L-DOPA Synthesis Using Tyrosinase Enzyme Precipitate Coatings on the Electrode Surface

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Levodopa or L-3,4-dihydroxyphenylalanine (L-DOPA) is the precursor of the neurotransmitter dopamine. L-DOPA is a famous treatment for Parkinson's disease symptoms. L-DOPA was synthesis using tyrosinase enzyme as biocatalyst for converting L-tyrosine to L-DOPA and electrochemical method for reducing L-DOPAquinone, the product resulted from enzymatic synthesis, to L-DOPA. In this study, three electrode systems consist of glassy carbon electrode (GCE) as working electrode, platinum and Ag/AgCl electrode as auxiliary and reference electrode, respectively. GCE has been modified using enzyme precipitate coating methods to facilitate electron transfer process and immobilize tyrosinase. Kinetic constant of enzyme after immobilization for both cresolase and catacholase activity were found to be 0.226 mM and 0.28 mM. As reducing power, the mean of electron transfer rate of electrode was found to be 5.2×10^{-4} cm/s.