

**DESIGN AND BUILDING MONITORING SYSTEM
CONDITION OF OPERATION
ANAEROB DIGESTION CONTINUE USING
PRINCIPAL COMPONENT ANALYSIS ALGORITM**

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Abstract

In continue bioreactor, supply of influent and expenditure of effluent from tube occurs continually. By continue method organism grows in steady state condition is possible, in which growth occurs in constant rate and stable environment. Moreover, condition of microorganism could be disturbed because bioreactor is very susceptible with change, such as concentration of substrate, flow rate gas, pH, and temperature. so that a monitoring system is needed.

In this research, several variables which is being monitored is pH and flow rate gas. pH sensor is glass electrode sensor, and flow rate gas sensor is potentiometer with level float sensor. Monitoring system with principal component analysis (PCA) method is used to monitor several condition in bioreactor anaerob. Principal Component Analysis is a method that could reduce multivariate data variable to become several new variables. The new variables, is applied to form Hotteling. Then fuzzy logic is used to determine condition that value T^2 in conditions.

From this experiment, normal condition has primary component represents variance 93.07%, second component value 6.93%. Rein hotteling map T^2 give pattern that vary to every conditon, that is average value for normal condition 0.6387, overload 1.2775, and underload 3.0089. Monitoring

system can to detect three conditions in bioreactor such as normal condition, overload and underload.

Keyword : Bioreactor, PCA, Hotteling, Fuzzy

