

HRP biosensor based on carbonized maize tassel-MWNTs modified electrode for the detection of divalent trace metal ions

Abstract

The change in electrochemical behavior of horseradish peroxidase (HRP) activity induced by trace metals was used as a basis for developing an amperometric biosensor. The HRP was immobilized on maize tassel-multiwalled carbon nanotube (MT-MWCNT) through electrostatic interactions. The FTIR and UV-Vis results inferred that HRP was not denatured during its immobilization on MT-MWCNT composite. Using Cd^{2002B} as a model divalent metal ion, the inhibition rate was proportional to the concentration in the range from 0.002-0.030 mg L⁻¹ with a limit of detection of 0.51 µg L⁻¹. Representative Dixon and Cornish-Bowden plots showed that the reaction was reversible and noncompetitive.