

## **Development of electrochemical DNA biosensor for *Trichoderma harzianum* based on ionic liquid/ZnO nanoparticles/chitosan/gold electrode**

### **Abstract**

Electrochemical DNA biosensor was successfully developed by depositing the ionic liquid (e.g., 1-ethyl-3-methylimidazolium trifluoromethanesulfonate ([EMIM][Otf])), ZnO nanoparticles, and chitosan (CHIT) nanocomposite membrane on a modified gold electrode (AuE). The electrochemical properties of the [EMIM][Otf]/ZnO/CHIT/AuE for detection of DNA hybridization were studied. Under optimal conditions using cyclic voltammetry, the target DNA sequences could be detected in the concentration range of  $1.0 \times 10^{-18}$  to  $1.82 \times 10^{-4}$  mol L<sup>-1</sup>, and with the detection limit of  $1.0 \times 10^{-19}$  mol L<sup>-1</sup>. This DNA biosensor detection approaches provide a quick, sensitive, and convenient method to be used in the identification of *Trichoderma harzianum*.