

# NIFEDIPINE CHEMILUMINESCENCE QUANTITATIVE DETERMINATION IN PHARMACEUTICAL PREPARATIONS

Bondarenko N.Yu.

The National University of Pharmacy, Kharkiv, Ukraine

tropikana2003@ukr.net

Nifedipine (*N*) (3,5-pyridinedicarboxylic acid, 1,4-dihydro-2,6-dimethyl-4-(2-nitrophenyl)-dimethyl ester) is the main representative of antagonists of dihydropyridine calcium channel blocker.

The intensive literature survey revealed the *N* can be quantitatively determined using ceriometric method, HPLC, voltammetric, polarography and UV-spectrophotometric methods. The analytical system  $H_2L - N - H_2O_2$  was proposed for quantitative determination of *N* using chemiluminescence (*ChL*) method in pure substance and pharmaceutical preparations, where *N* is the activator of *ChL*. The *ChL* occurrence was studied in discrete mode, measurements were performed by photoelectric method. The maximal value of ( $I_{ChL}$ ) *ChL* intensity was chosen as analytical response.

The Nifedipine pure substance, that meets the BPh requirements, and pharmaceutical preparations that contain Nifedipine: tablets “Phenihydin-Zdorovye” produced by OOO “Zdorovye” Pharmaceutical Company, Ukraine, 10 mg of active substance and “Nifedipine” tablets produced by „Actavis”, Bulgaria were used. All standard solutions were prepared using Hillenbrand method. The intensity of chemiluminescence was measured in conditional units (c.u.) on the device with photoelectric multiplier FEU-84-A, using measurement of low currents IMT-0.5 and quick-acting (time constant 0.1 s) automatic potentiometer.

The performed experiments revealed that the following mixing order when  $H_2O_2$  solution is the last is optimal for *ChL* activation in the system  $H_2L - N - H_2O_2$ . Optimal reagents concentrations are:  $c(NaOH) = 0.03 \text{ mol L}^{-1}$ ,  $c(H_2O_2) = 0.3 \%$ ,  $c(H_2L) = 1 \cdot 10^{-4} \text{ mol L}^{-1}$ . The  $I_{ChL}$  (c.u.) against *N* ( $\text{mol L}^{-1}$ ) concentration linear dependence was observed in the concentration range  $(1-10) \cdot 10^{-8} \text{ mol L}^{-1}$ . Calibration graph equation is  $I_{ChL} = 2.96 \cdot 10^8 c + 0.61$  ( $r = 0.998$ ). *N* quantitative determination in pharmaceutical preparations was performed by the method of standards using linear parts of mentioned before  $I_{ChL}$  concentration dependence.

So, the selective procedures of quantitative determination of Nifedipine in pure substance and tablets were developed by the chemiluminescence method of luminol reaction activation effect. While *N*  $5.575 \cdot 10^{-5} \text{ mol L}^{-1}$  determination in model solutions of pure substance by the activation method  $RSD = 3.9\%$  ( $n = 5$ ,  $P = 0.95$ ),  $LOQ = 2 \text{ ng mL}^{-1}$ .