Bioreactor Kinetics

Spring 2007

TO: Engineering Development Branch
FROM: Engineering Division

SUBJECT: Bioreactor Kinetics

Our company has been asked to test a certain yeast strain (saccharomyces cerevisiae) for general use in an organic ethanol production facility. Ethanol can be produced by fermentation of glucose by yeast when in an anaerobic environment. A small amount of yeast can be cultivated in a reactor to quickly increase the cell mass under aerobic conditions. The increased cell mass can then be sent to a second reactor for ethanol production.

Use the company's bioreactor to test the yeast strain in aerobic conditions. Please determine the following parameters for this yeast: gas-liquid mass transfer coefficient, specific cell growth rate, specific cell respiration rate, and specific glucose uptake rate. The experiment works much better if fresh yeast is used.

There are several references in the company’s library that might be beneficial (see below) and a copy of a Cornell experiment (first reference) is attached.

References:


Wang, D.I.C., "Fermentation and Enzyme Technology".


Bailey, J.E., "Biochemical Engineering Fundamentals"