# PNA biosensor based on reduced graphene oxide/water soluble quantum dots for the detection of Mycobacterium tuberculosis


## ABSTRACT

Electrochemical biosensor holds great interest in establishing robust analytical method for Mycobacterium tuberculosis (M. Tuberculosis). Herein, fabrication of a highly sensitive electrochemical PNA biosensor based on functionalized graphene oxide (NH2-GO) composited with CdS quantum dots (QDs) for the detection of M. Tuberculosis has been described. Firstly, NH2-GO/QDs was applied onto screen-printed carbon electrode (SPCE) surface by electro-deposition method, then the PNA probe was immobilized onto the surface of NH2-GO/QDs modified SPCE via EDC/NHS coupling technique. Subsequently, the developed PNA biosensor was used to hybridize with target DNA. Differential pulse voltammetry (DPV) was employed to monitor the hybridization event by using methylene blue (MB) as the electrochemical indicator. Under the optimal conditions, a linear detection range of the PNA biosensor was obtained from 1 × 10−11 to 1 × 10−7 M with the detection limit of 8.948 × 10−13 M. The biosensor has successfully discriminated between negative and positive sample of M. Tuberculosis DNA sequences from real sample analysis.



**Keyword**: Mycobacterium tuberculosis; Graphene oxide; Quantum dots; Biosensor