World Academy of Science, Engineering and Technology
International Journal of Environmental and Ecological Engineering
Vol:9, No:04, 2015

# Biosensors for Parathion Based on Au-Pd Nanoparticles Modified Electrodes

**Authors :** Tian-Fang Kang, Chao-Nan Ge, Rui Li

**Abstract :** An electrochemical biosensor for the determination of organophosphorus pesticides was developed based on electrochemical co-deposition of Au and Pd nanoparticles on glassy carbon electrode (GCE). Energy disperse spectroscopy (EDS) analysis was used for characterization of the surface structure. Scanning electron micrograph (SEM) demonstrates that the films are uniform and the nanoclusters are homogeneously distributed on the GCE surface. Acetylcholinesterase (AChE) was immobilized on the Au and Pd nanoparticle modified electrode (Au-Pd/GCE) by cross-linking with glutaraldehyde. The electrochemical behavior of thiocholine at the biosensor (AChE/Au-Pd/GCE) was studied. The biosensors exhibited substantial electrocatalytic effect on the oxidation of thiocholine. The peak current of linear scan voltammetry (LSV) of thiocholine at the biosensor is proportional to the concentration of acetylthiocholine chloride (ATCl) over the range of 2.5 × 10-6 to 2.5 × 10-4 M in 0.1 M phosphate buffer solution (pH 7.0). The percent inhibition of acetylcholinesterase was proportional to the logarithm of parathion concentration in the range of 4.0 × 10-9 to 1.0 × 10-6 M. The detection limit of parathion was 2.6 × 10-9 M. The proposed method exhibited high sensitivity and good reproducibility.

**Keywords :** acetylcholinesterase, Au-Pd nanoparticles, electrochemical biosensors, parathion
**Conference Title :** ICEES 2015 : International Conference on Environmental and Earth Sciences
**Conference Location :** Venice, Italy
**Conference Dates :** April 13-14, 2015