

Glucose Biosensor Using Chitosan Membrane

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A glucose biosensor was constructed using a double membrane and electrodes. In order to minimize the loss of stability due to coating of the sensor membrane with blood constituents, we applied a double membrane, one layer of which was a glucose oxidase-polyvinylchloride membrane and the other, a chitosan membrane. The characteristics of this sensor system were investigated using glucose as the standard substrate. Then, the effects of the double membrane on sensor stability were investigated using control serum and porcine whole blood. Glucose in physiological buffer was determined to be in the range of 10-500 mg/dl. Response time of this sensor system was approximately 2 minutes. This sensor system utilizing the chitosan membrane revealed good stability in control serum as compared with the cellulose triacetate membrane.

1. Introduction

The determination of glucose in blood and urine samples is important for diagnostic clinical processes. Conventional methods for glucose determination are mostly based on either the chemical or the enzyme assay. These methods, however, involve complicated and delicate procedures, and the assay times are rather long because there are several steps involved. The test strips for glucose are a simple inexpensive assay. This method, however, is lacking in accuracy. Alternative systems based on electrochemical sensors have been developed for glucose.

The great majority of the glucose sensors developed so far operate through the