Lee E, M.E.Sc., "Development of An Ameperometric Mediated Biosensor for Fructose and its Applications", The University of Western Ontario, June 1997 (co-supervised, A Bassi as chief advisor).

Abstract

A biosensor for the determination of fructose was constructed by the immobilization of the enzyme fructose dehydrogenase (FDH) by a thin non-conductive electropolymer film. The mediators, ferricyanide (FeCN) and tetracyanoquinodimethane, were used to measure the concentration of fructose amperometrically. the performance of the two types of biosensors based on the mediators was then compared. The response of the biosensor is optimized with respect to temperature, pH, enzyme loading and mediator concentration. The linear range, the minimum detection limits, and long term stability of the biosensor are determined. The biosensor has a minimum detection limit of 10 m M with a linear range up to 10 mM. Samples taken from a High Fructose Corn Syrup (HFCS) packed bed reactor with immobilized glucose isomerase (IGI) where the temperature of the column had been varied was tested with the FIA biosensor. Batch and Flow Injection Analysis of "real sample" were tested to verify the practical application of the biosensor. The development of a novel amperometric mediated fructose dehydrogenase (FDH) biosensor and its application such as the monitoring of an IGI-HFCS packed bed reactor is studied.