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NARAMETH NANANUKUL : DEVELOPMENT OF SEMI-AUTOMATIC GLUCOSE
ANALYZING SYSTEM BY USING A BIOSENSOR.

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The glucose analyzing system has been developed. It consists of glucose sensor, flow injection system and computerized analyzing system. The glucose biosensor is composed of transducer, which is made of thin film platinum, and a layer of enzyme, which is immobilized at the transducer's surface. In this research, four techniques of enzyme immobilization have been used. The techniques are enzyme immobilization by chemical bonding, using silane and p-nitrobenzoyl chloride, by chemical bonding, using silane and glutaraldehyde, by electropolymerization of pyrrole and enzyme immobilization by enzyme entrapment in epoxy structure. From the tests, the sensor with enzyme immobilization by enzyme entrapment in epoxy structure gives the best results for applications. The correlation coefficient of the sensor is 0.996 when used to measure glucose concentration range from 0 to 1000 mg/dl. The interference from maltose, lactose, sucrose and reducing agents is very low in the measurement. The best conditions for enzyme immobilization are glucose oxidase 50 mg, ferrocene 18.6 mg, epoxy 50 mg, ethylalcohol 0.5 ml and phosphate buffer solution 0.01M 0.5 ml. The signal from the system is real-time displayed on a monitor and then recorded to computer for further analyzations. In analyzing the signal, the peak values of signals are used to calculate glucose concentration of the samples. The developed system can be measured at a speed of 1 sample per minute. The correlation coefficients of the system are 0.9197 and 0.977 when it is used to measure glucose concentration in biological samples and human blood plasma, respectively.