

Abstract

The aim of this bachelor thesis was to study the voltammetric behavior of 27-hydroxycholesterol using boron-doped diamond electrode. The influence of several factors on the current response of 27-hydroxycholesterol was investigated: the effect of the supporting electrolyte, concentration of perchloric acid, polarization rate, water content, and pH effect. The study was conducted using cyclic voltammetry in a perchloric acid or sodium perchlorate in acetonitrile. 27-hydroxycholesterol provided a current response in the anodic region with a potential around +1450 mV vs. Ag/0.01 mol l⁻¹ AgNO₃ in 1 mol l⁻¹ NaClO₄ in acetonitrile in the presence of 0.1 mol l⁻¹ perchloric acid in acetonitrile (water content 0.43 %) and 0.1 mol l⁻¹ sodium perchlorate in acetonitrile. Furthermore, concentration dependence was measured using differential pulse voltammetry resulting in a limit of detection (*LOD*) of 2.71 μmol l⁻¹ and a limit of quantitation (*LOQ*) of 9.04 μmol l⁻¹. It was demonstrated that the direct current voltammetry method does not achieve comparable limit values.

Key words

27-hydroxycholesterol, boron-doped diamond electrode, oxidation, oxysterols, voltammetry