

AChE/IL-GR/CHI/GCE结构酶电极的研制及其对毒死蜱农药的检测

作者: 郑莹莹, 刘志敏, 李婕, 展海军

单位: 河南工业大学

基金项目: 功能化离子液体修饰石墨烯构筑的生物传感界面及其在有

摘要:

利用氨基功能化离子液体修饰石墨烯(IL-GR)的独特性质, 以壳聚糖(CHI)为交联剂, 首先在玻碳电极表面固定IL-GR, 然后吸附乙酰胆碱酯酶(AChE)制得新型有机磷检测酶电极(AChE/IL-GR/CHI/GCE), 并用于卷心菜样品中毒死蜱农药残留的测定。采用透射电镜(TEM)表征了IL-GR的形貌, 采用循环伏安法(CV)和差分脉冲伏安法(DPV)研究了酶电极的电化学性质。结果表明, 在优化的实验条件下, 抑制率(I%)与毒死蜱浓度的对数在 1.0×10^{-10} ~ 1.0×10^{-5} mol/L范围内呈良好的线性关系, 检出限为 7.0×10^{-12} mol/L (S/N=3)。测定了卷心菜中毒死蜱的含量, 回收率为92.3% ~ 108.6%。

关键词: 酶电极; 石墨烯; 离子液体; 乙酰胆碱酯酶; 毒死蜱

Preparation of AChE/IL-GR/CHI/GCE Enzyme Electrode and Its Application for Chlorpyrifos Pesticide

Author's Name:

Institution:

Abstract:

According to the special properties of functionalized ionic liquid modified graphene (IL-GR), IL-GR was first immobilized on the glass carbon electrode via chitosan (CHI) cross-linking. Finally, acetylcholinesterase (AChE) can be immobilized on the composite film by adsorption. A novel biosensor for detecting organophosphorus pesticides enzyme biosensor (AChE/IL-GR/CHI/GCE) was developed and was used for the determination of chlorpyrifos. Different technologies were employed to study the construction process and the electrochemical properties of the biosensor. Linear relationship between the inhibition percentage (I%) and logarithm of concentration of chlorpyrifos was found in the range of 1.0×10^{-10} mol/L ~ 1.0×10^{-5} mol/L, and the detection limit was calculated to be about 7.0×10^{-12} mol/L (S/N=3). The recoveries of chlorpyrifos in vegetable were from 92.3 % to 108.6%.

Keywords: Enzyme electrode; Graphene; Ionic liquid; Acetylcholinesterase; chlorpyrifos

投稿时间: 2013-12-18

[查看pdf文件](#)