

Hydrogel microarray based sensitive paraoxon biosensor utilizing metal-enhanced fluorescence(MEF) effect

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Organophosphorus compounds(OP) have been widely used as pesticides and used around the world. One such OP is paraoxon, which is poisonous if ingested, inhaled, or absorbed through the skin. Because of the acute toxicity, environmental monitoring of the concentration of paraoxon in food and air is more important. Numerous analytical methods have been used for the detection of OP, such as gas chromatography-mass spectrum(GC-MS), electrochemical method. These are all sensitive and reliable methods, however, they are time-consuming and expensive. So enzymatic bioassay has the ability to overcome these problem. in this study, a sensitive and selective method for the paraoxon detection based on enzyme inhibition and fluorescence quenching. Under the catalytic effect of acetylcholinesterase(AChE), paraoxon released p-nitrophenol which would lead to quench the Quantum dots. FRET between QDs and p-nitrophenol was utilized for the detection of low concentration of paraoxon. Furthermore we used the silica coated silver nanoparticles (Ag@SiO₂), could more sensitive detect of paraoxon through metal enhanced fluorescence(MEF)