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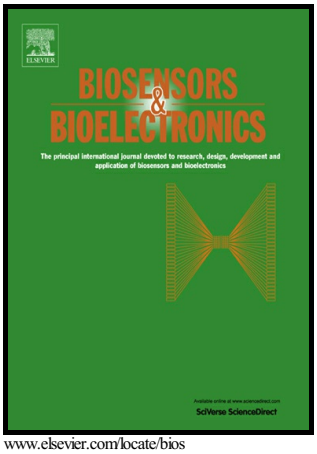

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Aptamer functionalized MoS_2-rGO nanocomposite based biosensor for the detection of Vi antigen

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Abstract

We report a novel aptamer functionalized MoS_2-rGO based electrochemical method for Vi polysaccharide antigen mediated detection of enteric fever. Herein, highly selective anti-Vi aptamers were screened from a pool of oligonucleotides using a microtitre based SELEX approach and characterized for its specificity and stabilty. The MoS_2-rGO nanocomposite was synthesized using a liquid assisted exfoliation by taking optimum ratio of MoS_2 and rGO. The nanocomposite presented synergistic effect owing to easy biomolecular functionalization and enhanced conductivity. The screened anti-Vi aptamers were embedded on the MoS_2-rGO nanocomposite via thiol linkage to give a stable biointerface. The developed aptasensor was characterized and further evaluated for its performance with different conc. of Vi antigen using ferrocene labeled boronic acid as an electroactive probe. The aptasensor responded linearly in the range between 0.1 ng mL^{-1} to 1000 ng $mL^{-1}$with a detection limit of 100 pg mL^{-1}, and did not show any cross-reactivity with other bacterial polysaccharides indicating high specificity. The applicability of the developed aptasensor was further validated in urine and sera specimens spiked with Vi antigen.

Keywords: Aptamers, MoS_2-rGO nanocomposite, Square wave voltammetry (SWV), Ferrocene-boronic acid, Vi capsular polysaccharide.

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