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Research Article

UV SPECTROSCOPIC METHOD FOR ESTIMATION OF LINEZOLID IN TABLETS

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ABSTRACT

A simple, sensitive, specific, and validated UV method has been developed for the quantitative determination of Linezolid in pure and tablet dosage form. The λmax was found to be 590nm for assay. The linearity was found in concentration range of 3-18 µg/ml. The correlation coefficient was found 0.999. The regression equation was found as Y= 0.030X + 0.006. The method was validated for linearity, accuracy, precision and ruggedness. The LOD and LOQ for estimation of Loperamide were found as 0.09784, 0.2951respectively. Recovery of Loperamide was found to be 96.93%.

Keywords: Linezolid, UV–Vis Spectrophotometry, Migraine, Validation.

INTRODUCTION

Linezolid is a member of a new structural class of antibiotics, Oxazolidinones. The oxazolidinones have a good activity against Gram-positive bacteria[1,2]. They act uniquely by inhibiting the formation of protein synthesis initiation in Gram-positive bacteria[3]. There are several HPLC methods described to analyze linezolid in various body fluids including LC-MS-MS, microbore LC-ESI-MS-MS[4-7] and fluorescence detection[8]. For the assays in the pharmaceutical dosage forms, the methods reported in literature are HPLC[9-12], capillary electrophoresis[13] and HPTLC[14]. The aim of the present study is to develop a new simple, rapid, reliable and precise UV spectrophotometric method for analysis of linezolid from tablet formulation; method is based on measurement of UV absorbance of linezolid in phosphate buffer (pH 7.2).

MATERIAL AND METHODS

Instrument Used

Analytical 2080 –UV/Vis-Spectrophotometer with a pair of 10 mm matched quartz cells was used for spectral and absorbance measurements. Transonic Digital S (Sonicator). Shimadzu electronic one pan balance also used in this study.

Reagents

All chemicals used were of analytical reagent grade. Linezolid was obtained from Optimus pharmaceuticals Ltd, Hyderabad. Lizoforce is the commercial tablet formulation labeled to contain 600 mg per tablet. Stock reference solution (1000µg/ml) was freshly prepared from pure sample of Linezolid by dissolving 100 mg in 100 ml of buffer.

EXPERIMENTAL

Determination of λmax

Drug was dissolved in buffer to obtain a 1000µg/mL solution. This solution was subjected to scanning between 200 – 400 nm and absorption maximum was determined. The effect of dilution on absorption maxima was studied by diluting the above solution to 10mcg/mL and scanned from 200 – 400nm. From the spectra of drug (Fig. 1), λ max of Linezolid, 251 nm was selected for the analysis. The calibration curve was prepared in the concentration range of 2-16 mcg/ml at 251 nm. By using the calibration curve, the concentration of the sample solution can be determined.

Linearity and Calibration

The aliquots working standard solution was diluted serially with sufficient distilled water to obtain the concentration range of 2-16 mcg/ml. A calibration curve for Linezolid was obtained

by measuring the absorbance at the λmax of 251 nm. Statistical parameters like the slope, intercept, coefficient of correlation, standard deviation and Relative standard deviation were determined.

Assay

Twenty tablets, each containing 600mg of linezolid were weighed and average weight was calculated. Quantity equivalent to 10 mg of linezolid was weighed, transferred to a 100 ml volumetric flask, extracted and made up to volume with phosphate buffer and filtered. From this solution, suitable aliquots were prepared, scanned in UV region and absorbances were noted at selected wavelength.

Recovery studies

In order to ensure the suitability and reliability of proposed method, recovery studies were carried out. To an equivalent quantity of formulation powder, a known quantity of standard linezolid was added at 50%, 80% and 100% level and the contents were reanalyzed by the proposed method.

RESULTS

The UV scan of standard solution between 200-400 nm showed the absorption maxima at 251 nm, shown in fig. 1. The Beer's law was verified from the calibration curve by plotting a graph of concentration vs. absorbance. The plot is shown in fig. 2. Regression analysis showed very good correlation. The calibration plot revealed low intercept which is clear by the regression analysis equation Y = mX + C will be Y= 0.04x + 0.001. (Where Y is absorbance, m is the slope and X is the concentration of linezolid in mcg/ml) as obtained by the least square method. The correlation coefficient was 0.998. The results of analysis for assay are shown in Table 1 and recovery studies for the formulation were studied and are shown in Table 2. No significant variations were observed on interday and intraday analysis. Also no significant variations were observed on changing the instrument make and model.

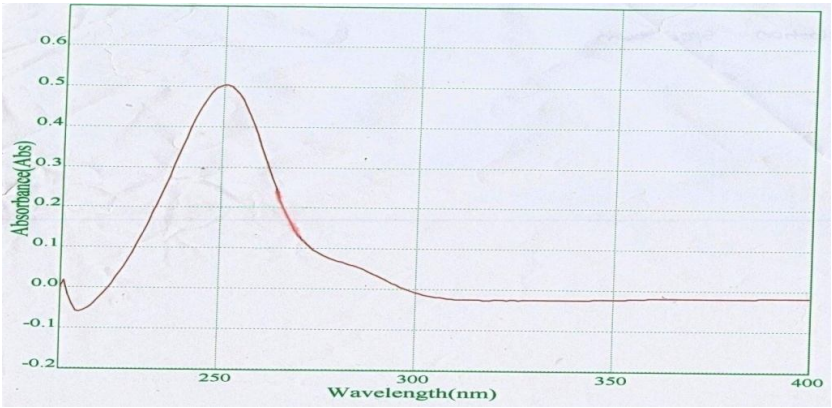

Fig. 1: Absorption spectrum of linezolid

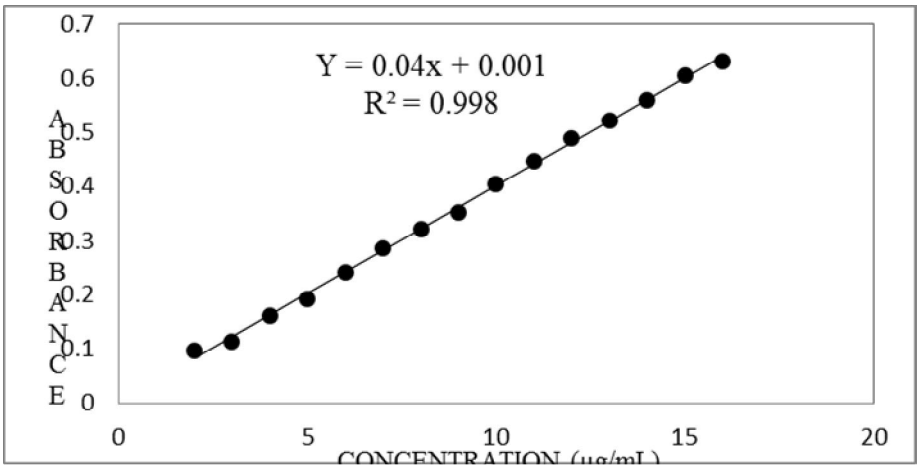

Fig. 2: Linearity curve of linezolid

Table 1: Analysis of formulation

Drug	Amount (mg/tablet)		% label claim	%RSD
	labelled	Found		
Linezolid	600	598.5	99.5	0.324

Table 2: Recovery Studies

Drug	Label Claim (mg/ Tablet)	Estimated Amount (mg/ Tablet)	Spike level (%)	Amount of drug added (mg)	Amount of drug recovered (mg)	Percentage recovery ± SD*
Linezolid tablets	600	598.5	50	3.0	3.03	100.72±0.6473
			100	6.0	5.98	99.50±0.4235
			150	9.0	9.01	100.12±0.2456

*Mean of six determinations.

CONCLUSIONS

From the results the method described in this paper for the determination of linezolid from tablet formulation is simple, accurate, sensitive and reproducible. The proposed method utilizes inexpensive solvent. The proposed method could be applied for routine analysis in quality control laboratories.

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