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TREATMENT EFFICIENCY AND BIOGAS PRODUCTION OF ANAEROBIC CO-DIGESTION OF RICE STRAW AND WASTEWATER

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Abstract

This research investigated wastewater treatment efficiency along with agricultural residue utilization for biogas production of anaerobic co-digestion system. The purpose of this work was to study effect of ratio between rice straw and swine wastewater at 1:20, 1:40 and 1:80 by weight including effect of wastewater changing interval for every 2, 3 and 4 weeks on effluent characteristics, wastewater treatment efficiency and biogas production. The finding will provide alternative way for agricultural waste utilization. Results showed pH and total Kjeldahl nitrogen (TKN) in effluent of all tested systems were in the Thailand's swine effluent standard. Besides most of TSS in effluent of the co-digestion system, average COD and BOD5 were higher than those in influent of the system and in the effluent standard. For treatment efficiencies, lowest values were frequently found in the co-digestion system with the ratio of 1:80 but highest values obtained from control unit. Average biogas production rate and average specific methane yield of all co-digestion systems were 105.7-202.7 mL/d and 52.1-217.0 mL biogas/g VSadd, respectively with 9090.0-17430.0 mL of average biogas accumulation for 3 months of operation. The co-digestion system with every 2 weeks of wastewater changing interval and the system with co-fermentation ratio of 1:40 provided high biogas accumulation yield.

Key words: anaerobic digestion, biogas, removal efficiency, rice straw, swine wastewater

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