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Recent Applications of Molecularly Imprinted Polymers (MIPs) on Screen-Printed Electrodes for Pesticide Detection

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Abstract

The overuse of pesticides in agricultural sectors exposes people to food contamination. Pesticides are toxic to humans and can have both acute and chronic health effects. To protect food consumers from the adverse effects of pesticides, a rapid monitoring system of the residues is in dire need. Molecularly imprinted polymer (MIP) on a screen-printed electrode (SPE) is a leading and promising electrochemical sensing

approach for the detection of several residues including pesticides. Despite the huge development in analytical instrumentation developed for contaminant detection in recent years such as HPLC and GC/MS, these conventional techniques are time-consuming and labor-intensive. Additionally, the imprinted SPE detection system offers a simple portable setup where all electrodes are integrated into a single strip, and a more affordable approach compared to MIP attached to traditional rod electrodes. Recently, numerous reviews have been published on the production and sensing applications of MIPs however, the research field lacks reviews on the use of MIPs on electrochemical sensors utilizing the SPE technology. This paper presents a distinguished overview of the MIP technique used on bare and modified SPEs for the detection of pesticides from four recent publications which are malathion, chlorpyrifos, paraoxon and cyhexatin. Different molecular imprint routes were used to prepare these biomimetic sensors including solution polymerization, thermal polymerization, and electropolymerization. The unique characteristics of each MIP-modified SPE are discussed and the comparison among the findings of the papers is critically reviewed.

Author keywords

Molecularly imprinted polymer; Pesticides; Screen-printed electrode; Sensor

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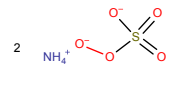
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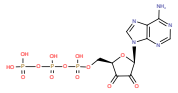
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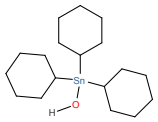
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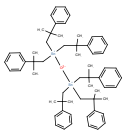
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