عنوان مقاله:

Studies on secondary structures of Horseradish peroxidase immobilized on reduced graphene oxide nanoparticle

محل انتشار:

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خلاصه مقاله:

Horseradish peroxidase (HRP) (EC 1.11.1.7) is an oxidoreductase enzyme that oxidases a variety of organicand inorganic compounds. HRP is normally applied to catalyze the oxidation of substrates such as phenols andaromatic amines by H2O2. The free enzyme is not stable under different normal conditions, so immobilizationof the enzyme may be applied to keep the stability and reduce the cost of their applications significantly.During the past decades, nanoparticles are developed to support for enzyme immobilization. In this study, weattempt to immobilize HRP on reduced graphene oxide (RGO) functionalized nanoparticles to be used inremoving aromatic pollutants from wastewater. RGO can interact to HRP primarily through electrostaticinteractions and hydrogen bonding because this nanoparticle contains greater amounts of O-containingfunctional groups. The secondary structure of the free and immobilized enzymes was also evaluated by usingthe circular dichroism (CD) spectrometer. The far-UV region was scanned between 195 and 250 nm. Therelative contents of secondary structures, including α-helix, β-sheet, β-turn and random coil were calculated.Results obtained from CD spectra demonstrated that physical adsorption during the process of enzymeimmobilization leads to a decrease in α-helical structure and an increase in β-sheet, β-turn and random coilstructural amounts. The experimental observations also indicated that both activity and stability ofimmobilized enzyme is promoted. In conclusion, it can be implied that RGO has a good potential to improvethe preservation of HRP activity.

کلمات کلیدی:

Horseradish peroxidase, Physical adsorption, Reduced graphene oxide, CD spectroscopy analysis