

ABSTRACT

Biogas is a renewable energy source formed through the degradation of organic matter by anaerobic microorganisms. However, to convert organic matter into biogas, certain parameters supporting the growth of anaerobic microorganisms are required. This research focuses on the temperature parameter to support the development of anaerobic microorganisms, by creating a prototype temperature control system using a fluid flow blanket on a simple biogas reactor based on Arduino. The experiments involve temperature control within the range of 35°C, 40°C, 45°C, 50°C, 55°C, 60°C, and 65°C. A setpoint of 35°C resulted in an output with an overshoot (%) value of 25.68% and a steady-state average error (%) value of 0.4087%. A setpoint of 40°C produced an output with an overshoot (%) value of 19.25% and a steady-state average error (%) value of 0.4579%. A setpoint of 45°C yielded an output with an overshoot (%) value of 14.24% and a steady-state average error (%) value of 0.3510%. A setpoint of 50°C generated an output with an overshoot (%) value of 9.86% and a steady-state average error (%) value of 0.3712%. A setpoint of 55°C resulted in an output with an overshoot (%) value of 7.43% and a steady-state average error (%) value of 0.3278%. A setpoint of 60°C produced an output with an overshoot (%) value of 4.98% and a steady-state average error (%) value of 0.3762%. Lastly, a setpoint of 65°C led to an output with an overshoot (%) value of 0.75% and a steady-state average error (%) value of 0.4730%.

Kata kunci: *Control PI, Biogas, anaerobic microorganisms, Overshoot (%), average error value (%) steady-state*