A cell-based potentiometric biosensor using the fungus Lentinus sajor-caju for permethrin determination in treated wood

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The characteristics of a potentiometric biosensor for the determination of permethrin in treated wood based on immobilised cells of the fungus Lentinus sajor-caju on a potentiometric transducer are reported this paper. The potentiometric biosensor was prepared by immobilisation of the fungus in alginate gel deposited on a pH-sensitive transducer employing a photocurable acrylic matrix. The biosensor gave a good response in detecting permethrin over the range of 1.0-100.0 μM. The slope of the calibration curve was 56.10 mV/decade with detection limit of 1.00 μM. The relative standard deviation for the sensor reproducibility was 4.86%. The response time of the sensor was 5 min at optimum pH 8.0 with 1.00 mg/electrode of fungus L. sajor-caju. The permethrin biosensor performance was compared with the conventional method for permethrin analysis using high performance liquid chromatography (HPLC), and the analytical results agreed well with the HPLC method (at 95% confidence limit). There was no interference from commonly used organophosphorus pesticides such as diazinon, parathion, paraoxon, and methyl parathion. © 2013 Elsevier B.V.