Della Grace Thomas Parambi et al. / Journal of Pharmacy Research 2010, 3(8),1706-1708

Research Article
ISSN: 0974-6943

Available online through
www.jpronline.info

Estimation of Olmesartan Medoxomil, an angiotensin receptor blocker in pharmaceutical dosage form by U.V.Spectrophotometric method

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Received on: 15-04-2010; Revised on: 12-05-2010; Accepted on:13-06-2010

ABSTRACT

A simple, rapid, economical, accurate and precise method has been developed for estimation of Olmesartan medoxomil from tablet dosage form. The absorption maxima in THF solvent was found to be 265nm and Beer's law was obeyed in a concentration range of 5-30mcg/ml and coefficient of correlation for Olmesartan was found to be 0.9997.The precisional accuracy of the developed method were confirmed by repeatability and recovery studies are validated statistically. The limit of detection and limit of quantitation of Olmesartan were found to be 0.23mcg/ml and 0.77mcg/ml respectively. The percentage recovery was found to be 99.37% for Olmesartan. The method showed good repeatability and recovery with relative standard deviation less than 2.So, this developed method can be used for the routine analysis of Olmesartan medoximil from formulations.

Key words: Olmesartan medoxomil, U.V. Spectrophotometric method, THF.

INTRODUCTION

Olmesartan medoxomil is the most recent member of Angiotensin receptor blocker[1,2,3] which is chemically, (5-methyl-2-oxo-2H-1,3-dioxol-4-yl) methyl 4-(2-hydroxypropan-2-yl)-2-propyl-1-({4-[2-(2H-1,2,3,4-tetrazol-5-yl)phenyl]phenyl}methyl)-1H-imidazole-5-carboxylate.Key structural elements of Olmesartan medoxomil include a hydroxy alkyl substituent at the imidazole 4- position and a hydrolysable ester at the imidazole 5- position. Inter and Intra molecular hydrogen bonding involving these groups may contribute to the potentiation of antagonistic activity. After the oral administration, Olmesartan medoxomil is de-esterified in the intestinal tract to produce the active metabolite Olmesartan, which undergoes no additional metabolic change [4]. The marked anti-hypertensive efficacy of Olmesartan medoxomil may result from a unique pharmacological interaction of the drug with the AT_1 receptor, resulting in a potent, long lasting, dose dependent blockade of A_2.This characterizes the structural features of Olmesartan that may be responsible for its clinical efficacy [5]. Literature survey reveals that Olmesartan medoxomil can be estimated by RP-LC and HPLC[7], HPTLC[8,9] methods individually or in combination with other drugs. However, there is no U.V. Spectrophotometric method reported for the estimation of Olmesartan from pharmaceutical dosage forms. Present work describes a simple, economical, accurate and precise method for the estimation of Olmesartan in tablet formulations.

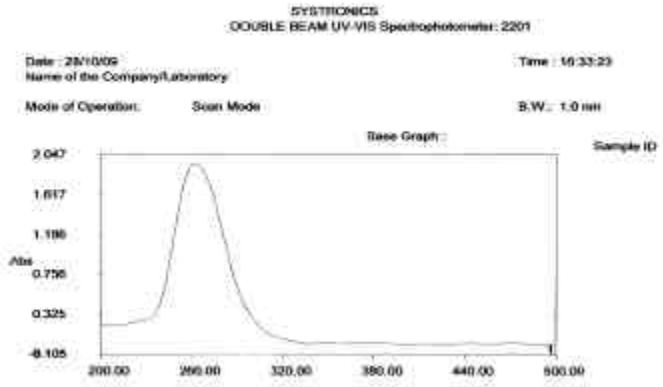
MATERIALS AND METHODS:

Instrument: A double beam SYSTRONICS- U.V.-Visible spectrophotometer 2201, with spectral band width of 2nm, wavelength accuracy ±0.5nm and a pair of 1cm matched quartz cells was used to measure absorbance of the resulting solution.

Materials: Pure drug, Olmesartan was supplied as a gift sample by RANBAXY Laboratories Limited, Delhi. Tablet formulations containing Olmesartan of the brand names OLMESAR of MACLEDDS Pharmaceuticals, Mumbai and OLMECIP of CIPLA, Gujarat were purchased from local pharmacy shop.

Solvent: THF was used as the solvent.

Stock solution: Standard stock solution were prepared by weighing out 100mg of Olmesartan and transferred to 100ml volumetric flask. It was dissolved in THF(A.R grade)and made upto volume to get a concentration of 1mg/ml. Spectral characteristics of Olmesartan were studied by taking concentrations of 10, 20, 30, mcg/ml and scanned by U.V.-Visible spectrophotometer from 190-400nm and λmax of 265nm were fixed.



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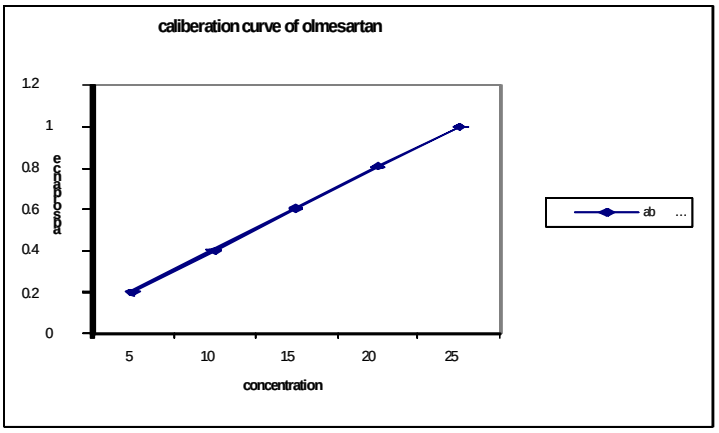
Calibration curve of absorbance versus Concentration were studied by taking concentrations ranging from 1-40mcg/ml and data revealed that Beer's law was obeyed between concentration range of 5-30mcg/ml. Calibration curve of Olmesartan is given below.



Statistical evaluation of the calibration plot was done and the parameters are shown in table no 1.

Table No.1 statistical parameters from the calibration plot

Statistical parameters	Observed value
The co-relation coefficient	0.9999
Standard deviation	0.4571
Variance	0.2090
Standard error	0.0040
Coefficient of determination(r^2)	0.9998

Assay of olmesartan in dosage forms:

20 tablets (OLMESAR & OLMECIP) both 20 and 40 mg were accurately weighed and average weight of the tablets were calculated. Weight equivalent to 100mg was transferred to 100ml volumetric flask and made up to volume with THF and sonicated for 15minutes.The solution was mixed and centrifuged for excipients to settle down. The resultant 1mg/ml of the solution was further diluted to get a concentration of 100mcg/ml. Accurately pipetted out 1, 1.5 and 2ml of the above solution into three 10ml standard flasks and the volumes were made up using THF. This gave sample solution having concentration 10, 15, and 20mcg//ml. The absorbance of each concentration was measured and the results of analysis of tablet formulations were shown in table No. 2

Table No.2 Result of tablet analysis

Brand of Drug	Label Claim	Amount of Drug Estimated	Percentage Label Claim	Standard Deviation
Olmesar	20mg	19.7801mg	98.90%	0.19
Olmesar	40mg	39.5078mg	98.76%	0.41
Olmecip	20mg	19.92mg	99.60%	0.01
Olmecip	40mg	39.87mg	99.67%	0.04

VALIDATION [10,11]:

The methods were validated with respect to linearity, accuracy, precision and LOD and LOQ.

Accuracy:

To study the accuracy of the proposed methods, recovery studies were carried out by adding a known amount of drug to the pre analysed tablet powder and percentage recoveries were calculated.The result of recovery studies were satisfactory and are presented in table no 3.

Table. 3 Result of recovery studies

Brand of Drug	Label Claim	Amount of Pure Drug Added	Percentage Recovery*	Standard Deviation
Olmesar	20mg	50mg	99.37%	0.29
Olmesar	40mg	50mg	99.35%	0.18
Olmecip	20mg	50mg	99.15%	0.41
Olmecip	40mg	50mg	99.30%	0.3

**Mean of 3 determinations*

Precision:

The reproducibility of the proposed method were determined by performing the tablet assay at different time intervals on the same day(intra-day assay precision) and on three different days(inter-day assay precision).The results of intra-day and inter-day precisions were expressed in %RSD. The %RSD for intra-day assay precision was found to be 0.4 and inter-day assay precision was found to be 0.6.

Limit Of Detection and Limit Of Quantitation:

The LOD and LOQ were determined based on the standard deviation of the y-intercept and the slope of the calibration curves.LOD and LOQ for Olmesartan was found to be 0.23mcg/ml and 0.77mcg/ml respectively.

Linearity:

The linearity of analytical procedure is its ability to obtain the best results which is directly proportional to the concentration of analyte in the sample, the calibration curve of Olmesartan by the proposed method was found to be linear of the range of 5-30mcg/ml.

RESULTS AND DISCUSSION:

The method discussed in the present work provides a simple, accurate, economical and convenient method for the analysis of Olmesartan using U.V. spectrophotometry. λmax selected for quantitation was 265nm.In the developed method, the linearity was observed in the concentration of 5-30mcg/ml. Present label claim for the two brands of Olmesartan at concentrations 20 and 40mg was found in the range of 98.7-99.6%.Accuracy of the proposed method was ascertained by recovery studies and the results were expressed as percent recovery and was found in the range of 99.15-99.35.Values of standard deviation and coefficient of variance was satisfactorily low indicating the accuracy of both the methods. Intra-day and Inter-day precision studies were carried out by analyzing the tablet powder at different time interval on the same day and on three different days respectively. Standard deviation and coefficient of variance for Intra-day and Inter-day precision studies was found to be less than 2 indicating precision of the proposed method. Based on the results obtained, it was found that, the proposed methods were accurate, precise, reproducible and economical and can be employed for routine quality control of Olmesartan in tablet dosage forms.

ACKNOWLEDGEMENT:

Authors are thankful to RANBAXY Laboratories Limited, Delhi for providing the gift samples.

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Source of support: Nil, Conflict of interest: None Declared