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The Effect of System Parameters on the Biogas Production from Poultry Rendering Plant Anaerobic Digesters

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Abstract : Animal wastes can serve as the feedstock for biogas production (mainly methane) that could be used as alternative energy source. The green energy derived from animal wastes is considered to be carbon neutral and offsetting those generated from fossil fuels. In this study, an evaluation of system parameters on methane production from anaerobic digesters utilizing poultry rendering plant wastewater was carried out. Anaerobic batch reactors and continuous flow system subjected to different operation conditions (i.e., flow rate, temperature, and etc.) containing poultry rendering wastewater were set up to evaluate methane potential from each scenario. Biogas productions were sampled and monitored by gas chromatography and photoacoustic gas analyzer over six months of operation. The results showed that methane productions increased as the temperature increased. However, there is an upper limit to the increase in the temperature on the methane production. Flow rates and type of systems (batch vs. plug-flow regime) also had a major effect on methane production. Constant biogas production was observed in plug-flow system whereas batch system produced biogas quicker and tapering off toward the end of the six-month study. Based on these results, it is paramount to consider operating conditions and system setup in optimizing biogas production from agricultural wastewater.

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