

Analysis of Microbial Growth and Product Formation Data Using Modified Pirt's Model.

Agho, Godfrey Nosakhare

M.Sc. Chemical Engineering

Department of Chemical Engineering
Obafemi Awolowo University, Ile Ife, Nigeria

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Abstract:

The 'true' biomass and product energetic yield coefficients and the maintenance coefficient for different microorganisms have been determined by analysing data on microbial growth, with and without product formation, using modified Pirt's model.

The data of Kappeli and Fiechter for the aerobic growth of *Trichosporum cutaneum* on glucose in continuous culture and those of Duvnjak et al for the anaerobic growth of various strains of *Saccharomyces* and *Kluyveromyces* on Jerusalem artichokes in batch culture were analysed. Material and energy balances were carried out and these with identified regularities were used to establish the consistency of the data and also used to identify probable sources of measurement errors and outlier data points.

The estimates of the yield and maintenance coefficients, obtained using the modified Pirt's model, are presented. Improved estimates are obtained using covariate adjustment method.

The values of the true biomass yield and the maintenance coefficients obtained from the analysis of the data of *T. cutaneum* are 0.668 and 0.007 respectively. These values compare favourably with those reported for *Candida utilis* which is used for biomass (single cell protein) production. Analysis of the growth studies on Jerusalem artichokes show that the microorganism, *K. fragilis* 105, may be the best for ethanol production on this substrate. The method used in this work will have applications in the selection of new strains of microorganisms.

Keywords: Microbial growth/ product formation data/ microorganism

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