

Pornpimon Phanthusoontorn 2015: Biogas Production from Organic Sludges of Modified Starch Factory Wastewater Treatment Plant by Anaerobic Digester. Master of Engineering (Environmental Engineering), Major Field: Environmental Engineering, Department of Environmental Engineering. Thesis Advisor: Assistant Professor Mongkol Damrongsri, Dr.Ing. 110 pages.

This thesis is to study biogas production from organic sludges, the total amount of biogas and methane in generated biogas by weight of organic sludge, which was eliminated in batch and semi-continuous flow system, at 2.0–8.0 kg-COD/m<sup>3</sup>-d Volumetric loading of modified starch factory wastewater treatment plant by anaerobic digester. The experiment was performed in 12-liter lab scaled anaerobic digester at room temperature and controlled pH.

The result from batch system showed that three types of sludge, which are AS sludge, coagulation sludge and starch have the highest accumulated methane level at 60.81, 49.78 and 30.08%, 0.361, 0.196 and 0.030 L/g-COD<sub>re</sub> of biogas by eliminated organic sludge weight, and 0.220, 0.097 and 0.009 L/g-COD<sub>re</sub> of methane by eliminated organic sludge weight, respectively. While AS sludge in Semi-Continuous Flow system at stable state of 2.0, 4.0, 6.0 and 8.0 kg-COD/m<sup>3</sup>-d volumetric loading presented 33.81, 36.50, 38.40 and 43.37 % of average amount of methane, 0.035, 0.031, 0.039 and 0.040 L/g-COD<sub>re</sub> of biogas by eliminated organic sludge weight, and 0.012, 0.012, 0.015 and 0.018 L/g-COD<sub>re</sub> of methane by eliminated organic sludge weight, respectively. The study also showed that the level and amount of methane by eliminated organic sludge weight increase along with volumetric load. And starch in Semi-Continuous Flow system, at stable state of 2.0 and 6.0 kg-COD/m<sup>3</sup>-d volumetric load, has 15.63 and 23.05% average amount of methane, 0.160 and 0.086 L/g-COD<sub>re</sub> of biogas by eliminated organic sludge weight, and 0.025 and 0.020 L/g-COD<sub>re</sub> of methane by eliminated organic sludge weight, respectively. It indicated that level and amount of methane by eliminated organic sludge weight at 2.0 kg-COD/m<sup>3</sup>-d volumetric load is less than one in 6.0 kg-COD/m<sup>3</sup>-d.

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