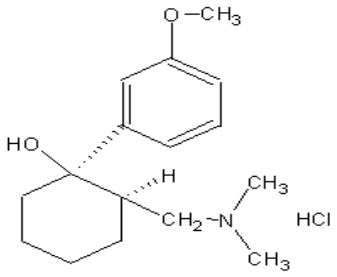
DETERMINATION OF TRAMADOL IN SOLUTION DROP BY TRAMADOL SELECTIVE ELECTRODE (TCE).

Derevyanko L., Akhmedov E. Yu.
National University of Pharmacy, Kharkiv, Ukraine
dan.96@mail.ru

Introduction. Tramadol (tramadol hydrochloride, Melanate, Limadol, Tradonal Retard, Tramal, Tramundin Retard, Ultram, Zydol, Biovail, Crispin) - RR, SS-trans-2 [(dimethylamino) methyl] -1- (m-methoxyphenyl) cyclohexanol hydrochloride.



In the literature, there are allegations of non-medical use of tramadol hydrochloride persons with heroin addiction at doses significantly higher than therapeutic. This marked the various side effects, including the development of dependence. Moreover, in these cases, and often fatal acute poisoning, which significantly increases the risk while taking certain substances.

Aim. When the chemical-toxicological studies often have to deal with small volumes of samples analyzed, which contain small amounts of certain substances. In the pharmaceutical feasibility study is the use of small amounts of dosage forms, which are investigated.

To determine the concentration of the solution drops Tramal used in the installation shown in Fig. 1.

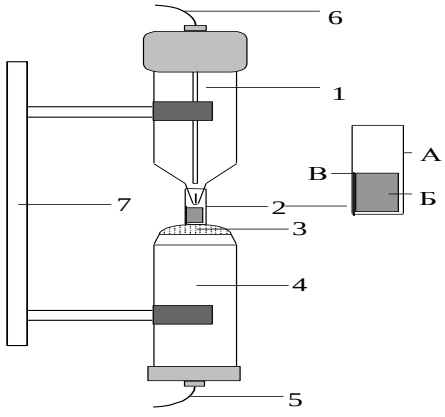


Figure 1. *Apparatus for the potentiometric determination of tramadol in solution drop:*

1 - silver chloride electrode (reference electrode); 2 - capillary nozzle (A - B PVC tube - glass tube in - capillary for potassium chloride solution); 3 - a drop of the

solution was analyzed; 4 - solid contact electrode ISE tramadol; 5, 6 - electrodes outputs; 7 – tripod

Materials and methods. EMF measurement in solutions tramal performed on digital ionomer I-130. The temperature of all solutions studied was the same. Standard solutions were prepared with different concentrations of tramadol (from 5.0 $\cdot 10^{-4}$ to 5.0 $\cdot$ 10^{-3} M), and the two standard solutions with concentrations of tramadol $C_1 = 5.0 \cdot 10^{-4}$ M and $C_2 = 5.0 \cdot 10^{-3}$ M.

As the reference electrode using a saturated silver chloride electrode EVL-1-M3. Expiration of the salt bridge solution rate in comparison modern electrodes is about 1.5 cm^3 per day ($1 \cdot 10^{-3}$ cm^3 / min). If we assume the volume of the solution was analyzed drops close to 0.05 cm^3, and in contact with the salt bridge 5 min, then during this period the solution was diluted to approximately 10%. This leads to a sharp decrease in the accuracy of ionometric analysis.

In order to reduce the expiration of a reference electrode liquid junction solution flow rate, we used a capillary nozzle 1-1.5 cm in length and 0.5 mm diameter capillary (Fig. 1). The nozzle is fixed to the capillary tube of the reference electrode. The electrode resistance of the reference electrode with the nozzle is in the range 17-20 ohms. A nozzle electrode stably by using ionomers I-115, I-130, and does not require additional shielding measurement circuits. We collect the installation, as shown in Fig. 1. membrane ISE Tramal and nozzle end of the reference electrode was applied to 1 drop Tramal solution, investigate immediately and carefully dried with filter paper. They were then applied to the membrane of ISE drop of solution investigated and summed side end nozzle drop the reference electrode. We take measurements of emf element every minute for 10 minutes.

Results and discussion. The most stable value system potentials observed for 3-7 minutes measurements. For low concentrations ($1 \cdot 10^{-6}$ - $1 \cdot 10^{-5}$ M) the stability of the potential is reduced, presumably due to the surface-active phenomena. Linearity interval electrode function for the fifth minute of measurements made (1,0±0,2) $\cdot$ 10^{-1} - (1±0,4) $\cdot$ 10^{-5} M with a slope of 56±1 mV. The minimum concentration that can be determined under these conditions is $3.2 \cdot 10^{-5}$ M. Thus, in one liter of solution will contain $9.6 \cdot 10^{-3}$g tramal, and into droplets (0.05 ml) solution of limit of detection will be about 0.48 g.

Conclusions. Tramal selective ISE ionometrical and developed methods for the determination of the drug suitable for the purposes of the pharmaceutical and chemical-toxicological analysis.