IMPLEMENTATION OF MULTIVARIATE CUMULATIVE SUM (MCUSUM) METHODS FOR SUPERVISORY OF PREDICTIVE CONTROL AT AN ANAEROBIC DIGESTION

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Abstract

Anaerobic Digestion can process the waste to produce methane gas as one of alternative energy sources. However digestion plant is a system that has many variables that affect the process. One of them is the content of Volatile Fatty Acid (VFA) in the waste. An increase in VFA content can cause the rate of methane gas produced increases but also causes the pH system down that can affect the stability of the system. Seeing these phenomena is at the end of this task has made a supervisory control to maximize the rate of methane gas and still trying to maintain the system stability by doing set-point changes automatically by supervisory the control system. Supervisory control making use of graphics processing control MCUSUM of multivariate data from the pH of the system and the rate of methane gas. Simulation results showed the increased production of methane gas 331.5687 mmol/liters or 24.11%, from the previous ones 1375.0805 mmol/liters into 1706.6492 mmol/liters.

Keywords: Anaerobic Digestion, Volatile Fatty Acid (VFA), supervisory control, MCUSUM, set point changes, rate of methane gas.