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Short Note

A VALIDATED RP HPLC METHOD FOR THE DETERMINATION OF MOPROLOL IN BULK AND TABLET DOSAGE FORM

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ABSTRACT

A validated reverse phase high performance liquid chromatographic method (RP-HPLC) has been developed for the estimation of moprolol in the pharmaceutical preparation using RPC_{18} column. The mobile phase (Acetonitrile: Methanol: Water) was pumped at a flow rate of 1ml/min in the ratio of 15:50:35 and the eluents were monitored at 274nm at 30^0C.The intra and interday precision was found to be less than 2% showing high precision of the assay method. The % recovery of the method was more than 99% and RSD did not exceed 2% indicating high degree of accuracy of the proposed HPLC method. The %RSD for the robustness testing was also less than 2%.The proposed HPLC method can be used for the estimation of moprolol in tablet dosage forms.

Keywords: *Moprolol; RP-HPLC; Validation; Recovery; tablet dosage.*

INTRODUCTION

Moprolol belongs to â-adrenergic blocking agent that inhibits the adrenergic response mediated through the â-receptors, chemically Moprolol is 1-(2-methoxyphenoxy)-3-[(1-methylethyl)amino]-2-propanol[1]. It is clinically useful in the treatment of ocular hypertension, ischemic heart disease, congestive heart failure and certain arrhythmias[2]. It is not official in any of the pharmacopoeias. It is listed in the Merck index and Martindale; the complete drug reference. The literature survey reveals that only one HPLC method is reported for the determination of moprolol in biological fluid[3-6]. So far not a single UV, HPLC or HPTLC method is reported for the analysis of moprolol in tablet dosage form. The object of the study was to develop a simple, precise, rapid and accurate reverse phase HPLC method for the determination of moprolol in pharmaceutical dosage forms.

EXPERIMENTAL

Reagents and Chemicals

Analytically pure Moprolol were obtained as gift sample from Sequent Scientific Ltd. Mangalore, India. Acetonitrile, methanol and water used for the preparation of mobile phase were of HPLC grade and procured from Qualigens Fine Chemicals, Mumbai.

Instruments used

An isocratic high pressure liquid chromatographic system consisted of the following components: Shimadzu HPLC model VP series containing LC-10 AT VP series pump, variable wavelength programmable UV/Vis detector SPD-10AVP system and rheodyne injector with 20îl fixed loop. Chromatographic analysis was performed using Winchrom software on reverse phase phenomenox C_{18} column with 250 x 4.6 mm i.d and particle size 5ìm. As this drug has no marketed formulations yet, we had prepared tablets (Tablet Formulation-1 and Tablet Formulation-2) by varying the ratio of most commonly used excipients like starch, MCC, talc and magnesium stearate by keeping the strength as constant (25 mg of Moprolol) and analysed the drug.

Preparation of mobile phase and stock solutions

The mobile phase consisting of Acetonitrile: Methanol:Water (15:50:35) was selected. The solution was sonicated for 5 minutes. 25 mg of moprolol raw material was weighed and transferred to 25 ml volumetric flask and dissolved in DMF to give 1000 ìg/ml of moprolol. Moprolol solution was further diluted with mobile phase to obtain final concentration of 100ìg/ml.

Chromatographic conditions

Optimum composition of mobile phase consisting of acetonitrile:methanol:water (15:50:35, v/v/v) was selected as it was found to ideally resolve the peaks of moprolol. Reverse phase C_{18} column equilibrated with mobile phase was used. Mobile phase was filtered through 0.45µm membrane filter before use and then

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ultrasonicated. Flow rate was maintained at 1 ml/min and effluents were monitored at 274 nm. The sample was injected using a 20ìl fixed loop and the total run time was 5 min. All determinations were performed at constant column temperature (20^{0}C). The retention time for moprolol under the optimized chromatographic conditions was found to be 2.47min (Fig.1).

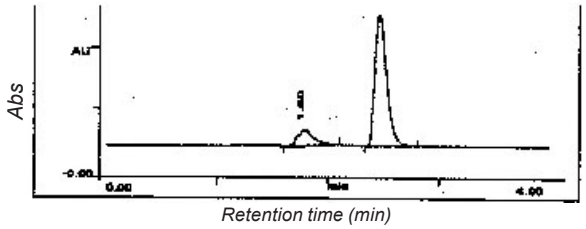

Fig. 1: *A Typical chromatogram of moprolol (2.47 min) in tablet formulation for detailed experimental and chromatographic conditions see text.*

Linearity of data

Appropriate aliquots of moprolol stock solutions were taken in different 10 ml volumetric flasks and diluted up to the mark with mobile phase to obtain final concentration of 10,20,30,40,50 ìg/ml respectively. Triplicate dilutions of each concentration were injected into the HPLC in duplicate. The linearity of calibration graphs and adherence of the system to Beer's law was validated by high value of correlation coefficient. Solutions were injected using a 20ìL fixed loop system and chromatograms were recorded. Calibration curves were constructed by plotting area versus concentration and regression equation was computed for moprolol.

Assay of formulations

Twenty tablets containing 25 mg of moprolol were weighed and crushed to fine powder. An accurately weighed powder sample equivalent to 50 mg of Moprolol was dissolved in DMF. The solution was ultrasonicated for 30 min and then filtered through a 0.22 ìm membrane filter. A suitable aliquot of this solution was transferred to 50 ml volumetric flask, and volume made up to the mark with mobile phase. Further dilutions were made so as to get 30ìg/ml with mobile phase and analysed under the optimized chromatographic conditions.

Validation of HPLC method

The proposed HPLC method was validated as per ICH guidelines[7, 8].

The accuracy of the method was determined by performing recovery studies at 25, 50 and 75 % of the test concentrations. The mean percent recovery was 99.6%. The precision of the method was demonstrated by interday and intraday studies. To evaluate the robustness of the developed RP HPLC method, small deliberate variations in the optimized method parameters like the effect of change in pH of the mobile phase, flow rate, mobile phase ratio and column temperature on the retention time, tailing factor, area count and percentage content of moprolol were studied. The results of validation and system suitability studies are given in Table 1.

Table 1: *Validation and System Suitability Studies*

Parameter	Moprolol
Linearity range(µg/ml)	10-50 µg/ml
Coefficient of correlation	0.99998
Slope	136763
Intercept	16895
Limit of detection µg/ml	0.85461
Limit of quantification µg/ml	0.25897
Retention time(min.)	2.47
Precision (%RSD)	1.99
Inerday (n=3)	0.485
Intraday (n=3)	0.296
Tailing factor	1.55
Mean% recovery	99.6

RESULTS AND DISCUSSION

The proposed method was found to be simple and linear in the concentration range of 10-50 ìg/ml for moprolol. The peak areas of the drug were reproducible as indicated by the low coefficient of variation. The % RSD for both the tablet analysis and recovery studies were less than 2% indicating high degree of precision and accuracy of the proposed method. The results of robustness study also indicated that the method is robust and is unaffected by small variations in the chromatographic conditions. Hence, the developed RP HPLC method is simple, accurate, precise and robust and can be employed successfully for the routine estimation of moprolol in tablet formulations.

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