

3rd International Conference and Exhibition on **Biosensors & Bioelectronics**

August 11-13, 2014 Hilton San Antonio Airport, San Antonio, USA

Design of a stable solid-contact ion-selective electrode based on polyaniline nanoparticles as ion-to-electron transducer for quantification of dopamine in pharmaceutical formulations and human blood serum

Mohamed K Abd El-Rahman, Amr M Mahmoud, Mamdouh R Rezk and Mohamed R Elghobashy
Cairo University, Egypt

Selective and sensitive determination of dopamine in the presence of a large excess of ascorbic acid is a challenging analytical task. The purpose of this work is to develop a junction between the electrochemical quantification of neurotransmitters and recent advances in designing stable and reproducible solid-contact ion selective electrodes (SC-ISEs). The long-term stability of the chemically prepared polyaniline (PANI) nanoparticles to be applied as an intermediate ion-to-electron transducer layer between an ionophore-doped PVC membrane and solid contact glassy carbon electrodes was exploited. PANI nanoparticles were chemically polymerized and characterized spectroscopically and the particle size was determined to be 8 nm. The inclusion of PANI nanoparticles as a transducer layer added more stability to the electrical signal due to their excellent electronic and chemical properties. The fast ion-to-electron transduction allows obtaining short response times and the hydrophobic behaviour of PANI nanoparticles avoids the formation of thin water layers at the electrode/membrane interface. These results enabled the production of a series of SC-ISEs with improved piece-to-piece reproducibility where the potential was stable over 30 days with drift of 0.9 mV/h. The linear range was 2.3×10^{-7} to 1.0×10^{-2} mol L⁻¹ and the detection limit was calculated to be 7.8×10^{-8} mol L⁻¹. The fabricated electrode has been successfully applied for recovery assays of dopamine in pharmaceutical formulations and human blood serum. Therefore, the new sensor represents an interesting and promising alternative for the electrochemical quantification of neurotransmitters and other analytes of clinical interest.

Biography

Mohamed K Abd El-Rahman received his Master's degree in 2008 and his PhD in 2011 in the field of Analytical Chemistry from Faculty of Pharmacy, Cairo University. He is working presently as Lecturer in the Department of Analytical Chemistry, Faculty of Pharmacy, Cairo University. His research interest includes supramolecular host-guest chemistry, development of ionophore-based ion selective electrodes for pharmaceutical analysis, spectroscopy and chromatography. He has published more than 10 research papers in different international journals of repute.

khaled20m20@hotmail.com