**Non-Enzymatic Electrochemical Biosensor for Dopamine Detection Using MoS2/rGO/Ag Nanostructure**

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**Abstract**

Designing an ultra-sensitive and stable sensor platform for real-time sensing of dopamine (DA) and Serotonin (5-HT) is highly desirable. Herein we have prepared an electrochemical sensor where sensitivity is greatly enhanced by modifying rGO with sulfonic acid groups [1]. To further enhance the sensitivity of the electrochemical composite material, the introduction of additional asymmetricity through the incorporation of Transition metal Dichalcogenide (TMD) materials was attempted. Keeping in account the higher cost and synthetic complexities related to the use of MNPs like Pt, Au, Ag, etc, Copper Nanoparticles (CuNPs) were used as preferred the choice of interest for further enhancement of electrical properties. [2-3] During the synthesis CuNPs were incorporated in situ, in the MoS2 -Sulphonated Graphene matrix. The reported Cu/MoS2/SG nanocomposite has demonstrated better electrical conductivity, electrochemical sensitivity, and selectivity during the electrochemical sensing of the analytes DA and 5-HT as compared to recently reported studies. The modified electrocatalyst shows a wide linear range of 0.01 nM to 0.5 nΜ for DA concentrations (with a correlation coefficient of 0.99552) and a linear range of 0.005 nM to 0.05 nΜ for 5-HT concentrations (with a correlation coefficient of 0.99174). The Limit of Detection (LOD) value was calculated to be 0.85 nm for DA and 0.62 nm for 5-HT (S/N = 3). The sensor exhibited good stability in peak current potentials over a period of 30 days. Chronoamperometry, Tafel plots, and EIS revealed that the nanocomposite would find potential diagnostic applications. The prepared nanocomposite with its excellent electrocatalytic activity might emerge as a promising electrode for the detection of DA and 5-HT in human urine samples.

References:

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