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Enzyme-Based Biosensors for Electrochemical Detection of Pesticides - A Mini Review

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Abstract

Despite their important contribution in increasing crops production, most pesticides are harmful to humans and living beings and can persist in the environment over a long period of time. Traditional chromatographic methods of analysis are expensive and cumbersome. Biosensor technology appears therefore as an efficient and economical alternative for fast detection of pesticides. The devices are portable, rapid, and highly sensitive. Other important features of the devices are their relatively low limit of detection and response time. Enzymatic biosensors for pesticide detection rely either on the inhibition mechanism or on the catalytic activity of the immobilized enzyme toward a specific pesticide. Metal and carbon based nanomaterials are being widely used as immobilization support owing to novel characteristics such as biocompatibility and enhanced electron transfer ability for sensitive electrochemical detection, among others. This review focusses on the electrochemical detection of organophosphorus pesticides, delineating the limit of detection and response time of biosensors toward a wide range of organophosphorus pesticides.

Keywords

Biosensor; pesticides; enzyme; inhibition; electrochemical detection

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