Effects of mixing on methane production during thermophilic anaerobic digestion of manure - DTU Orbit (19/01/2019)

Effects of mixing on methane production during thermophilic anaerobic digestion of manure: Lab-scale & pilot-scale studies

The effect of mixing on anaerobic digestion of manure was evaluated in lab-scale and pilot-scale experiments at 55 °C. The effect of continuous (control), minimal (mixing for 10 min prior to extraction/feeding) and intermittent mixing (withholding mixing for 2 h prior to extraction/feeding) on methane production was investigated in three lab-scale continuously stirred tank reactors. On comparison to continuous mixing, intermittent and minimal mixing strategies improved methane productions by 1.3% and 12.5%, respectively. Pilot-scale studies also supported the lab-scale results with an average 7% increase in biogas yields during intermittent mixing compared to continuous mixing. The effect of mixing intensities (minimal, gentle or vigorous) in batch assays at 55 °C showed that when the process was overloaded by high substrate to inoculum ratio (40/60), gentle (35 times per minute) or minimal mixing (10 min mixing before feeding) was advantageous compared to vigorous mixing (110 times per minute). On the other hand, under low substrate to inoculum ratio (10/90), gentle mixing was the best. The study thus indicated that mixing schemes and intensities have some effect on anaerobic digestion of manures.

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