



Research Article

APPROACH FOR QUANTITATIVE ESTIMATION OF EPROSARTAN MESYLATE BY UV SPECTROPHOTOMETER

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ABSTRACT

Eprosartan Mesylate is an angiotensin II receptor (AT1) antagonist. Eprosartan Mesylate is an effective, well tolerated and potent pure competitive antagonist of the AT1 receptor and hence there has been significant research on broad range of analytical and detection techniques that could be useful in its estimation in formulations and biological matrices. A simple, sensitive and accurate UV spectrometric method has been developed for the determination of eprosartan Mesylate in raw material and experimental tablets. Beer's law was obeyed in the concentration range 2-3 μ g mL⁻¹ for the drug (λ =233nm) with an apparent molar absorptivity and sandell sensitivity of 2.8 \times 10⁴ Lmol⁻¹cm⁻¹ and 0.01854 μ gcm⁻²/0.001A, respectively. The limit of detection and quantitation were calculated to be 0.3623 and 1.098 μ g mL⁻¹, respectively. Results were validated statistically according to ICH guidelines. Validation of the method yielded good result in the concerning range (2-30 μ g mL⁻¹), linearity ($r^2 = 0.9998$), precision and accuracy. The excipients present in the experimental tablet did not interfere with the method.

Keywords: Eprosartan Mesylate, Beer's Law, UV Spectrophotometry, Quantitative estimation.

INTRODUCTION

During the past decade, ambulatory blood pressure (BP) measurements have been consistently used in the evaluation of new classes of antihypertensive drugs. [1,2]. Such has been the case with a number of the older therapeutic drug classes, such as the angiotensin converting enzyme inhibitors or the calcium channel blockers. [3] More recently, this technology has been applied to the study of the BP-lowering effects of the angiotensin II receptor blockers (ARB).

Eprosartan Mesylate is a nonphenyl, nontetrazole angiotensin receptor blocker highly specific for the AT1 receptor [4]. After oral ingestion of Eprosartan Mesylate, peak plasma concentrations are reached within 2 h and the plasma half-life is 5 to 9 h. Eprosartan Mesylate is not significantly metabolized and approximately 70% of its systemic

clearance being hepatic and the remainder of its systemic clearance is renal in origin [5, 6]. Eprosartan Mesylate reduces BP by selectively blocking the AT1 receptor as well as by blockade of the presynaptic AT1 receptors with a resultant diminution in sympathetic nerve activity [7]. The purpose of this study was to formally evaluate the efficacy of Eprosartan Mesylate administered once daily using both clinic and the more sensitive modality of 24-h ambulatory BP monitoring.

Eprosartan Mesylate is a novel angiotensin receptor antagonist with chemical name IUPAC: (E)-2-Butyl – (1-P-carboxy benzyl)- -2- thenylimidazole-5-acrylic acid methane sulfonate. Its molecular weight is 520.61832 [g/mol] with molecular formula C₂₄H₂₈N₂O₇S₂ [8].

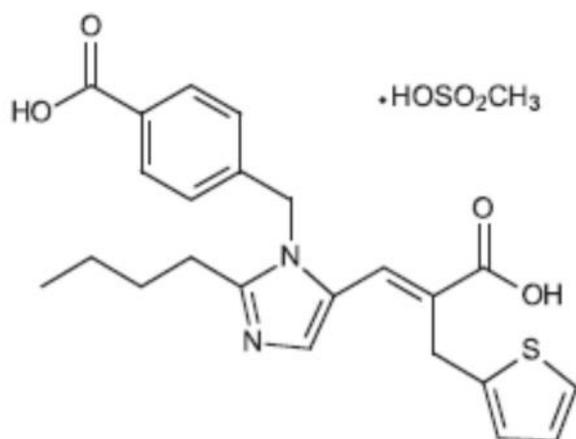


Fig. 1: Chemical structure of Eprosartan Mesylate

Literature survey reveals few analytical methods for the determination of Eprosartan Mesylate in pharmaceutical preparations and biological fluids, viz. Spectrophotometry [9], and HPLC [10]. UV Spectroscopy [11, 12], HPLC [13, 14] methods are reported for simultaneous estimation of dosage form.

MATERIALS AND METHODS

Chemicals:

Eprosartan reference substance was obtained from Life care Laboratories Pvt. Ltd. Hyderabad (India). The solvent used for the experiment was methanol (SD Fine Chem. Ltd. Mumbai). All chemicals were used as obtained without further purification.

Instrument:

A double beam UV-VIS spectrophotometer (Systronics India Limited UV-VIS Spectrometer-2203) was employed for spectrophotometric measurements.

Preparation of Standard Stock solution:

The stock solution of Eprosartan was prepared by dissolving accurately 10 mg of drug in 0.1N methanol in a 10 ml volumetric flask to obtain a concentration of 1000 µg/ml. From this solution, 2.5 ml was taken and diluted with methanol in a 25 ml volumetric flask to prepare a working standard solution (100µg/ml).

Calibration curve:

Aliquots (0.2, 0.4, 0.6, and 0.8 up to 3mL) of working standard solution were transferred into series of 10 mL volumetric flasks and diluted by methanol to give the concentration of 2-30µg mL⁻¹. The above solutions were scanned over the range of 400 nm to 200 nm against

reagent blank. The absorbance of each solution at 233 nm against methanol as blank. A calibration curve was prepared by plotting absorbance versus concentration.

Estimation of Eprosartan in Tablets:

For the analysis of the drug in bulk, accurately weighed 10 mg sample was dissolved in 100 mL methanol in a volumetric flask. After suitable dilution, the absorbance of final sample was recorded against the blank at 233nm. For the analysis of dosage form, twenty tablets of eprosartan Mesylate (300mg) were ground to fine powder and mixed thoroughly. A quantity of powder equivalent to 10 mg of the drug was transferred to 100 mL volumetric flask and dissolved in about 40 ml methanol. The insoluble excipients were separated by filtration through whatman filter paper (No. 41). After suitable dilution, the absorbance was recorded against the blank at 233nm.

Recovery studies:

The accuracy of the proposed method was confirmed by recovery studies. To the pre analyzed formulation a known amount of raw material was added and it can be analyzed by proposed method. Recovery studies were performed by adding known amount of Eprosartan Mesylate reference substance (20, 40, 60 and 80 µg) to the fixed amount of drug in the tablet powder equivalent to 100 µg. Then the procedure was followed as per the analysis of formulation. The amount of each drug recovered was calculated. Statistical analysis of the data was done by simple linear regression.

RESULTS AND DISCUSSION:

Eprosartan Mesylate was analyzed by UV spectrophotometric method both in raw material and in tablet as a pharmaceutical formulation. The method was validated according to the guidelines of International Conference Harmonisation (ICH) [15, 16]. The drug showed maximum absorption at 233 nm in methanol. A standard calibration curve of the drug was constructed by plotting absorbance versus concentration (Figure 2). The linear regression equation was calculated to be $Y=0.0532X+0.0054$ (Y = absorbance, X = concentration in µg mL⁻¹) with correlation coefficient of 0.9998. Beer's law was obeyed over the concentration range of 2-30 µg mL⁻¹ with apparent molar absorptivity and sandell sensitivity of

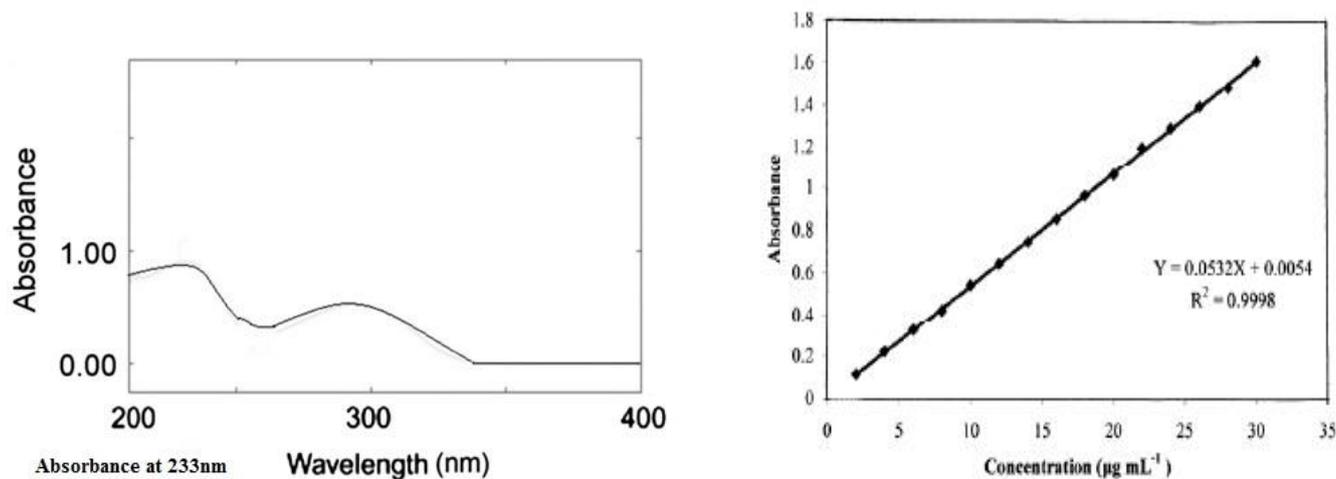


Fig. 2: Calibration curve of Eprosartan Mesylate against methanol as blank.

$2.8 \times 10^4 \text{ L.mol}^{-1}\text{cm}^{-1}$ and $0.01854 \mu\text{g cm}^{-2}/0.001\text{A}$, respectively. The limits of detection and limit of quantitation were calculated to be 0.3623 and $1.098 \mu\text{g mL}^{-1}$, respectively. The linear regression equation with a correlation coefficient (r) of 0.9998 indicates a good linearity between absorbance and concentration in the range of $2\text{-}30 \mu\text{g mL}^{-1}$

The low value of % relative standard deviation ($\text{RSD} = 0.309, n=7$) of intra-day assay and inter day assay ($\% \text{RSD} = 1.11, n=5$) confirm the high degree of precision of the proposed method. The interference of excipients used in the formulation was studied. The assay result of tablets obtained by the proposed method was found to be $99.83 \pm 0.740\%$. Low value of standard deviation indicates the method to be precise.

The observed concentrations of Eprosartan Mesylate reference substance in the tablets were not significantly different from the stated concentration by student's t test, $P=0.05$ ($99.02\%, n=6$). To evaluate the validity and accuracy the recovery studies were carried out. The percentage recovery ($98.60 \pm 0.725, n=4$) indicates the accuracy of the method and absence of interference of excipients present in the formulation. The ANOVA analysis showed there is no significant difference ($F_{\text{stat}} \text{ value} < \text{tabulated } F \text{ Value at } P=0.05$) among the assay result obtained in three different days at different times as compared to reported capillary zone electrophoretic method [17].

CONCLUSION:

The method is very simple, sensitive, accurate, precise and rapid. Since no UV spectrophotometric method is reported for Eprosartan Mesylate from bulk and pharmaceutical formulation, the present method may be useful for routine quality control test and analysis of Eprosartan Mesylate from bulk as well as tablet.

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