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Application of Carbon Nanotube Nanocomposite decorated with different proportions of Prussian blue to detection of Carbendazim

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In order to ensure the control and appropriate use of agricultural pesticides, many countries and organizations impose limits on the maximum amount of residues in various matrices. In this context, the creation of new materials and the development of reliable techniques for the quantification and detection of pesticides in different matrices become extremely important and urgent. The electrochemical method stands out due to its advantages, such as: (i) simplicity; (ii) low cost of instruments; (iii) quick responses; (iv) portability[1]. This work explores the use of carbon nanotube (CNT) and Prussian blue (AP) nanocomposites as electrochemical sensors for carbendazim detection. CNT films were previously prepared in ITO for the electrosynthesis of Prussian blue nanotubes on CNT walls. This was achieved through the heterogeneous reaction between ferricyanide ions in solution and iron species present in the CNT film. Different amounts of AP electrodeposition were performed using cyclic voltammetry (50, 100 and 150 cycles). The compounds were characterized by UV-Vis, Raman, XRD, SEM, EDS and electrochemistry. The nanocomposites showed interaction between AP and CNTs, promoting greater stability and improving redox properties[2]. It was observed that the formation of AP in CNT occurs up to 100 cycles without the formation of AP aggregates, while with 150 cycles the formation of AP clusters in CNT is noted. The CNT composite with 50 electrodeposition cycles showed the best result for detection, indicating that greater amounts of Prussian blue impair the electrochemical response. The formation of composites of Prussian blue and carbon nanotubes promotes both electrochemical stability and improved conductivity.

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References

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