Abstract:

This master's thesis contains a study of electrochemical processes of selected bile acids possessing 7α hydroxyl group (cholic, chenodeoxycholic and α–muricholic). The measurements were performed on boron–doped diamond electrode in the non-aqueous medium of acetonitrile and perchloric acid (water content 0.55 %) by cyclic voltammetry. It is known that the electrochemical activity of 7α bile acids is increased by a dehydration reaction between perchloric acid and the 7α bile acid. The subject of the study was the stability of the voltammetric response of chemically activated bile acids in the region of negative potentials. It was found that the presence of oxygen in the measured solution is an important factor for obtaining the cathodic signal of 7α bile acids. It probably performs a regenerative function; the product of the electrochemical reduction is re-oxidized in its presence, which leads to an increase in the voltammetric response. At the same time, it is important that the direction of the scan in cyclic voltammetry first proceeds to positive values. A potential of +2.0 V (*vs.* $Ag/AgNO_3$ in acetonitrile) must be reached for the HO● radicals to be formed. It is these radicals that presumably lead to the formation of the product(s) of bile acids electrochemical oxidation that can be subsequently reduced. Then, the cathodic response of the studied bile acids is achieved at *ca* –0.40 V (chenodeoxycholic acid), –0.30 V (cholic acid) and –0.35 V (α–muricholic acid).

Key words:

Boron doped diamond electrode, dehydration, oxidation, reduction, voltammetry, bile acids