Short Communication

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Biosensor for uric acid determination based on the combination of polypyrrole and poly (allylamine) films

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ABSTRACT

Aim and Background: The use of polypyrrole and poly(allylamine) as a matrix of biosensor has been done separately, but the combination of this two has never existed. The purpose of this research is to produce a selective biosensor using combination of polypyrrole (PPy) and poly(allylamine) (PAA) as a polymer for the immobilization of the uricase enzyme, which is used to detect uric acid level in the blood. **Materials and Methods:** Biosensor manufacturing process began with the electropolimerization of pyrrole on platinum wire then immobilization r turicase enzyme (UOx) with glutaraldehyde as cross-linker, After that, UOx and PAA were deposited via layer-by-layer sequential deposition up to 10 UOx layers to prepare amperometric sensors for uric acid. Biosensor proved to have a linear relationship between the current response and the increase of analyte concentrations, with a correlation coefficient (r) = 0.992. **Results and Conclusion:** Presence of interferences had a little effect on uric acid analysis i.e. 1.39% glucose and1.65% ascorbic acid. The sensors could be used up to 32 times. In the stability test, 13.4% of the initial amperometric response decreased at day 33rd. The results showed that combination of PPy and PAA can be used as a matrix for uric acid biosensor.

Key words: Biosensor, uric acid, polypyrrole, poly (allylamine)

Uric acid in human physiological fluids is of great importance in the diagnosis and therapy of patients suffering from a range of disorders associated with altered purine metabolism, most notably gout and hyperuricemia. Consequently, uric acid measurement for diagnosis and treatment of these disorders is routinely required. Electrochemical biosensors have an accurate layer of enzymes with the function to identify biological components and provide the electroactive substances that can be detected by a transducer.[1] A conductive polymer is a material that possesses electrical conductivity and metal mechanical properties such as polymers do.[2] Polypyrrole (PPy) is among the good conductive polymers.[3] From previous study, the use of PPy as uric acid polymers in biosensors had a detection limit of 5.0×10^{-7} M and the sensor was found to be relatively stable over the 5 weeks.[4] Poly (allylamine)(PAA) is a polymer with a positive charge, with the presence of a positively charged membrane only anions are expected and desired to pass through.[5] Based on the advantages of PPy as well as PAA and the absence of a uric acid biosensor manufacture from a combination of the two polymers, this research needs

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