

Electrochemical sensor for sensitive determination of ferulic acid based on the manganese dioxide nanoparticles–MWCNT nanocomposites

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We prepared on an electrochemical sensor for the detection of ferulic acid (FA) that is based on a glassy carbon electrode modified with functional multiwalled carbon nanotubes that are decorated with MnO₂ nanoparticles. The new electrode shows excellent electrochemical catalytic activity towards the oxidation of ferulic acid at pH 7. Cyclic voltammetry reveals a 23 mV decrease in the peak-to-peak separation of the oxidation and reduction waves. Under optimized conditions, the anodic peak current at a voltage of 150 mV (vs. Ag/AgCl) is linearly related to the peak current in the 0.082–220 μM concentration range, and the limit of detection (at an SNR of 3) is 10 nM. The sensor was applied to the determination of FA in spiked human serum samples and gave satisfactory results, with recoveries ranging from 97 to 99.2 %.