

ADVERTISEMENT


 Get e-Alerts  
Cite Share Jump to

ARTICLE | June 15, 2015

Electrochemical Determination of Chlorpyrifos on a Nano-TiO₂/Cellulose Acetate Composite Modified Glassy Carbon Electrode

Ammasai Kumaravel^S, and Maruthai Chandrasekaran^{*†}View Author Information 

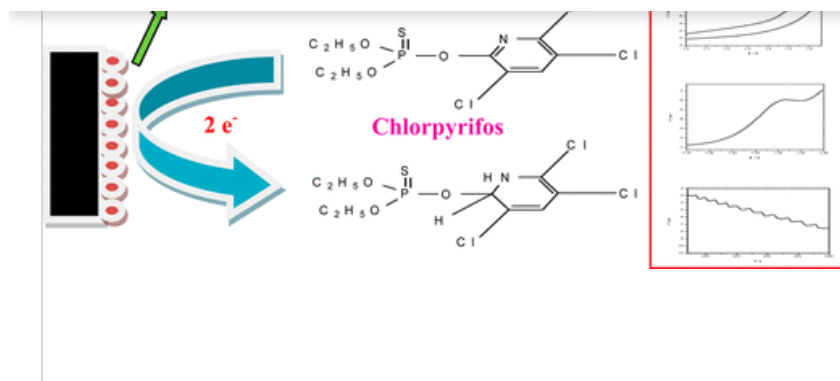
Access Through Your Institution

[Other Access Options](#)*Journal of Agricultural and Food Chemistry*Cite this: *J. Agric. Food Chem.* 2015, 63, 27, 6150–6156<https://doi.org/10.1021/acs.jafc.5b02057>Published June 15, 2015 

Copyright © 2015 American Chemical Society

[Request reuse permissions](#)

Abstract



A rapid and simple method of determination of chlorpyrifos is important in environmental monitoring and quality control. Electrochemical methods for the determination of pesticides are fast, sensitive, reproducible, and cost-effective. The key factor in electrochemical methods is the choice of suitable electrode materials. The electrode materials should have good stability, reproducibility, more sensitivity, and easy method of preparation. Mercury-based electrodes have been widely used for the determination of chlorpyrifos. From an environmental point of view mercury cannot be used. In this study a biocompatible nano-TiO₂/cellulose acetate modified glassy carbon electrode was prepared by a simple method and used for the electrochemical sensing of chlorpyrifos in aqueous methanolic solution. Electroanalytical techniques such as cyclic voltammetry, differential pulse voltammetry, and amperometry were used in this work. This electrode showed very good stability, reproducibility, and sensitivity. A well-defined peak was obtained for the reduction of chlorpyrifos in cyclic voltammetry and differential pulse voltammetry. A smooth noise-free current response was obtained in amperometric analysis. The peak current obtained was proportional to the concentration of chlorpyrifos and was used to determine the unknown concentration of chlorpyrifos in the samples. Analytical parameters such as LOD, LOQ, and linear range were estimated. Analysis of real samples was also carried out. The results were validated through HPLC. This composite electrode can be used as an alternative to mercury electrodes reported in the literature.

Copyright © 2015 American Chemical Society

Subjects

Cellulose Chromatography Electrodes Organic Compounds Redox Reactions

Keywords

Chlorpyrifos Biocompatible Modified Electrode Electroanalytical Sensor Detection Limits
Real Sample Analysis

Read this Article

To access this article, please review the available access options below.