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A facile and practical biosensor for choline based on manganese dioxide nanoparticles synthesized in-situ at the surface of electrode by one-step electrodeposition

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ABSTRACT

In this paper, a facile and sensitive biocompatible biosensor based on Nafion/choline oxidase/manganese dioxide composite film was developed for the determination of choline chloride. Manganese dioxide (MnO_2) nanoparticles, possessing the advantages of large specific surface areas, good hydrophilicity, great permeability as well as excellent biocompatibility, were synthesized in-situ at the surface of the glassy carbon electrode (GCE) by one-step electrodeposition. And then, choline oxidase (ChOx) was immobilized on the MnO_2 modified GCE with coating a Nafion film to hold the ChOx/ MnO_2 film on the electrode surface firmly. Upon optimized conditions, a linear range of 8.0 μM –1.0 mM was obtained for the sensor in a cyclic voltammetry method, with a detection limit as low as 5.0 μM . Besides, the biosensor was successfully employed to detect choline in milk, milk powder

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