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Determination of Cefpodoxime Proxetil using 1,10-phenanthroline

J.V.L.N. SESHAGIRI RAO, M. RAVI PRASADA RAO AND Y.S.N. REDDY

Dept. of Pharmaceutical Sciences,

Andhra University, Visakhapatnam - 530 003

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A simple and sensitive spectrophotometric method for the determination of cefpodoxime proxetil is described. The method is based on the formation of blood red coloured complex (λmax 520 nm) by reaction of the drug with ferric chloride and 1,10-phenanthroline. The Beer-Lambert's law range observed is 0.8-4.0 μg/ml.

Cefpodoxime proxetil[1], a recent broad-spectrum oral cephalosporin, is used mainly in the treatment of respiratory tract infections. So far, only HPLC methods have been reported for its estimation[2,3]. In the present method the authors employed ferric chloride and 1,10-phenanthroline and developed a visible spectrophotometric method for the estimation of the drug in pure and dosage forms.

The solution of ferric chloride was prepared by dissolving 54 mg of the salt in 100 ml of water. The solution of 1,10-phenanthroline was prepared by dissolving 198 mg of the compound in 100 ml of warm water. The strength of ortho phosphoric acid used was 0.2 M. The stock solutions of cefpodoxime proxetil was prepared by dissolving 25 mg of the drug (pure or formulation) in 100 ml of methanol. A working sample containing 40 μg/ml of the drug was prepared by diluting 4.0 ml of the stock solution to 25 ml with methanol.

Aliquots of working sample of the drug (ranging from 0.5 to 0.5 ml) were transferred to a series of 25ml volumetric flasks. To these flasks, 2.5ml of ferric chloride solution and 2.0 ml of 1,10-phenanthroline reagent were added successively. The flasks were heated on a water bath at 80° for 30 min and then cooled to room temperature. One and a half millilitre of ortho phosphoric acid was added to each flask. The solutions were diluted to the mark with water and allowed to stand for 15 min. Then the absorbance of the blood red colour developed was measured at 520 nm in a Shimadzu UV 150-02 double beam spectrophotometer against a reagent blank.

* **For correspondence**

TABLE 1 : OPTICAL CHARACTERISTICS AND PRECISION DATA

λ_{max}	520 nm
Beer's law limit	0.8-4.0 µg/ml
Sandel sensitivity (µg/cm^2/0.001 A.U.)	0.00433
Molar extinction coefficient (mole^{-1} cm^{-1})	12.68 x 10^{-4}
Regression equation (I+ ac):	
Slope (a)	22.5 x 10^{-2}
intercept (I)	0.01
Correlation coefficient (r)	0.9302
% RSD	0.4392
Range error :	
confidence limit with 0.05 level	0.3672
confidence limit with 0.01 level	0.5433

A graph of absorbance of the reaction mixture against varying concentration of the drug was plotted.

The red complex formed is due to the reaction between 1,10-phenanthroline and the ferrous ions formed by reduction of ferric chloride by the drug. Various parameters involved in the development of colour were optimized. The optical and precision data of the method is presented in Table 1. The method was applied for the analysis of the drug in tablet form (Cefpodem of Stancare) also. The average percentage recovery of the drug in tablets was 99.8 by this method. The usual excipients and other additives like starch, lactose, magnesium stearate, talc and the parabens in the formulations did not interfere in the proposed method.

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