

High solid anaerobic co-digestion of household organic waste with cow manure for mass and energy recovery

ABSTRACT

This paper describes a batch study on four different mixture ratios of household organic waste and cow manure. The biomethane potential test is used to evaluate the suitability of high solid anaerobic co-digestion of household organic waste and cow manure and its biodegradability. The maximum methane yield was observed for both co-digestions in R₃ (247 mL/g VS) and R₄ (244 mL/g VS). The percentages of mass recovery were 65-80% (based on VS removal). The biodegradability of each reactor was recorded as 97.7%, 10.7%, 71.6% and 76.8% for R₁, R₂, R₃, and R₄, respectively. High solid co-digestion of household organic waste and cow manure in different mixture ratios increase the specific methane yields compared to mono-digestion. Hence, this clearly demonstrates a synergistic effect on the stability of anaerobic digestion. Upon correcting the results of the theoretical method with experimental data, an agreement ranged 70-90% was achieved.

Keyword: Anaerobic co-digestion; Biodegradability; Biomethane potential; Energy mass recovery; High solid anaerobic digestion