

Effect of additional nutrients on Bio-methane production from anaerobic digestion of farming waste: Feasibility & Fertilizer recovery

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ABSTRACT

Various substrates digested together may be the supplement of lacks for the microbes engaged with anaerobic digestion. In the present work, the impact of nutrients on the co-digestion of farming substrates was evaluated. An additional supplement arrangement which assumes a key job in the anaerobic digestion was utilized at three distinct stages: 37 °C, 40 °C, and 50 °C. Outcomes demonstrated that at 37 °C by the use of supplements, biogas generation achieved 1.38-times than that of control. Besides, 40 °C without supplements represented an intriguing methodology because of the phenomenal utilization of this mid-temperature that had been found significant (56% of VS elimination and 8.4 L-biogas). The anaerobic co-digestion at 50 °C demonstrated that biogas generation likewise exceeded 11.3 L with supplements and that mL-CH₄/g-VS were 1.24-times of that attained for the procedure without additional supplement. Outcomes for every temperature demonstrate that the supplement arrangement contributes to co-digestion. Moreover, 37 °C was the most used temperature on the modern scale and had the most effective influence on the use of supplements during the digestion process. Recovery of sludge was 0.09 m³ sludge / m³ substrate and the recovery of water was 0.86 (m³ sludge / m³ substrate) from the digester effluent. The digested sludge can be used as fertilizer and the by-product water can be used for irrigation purposes. The time required to regain the expenditures was observed as 3.77 y.

KEYWORDS

Methane; Anaerobic digestion; Nutrients; Temperature

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