

AN ABSTRACT OF A THESIS

A KINETIC STUDY OF GLUCOAMYLSE IMMOBILIZED ON CHITIN IN A PLUG FLOW REACTOR

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Master of Science in Chemical Engineering

The enzyme glucoamylase was immobilized on crab shell chitin after treating the chitin with a series of acid-alkali washes interspersed with distilled water washes. Glutaraldehyde was used as a crosslinking reagent to achieve the immobilization. A reactor was constructed from a cylindrical tube made of Teflon using chitin-enzyme as packing to convert maltose to glucose. A peristaltic pump was used to pump the substrate maltose solution through the column against gravity. The effluent was analyzed for glucose using an electronic glucose monitor which was calibrated using glucose solutions of known concentrations. A series of control experiments was designed to determine the catalytic characteristics of the of the immobilized glucoamylase.

It was found that the immobilized enzyme operates most efficiently at low flow rates, within a pH range of 3 to 5, and between a temperature range of 50 deg. C to 60 deg. C. It was also found that the immobilized enzyme exhibits a phenomenon of high substrate inhibition, a decrease in the rate of reaction with increase in the substrate concentration, between a substrate concentration range of 500 mg maltose per 100 ml of solution and 2000 mg maltose per 100 ml of solution.

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CERTIFICATE OF APPROVAL OF THESIS

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