A simple and Novel Electroanalytical Method for Determination of Brain Serotonin Based on the MWNTs/Al₂O₃/chitosan SPE

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In this work, a simple and novel method for determination of brain serotonin (5-HT) in depression mice was proposed with modified screen-printed electrode based on MWNTs/Al₂O₃/chitosan. The modified SPE displayed excellent electrocatalytic activity towards the oxidation of 5-HT in real brain tissue samples. Square wave voltammetry (SWV) was employed to optimize the experimental conditions. The proposed sensor showed voltammetric responses with high and good sensitivity for 5-HT in optimal conditions. The peak current of 5-HT was proportional to the concentration in the range of 0.01 µM to 1.0 µM with the detection limit 0.005 µM. Compared with the HPLC method, the newly developed method also presented good results in the detection of brain 5-HT level, which made it possible for helping depression disease diagnosis. In conclusion, our experimental results strongly suggested that the established SPE could be used to the fast depression determination of 5-HT, which might offer a potential minor tool for in future.

Keywords: Disposable sensor, brain serotonin, modified screen printed electrode, clinical depression diagnosis

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