

ABSTRACT

Anaerobic Baffled Reactor (ABR) is a sub-reactor of biogas producing plant system with Temperature Phased Anaerob Digester (TPAD) method. The process of biogas formation of the reactor is the decomposition of organic materials by microorganisms in rare oxygen conditions (anaerobic digester). The process has several stages of the process including hydrolysis, acididesis, and metanogenesis. Stages of the process that occurs in the reactor ABR is the stage of methanogenesis. At this stage temperature conditioning is required on mesophilic conditions (35°C), as well as the monitoring of other parameters such as partial gas pressure, pH value and hydraulic retention time (HRT). In the previous research, a temperature conditioning system was made in the ABR reactor, but no other parameters have been monitored yet and each monitoring was conducted in a separate study. In this research, a system that integrates parameter monitoring (temperature, partial gas pressure and initial pH value) using STM32F103RBT6 microcontroller data acquisition module with characterization result on each sensor such as temperature sensor (DS18B20) = 99.68% accuracy; precision ± 0.13 °C; sensitivity 0.999 °C / °C; resolution 0.009 °C; , pressure sensor (MPX5100) = 99.64% accuracy; precision 0.03 psi; sensitivity 0.004 psi / mV; resolution 0.003 psi; , and pH sensor (SEN1601) = 99.64% accuracy; precision 0.003 pH; sensitivity 0.004 pH / mV; resolution 0.003 pH. Each monitoring result will be displayed on the media user interface created using the LabVIEW program on the computer. In addition, a temperature control system with PID control is adopted using the Ziegler Nichols method that can be set in LabVIEW. The results of the best result control test were obtained on PID control with the result of testing the control of substrate temperature at 35°C set point: rise time = 128.13 minutes, settling time = 829.2 minutes, overshoot = 5.5% and steady state error = 0.3%. The result of research are limited to monitoring and controlling of physical parameters in the absence of gas producing process.

Keywords : ABR; data acquisition; user interface; LabVIEW; PID control.