Available Online through
www.ijpbs.com

IJPBS |Volume 1| Issue 2 |APRIL- JUNE |2011

SIMPLE QUANTITATIVE METHOD DEVELOPMENT AND VALIDATION OF VALSARTAN IN PUREFORM AND PHARMACEUTICAL DOSAGE FORMS BYUV –SPECTROSCOPY

K.S.Nataraj[1]*, S.V.Ramakrishnama Charya[2], E.Swathi Goud[3], S.Saigeethika[4]and K.Ramanjineyulu[5]

[1, 2,3,4,5] VISHNU INSTITUTE OF PHARMACEUTICAL EDUCATION AND RESEARCH, NARSAPUR-502616 MEDAK DIST. ANDHRA PRADESH STATE, INDIA

*Corresponding Author Email: kalakondan@yahoo.com

Research Article

RECEIVED ON 13-06-2011 ACCEPTED ON 28-06-2011

ABSTRACT

Simple precise accurate UV Spectroscopic method has been developed and validated for estimation of valsartan in pure and pharmaceutical dosage form. UV Spectroscopic method which is based on measurement of absorption of UV light, the spectra of valsartan in methanol showed maximum wave length at 250nm and calibration graphs were plotted over the concentrations ranging from 2-20µg/ml of valsartan with correlation coefficient 0.9968 validation was performed as per ICH Q2 (R1) guidelines for linearity, accuracy, precision and recovery. The limit of detection (LOD) and limit of quantification (LOQ) were found to be 0.15 and 0.449 respectively by simple UV Spectroscopy .The proposed method was validated.

KEYWORDS: Valsartan, UV-Spectroscopy.

Introduction

Valsartan is chemically N-(1-Oxopentyl)-N-[(2'-(1H-tetrazol-5-yl)(1,1'-biphenyl)-4-yl)methyl]-L-Valine.It is a white crystalline powder with formula $C_{24}H_{29}N_5O_3$ and molecular mass 435.52 g/mol. It is used as a potent angiotensin receptor blocker[1,2] used as an antihypertensive i.e., used at high BP Conditionsand also can be used in treatment of congestive heart failure (CHF) Post myocardial infarction.

Analysis is an important component in the formulation and development of any drug molecule. A suitable and validated method has to be available for the analysis of drugs in bulk, in drug delivery systems, release dissolution studies and in biological samples. If a suitable method for specific need is not available then it becomes essential to develop simple sensitive, accurate, precise reproducible method for the estimation of drug samples. Methods such as HPLC[3], Capillary Electrophorsis[4] and simultaneous UV-spectroscopic methods of valsartan[5,6] are reported for estimation of valsartan alone or in combination with other drugs.

Materials and Methods

Instrumentation, Reagents &Chemicals:

Instruments used were UV-Visible spectrometer, model T-60U- PG Instruments and Shimadzu ELB 300 analytical balance, Valsartan pure drug (99.99%) was obtained as a gift sample from spectra laboratories

Hyderabad. All chemicals and reagents used were of analytical grade. Formulation used for studies was developed by "Torrent pharmaceuticals" with brand name "VALZAAR-80"

Selection of media:

Main criteria for selection of media solubility and stability i.e., drug should be soluble as well as stable for sufficient time in selected media. Valsartan was slightly soluble in distilled water and was soluble in di-chloromethane, chloroform and ethanol-water mixture. It was freely soluble in methanol and was considerably stable.

Preparation of standard stock solution:

Standard drug solution of valsartan was prepared by dissolving 50mg pure valsartan in methanol and transferred into 100ml volumetric flask to obtain 500µg/ml of stock solution from which desired concentrations of solutions were prepared.

Preparation of test solution:

10 Tablets were weighed and its average weight was determined. An accurately weighed tablet power equivalent to 25 mg of valsartan transferred into 50 ml volumetric flask dissolved in 25 ml of methanol and sonicated for 10 min and volume was made upto the mark and solution was filtered using whattman filter paper (**NO.41**) to obtain 500µg/ml stock solution .

Determination of λ_{max}:

10 µg/ml solution of valsartan was prepared and scanned in UV range of 200-400nm and spectrum was obtained. The **λ_{max}** was found to be at 250nm wave length where absorbance was maximum at this wavelength. Hence this is considered as absorbance maxima (λmax) shown in **fig.1**.

Preparation of calibration curve:

Standard stock solution was suitably diluted with methanol to obtain concentrations ranging from 2-20 µg/ml. Absorbance of these solutions was measured at 250nm (λ_{max} valsartan) using UV, calibration curve was obtained by plotting graph between concentration and absorbance shown in **figure 2**.

Linearity:

Linearity was obtained between2-20µg/ml concentration. Graph was plotted for concentration and absorbance. The equation of calibration curve obtained was Y=0.0328x+0.0206. The correlation coefficient (R^2) was 0.9968 shown in **fig.2**

Limit of Detection (LOD) and Limit of Quantification (LOQ)

The LOD and LOQ of valsartan were determined by using standard deviation of response and slope approach as defined by ICH guidelines. The LOD and LOQ were found to be 0.15 and 0.449 respectively shown in **table 5**.

Precision

Precision was calculated for intraday and inter-day of pure drug, the data shows that the method is sufficiently precise shown in **table 6 & 7**.

Accuracy

To determine the accuracy of the method recovery was performed by standard addition method. To pre-analyzed sample known amount of standard valsartan was spiked in different concentrations. The recovery was performed at three levels 50%, 100%, 150% of standard valsartan, solutions were analyzed and percentage recovery was calculated from calibration curve shown in **table 3**.

Stability:

The standard stock solution of Valsartan 10 µg/ml in Methanol was subjected to heat at 40^0C, 50^0C for 10 minutes then diluted up to the mark and absorbance were measured. The absorbances of initial and after heating are obtained the same. Hence concluded the drug is stable in Methanol.

Table 1: Validation Parameters

S.No.	Parameter	Result
1.	Absorption maxima (λ_{max}) (nm)	250nm
2.	Linearity range (µg/ml)	2-20 µg/ml
3.	Standard regression equation	Y=0.0328x+0.0206
4.	Correlation coefficient (r^2)	0.9968
5.	Molar absorptivity	15060

Fig.1.Overlain spectra of Valsartan in Methanol

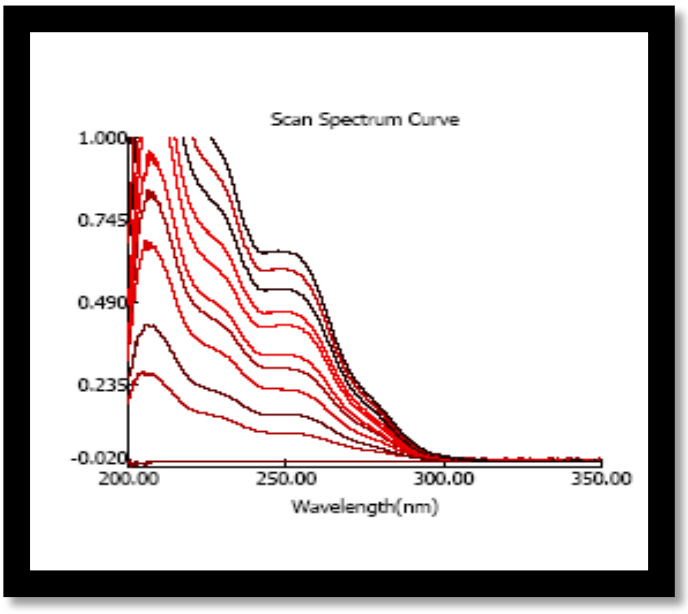

Table2: Calibration data for Analysis of Valsartan in methanol at λ_{250}

Concentration (µg/ml)	Mean Absorbance (±SD)
2	0.089 (0.001)
4	0.150 (0.0015)
6	0.226 (0.0009)
8	0.303 (0.0002)
10	0.339 (0.00025)
12	0.431 (0.0003)
14	0.479 (0.0006)
16	0.549 (0.0005)
18	0.610 (0.0009)
20	0.661 (0.0005)

Fig.2: Calibration Curve of Valsartan in methanol showing linearity relationship.

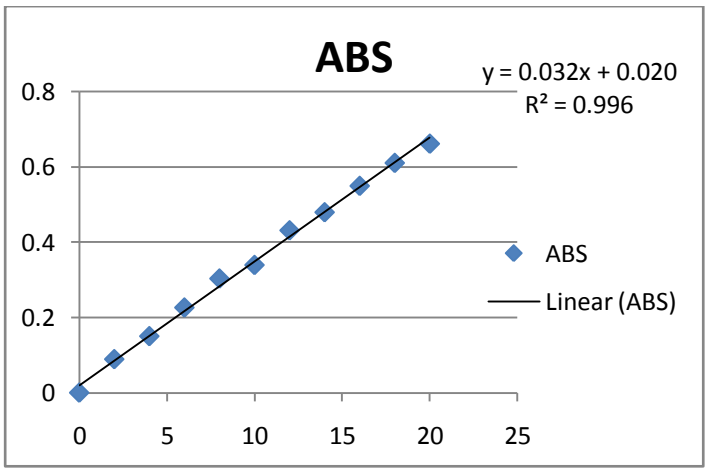

Table-3: Recovery data of Valsartan in methanol

Ingredient	Amount of drug from formulation	Amount of standard added	Percentage added	Amount recovered	% recovery
Valsartan	10 µg	5 µg	50%	14.92 µg	99.46%
Valsartan	10 µg	10 µg	100%	20.24 µg	101.2%
Valsartan	10 µg	15 µg	150%	24.66 µg	98.64%

Table 4: Results of analysis of laboratory samples (Assay):

Sample	Label	Amount Found	% label claim
Brand-1 Valsartan	80 mg	79.83	99.78
Brand-2 Valsartan	80 mg	80.02	100.025

Table5: Lowest Limit of detection and lowest limit of quantification

LOD (µg/ml)	LOQ (µg/ml)
0.15	0.449

Table 6: Results of Intraday precision of Valsartan in methanol

Parameter	% Recovery Estimated (Mean ± RSD)*		
	6 (µg/ml)	8(µg/ml)	10(µg/ml)
Morning	99.89± 0.38	99.65 ± 0.93	99.48 ± 0.90
Afternoon	99.96± 0.80	99.98 ± 1.10	100.05 ± 0.23
Evening	99.21 ± 0.84	99.76 ± 0.46	99.72 ± 0.21

** n=3 (Average of 3 determinations)*

Table 7: Results of Inter-day precision of Valsartan in methanol

Parameter	% Recovery Estimated (Mean ± RSD)*		
	6 (µg/ml)	8(µg/ml)	10(µg/ml)
Day -1	99.68± 0.67	100.24 ± 0.21	99.09 ± 0.74
Day -2	100.05± 0.18	99.04 ± 0.96	100.42 ± 0.16
Day -3	99.28 ± 0.94	99.78 ± 0.72	98.96 ± 0.96

**** n=3 (Average of 3 determinations)***

Results and Discussions

Attempt has been made to develop rapid sensitive, economic, precise and accurate analytical method for valsartan in pure and pharmaceutical dosage form. The proposed method is based on UV spectrophotometric absorption in UV region using methanol as solvent, maximum absorbance was found to be at 250nm. LOD and LOQ were found to be 0.15 and 0.449 respectively. Beer's law was obeyed in concentrations ranging from 2-20µg/ml. The correlation co-efficient values were above 0.9968 which shows that absorbance was linear with concentration. The optical characteristics such as Beer's law limits correlation co-efficient, slope, intercept and molar absorptivity were calculated and validated (**Table 1**). To study interference of various excipients recovery was done for formulation. It showed that there is no interference of excipients on the pure drug. The percentage label claim present in tablet formulation was confirmed by repeated analysis of formulation. It was found to be 99.90%.Precision of the method was confirmed by Intraday and inter-day analysis, % RSD values were found to be less than2. From all the validation parameters, the developed method was found to be simple, economical, precise and accurate. Hence proposed method could be effectively applied for analysis of valsartan in bulk and formulated tablet dosage form.

Conclusion

A spectrophotometric method for quantifying Valsartan in pure and tablet has been developed and validated .The method is selective, precise, accurate and linear over the concentration range studied. The method is simple and suitable for the determination of Valsartan in formulation, without interference from excipients or from common degradation products, suggesting its application in IPQC and pharmacokinetic studies.

References:

1. www.Rxlist.com/exforge – hct.htm
2. Goodmanand Gilman's The pharmacological basis of therapeutics. 10th ed. New-york; McGraw Hill medical publishing division.
3. Daneshtalab N, LewanczukRz and Jamali F. High performance liquid chromatographic analysis of Angiotensin II receptor antagonist valsartan using liquid extraction method. J Chromatography B Analyst

Technol Biomed Life Sci 2002; 766; 345-359

4. Hillaert S and Bossche VW. Simultaneous determination of hydrochlorothiazideand several angiotensin II receptor antagonists by capillary electrophoresis. J Pharm Biomed Anal 2003; 31; 329-339.

5. AnandaKumarand Jayamariappan M. Int J PharmPharmSci, vol3, issue1, 23-27

6. MrunaliniMadhusudhandeshpande et al. Journal of Pharmacy Research 2011, 4(3); 915-916.

*Address for the Correspondence:

K.S.Nataraj[1]*

Vishnu Institute of Pharmaceutical Education and Research,
Narsapur-502616
Medak Dist.
Andhra Pradesh State,
India

E.mail: **kalakondan@yahoo.com**