

细胞动力学研究 VI. 厌氧菌生长过程热化学特征

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摘要 用LKB2277生物活性检测系统测定了三种厌氧菌---吉氏类杆菌、艰难梭状芽胞杆菌、黑色消化球菌的生长发热功率曲线。根据广义logistic方程, 建立了细菌生长过程的热动力学方程: $\ln[P/(Pm-P)^v+1]=\ln[P_0/(Pm-P_0)^v+1]+k.t$ 。由此热动力学方程, 求得了细菌的生长常数k,

根据Arrhenius公式求得吉氏菌的生长活化能 $E_a=59.7\text{kJ/mol}$, 应用过渡态理论得到吉氏菌在不同温度下的活化力学参数, 这个热动力学方程描述的是一系列不规则的细菌生长过程发热曲线, 将它与经典的指数模型和logistic模型进行比较, 它具有更广泛的适用性。

关键词 [量热法](#) [活化能](#) [过渡态理论](#) [厌氧细菌](#) [细菌生长](#)

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Studies on cell kinetics VI. Thermochemical characteristics of the growth of anaerobes

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Abstract By using LKB2277 Bioactivity Monitor, we have determined the thermogenetic power curves of three kinds of Anaerobes: Bacteroides distasonis, Clostridium difficile, Peptococcus niger. Thermokinetic equation, $\ln[P/(Pm-P)^v+1]=\ln[P_0/(Pm-P_0)^v+1]+k.t$, was established based on the generalized logistic equation. The rate constants (k) of cell growth were obtained, and for Bacteroides distasonis, the activation properties, such as activation energy, the entropy of activation, Gibbs function of activation and equilibrium constant of activation were also calculated. This thermokinetic equation is very suitable for cell growth of separated culture. It was compared with exponential and logistic model. It is very significant for the study of bacterial limited growth and their characteristics.

Key words [CALORIMETRY](#) [ACTIVATION ENERGY](#) [TRANSITION STATE THEORY](#) [ANAEROBIC BACTERIA](#)

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