

6<sup>th</sup> International Conference and Exhibition on

# Biosensors & Bioelectronics

September 22-23, 2016 Phoenix, USA

## Pedot: Pss and gold nanocomposite activated electrochemical sensor for the recognition of fungal DNA

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Electrochemical sensors are designed to observe current or potential changes as a result of interaction between the sample matrix surface and the sensor. The major challenges with the application of sensors is the recognition of small sequences in large amounts of double stranded DNA. A designed functionalized Pedot:Pss with gold nanocomposite modified gold electrode has enhanced the sensitivity of the sensor for easy recognition of DNA. Gold nanoparticles solution was synthesized and characterized using UV-Vis spectroscopy and XRD for the formation of nanocomposite with a conductive poly(3,4-ethylenedioxythiophen)-poly (styrenesulfonate) (Pedot-Pss) film on gold electrode which was also characterized using FE-SEM. Bare and the modified gold electrode surfaces were characterized using Cyclic Voltammetry (CV) technique for the active surface area. Immobilization of a 20-mer single stranded peptide nucleic acid (ssPNA) probe as the bioreceptor of the sensor was achieved by covalent attachment of the amine group of the capture probe to a carboxylic group of an activated 3,3'-dithiodipropionic acid layer using EDC/NHSS. The sensitivity of the sensor was optimized using differential pulse voltammetry (DPV) and the sensor demonstrated specific detection for the target concentration ranged between  $1.0 \times 10^{-15}$  M to  $1.0 \times 10^{-9}$  M with a detection limit of  $1.55 \times 10^{-18}$  M. Hybridization of the bioreceptor with perfectly matched target DNA related to *Ganoderma boninense* fungal disease was successful in TE supporting electrolyte and monitored using a new ruthenium complex  $\text{Ru}(\text{dppz})_2(\text{qtpy})\text{Cl}_2$ ;  $\text{dppz} = \text{dipyrido}[3,2\text{-a};2',3'\text{-c}]$  phenazine and;  $\text{qtpy} = 2,2',4,4''\text{-quaterpyridyl}$  redox indicator using cyclic voltammetry (CV). The sensor was also able to detect genomic DNA of *Ganoderma boninense* (*G. boninense*) extracted via DNeasy plant mini kit procedure from a cultured fungal isolate harvested from palm oil tree. The probe is found to have good analytical recognition performance.

### Biography

Sabo Wada Dutse has completed his PhD from Universiti Putra Malaysia in 2014. He is the Director of College of Science and Technology, Hussaini Adamu Federal Polytechnic, Kazaure, Jigawa, Nigeria. He has published papers in reputed journals and has been serving as a Lecturer and an Administrator.

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