

Recent developments on graphene and its derivatives based electrochemical sensors for determinations of food contaminants

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Abstract

The sensing of food contaminants is essential to prevent their adverse health effects on the consumers. Electrochemical sensors are promising in the determination of electroactive analytes including food pollutants, biomolecules etc. Graphene nanomaterials offer many benefits as electrode material in a sensing device. To further improve the analytical performance, doped graphene or derivatives of graphene such as reduced graphene oxide and their nanocomposites were explored as electrode materials. Herein, the advancements in graphene and its derivatives-based electrochemical sensors for analysis of food pollutants were summarized. Determinations of both organic (food colourants, pesticides, drugs, etc.) and inorganic pollutants (metal cations and anions) were considered. The influencing factors including nature of electrode materials and food pollutants, pH, electroactive surface area etc., on the sensing performances of modified electrodes were highlighted. The results of pollutant detection in food samples by the graphene-based electrode have also been outlined. Lastly, conclusions and current challenges in effective real sample detection were presented. © 2022 Elsevier Ltd

Author keywords

Electrochemical sensors; Food pollutants; Graphene; Modified electrodes; Nanocomposites