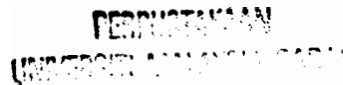


## End of Project Report

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



By

Dr. Chan Eng Seng (Project Leader)

Prof. Dr. Pogaku Ravindra

School of Engineering and IT  
University Malaysia Sabah



**UMS**  
UNIVERSITI MALAYSIA SABAH

## 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 ( $\mu_{max}$ ) of immobilized and free cells were found to be  $0.309 \text{ hr}^{-1}$  and the saturation constants ( $K_s$ ) were found to be  $0.906 \text{ g/L}$  and  $1.548 \text{ g/L}$  for free and immobilized cells respectively. It was found that diffusion limitation occurred due to the effect of 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 ( $k_d$ ) for all strains increased with decrease in the pH and cell concentration. The death constant could be expressed by a general mathematical equation,  $k_d = k_{AI} [pH^{-9.02} \cdot N_0^{-0.19}]$  where  $k_{AI}$  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.

