

VALIDATION OF A NOVEL SPECTROPHOTOMETRIC PROCEDURE FOR CEFUROXIME ASSAY BY MEANS OF POTASSIUM CAROATE

Srouf A.

Scientific supervisor: PhD, associate professor Buryan G.O.

PhD, assistant, Serdiukova Yu.Yu.

National University of Pharmacy

tamadiw@gmail.com

Introduction. The cephalosporins are the largest and most diverse family of antibiotics of the beta-lactam group. They are structurally and pharmacologically related to the penicillins. Cephalosporins have a beta-lactam ring structure, infused to a 6-membered sulfur-containing dihydrothiazine ring, in place of the 5-membered thiazolidine ring of penicillins. Cefuroxime (Ceftin, Zinacef) belongs to the second-generation cephalosporin it has enhanced activity against gram-negative bacilli while retaining some activity against gram-positive bacteria. They are also more resistant to beta-lactamase. The methods proposed to assay Cefuroxime are variable but have some disadvantages. These include chromatography, spectrophotometry, voltammetry, spectrofluorimetry methods. The State Pharmacopoeia of Ukraine and the British Pharmacopoeia describe HPLC for the cephalosporin determination, which is surely the best method but has a longtime preparation, expensive and complicated in performing. The kinetic-spectrophotometric methods belong to modern and prospective one. The methods obligates a proper oxidation analytical reagent that should require to all the statements of analytical reagents.

The aim of the proposed research is to validate the procedure of the Cefuroxime quantitative determination in pure substance the kinetic-spectrophotometric method using potassium caroate as analytical reagent (KHSO_5).

Materials and methods. The pure substance of Cefuroxime that meets the requirement of the State Pharmacopoeia of Ukraine was used. The triple potassium salt of Caro's acid was used as analytical reagent. The statistic calculation were performed using Microsoft Excel 2016.

Results and discussion. In an acidic medium the Cefurxime S-oxide is formed after the addition of KOH it undergoes the hydrolytic cleavage. The appearance of a new band with absorption $\lambda_{\text{max}} = 302 \text{ nm}$ demonstrates its formation in the reaction of alkaline hydrolysis of Cefuroxime S-oxide in the presence of potassium caroate (perhydrolysis reaction). The precision was calculated ($\text{RSD} = 1.53 \div 2.05 \%$, $\delta = 0.55 \div 0.71 \%$) for a wide range of concentrations ($1\text{-}10 \mu\text{mol L}^{-1}$). The LOD is $0.33 \mu\text{g mL}^{-1}$.

Conclusions. The procedures developed for the Cefuroxime determination in pure substance do not require elaborate treatment and expensive materials. The proposed methods are sensitive enough to enable determination of lower amounts of drug.