Optimization of Simultaneous Analysis of Cefixime and Dicloxacillin Sodium in Oral Tablets

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ABSTRACT

The present manuscript describes simple, sensitive, rapid, accurate, precise and economical spectrophotometric method for the simultaneous determination of cefixime and dicloxacillin sodium in their combined tablet dosage form. The method was based on additive property of absorbance and correction of absorbance for the analysis of two drugs using methanol as solvent. The two wavelengths were selected from the UV spectra of both the drugs, which 218.4 nm and 289 nm. Cefixime was determined directly at 289 nm (λmax of cefixime) without any interference of dicloxacillin sodium in binary mixture. At 218.4 nm, both drugs have reasonable absorbance. So to remove interference of cefixime, its absorbance was calculated by using its standard absorptivity values at this wavelength. Finally, corrected absorbance of dicloxacillin sodium at 218.4 nm was found by subtracting the absorbance of cefixime from the total absorbance at 218.4 nm. The linearity was found in the concentration range of 3-16 μg/ml for both the drugs. The % recovery was found in the range of 100.22 ± 0.43 and 100.46 ± 0.32 for cefixime and dicloxacillin sodium respectively. The intermediate precision data obtained under different experimental setup, the calculated value of % coefficient of variation (% CV) was found to be less than critical value. The method was successfully applied for the simultaneous determination of these two drugs from their combined tablet dosage form without any interference.

KEYWORDS: Cefixime; Dicloxacillin sodium; Spectrophotometric method; Absorbance correction; Validation; Tablet dosage form.

Introduction

Cefixime is chemically (6R,7R)-7-[(2Z)-2-(2-amino-1,3-thiazol-4-yl)-2-(carboxymethoxy)iminolacetamido]-3-ethenyl-8-oxo-5-thia-1-azabicyclo-oct-2-ene-2-carboxylic acid (O’Neill MJ, 2001) (Figure-1). Cefixime (CEE), an antibiotic, is a third generation cephalosporin. The antibacterial effect of cefixime results from inhibition of muropeptide synthesis in the bacterial cell wall (Tripathi, 2009). Cefixime is official in Indian Pharmacopeia (Indian Pharmacopeia, 2010), British Pharmacopoeia (British Pharmacopoeia, 2010), and United States Pharmacopoeia (The United States Pharmacopoeia, USP27-NF22, 2009). These three pharmacopoeias describe liquid chromatography method for its estimation. Literature survey reveals UV spectrophotometry (Dey et al., 2012; Uzochukwu et al., 2013; Azmi et al., 2013; Omkar, 2013), High Performance Liquid Chromatography (Nahata et al., 1991; Khaja et al., 2010; Hafiz et al., 2009; Kandikonda et al., 2010) methods for determination of cefixime alone. Literature survey also reveals UV methods for determination of cefixime alone. Literature survey also reveals UV (Attimarad et al., 2011a; 2012b; Gadiya et al., 2013; Rajendran et al., 2011; Shah et al., 2012; Patel M et al., 2013; Patel D et al., 2013; Sharma et al., 2012; Chaudhari et al., 2012; Patel DP et al., 2012; Kumar et al., 2011), High Performance Liquid

Fig. 1. Chemical structure of cefixime.