An Efficient Electrocatalyst for the Nano-Level Detection of Neurotransmitter (Dopamine) in Biologic Matrices based on Samarium (III) Oxide Nanoparticles; An Electrochemical Approaches

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Dopamine (DA) play a vital role in brain as a neurotransmitter and its excess secretion can leads to several abnormalities. The important challenge in DA detection was the existence of interference like ascorbic acid and uric acid in blood. Therefore, it is important to improve the selective and sensitive detection of DA in biological samples. Herein, we reported the synthesis of samarium oxide (Sm₂O₃) nanoparticle for the selective detection of DA. The morphological and chemical composition of the as prepared Sm₂O₃ NPs was characterized by using FESEM and XRD. In addition, the synthesized Sm₂O₃ NPs were modified on the GCE surface, which was subjected for the determination of DA. Moreover, the Sm₂O₃ NPs/GCE has displayed the wider covering range of 0.01 to 342.9 μM with limit of detection up to 2.54 nM. The Sm₂O₃ NPs/GCE were successfully examined with DA spiked human blood serum and urine samples, which shows the appreciable found and recovery values.

Keyword: Samarium oxide; Dopamine sensor; neurotransmitter; biologic matrices; electrochemical method.

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