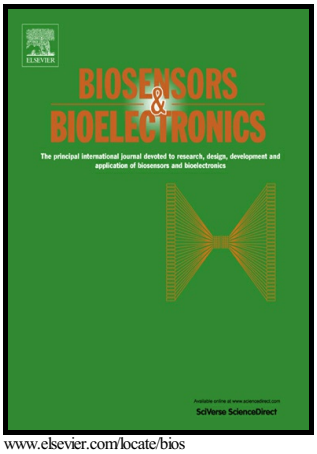

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FROM ELECTROCHEMISTRY TO ENZYME KINETICS OF CYTOCHROME P450

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ABSTRACT

This review is an attempt to describe advancements in the electrochemistry of cytochrome P450 enzymes (EC 1.14.14.1) and to study molecular aspects and catalytic behavior of enzymatic electrocatalysis. Electroanalysis of cytochrome P450 demonstrates how to translate theoretical laws and equations of classical electrochemistry for the calculation of the kinetic parameters of enzymatic reactions and then translation of kinetic parameters to interpretation of drug-drug interactions.The functional significance of cytochrome P450s (CYPs) includes the metabolism of drugs, foreign chemicals, and endogenic compounds. The pharmaceutical industry needs sensitive and cost-effective systems for screening new drugs and investigation of drug-drug interactions. The development of different types of CYP-based biosensors is now in great demand. This review also highlights the characteristics of electrode processes and electrode properties for optimization of the cytochrome P450 electroanalysis. Electrochemical cytochrome P450-biosensors are the most studied. In this review, we analyzed electrode/cytochrome P450 systems in terms of the mechanisms underlying P450-catalyzed reactions. Screening of potential substrates or inhibitors of cytochromes P450 by means of electrodes were described.

Abbreviations

CYP17A1, cytochrome P450 17A1; DDAB, didodecyldimethylammonium bromide; KP_i , potassium phosphate buffer; SPE, screen-printed electrode; CV, cyclic voltammetry; Cytochrome b_5(*mc*), microsomal cytochrome b_5; Cytochrome b_5*om*, mitochondrial cytochrome b_5

Keywords: *Cytochrome P450, Bioelectrochemistry, Electroanalysis, Drug interactions, Enzyme kinetics, Inhibition*