IONOMETRIC ANALYSIS OF VITAMIN B1 IN SOLUTIONS FOR INJECTION USING THE THIAMINE-SELECTIVE SOLID CONTACT ELECTRODE

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The most well-known methods for the quantitative determination of vitamin B1 (thiamine bromide) described in the literature include spectrophotometry, fluorometry, photocolorimetry; alkalimetric titration is also widely used in pharmaceutical analysis. These methods are time-consuming, less sensitive. For that reason, it was necessary to develop a sensitive express method for the determination of thiamine bromide in solutions for injection. Ionometry is the most promising method for such analysis.

Thiamine-selective solid contact electrode for the potentiometric determination of thiamine bromide in solutions for injection, which is a thick-walled polyvinyl chloride tube with graphite rod as a current collector pressed in it, has been developed. The membrane composition is applied on the ground edge of graphite rod. The membrane composition (wt%) is: 26 ± 4 of polyvinyl chloride, 50 ± 5 of dibutyl phthalate, 17 ± 3 of thiamine tetraphenylborate, 4 ± 1 of activated charcoal.

The linear range of the electrode function is 1·10-1 – 1·10-5 mole/dm3, the slope of the electrode function is 53 ± 2 mV. The detection limit is 3·10–5 mole/dm3. The response time of electrodes is 20 - 30 seconds, the reproducibility of the potential is 2 mV. The drift for the potential of the proposed electrode for a week does not exceed 3-5 mV, endurance is not less than 3-5 months.

Ionometric analysis of thiamine bromide in solutions for injection with concentration of 3% and 6% has been developed. Our specially designed thiamine-selective solid contact electrode was used as an indicator; the EVL-1 M3 silver-chloride electrode was used for comparison. EMF measurement was carried out on the I-130 ionomer. The analysis was performed by two-point narrow range calibration curve.

The results of obtained ionometric analysis of thiamine bromide in solutions for injection are characterized by precision and reproducibility. The proposed method of analysis is characterized by simplicity and rapidity. Relative error of the analysis is not more than 2%, which complies normative-technical documentation for dosage forms.