

**SENSORY SYSTEMS BASED ON POLYARYLENEPHTHALIDES
FOR THE DETERMINATION OF BISOPROLOL**Khabletdinova A. I., Zilberg R. A.

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Electrochemical methods, in particular voltammetry, differ by rapidity, simplicity of experiment, rather low cost of devices and, as a result, of analysis in general. A promising direction in voltammetry is the fabrication and practical use of chemically modified electrodes. On their basis analysts have developed sensors, with which a great number of medicinal compounds were determined. These sensors have recently found application in multisensory voltammetric systems like electronic tongue, which ensure not only the identification of medicinal preparations, but also the revelation of their conformity to the standard samples and of the manufacturing company.

In this work, we studied the electrochemical behavior of bisoprolol on glassy carbon electrodes modified by polyarylenephthalides with different number of sulfur and oxygen atoms (PAP-O, PAP-S, PAP-SO, PAP-SOO, PAP-SOOO, PAP-SSO, PAP-SSSO) under voltammetry conditions.

To choose the optimum conditions for recording voltammograms, we studied the effects of pH of the supporting electrolyte, potential scan rate, time of conditioning the electrode in a bisoprolol solution, and bisoprolol concentration on the value of current and the shape of current-voltage curves. The maximum peak currents were observed at $\text{pH} < 1$. The supporting electrolyte was 0.1 M H_2SO_4 . Cyclic and square-wave ($E_{\text{sw}} = 50 \text{ mV}$, $\Delta E = 5 \text{ mV}$, $f = 100 \text{ Hz}$) voltammograms of bisoprolol were recorded in aqueous solutions in a 0.1 M H_2SO_4 supporting electrolyte using an IVA-5M voltammetric analyzer at the potential scan rate 0.01–1 V in the potential range 0.0–2.0 V after conditioning the electrodes in the test solution within 60 s at $E = 0 \text{ V}$ and intensive stirring.

A procedure is developed for the voltammetric determination of bisoprolol on glassy carbon electrodes modified by polyarylenephthalides. The dependence of the analytical signal on the concentration of bisoprolol is linear in the range 10^{-6} – 10^{-5} M with the limit of detection $(3.4\text{--}9.8) \times 10^{-8}$ M. Thus, glassy carbon electrodes modified by polyarylenephthalides can be successfully used for the determination of bisoprolol in medicinal preparations by square-wave voltammetry. These electrodes can also be used in multisensor voltammetric systems of the electronic tongue type for the identification of antiarrhythmic preparations relating to β -adrenoreceptorantagonists, manufactured by different companies, and for the revelation of counterfeit products. The proposed polymeric modifiers possess high conductivity and low ohmic resistance and are chemically stable. Sensors on their basis can be used in the wide range of pH, also for the determination of bisoprolol in physiological solutions.

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