VOLTAMMETRIC SENSORS BASED ON A POLYELECTROLYTE COMPLEX AND CYCLODEXTRINS FOR THE RECOGNITION OF ENANTIOMERS OF METHIONINE

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As is known, only one of the enantiomers in medicines is biologically active, so the demand for enantiomerically pure preparations is constantly increasing. There are a number of methods for the separation and recognition of enantiomers, such as HPLC, capillary electrophoresis, etc. However, these methods require expensive equipment and considerable time for analysis. An alternative is the voltammetric enantioselective sensors.

Methionine is an essential amino acid and component of proteins, a precursor of a number of biologically active compounds that participates in many biochemical processes. The possibility of selective concentration of methionine enantiomers (Met) on a modified glassy carbon electrode (GCE) was studied.

The modifier was a polyelectrolyte complex of chitosan and chitosan succinamide with α-, β- and γ-cyclodextrin (CS-SCS-CD). The films of these complexes are stable in aqueous solutions and their properties do not change for a long time. Under conditions of cyclic and differential-pulse voltammetry, it was shown that, the peaks on voltammograms for the L-enantiomer of methionine were higher than for D-methionine, which indicated selective concentration at the electrode. Figure shows a graphical diagram of the modification of the GCE/ CS-SCS-CD and performing the analysis.

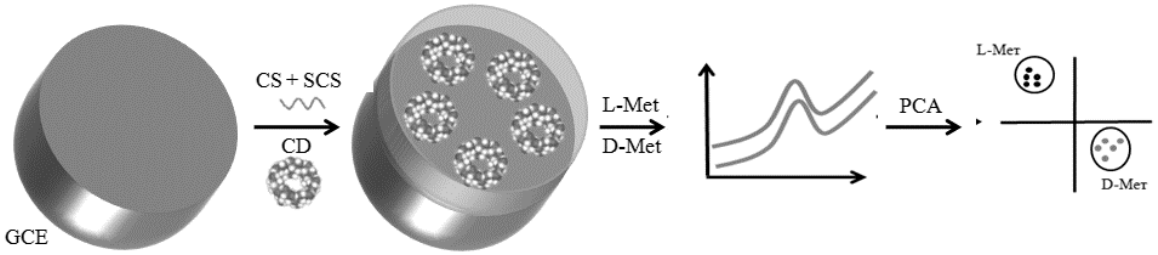

Fig. Graphical scheme for modifying the GCE/CS-SCS-CD and performing the analysis

The analytical characteristics of the proposed electrodes, the conditions for recording voltammograms and applying composites were studied. Cyclic and differential-pulse voltammograms obtained on the GCE modified by a polyelectrolyte complex of CS-SCS-CD in aqueous solutions of L- and D-methionine were processed using the chemometric method-principal component analysis. It was revealed that using a multisensory system based on three electrodes, the percentage of enantiomers recognition increased. Moreover, the proposed method of concentration has been successfully tested on real samples of pharmaceutical preparations and human urine.

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