

Improvement Anaerobic Digestion Performance of Sewage Sludge by Co-Digestion with Cattle Manure

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Abstract : Biogas energy production from sewage sludge is an economically feasible and eco-friendly in nature. Sewage sludge is considered nutrient-rich substrates, but had lower values of carbone which consider an energy source for anaerobic bacteria. The lack or lower values of carbone-to-nitrogen ratio (C/N) reduced biogas yield and fermentation rate. Anaerobic co-digestion of sewage sludge offers several benefits over mono-digestion such as optimize nutrient balance, increased cost-efficiency and increased degradation rate. The high produced amounts of animal manures, which reach up to 90% of the total collected organic wastes, are recommended for the co-digestion with sewage sludge, especially with the limitations of industrial substrates. Moreover, cattle manures had high methane production potential (500 m³/t vsadded). When mixed with sewage sludge the potential methane production increased with increasing cattle manure content. In this paper, the effect of cattle manure (CM) addition as co-substrates on the sewage sludge (SS) anaerobic digestion performance was investigated under mesophilic conditions (35°C) using anaerobic batch reactors. The batch reactors were operated with a working volume 0.8 liter, and a hydraulic retention time of 30 days. The research work focus on studying two main parameters; the biogas yield (expressed as VSS) and pH values inside the reactors.

Keywords : anaerobic digestion, sewage sludge, cattle manure, mesophilic, biogas yield, pH

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