

Iodometric Determination of Cystine in Pharmaceutical Formulation using Diperoxyadipic Acid as Reagent

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The kinetic studies of L-Cystine oxidation by Diperoxyadipic acid (DPAA) have been carried out in water media at 293 K and over pH range 4.0 to 9.3. The second order rate constant, k ($L \text{ mol}^{-1} \text{ min}^{-1}$) has been calculated from kinetic data. A suitable scheme has been proposed for the oxidation of cystine with diperoxy adipic acid, which involves electrophilic attack of the monoanion of DPAA on a sulfur atoms, and subsequent nucleophilic attack by the dianions of DPAA of the formed disulfoxide centers, in the first and second stages, respectively. Cystine was determined by indirect titration with DPAA. The required amount of Cystine was dissolved in appropriately concentrated NaOH solution, pH buffer solution and DPAA solution was added. After 10 min, the solution was acidified. The excess DPAA was iodometry titrated applying visual end-point detection approach. The advantages of the applied analytical techniques in the determination of Cystine in pharmaceutical preparation «Elthacin» has been presented. The recovery of this analyte in preparation sample ranged from 99.6 to 100.4%. A paired t-test showed that all results obtained for Cystine in model solutions and pharmaceutical preparation «Elthacin», using the proposed procedure and the official procedure respectively, agreed at the 95% confidence level.

Keywords: kinetics, mechanism, oxidation, cystine, diperoxy adipic acid (DPAA)
