Electrochemical Detection of Norepinephrine Using Sponge-like Co$_3$O$_4$ Modified Screen Printed Carbon Electrode

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Neural diseases, like Parkinson’s and Alzheimer’s widely increase portions of degenerative nerve disease, are related to norepinephrine (NE) concentration with proportional correlation. Quantification of NE is difficult as NE coexists with dopamine (DA), ascorbic acid (AA), and uric acid (UA), which interfere with the detection of NE in biological samples. We report the fabrication of sponge-like Co$_3$O$_4$ particles modified screen printed carbon electrode for highly selective and sensitive detection of NE. Compared with recent studies, our newly developed sensor appears to have not only a wide detection range (0.1-1525 μM) but also superior detection limit (75 nM). The Co$_3$O$_4$ particles were prepared by simple, very cheaper and reproducible method. The effect of concentration and kinetics of electrochemical detection of NE were studied. Furthermore, the modified electrode was appreciable stability, repeatability and reproducibility. In addition, the practical feasibility of the modified sensor is demonstrated in biological samples.

Keywords: Nanomaterials, metal nanoparticles, electrocatalysis, electrochemical methods, sponge like Co$_3$O$_4$, neurodegenerative diseases, norepinephrine.

FULL TEXT