**ASSOC. PROF. DR. JAAFAR ABDULLAH**
Head, Functional Nanotechnology Devices Laboratory
Expertise: Fluorescence sensing, Chemical Sensor, Biosensor, nucleic acid hybridization
Email: jafar@upm.edu.my
Phone: +603.9769.7532 / 6980

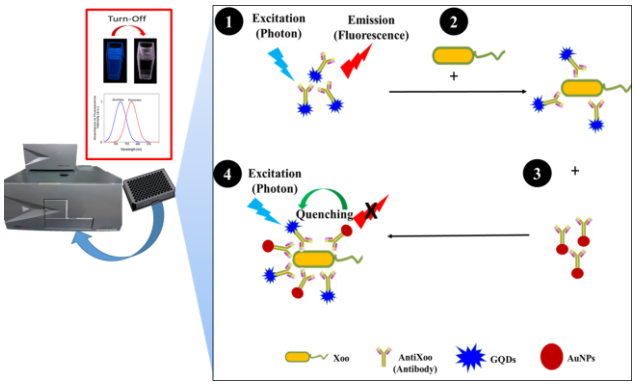
Google Scholar: Link
ResearchGate : Link
Scopus Author ID: 21742117500

ORCID

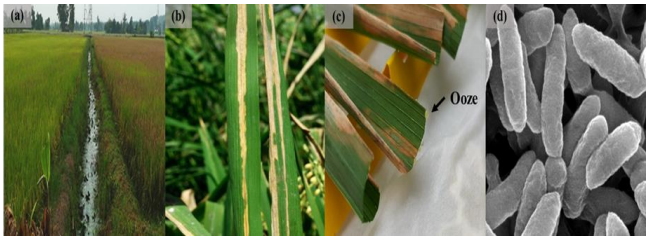
# RESEARCH HIGHLIGHTS

## 1. Fluorescence Sensing Platform Based on Graphene Quantum Dots Based for Pathogen Detection

This research focused on the development of *turn-off* fluorescence-graphene quantum dots-based immunoassay for the early detection of *Xanthomonas oryzae pv. oryzae (*Xoo*)*, a gram-negative bacteria that causes rice bacterial leaf blight disease. The specific antibody against Xoo cells was produced as specific bio-recognition molecules. The conjugation of this antibody with graphene quantum dots and gold nanoparticles was performed and characterized respectively. The combination of these two bioprobes as fluorescent donor and metal quencher showed fluorescence signal changes which proportional to the logarithm of Xoo cells in the range of $10^0$ to $10^5$ CFUmL$^{-1}$. The limit of detection was achieved at 22 CFUmL$^{-1}$ and the specificity test against other plant disease pathogens showed high specificity to Xoo. The detection of Xoo in real plant samples was also performed in this study and demonstrated satisfactory results.



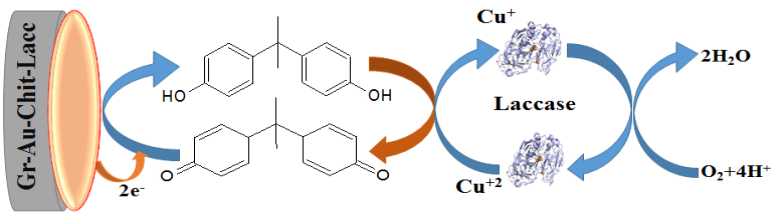

Schematic diagram of fluorescence graphene quantum dots based immunosensor that using two probes of antibody conjugated with GQDs and gold nanoparticles




Bacterial leaf blight disease in rice crops (a) A view of BLB-infected paddy field at Sekinchan, Selangor, Malaysia; (b) BLB's symptom of yellowish strip lesions along the leaf margin; (c) Bacterial ooze from BLB infected leaves (IRRI) and (d) scanning electron microscopy (SEM) image of Xoo cells

## 2. Electrochemical Biosensor based Graphene-gold/chitosan Composite for Phenolic Detection

Bisphenol A (BPA) is considered one of the most common chemicals that could cause environmental endocrine disrupting. Therefore, there is an increasing demand for simple, rapid and sensitive methods for BPA detection that result from BPA leaching into foods and beverages from storage containers. Herein, a simple laccase electrochemical biosensor was developed for the determination of BPA based on screen-printed carbon electrode (SPCE) modified graphene gold/chitosan. The synergic effect of graphene-gold/chitosan nanocomposite as electrode modifier greatly facilitates electron-transfer processes between the electrolyte and laccase enzyme, thus leads to a remarkably improved sensitivity for bisphenol A detection. The developed laccase biosensor offered excellent analytical performance for the detection of BPA with a sensitivity of 0.271 µA/µM and limit of detection (LOD) of 0.023 µM, respectively. Moreover, the constructed biosensor showed good reproducibility, selectivity and stability towards BPA.




The possible mechanism of bisphenol A catalyze by laccase at modified electrode