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Biosensor for detection of organophosphate pesticide residues by screen printed carbon electrode (SPCE)-chitosan base

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Organophosphate pesticides are recommended pesticides by the Department of Agriculture, Indonesian government. Research has developed enzyme biosensor for detection organophosphate pesticide residues in agriculture products. The biosensor based on conductance measurement of organophosphate hydrolyzed by organophosphate hydrolase (OPH). The conductance cell consisted of a pair of Screen Printed Carbon Electrode (SPCE), which is as a working and reference electrode. Working electrode is SPCE which contain immobilized OPH on chitosan membrane by cross linked method with glutaraldehyde. The area of electrodes was optimized to 3 mm², 5 mm² and 7 mm². The OPH was isolated from *Pseudomonas putida*, that were purified by ammonium sulfate precipitation method, 6444 ppm (A) and 7865 ppm (B). The organophosphate pesticide samples were 0 to 0.1 ppm in tris-acetate buffer 0.05 M pH 8.5. The results showed that the performance of biosensor made by A enzyme is better than biosensor by B. The highest sensitivity of biosensor was resulted by electrodes of area 5 mm². The sensitivity of biosensor in between 109-242 μ S/ppm with a detection limit for each of organophosphates is 0.03 ppm (diazinon); 0.03 ppm (malathion); 0.04 ppm (chlorpyrifos), and 0.03 ppm (profenofos). The detection limit of the biosensor is lower than maximum threshold of organophosphate pesticide residues in agriculture products.

Biography

Ani Mulyasuryani has completed her PhD in 2002 from Chemistry Department, Institute of Technology Bandung, Indonesia. She is the lecturer and researcher at Chemistry Department, faculty of Mathematics and Natural Sciences, University of Brawijaya, Malang, Indonesia. Now she serves as head of the chemistry master program. She developed enzyme biosensors since 2007.

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