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Spectrophotometric Method for Quantitative Estimation of Moprolol in Bulk and Pharmaceutical Preparation

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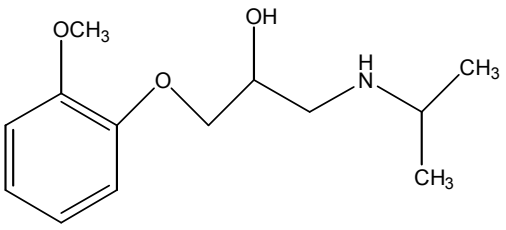
ABSTRACT: A simple and sensitive visible spectrophotometeric method has been developed for the quantitative estimation of Moprolol in bulk drug and pharmaceutical preparations. This method is based on the reaction of Moprolol with 1%w/v 3-methyl-2- benzthiazolinone hydrazone hydrochloride (MBTH) reagent in presence of 2%w/v of ferric chloride salt to give a green colored chromogen with absorption maximum at 629 nm and obeyed Beer's law in the concentration range of 10-35 µg/ml.The results of analysis for the method have been validated and by recovery studies. The results obtained with the proposed method are in agreement with the labeled amounts.
Key words: Moprolol, Spectrophotometry, MBTH, Shimadzu 1700.

INTRODUCTION

Moprolol is chemically, 1-(2 methoxy phenoxy)-3-[(1-methyl ethyl) amino]-2-propanol ; 1-(iso-propylamino)-3-(O-methoxyphenoxy)-2-propanol , is a Cardio selective $ß_1$-adrenergic blocker[1]. It is used in the treatment of angina pectoris, glaucoma and hypertension[2]. It is not official in any pharmacopoeia.



A Survey of literature reveals that a few analytical methods for the estimation of moprolol from biological fluid including HPLC[3], GC[4] and LC-MS[5] are reported. However, no spectrophotometric methods have been reported for the estimation of the drug from pharmaceutical dosage form. In view of the above fact, some rapid and sensitive analytical methods are in need for its quantitative estimation.

The present work describes a simple, economical and accurate spectrophotometric method for the estimation of moprolol in bulk and pharmaceutical dosage form (Tablet).

MATERIALS AND METHODS

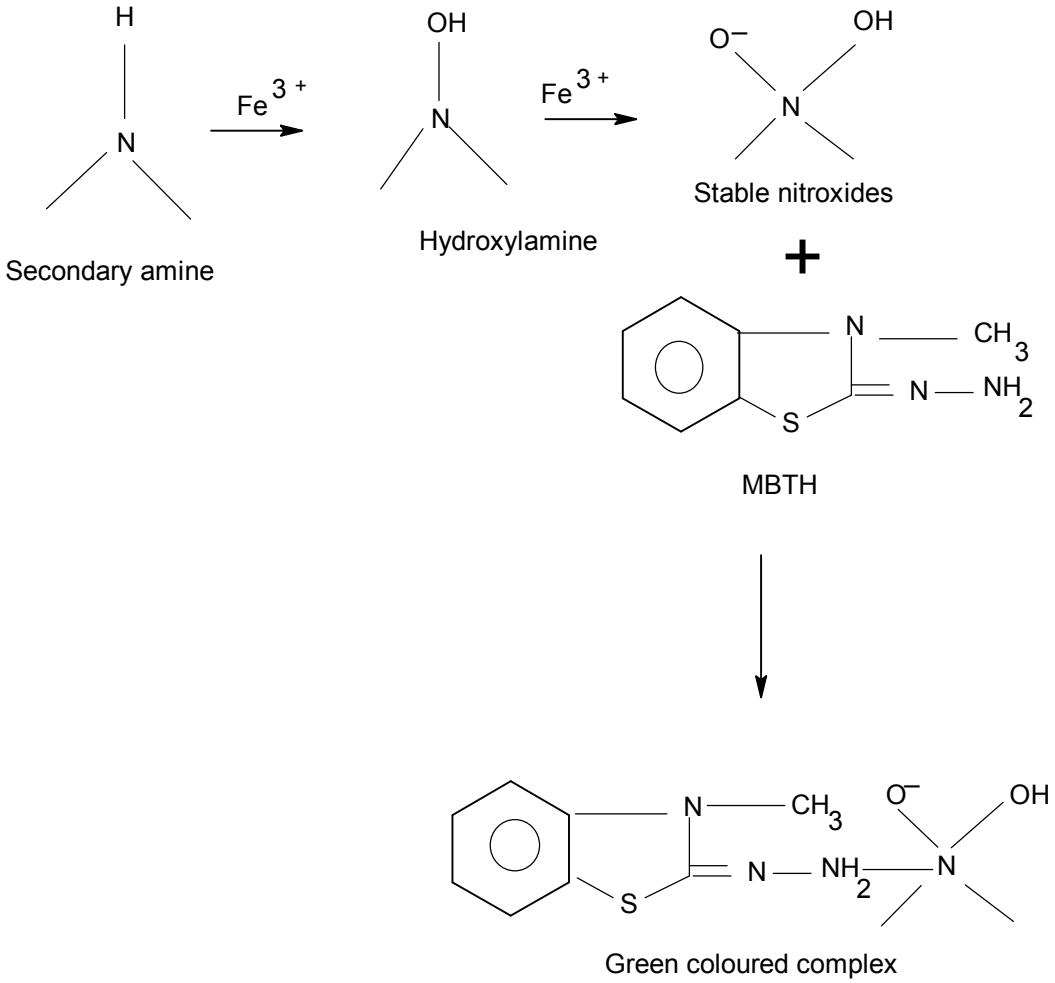
A Shimadzu UV/VIS double beam spectrophotometer (model 1700) with 1cm matched quartz cells, were used for all spectral measurements.Shimadzu-AX-200 electronic balance was used for weighing the samples. Ultrasonicator was used in the initial steps of extraction. Whatmann filter paper No.41 was used to filter the solution. All the chemicals used were of analytical grade procured from Qualigens Fine chemicals, Mumbai. Double distilled water, MBTH (1% w/v in distilled water), Ferric chloride (2%w/v in distilled water).The pharmaceutical grade of moprolol was supplied as a gift sample by strides and chemical

specialty Ltd Mangalore. As this drug has no marketed formulations yet, we have prepared tablets (Tablet 1 and Tablet 2) by varying the ratio using 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.

This method is based on the reaction of moprolol with3-methyl-2-benzothiazolinone hydrazone hydrochloride [MBTH] reagent and ferric chloride to form green colored chromogen (Scheme 1) with absorption maximum at 629 nm and Beer's law is obeyed in the concentration range of 10-35µg/ml.

It is known that secondary amine undergoes oxidation to give hydroxylamine which converts into stable nitroxides to gives a green colour complex with MBTH reagent[6-9]. The probable reactions involved in this method have been shown in scheme I.

Reaction:



Scheme I

METHODOLOGY

25mg of bulk drug was weighed accurately and dissolved in dimethyl formamide (DMF) and made up to the volume 25ml with DMF. Then it was further diluted to a concentration of 100 µg/ml with distilled water. For sample solution, the tablets of moprolol were accurately weighed and average weight per tablet was determined. The tablets were powdered and powders equivalent to 50mg of drug was taken and treated in a similar manner that of standard.

For this method, aliquots of moprolol standard solution ranging from 1 to 3.5 ml (1ml=100µg) were transferred into a series of 10ml volumetric flasks. To each 1 ml of ferric chloride (2%) solution was added, followed by 1ml of 1% w/v MBTH reagent, and kept aside 5 min for the completion of reaction at the room temperature. The volumes were made up to the mark with

distilled water. The absorbance of the resulting green chromogen was measured at λ_{max} 629 nm against the reagent blank. Calibration curve was prepared by plotting concentration versus absorbance and found to be linear in the concentration range of 10 to 35µg/ml.Similarly absorbance of sample solution was measured and amount of moprolol was determined from standard calibration curve.

To test the accuracy and reproducibility of proposed methods recovery experiments were performed by adding known amount of drug to the preanalysed formulation and reanalyzing the mixture by proposed method.

RESULT AND DISCUSSION

This method is based on the reaction of moprolol with 3-methyl-2-benzothiazolinone hydrazone hydrochloride [MBTH] reagent and ferric chloride exhibited λ_{max} at 629 nm. It is known that secondary amine undergoes oxidation to give hydroxylamine which convert into stable nitroxides to give a green colour chromogen with MBTH reagent. It was found that 5 min were required to form stable chromogen. The chromogen was stable for 4 hours.

The regression equation for the method was found to be y=0.0296x+0.00199 (r=0.9997) and found to be linear over Beer's range 10-35 µg/ml respectively. The molar absorpitivity (lit/mol.cm) was found to be $1.1603x10^4$.Sandell sensitivity (µg/cm^2/0.001) was found to be 0.3374.

The results of analysis of moprolol tablet formulation are shown in **[Table -1].**The reproducibility and accuracy of the method was found to be good with low standard deviation. The results of recovery study are given in **[Table- 2].**The percent recoveries values indicate non interference from excipients used in formulation.

The proposed spectrophotometric method was found to be simple, rapid, sensitive, selective, accurate, precise and easy to apply in routine usage and do not require any costly instrumentation The results show that the presence of excipients in tablet formulation did not interfere with the final determination of the active component moprolol. This reveals the potential utility of the developed method for the routine analysis of moprolol in pharmaceutical preparations.

Table 1: Results of analysis of tablet formulation by proposed method

Formulation	Label claim (mg/tab)	Amount found* mg/tablet ± SD	Percentage of label claim ± SD
Tablet 1	25	24.99 ± 0.202	99.79 ± 0.8087
Tablet 2	25	24.81 ± 0.772	99.25 ± 0.777

* Mean of six observations; SD = Standard deviation.

Table 2: Percentage recovery study data of tablet formulation

Formulation	Level of % Recovery	% Recovery found*	SD
Tablet 1	80	99.96	0.648
	100	99.10	0.448
	120	99.47	0.229
Tablet 2	80	99.89	0.278
	100	99.36	0.242
	120	99.08	0.021

*Mean of three observations; SD = Standard deviation.

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