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Differential pulse voltammetric determination of dopamine at glassy carbon electrode modified with molecularly imprinted polyethacridine

Anton Alexandru Ciucu
University of Bucharest, Romania

A simple and reliable method for preparing a selective dopamine (DA) sensor based on a molecularly imprinted polymer of ethacridine (ET) was proposed. The molecular imprinted electrode was prepared through electrodepositing ET-DA film on the glassy carbon electrode (GCE) emoving DA from the film via chemical induced elution. The molecular imprinted sensor was tested by cyclic voltammetry (CV) as well as by differential pulse voltammetry (DPV) to verify the changes in oxidative currents of DA. The prepared sensor exhibited highly sensitive response to the oxidation of DA. In optimized DPV conditions the oxidation peak current was well-proportional to the concentration of DA in the range from $2.0x10^{-8}$ M to $10.7x10^{-8}$ M. The limit of detection (3σ) of dopamine was found to be as low as 4.4 nM, by the proposed sensor that could be considered a sensitive marker of dopamine depletion in Parkinson's disease. Good reproducibility with relative standard deviation of 1.4% and long term stability within two weeks were also observed. Under the optimized conditions the dopamine-imprinted polyethacridine (PET-DA) films were found to selectively detect DA against the physiologically common interferents ascorbic acid, uric acid and paracetamol. The modified sensor was validated for the analysis of DA in deproteinized human serum samples using differential pulse voltammetric technique.

Biography

Anton Alexandru CIUCU is a Professor, PhD in University of Bucharest in Romania. He is focused with research interest on biosensor development and practical applications in bioanalysis. Fundamental studies in bio-electrocatalysis, direct electron transfer enzyme catalyzed redox reactions; Engineering of biosensors based on electrochemical detection of direct electron transfer, enzyme sensor for direct detection of substrates of enzymes expressing bio-electrocatlytic properties. DNA sensors, electrochemical approaches for DNA direct assay. Practically useful solutions are sought for the application of biosensor in process control, in biomedical applications, e.g. miniaturization for home monitoring as well as for in and *ex vivo* monitoring and development of portable and hopefully even implantable sensor-chips. He had an industrial experience of 3 years as a Biochemist at the Pharmaceutical Factory in Bucharest.

anton_ciucu@yahoo.com