Short Communication

Oriented T4 Bacteriophage Immobilization for Recognition of *Escherichia coli* in Capacitance Method

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One of the important aspects in biotechnology is the development of a rapid and selective approach for the identification and quantization of *Escherichia coli* (*E. coli*) bacteria. In this research, we fabricated a novel Label-free electrochemical *E. coli* biosensor based on oriented immobilization of T4 biotinylated bacteriophage as recognition receptor of *E. coli* on streptavidin immobilized on polyaniline (PANI) glassy carbon (GC) modified electrode. Labeled PANI was synthesized by chemical method and characterized by Raman and cyclic voltammetry (CVs) and field emission scanning electron microscope (FESEM). The bacteriophage/PANI/GC electrodes were applied as indicator electrodes for capacitance determination of *E. coli* bacteria. By fabricating this biosensor, *E. coli* was sensed in a linear range and detection limit of 10-98 N/mL and 10 N/mL (N stands for number of *E. coli*) respectively. The proposed biosensor shows fast response time of ~1 s and good selectivity over other bacteria. We successfully developed and implemented an *E. coli* biosensor based on oriented bacteriophage immobilization on PANI modified GC electrode. This biosensor is cost-effective, rapid, renewable and high selective for detection of *E. coli* bacteria. Also, this method can be extension to detection of other biological agents.

Keywords: *E. coli*, bacteriophage T4, capacitance, biosensor, PANI.

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