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DOLURDEE BOONSUA : DEVELOPMENT OF AN AMPEROMETRIC IMMUNOSENSOR FOR THE DETERMINATION OF METHAMPHETAMINE. THESIS ADVISOR : CHAMRAS PROMPTMAS, Ph.D., SUDARAT MANOCHIOPINIJ, Ph.D., SARISAK SOONTORNCHAI, D.Sc., 97 p. ISBN 974-661-970-5

Amphetamine addiction is an important drug abuse problem in many countries all over the world. The reliable detection of this group of drugs is necessary for controlling and preventing the abuse. There are several methods, such as colorimetric, chromatographic and immunological, for the detection of amphetamine. This study is intended to develop a novel amperometric immunosensor for the detection of methamphetamine in biological samples such as urine. A biosensor, using carbon paste and an Ag/AgCl screen printed on heat sealing film as electrode transducers and monoclonal anti-methamphetamine as the biorecognition element, was developed and used in the study.

The optimum amounts of methamphetamine-N-BSA conjugate, monoclonal anti-methamphetamine and goat anti-mouse IgG conjugated with alkaline phosphatase used in this experiment were 20 ng, 10 ng and 1:10000, respectively (total volume of 10 µL). Methamphetamine can successfully be detected by this method with the sensitivity of 200 ng/mL and gave a dose response curve with the acceptable response up to 2000 ng/mL. A amphetamine concentrations of 0-1500 ng/mL had no significant cross-reaction to methamphetamine assay. The immunosensor was stable at 4°C for at least 2 months. The percentages of recovery and precision with coefficient of variation were 91.5-104.4 % and 15.8-24.4 %, respectively. Comparison of a novel amperometric immunosensor and EMIT was studied using 20 urine samples obtained in Thanyarak Hospital. Amperometric immunosensor interpreted 11 positive and 9 negative cases, while EMIT resulted in 7 positive and 13 negative cases. The study showed no statistically significant difference (p 0.15) between the two assay methods.