SMA)¹ in the presence of acetate, propionate, butyrate, ethanol and H₂/CO₂, and the biomass morphology were quantified. The SAA steadily increased as expected by the reactor performance, achieving a value of 183 ± 13 mg COD-CH₄/gVSS.day at day 108. From the SMA results it was suggested that, until day 62, the initial methane production rate was dominated by the hydrogenotrophic population and afterwards, the developed acetoclastic activity started to play a role in the initial methane production from ethanol. Until day 62 the ratio between the filaments length and aggregates projected area (LfA)² increased due to the breakdown of granules inside the reactor, after that decreased and granules development was simultaneous with the increase of the SAA. Percentage of aggregates in size range 0.1 to 1 mm (equivalent diameter) increased until day 40 due to granules fragmentation. When the system achieved a steady state, the aggregates size increased.

1. Colleran, E. et al. (1992) *Water Science and Technology* **25**: 31-40.

2. Araya-Kroff, P. et al. (2004) *Biotechnology and Bioengineering* **87**: 184-193.