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Determination of Antidepressants Using Monoamine Oxidase Amperometric Biosensors Based on Screen-Printed Graphite Electrodes Modified with Multi-Walled Carbon Nanotubes

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Abstract

© 2014, Springer Science+Business Media New York. Novel amperometric biosensors based on screen-printed graphite electrodes modified with multi-walled carbon nanotubes (MWCNTs) dispersed in various solvents (chitosan, DMF) and immobilized monoamine oxidase (MAO) were developed for the determination of the antidepressants imipramine and afobazole. It was found that afobazole and imipramine inhibited MAO, which allowed these pharmaceuticals to be determined within the concentration range from 0.1 mM to 1 nM by recording the H2O2 oxidation wave when dopamine and epinephrine were used as MAO substrates. The best analytical performance was observed for MAO biosensors modified by MWCNTs in chitosan solution, for which the lower detection limit was 3 – 9 nM. The main active ingredients in melipramine and afobazole preparations were quantified with an RSD of 0.08 using the MAO-based amperometric biosensors.

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Keywords

afobazole, amperometric biosensor, antidepressants, carbon nanotubes, imipramine