

## Graphene-Based Nanobiosensors and Lab on Chip for Sensitive Pesticide Detection

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**Abstract :** Graphene materials are being widely used in electrochemistry due to their versatility and excellent properties as platforms for biosensing. Here we present current trends in the electrochemical biosensing of pesticides and other toxic compounds. We explore two fundamentally different designs, (i) using graphene and other 2-D nanomaterials as an electrochemical platform and (ii) using these nanomaterials in the laboratory on chip design, together with paramagnetic beads. More specifically: (i) We explore graphene as transducer platform with very good conductivity, large surface area, and fast heterogeneous electron transfer for the biosensing. We will present the comparison of these materials and of the immobilization techniques. (ii) We present use of the graphene in the laboratory on chip systems. Laboratory on the chip had a huge advantage due to small footprint, fast analysis times and sample handling. We will show the application of these systems for pesticide detection and detection of other toxic compounds.

**Keywords :** graphene, 2D nanomaterials, biosensing, chip design

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