End of Project Report

Growth behaviour of microbial cells immobilised within hydrogel spheres (FRG116-TK-1/2007)

FERRICES CONTRACTOR

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Abstract

The effect of immobilization on cell growth in MRS medium and cell survival during exposure to acidic medium were studied in this project. The growth kinetic models of L.Casei 01 were developed using initial rate method and Lineweaver-Burke plot. Growth kinetics of immobilized cell was found to follow a competitive model. The maximum growth rates (μ_{\max}) of immobilized and free cells were found to be 0.309 hr $^{-1}$ and the saturation constants (K_c) were found to be 0.906 g/L and 1.548 g/L for free and immobilized cells It was found that diffusion limitation occurred due to the effect of respectively. immobilization but without affecting cell physiology and metabolism. Higher substrate concentration could overcome substrate limitation in immobilized cell system. On the other hand, the cell survival kinetics during exposure to acidic medium was determined and was described with a mathematical equation. It was found that the overall death constant (k_{\perp}) for all strains increased with decrease in the pH and cell concentration. The death constant could be expressed by a general mathematical equation, $k_d = k_{AU} [pH^{-9.02} \cdot N_0^{-0.19}]$ where k_{All} is the acid intolerance indicator and N_0 is the initial cell concentration. Immobilization in alginate matrices was found to give no effect to cell survival.

