

Biosensing in microfluidic channels using enzyme-fluorophore conjugates within Poly (ethylene glycol) particles for detection of organophosphorus compounds

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Microfabricated microfluidic devices provide useful platforms for sensing. The advantages of using microfluidic devices for sensing include small volume requirements, low cost, and accurate measurement. Biosensors based on acetylcholinesterase(AChE) inhibition have been developed and used for environmental monitoring. In this study, we fabricated poly(ethylene glycol) hydrogel microparticles containing pH-sensitive fluorophore(SNAFL-1) and AChE conjugates for the detection of organophosphorus compounds. The PEG particles containing enzyme-fluorophore conjugates were immobilized in microchannels created with PDMS and a glass substrate. PEG microparticles containing SNAFL-AChE conjugate exhibited a different emission intensity ratio in response to the microenvironmental pH changes due to the enzyme reaction between AChE and the analytes of interest. The feasibility of this system for the biosensor of organophosphorus compound analysis was evaluated.