

THE CHOICE OF THE ELECTRODE ACTIVE SUBSTANCE FOR THE ION-SELECTIVE ELECTRODE ON GENTAMICIN

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Introduction. Gentamicin sulfate belongs to aminoglycoside antibiotics and has a wide spectrum of the antibacterial action. However, its long-term use can cause neuritis and the impaired renal function. Gentamicin sulfate has also the ability to suppress respiration up to development of the neuromuscular blockade. Microbiological, spectroscopic and chromatographic methods are used to determine gentamicin sulfate, but ionometry is not practically used. Ion-selective electrodes (ISE) with plasticized membranes based on ion associates of gentamicin with tetraphenylborate and acid black chromium are described in literature. At the same time, the electrodes proposed are characterized by a narrow range of the concentrations determined and a low specificity of the membrane in the presence of organic ions, and it makes analysis of gentamicin in complex dosage forms more difficult. Nevertheless, there are data concerning the use of associates of organic cations with the Keggin structure heteropolyanions ($XMe_{12}On_{40}^{n-}$ where X(P,Si) Me(Mo(V);W(VI);V(V)) as an electrode active substance.

Aim. To study the use of associates of the Keggin structure heteropolyanions with gentamicin as electrode active substances to obtain ISE on gentamicin sulfate.

Materials and methods. The reactions of gentamicin sulfate with different heteropolyacids, such as phosphomolybdic, phosphotungstic, silicomolybdic, silicotungstic acids, were studied.

Results. As a result of reactions the corresponding ionic associates of gentamicin sulfate with the abovementioned heteropolyacids were obtained. These associates are yellow or white colored compounds, slightly soluble in water. Such parameters of the reaction sensitivity as the limit concentration (C_{lim}) and the limit dilution (V_{lim}) were also calculated. These parameters are within $C_{lim} = 10^{-4}$ - 10^{-5} g/cm³, $V_{lim} = 10^3$ - 10^4 cm³/g. The reaction of gentamicin sulfate with phosphotungstic acid is the most sensitive: $C_{lim} = (3.2 \pm 0.2) \cdot 10^{-5}$ g/cm³, $V_{lim} = (3.1 \pm 0.1) \cdot 10^4$ cm³/g.

Conclusions. Thus, the ionic associate of gentamicin sulfate with phosphotungstic acid should be used as an electrode active substance for ISE on gentamicin.