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QUANTITATIVE DETERMINATION OF AMOXICILLIN IN MEDICAL FORM USING KINETIC METHOD

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Amoxicillin (Amox) is used to treat a wide variety of bacterial infections. This medication is a penicillin-type antibiotic. It works by stopping the growth of bacteria. This antibiotic treats only bacterial infections. It will not work for viral infections (such as common cold, flu). Using any antibiotic when it is not needed can cause it to not work for future infections. Amox is also used with other medications to treat stomach intestinal ulcers caused by the bacteria H. pylori and to prevent the ulcers from returning. [1].

Common adverse effects include nausea and rash. It may also increase the risk of yeast infections and, when used in combination with clavulanic acid, diarrhea. It should not be used in those who are allergic to penicillin. While usable in those with kidney problems, the dose may need to be decreased. Its use in pregnancy and breastfeeding does not appear to be harmful. Amox is in the beta-lactam family of antibiotics [2].

Amox was discovered in 1958 and came into medical use in 1972. It is on the World Health Organization's List of Essential Medicines, which lists the most effective and safe medicines needed in a health system. It is one of the most commonly prescribed antibiotics in children. Amox is available as a generic medication. Amox is used in the treatment of a number of infections, including acute otitis media, streptococcal pharyngitis [3].

In the production of amoxicillin by acylation of silylated 6-aminopenicillanic acid with the appropriate acid chloride hydrochloride the efficiency of the process and the purity of the product are increased by a new recovery process consisting of

isolation from the acylation reaction mixture of solid amoxicillin hydrochloride which is then easily converted to amoxicillin trihydrate [4].

Different methods, such as biological, chemical and physicochemical are recommended for its quantitative determination. Biological methods are based on the direct antibiotic biological action on a test-microorganism sensitive to the given antibiotic. Disadvantages of the biological methods are the long-lasting procedure and the dependence of the results precision on the external factors [5].

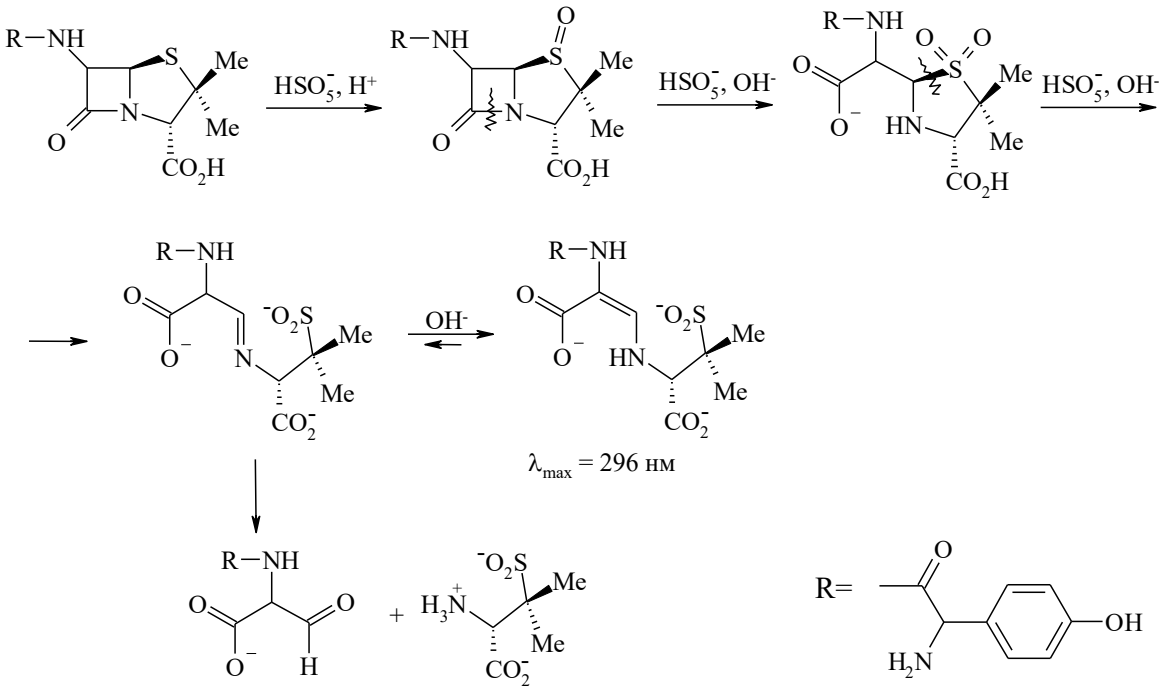

Figure 1. The scheme of peroxo acid oxidation and perhydrolysis conjugated reactions of Amox on the time are shown.

The extensive literature survey reveals varies methods of quantitative determination of penicillin family preparations, such as HPLC, spectrophotometry, iodometry, extraction photometry, different variants of voltametry, polarography and kinetic analysis are proposed.

The spectrophotometric methods that are based on the application of phenol Folin-Ciocalteu reagent, reactions with Mn(II), Co(II) and Ni(II) salts and etc. are also known. These methods give the possibility to determine penicillin in medical preparations in presence of different excipients [6-15].

Thus, the improvement of the known and development of new methods of quantitative determination of penicillin is rather important. The existing pharmacopoeial methods of penicillin preparations determination are quite complex, long-lasting and require the application complex and expensive devices. The disadvantage of the known simple enough in performance methods of spectrophotometric determination of penicillin, which are based on the determination of the final products of their hydrolytic cleavage, is the requirement of prolonged heating.

The developed method of Amox kinetic determination has several advantages: makes it possible to identify the preparation in much smaller quantities than the

parmacopoeial iodometric method, it is applicable to the same range of concentrations, as in photometric determination of hydrolysis products, but it doesn't require prolonged heating of the reaction mixture, it is simpler and faster than the method of chromatographic analysis.

It is based on the preliminary oxidation of Amox with potassium caroate excess to the corresponding S-oxide, followed by determination of the hydrolytic conversion of it's product in an alkaline medium by the kinetic spectrophotometric method (Initial rate (tangent) method).

The reaction kinetics of the peroxyacidic oxidation and perhydrolysis of Amox with potassium caroate in the alkaline medium is studied. As an oxidizing agent, the potassium triple salt of peroxymonosulfuric acid, $2KHSO_5 \cdot KHSO_4 \cdot K_2SO_4$, syn. "Oxone", was applied. The procedure was developed and the possibility of the quantitative determination of Amox in the Mapichem® (Switzerland) preparation based on the results of the kinetic-spectrophotometric method with potassium caroate as reagent was shown. RSD = 2.0 %, δ = 0.9%.

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