Kinetic Spectrophotometric Determination of N-(2-Mercaptopropionyl)-glycine in Pharmaceuticals

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N-(2–mercaptopropionyl)-glycine (MPG), also named tiopronin, is a synthetic aminothiol antioxidant. It is highly desirable to provide a simple, rapid and cost-effective spectrophotometric procedure that is suitable for precise and sensitive determination of MPG in pharmaceutical preparation over a wide analytical range. A few classical (equilibrium) spectrophotometric methods for determination of MPG have been reported, but they lack to fulfill all the abovementioned criteria. Furthermore, to authors' knowledge, there are not any published kinetic spectrophotometric methods for the determination of MPG. Also, none of the cited equilibrium methods for determination of MPG has used Fe(III) and 2,4,6-Trypyridyl-s-triazine (TPTZ) as reagent solution.

In this report a novel, simple and sensitive kinetic spectrophotometric method for the determination of MPG in pharmaceutical preparation is described. The proposed kinetic method has been compared with the equilibrium method. Both methods are based on the coupled redox-complexation reaction whose first part is reduction of Fe(III) by MPG, while second one includes the complexation of Fe(II), resulted from preceding redox reaction, with TPTZ. The stable $Fe(TPTZ)_2^{2+}$ complex exhibits an absorption maximum at λ = 593 nm. Apparatus used in the kinetic spectrometric measurement was described in our previous publication [1].

MPG can be determined in concentration range from 1.0×10^{-6} to 1.0×10^{-4} mol L^{-1} using each method. In order to evaluate the potential of the proposed methods to analysis of real sample, both methods were applied to pharmaceutical samples for the determination of MPG. The accuracy of the methods was checked by carrying out recovery studies, when known amounts of the MPG standard were added to the samples before the recommended procedures. There were no significant differences between the labelled contents and those obtained by the two methods. The recoveries were approximately 100% for both methods, indicating that the proposed kinetic method is reliable for the determination of MPG in pharmaceutical preparations.

The proposed kinetic spectrophotometric method can be applied in an analytical laboratory as a simple, sensitive, fast and economical procedure for the determination of MPG in pharmaceuticals.

[1] A. Martinović, L. Kukoč-Modun, N. Radić, Anal. Lett. 40 (2007) 805-815.