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NOTE

Simultaneous Spectrophotometric Determination of Levofloxacin and Ornidazole from Combined Dosage Form

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A simple, rapid, accurate and precise spectrophotometric method has been developed for simultaneous estimation of levofloxacin and ornidazole from tablet dosage form. Proposed method involves formation of simultaneous equations at 289 and 320 nm, using distilled water as a solvent. The linearity was observed in the concentration range of 4-20 µg/mL for levofloxacin and 4-20 µg/mL for ornidazole. The results of analysis have been validated statistically and by recovery studies.

Key Words: Levofloxacin, Ornidazole, Spectrophotometry.

The combination formulations of levofloxacin hemihydrate (LEV) and ornidazole (ORN) have been in the market for their use in anaerobic infections[1-3]. Literature survey revealed that visible spectrophotometric[4], HPLC[5] methods are available for estimation of levofloxacin hemihydrate from pharmaceutical formulations and spectrophotometric[6,7] methods for estimation of ornidazole from pharmaceutical formulations.

A UV-Visible spectrophotometer (1601 Shimadzu) with spectral bandwidth 2 nm was employed for all spectroscopic measurements, using a pair of 10 mm matched quartz cells. Standard stock solutions of LEV and ORN were prepared separately in distilled water and diluted to different concentrations. The linearity was studied at respective absorbance maximas, *i.e.* 289 and 320 nm, respectively. It obeys Beer's law in the concentration range 4-20 µg/mL for LEV and 4-20 µg/mL for ORN. The optical characteristics and regression equation for the calibration are presented in Table-1.

The method is based on simultaneous equation[8] and utilizes corresponding absorbance maximas for quantification. The mean absorptivity coefficients of both drugs at each wavelength were determined from different dilutions (six independent determinations) of corresponding drugs within Beer's law concentration range limit. Using these, a set of two simultaneous equations was framed:

$$A_{289} = 604.6\ C_{LEV} + 151.45\ C_{ORN} \quad (1)$$

$$A_{320} = 212.17\ C_{LEV} + 361.5\ C_{ORN} \quad (2)$$

where, C_{LEV} and C_{ORN} are the concentration in g/100 mL in sample solution.

TABLE-1
OPTICAL CHARACTERISTICS AND STATISTICAL DATA OF THE REGRESSION EQUATION

Parameters	LEV	ORN
λ_{max} (nm)	289.0	320.0
Beer's law limit (µg/mL)	4-20	4-20
Slop	0.0731	0.0452
Y-Intercept	- 0.0136	0.0006
Correlation coefficient	0.9991	0.9997

By rearranging eqns. 1 and 2, concentrations C_{LEV} and C_{ORN} can be obtained as:

$$C_{LEV} = A_{320} \times 151.45 - A_{289} \times 361.5 / -186429.76 \quad (3)$$

$$C_{ORN} = A_{289} \times 212.17 - A_{320} \times 604.6 / -186429.76 \quad (4)$$

Preparation and analysis of tablet formulations: Commercial tablets procured from local market were used for analysis. Twenty tablets were weighed and crushed to obtain a fine powder. An accurately weighed, sample equivalent to 250 mg of LEV was taken in a stoppered volumetric flask (100 mL); 40 mL of distilled water was added and sonicated for 10 min. The solution was filtered through whatmann filter paper (No. 41) and volume was made up to the mark with same solvent. After, appropriate dilutions, the absorbances of the sample solutions were recorded at 289 and 320 nm *i.e.* A_{289} and A_{320}, respectively. The concentrations of two drugs in sample were determined by using eqns. 3 and 4.

The analysis procedure was repeated five times with tablet formulations of two brands. The results of analysis of tablet formulations are presented in the Table-2.

Recovery studies: The recovery studies were carried out by adding known amount of standard solution of LEV and ORN to preanalyzed tablet solutions. The resulting solutions were then analyzed by proposed method. The results of recovery studies were found to be satisfactory.

The proposed method was found to be simple, accurate, economical and rapid for routine simultaneous estimation of LEV and ORN in tablet formulations. The accuracy of the method was determined by calculating mean percentage recovery.

TABLE-2
TABLET FORMULATION ANALYSIS DATA

S. No	Label claim (mg/tab)		Found* % (mg/tab) ± S.D.		% Recovery* ± S.D.	
	LEV	ORN	LEV	ORN	LEV	ORN
T1	250	500	98.37 ± 1.051	98.50 ± 0.4372	98.94 ± 0.80	98.18 ± 0.69
T2	250	500	99.09 ± 0.6024	98.35 ± 0.5763	100.01 ± 0.65	99.92 ± 0.31

*mean of five estimation

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