Electrochemical Study of the Interaction of Ubiquinone,0 and Ubiquinone,10 with Nucleosides and Nucleic Acid Bases

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Electrochemical polarographic measurements done for mixtures of the ubiquinone,0 (Ub,0) and Ubiquinone,10 (Ub,10) in their monomeric form ($c < 10^{-5}$ mol/l) with nucleosides and nucleic acid bases show that their half wave potentials, $E_{1/2}$, as well as limited diffusion currents, i_d, decrease as functions of the concentrations of the added components. The change in the $E_{1/2}$ values is attributed to the change in the lowest unoccupied molecular orbital (LUMO) energy of the ubiquinone, resulting from its interaction with the heterocyclic rings. The decrease in i_d is explained in terms of complex formation and consequently increase in the mass of the reducible species, according to the Ilkovic equation. In all mixtures the number of reduction electrons (n) is smaller than that of free ubiquinone. The changes in all electrochemical variables of the native Ub,10 are more pronounced than those of the synthesized Ub,0, confirming the former accepted assumption that the complex formation ability of Ub,10 is higher than that of Ub,0. The results indicate a possible interaction of such molecules when they migrate into the mitochondria with ubiquinone molecules (coenzyme Q).

Key words: Ubiquinones; Nucleosides; Polarography.