KINETIC ANALYSIS OF BACTERIAL GROWTH AND EFFECT ON BIOGAS PRODUCTION FROM MOLASSES ON CONTINUOUS ANAEROBIC REACTOR 3000 L

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ABSTRACT

Energy crisis in Indonesia as a result of fossil fuel energy shortages, especially from unrenewable fuel so Indonesia have to find alternative fuel sources that can be renewed. One of the renewable energy that can be used is biogas. Another advantage is it can produce a clean gas that can be made from organic wastes. The formation of biogas caused the decomposition of organic waste by anaerobic bacteria. This study, used a reactor with a volume of 3000 L and worked continuously.

From the experimental results, biological kinetic constants can be obtained by using Monod Equation. 

\[ Y = 0,05383 \text{ (gMLSS/gCOD)}, \quad K_d = 0,135995 \text{ (day}^{-1})), \quad \mu_{\text{max}} = 0,95703 \text{ (day}^{-1}) \]

as well as for 

\[ K_s = 7,5027 \text{ (gCOD / l)}. \]

Those kinetics constants can be used to predict the value of effluent. By comparing the effluent value from experiment results and calculation by using those obtained kinetic constants, the result shows that the highest % error is on load 2 kgCOD/m$^3$.day is 15.06% while the lowest for the load 1.43 kgCOD/m$^3$.day is 2.62 %.

Keywords : Fuel, Anaerobic, Biological Kinetics, COD Reduction