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Synthesis of polypyrrole doped polydopamine nanocomposite for non-enzymatic electrocatalytic oxidation of uric acid

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Abstract

Uric acid is mainly produced from metabolism of purine nucleotide in human body and have several medical importance in human system. It is therefore very imperative to develop a sensitive and accurate method of its detection. This study aimed to develop uric acid biosensor based on polydopamine-co-polypyrole (PDA-co-PPY) nanocomposite decorated on glassy carbon electrode. The conductive polymer PDA/PPY was electrochemically synthesized and casted on glassy carbon electrode (GCE). The synthesized PDA-co-PPY was characterized by Fourier transform infrared spectroscopy (FTIR), field emission scanning electron microscopy (FESEM), electrochemical impedance spectroscopy (EIS), energy dispersive x-ray spectroscopy (XEDS) and x-ray photoelectron spectroscopy (XPS). After the electrochemical synthesis and deposition on glassy carbon electrode, the mass of copolymeric film (PDA-co-PPY) deposited was 0.3 µg. As synthesized PDA-co-PPY modified GCE showed good response towards electrocatalytic oxidation of uric acid with low limit of detection (0.1µM, S/N =3), good linearity (0.5-40µM) and high sensitivity (2.1µAµMcm-2). It was also found that PDA-co-PPY modified GCE displayed stable current response for uric acid unaffected by common interferents (electroactive substances). Also, when used for uric acid detection in human serum and urine, it showed a good recovery of 90-110%. The developed PDA-co-PPY nanocomposite is proposed as a promising biosensor for uric acid for human health protection.

Biography

Waheed A Adeosun is current rounding up his Ph.D in Organic Chemistry at King Abdulaziz University. He has a number of publications in reputable journals.

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