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A Highly Sensitive Electrochemical Methamidophos Immobilized AChE Biosensor for Organophosphorus Pesticides Detection

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Despite the harmful effects of organophosphorus pesticides (OPPs), few rapid detection methods of OPPs multi-residue have been practically applied; thus, it is important to improve existing methods and develop rapid detection methods and techniques. Reduced graphene oxide-chitosan (RGO-CHI)/methamidophos electrochemical biosensor was developed to detect multiple OPPs based on the principle of acetylcholinesterase (AChE) activity inhibition in the presence of OPPs. One OPP (methamidophos) that can combine with AChE in the incubation solution was immobilized on the electrode. The proposed method shows good linear relationships of nine OPPs and methomyl, a carbamate pesticide, with limits of detection between 0.05 and 0.52 ppb, indicating high accuracy for the application in real sample detection.

Keywords: Organophosphorus pesticides; highly sensitive electrochemical biosensor; AChE activity inhibition; multi-residue organophosphorus pesticides detection

FULL TEXT