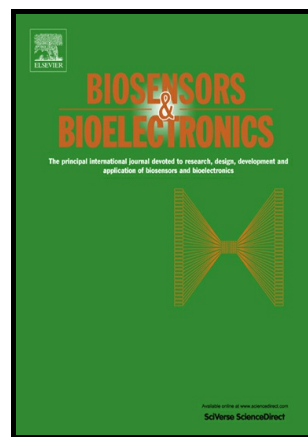


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## Ultra-sensitive detection of malathion using quantum dots-polymer based fluorescence aptasensor

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### ABSTRACT

A novel detection platform with high malathion specificity has been developed, which operates based on the signal response in the fluorescence of CdTe@CdS quantum dots (QDs). The designed nanoprobe comprises of QDs, poly(N-(3-guanidinopropyl)methacrylamide) homopolymer (PGPMA) and malathion specific aptamer. The interaction of aptamer with malathion results in switching off of the fluorescence signal of the probe due to the availability of the cationic polymer, which causes quenching of the QDs. However, in the absence of malathion, the polymer interacts with the aptamer, via electrostatic interactions thereby rendering the fluorescence of QDs unaffected. The assay exhibited excellent sensitivity towards malathion with a detection limit of 4 pM. A logarithmic correlation was observed in a wide range of malathion concentrations from 0.01 nM to 1  $\mu$ M, facilitating the potential of proposed assay in the quantitative determination of the analyte of interest. The selectivity of the designed probe was confirmed in the presence of various pesticides, commonly employed in agricultural fields.

**KEYWORDS:** Core shell quantum dots; guanidinium-containing polymers; aptamer; fluorescence quenching; malathion.

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