ΔE_p= 35 мВ), при этом значения RSD не превышают 3.5%.

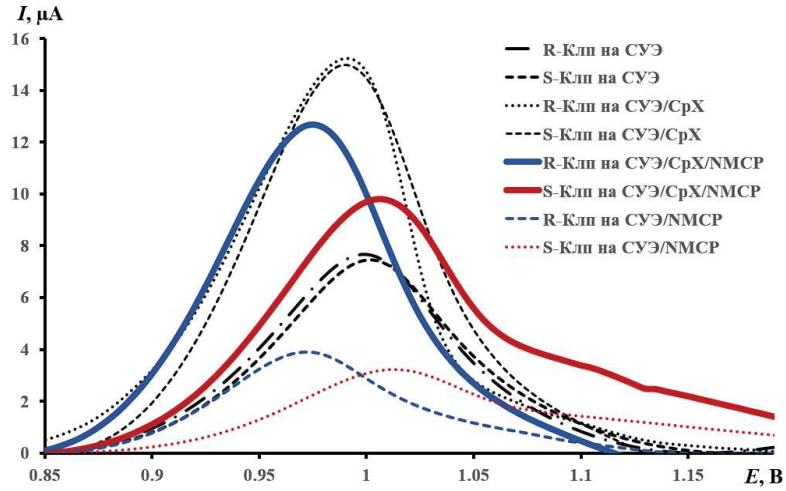

Рисунок 1 – КВВ R- и S-Клп на СУЭ, СУЭ/СрХ/NMCP и СУЭ/СрХ/NMCP

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ENANTIOSELECTIVE VOLTAMMETRIC SENSORS BASED ON COMPLEX COMPOUNDS OF TRANSITION METALS FOR RECOGNITION AND DETERMINATION OF NAPROXEN ENANTIOMERS

On the modern pharmaceutical market, there are many drugs and biologically active additives (BAA), which include optically active compounds. Their analysis is important for pharmaceutics and medicine; therefore, the development of new enantioselective voltammetric sensors (EVS) [1–5] is currently relevant, which allows creating inexpensive and affordable portable quality control systems for modern drugs and BAA. A promis-

ing direction in the creation of EVS is the use of complex compounds of transition metals with organic chiral ligands as modifiers.

To recognize and determine the enantiomers of naproxen (Nap), voltammetric sensors were developed based on a glassy carbon electrode (GCE) modified with a composite of a polyelectrolyte complex of chitosan and N-succinylchitosan (PEC) and mixed chelate complexes $[M(S\text{-Ala})_2(H_2O)_n]$–$[M(S\text{-Phe})_2(H_2O)_n]$ (M = Cu(II), Zn(II); n = 0–1) as chiral selectors. It was found that when only PEC was applied, the difference in the analytical signals of the Nap enantiomers was insignificant. By adding amino acids or chelate complexes, enantioselectivity was increased. The best results were observed on GCE/PEC–$[Cu(S\text{-Ala})_2]$–$[Cu(S\text{-Phe})_2]$ (1) and GCE/PEC–$[Zn(S\text{-Ala})_2(H_2O)]$–$[Zn(S\text{-Phe})_2(H_2O)]$ (2) (i_{pS}/i_{pR} = 1.27 and ΔE = 30 mV for 1; i_{pS}/i_{pR} = 1.12 and ΔE = 20 mV for 2). Linear relationships between the anodic current and the concentration of analyte enantiomers were obtained in the range of 5.0×10^{-5}–1.0×10^{-3} Mol L^{-1} on the (1) sensor and 2.5×10^{-5}–1.0×10^{-3} Mol L^{-1} on the (2) sensor. The limit of detection (LOD) (3 s/m) and the limit of quantification (LOQ) (10 s/m) were found to be: 0.38 μM and 1.25 μM for R-Nap, 0.30 μM and 0.99 μM for S-Nap on the (1) sensor; 0.42 μM and 1.40 μM for R-Nap, 0.38 μM and 1.26 μM for S-Nap on the (2) sensor. To assess the correctness of the determination of Nap enantiomers by the developed sensors in model solutions, the “added–found” method was used. Relative standard deviation (RSD) ranges from 0.9% to 2.1%, which indicates good reproducibility of the results. Also, to evaluate the analytical capabilities, the sensors were tested for the determination of Nap enantiomers in biological fluids. The relative standard deviation does not exceed 4.7%.

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COMPOSITE VOLTAMMETRIC SENSORS BASED ON COMPLEX COMPOUNDS OF TRANSITION METALS FOR RECOGNITION AND DETERMINATION OF PROPRANOLOL ENANTIOMERS

In many pharmaceutical preparations, the active substance is an optically active compound, and therefore there is a need for enantiomeric analysis at all stages of the development and use of such preparations. Usually, various electrochemical methods are used for these purposes (NMR spectroscopy, capillary electrophoresis, chromatography, etc.). However, most of the methods do not have sufficient rapidity, so in recent years there has been a constantly growing interest in the development of new methods of enantiomeric analysis, which include methods based on enantioselective voltammetric sensors (EVS) [1-5]. At the moment, EVS based on complex compounds of transition metals with organic chiral ligands are of the greatest interest, which are characterized by simple manufacture, availability, and relative cheapness.

To develop composite voltammetric sensors based on a glassy carbon electrode (GCE), a polyelectrolyte complex of chitosan and N-succinylchitosan (PEC) and mixed chelate complexes $[M(S\text{-Ala})_2(H_2O)_n]$–$[M(S\text{-Phe})_2(H_2O)_n]$ (M = Cu(II), Zn(II); n = 0–1)) as chiral selectors. Enantiomers of propranolol (Prp) acted as the analyte. According to the obtained differential-pulse voltammograms, it was concluded that the difference in analytical signals on GCE and GCE/PEC is insignificant. The greatest differences between the analytical signals of Prp enantiomers were observed on GCE/PEC–$[Cu(S\text{-Ala})_2]$–$[Cu(S\text{-Phe})_2]$ (1) (i_{pS}/i_{pR} = 1.37 and ΔE = 20 mV) and