

Renewable Energy Potential of Diluted Poultry Manure during Ambient Anaerobic Stabilisation

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Abstract : In this study, the anaerobic treatability of chicken manure diluted with tap water (with an influent feed ratio of 1 kg of fresh chicken manure to 6 liter of tap water) was investigated in a lab-scale anaerobic sludge bed (ASB) reactor inoculated with the granular sludge already adapted to chicken manure. The raw waste digested in this study was the manure from laying-hens having average total solids (TS) of about 30% with ca. 60% volatile content. The ASB reactor was fed semi-continuously at ambient operating temperature range (17-23[°]C) at a HRT of 13 and 26 days for about 6 months, respectively. The respective average total and soluble chemical oxygen demand (COD) removals were ca. 90% and 75%, whereas average biomethane production rate was calculated ca. 180 lt per kg of COD_{removed} from the ASB reactor at an average HRT of 13 days. Moreover, total suspended solids (TSS) and volatile suspended solids (VSS) in the influent were reduced more than 97%. Hence, high removals of the organic compounds with respective biogas production made anaerobic stabilization of the diluted chicken manure by ASB reactor at ambient operating temperatures viable. By this way, external heating up to 35[°]C (i.e. anaerobic processes have been traditionally operated at mesophilic conditions) could be avoided in the scope of this study.

Keywords : ambient anaerobic digestion, biogas recovery, poultry manure, renewable energy

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