The First Electrochemical Studies of Metallocarbonyl Complexes with Imides

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Metallocarbonyl complexes, also known as carbon monoxide releasing molecules (CORMs), containing imides can serve as novel compounds to overcome antibiotic resistance. CORM interfere with cell wall biosynthesis, target cytoplasmic membrane, depolarize membranes, and induce oxidative stress. They are characterized by anti-inflammatory, anti-apoptotic, anti-atherosclerotic, anti-proliferative and cytoprotective agents. One of the ways of pharmacological action of this type of compounds is oxidation and reduction reactions.

The aim of the presented studies was to determine the electrochemical activity and properties of metallocarbonyl complexes (Fe, Ru) with maleimide and succinimide ligands (Fpm, Rpm and Fps).

The synthesis of metallocarbonyl complexes (Fe, Ru) with maleimide and succinimide ligands (Fpm, Rpm and Fps) was carried out based on the photochemical reaction $(\eta^5\text{-}C_5H_5)M(CO)_2I$ (M = Fe, Ru) in the presence of diisopropylamine. Electrochemical studies of the synthesized metallocarbonyl complexes Fpm, Rpm and Fps were carried out in Britton-Robinson buffer solutions at different pH 5, 7 and 10 at the glassy carbon electrode using cyclic voltammetry (CV) and electrochemical impedance spectroscopy (EIS). In addition, the working glassy carbon electrode was characterized in a solution of the Fe(III)/Fe(II) standard redox system using CV and EIS and the topographic properties of the electrode surface were determined using an atomic force microscope (AFM).

Keywords: Metallocarbonyl complexes, cyclic voltammetry, electrochemical impedance spectroscopy