

Surface modification of electrodes by carbon nanotubes and gold and silver nanoparticles in monoaminoxidase biosensors for the determination of some antidepressants

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Abstract

© 2017, Pleiades Publishing, Ltd. Surface modification of screen-printed graphite electrodes with nanostructured materials (multiwall carbon nanotubes, gold and silver nanoparticles) allow their application as supports of amperometric monoaminoxidase biosensors for the determination of antidepressant drugs (moclobemide, tianeptine, and amitriptyline). This approach improves analytical characteristics of the corresponding biosensors because of the inhibitory effect of antidepressants (two-parameter concerted inhibition) on the catalytic activity of an immobilized enzyme. The analytical capabilities of the developed biosensor types were compared. The range of working concentrations was from 5×10^{-9} to 1×10^{-4} M and the lower limit of the analytical range was of about 8×10^{-10} M. Biosensors based on electrodes modified with nanostructured materials were tested in the control of the concentration of drugs in body fluids (urine) and dosage forms.

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Keywords

antidepressants, biosensor, carbon nanotubes, gold and silver nanoparticles, monoaminoxidase

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