

The development of cholesterol biosensor based on cholesterol oxidase implanted in the matrix of scaffolds film modified on screen printed carbon electrode

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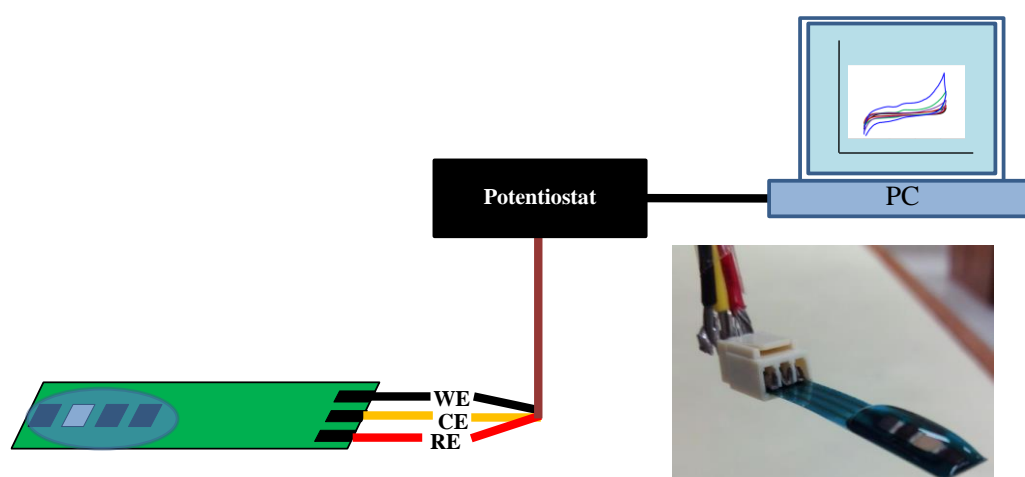
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The development of electrochemical biosensor for cholesterol determination in blood sample using carbon nanotube (CNT), chitosan (CHIT), gold nanowires (AuNW), nickel hexacyanoferrate (NiHCF) and cholesterol oxidase (ChOx) was fabricated on screen printed carbon electrode (SPCE). The optimized conditions of composited electrode were found to be 9 mg ChOx, 10 mg CNT, 5 mg AuNW, 0.5% CHIT and 20 cycles of NiHCF. The figure of merit of the biosensor were tested using chronoamperometry at 0.40 V. The characteristic of this biosensor such as linearity range was found to be 5 μM – 15 mM cholesterol with the detection limit of 3.8 μM cholesterol (S/N=3). The good repeatability and reproducibility showed 4.55 %RSD (n=8) and 6.34 %RSD (n=13), respectively. This biosensor showed moderated life time usages of 13 times. The interferences chemicals such as sucrose, fructose were investigated. Sucrose were not interfered at 100 mM, while the ascorbic and the salt such as potassium and sodium were not interfered at 5 mM and 1 M, respectively. This biosensor can be used for cholesterol detection in real blood sample. Both accuracy and precision of the developed biosensor comparing with the standard method were not different at the confidence interval of 95%.



Keywords: Cholesterol biosensor; Nanomaterials; Screen printed carbon electrode