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IODOMETRIC METHOD FOR DETERMINATION OF AZLOCILLIN

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Azlocillin (Azl) is an acylampicillin antibiotic with an extended spectrum of activity and greater in vitro potency than the carboxy penicillins. Azl is similar to mezlocillin and piperacillin. It demonstrates antibacterial activity against a broad spectrum of bacteria, including Pseudomonas aeruginosa and, in contrast to most cephalosporins, exhibits activity against enterococci. By the chemical structure penicillins are medicinal substances that belong to derivates of 6-aminopenicillanic acid (6-APA). Their characteristic feature is a rapid bactericide effect on the stage of microorganisms growth and insignificant side effects on human organism. Decomposition of one of the heterocycles leads to complete loss of activity meaning allergic action [1].

Azlocillin (Azl) (2*S*,5*R*,6*R*)-3,3-dimethyl-7-oxo-6-{[(2*R*)-2-{[(2-oxoimidazolidin-1-yl)carbonyl]amino}-2-phenylacetyl]amino}-4-thia-1-azabicyclo[3.2.0]heptane-2-carboxylic acid belongs to the ureidopenicillin class and it is used for the treatment of serious infections caused by susceptible strains of microorganisms [2].

Literature review revealed enormous analytical method were reported for the estimation of azlocillin individually or in combination with other drugs.

Classical iodometry of hydrolysis products is determined to be a basic method of penicillin summary quantitative determination. It's disadvantage is duration at least 40 min, and the necessity in standard samples and in rigid conditions standardization, as iodine interaction with hydrolysis products of penicillin reaction doesn't proceed strictly stoichiometrically: iodine expense, and also the quantity of substance that is

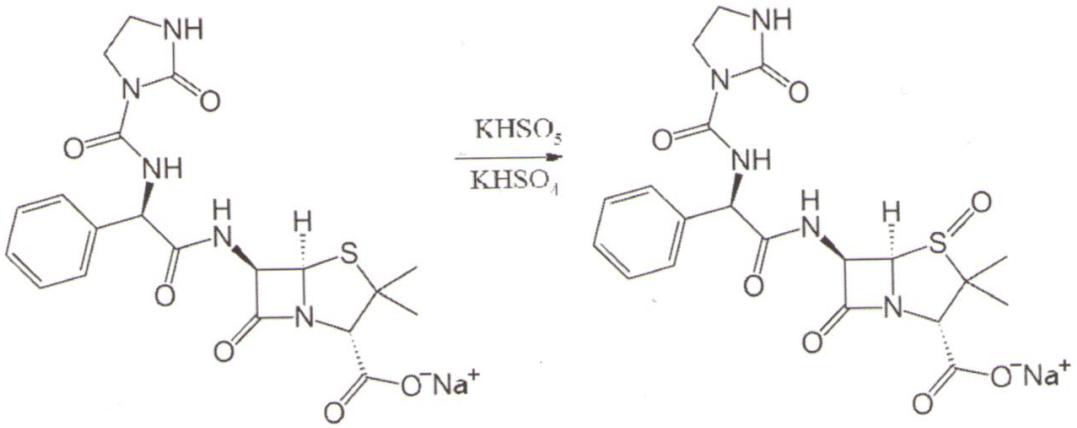
equivalent to 1.00 ml 0.005 mol/l (f=1/2, I_2) of iodine, depend on the reaction medium temperature.

International Pharmacopoeia recommends to determine penicillin summary in semisynthetic penicillin by neutralization method after preparation hydrolysis by excess of sodium hydroxide titrated solution at heating.

The following quantitative procedures of penicillin determination are described: using potentiometry titration and ionometry, spectrophotometry, extraction photometry, voltammetry and polarography, micelle electrokinetic capillary and paper chromatography, chemiluminescense and kinetic analysis methods [3-11].

A new procedure for the quantitative determination of *azlocillin* sodium in the Securopen® preparation by the method of back iodometric titration using potassium hydroperoxymonosulfate ($KHSO_5$) as an analytical reagent was developed.

By the method of back iodometric titration of $KHSO_5$ residue was found that 1 mol of $KHSO_5$ is consumed per 1 mol of penicillin. The reaction finishes during 1 min and stays for 30 min (observation time at pH 2-4). The transformation scheme of analytical determination of Azl is given on the Figure:



$$KHSO_5 + 2HCl + 2KI = KHSO_4 + 2KCl + I_2 + H_2O$$

$$HSO_5^- + 2H^+ + 3I^- = HSO_4^- + I_3^- + H_2O$$

Kinetics and stoichiometry of S-oxidation reaction of sodium *azlocillin* by means of potassium hydrogenperoxomonosulfate in aqueous solutions at pH 2-4 using iodometric titration method were studied. For 1 mole of penicillin, 1 mole of $KHSO_5$ is consumed, the quantitative interaction is achieved within a time of more than 1 minute (observation time). The new procedure was developed and ability of quantitative determination of penicillin in pharmaceutical preparation Securopen® by iodometric method using potassium hydrogenperoxomonosulfate ($KHSO_5$) as analytical reagent was shown. . RSD = (0.8 -2.8)%, δ = (+0.2 ….- 0.31)%.

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