RAPID AND SENSITIVE ELECTROCHEMICAL BIOSENSOR FOR THE DETECTION OF PLANT PATHOGEN DNA USING COLLOIDAL GOLD NANOPARTICLES

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Developing molecular diagnostics with rapid and sensitive characteristics is challenging. Herein, a nanoparticle-based electrochemical biosensor was developed for rapid and sensitive detection of plant pathogen DNA (*Pseudomonas syringae*) on screen-print carbon electrode (SPCE). Firstly, the target DNA was PCR-amplified and enriched with magnetic beads. The assay detects the PCR-amplified target DNA with the specific DNA probes. Gold nanoparticles labeled with the DNA probes were employed to capture the amplified targets, which are then detected by differential pulse voltammetry (DPV). As lower as 1500 copies of PCR products were detected with high specificity. With the replacement of PCR with Recombinase Polymerase Amplification (RPA), the sensitivity of the assay was significantly increased 100x to 15 copies of RPA product. Finally, detection of this pathogen DNA on the infected plant was also achieved with high specificity, indicating that the developed assay has great potential for the real application in the field.

Keywords: electrochemical biosensor, colloidal gold nanoparticles, plant pathogen detection