

Spectrophotometric Method For Assay Of Metoprolol Extended Release Tablets

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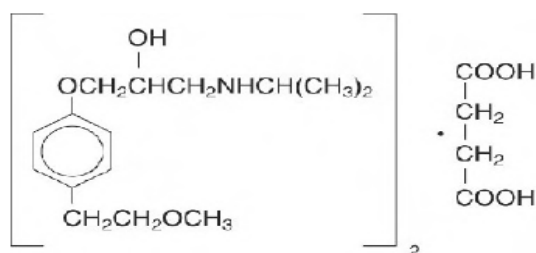
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Abstract: Metoprolol is a highly effective blood pressure lowering agent has been widely used for the treatment of hypertension. a fast and reliable method for treatment of blood pressure. Metoprolol, a highly effective blood pressure lowering a fast and reliable method for the determination of losartan was highly desirable to support formulation screening and quality control. A first derivative UV spectroscopic method was developed for determination of Metoprolol in the tablet dosage form. The first derivative spectrum was recorded between 220 and 320 nm, and a zero-crossing technique for first derivative measurement at 232.5 nm was selected. It is for that the selectivity and sensitivity of method to be in desirable range. In comparison with the direct UV method, the first derivative UV spectroscopy has a definite through without any interference from UV absorbing excipients.

Keywords: Spectrophotometric, Formulations

I. DRUG PROFILE



NAME OF THE DRUG: Metoprolol Succinate

CHEMICAL NAME: Bis[(2R)-1-[(2-methoxyethyl)Phenoxy]-3-[1-methylethyl)Propane-2-ol)butanedioate

EMPIRICAL FORMULA: [(C₁₅H₂₅NO₃)₂C₄S₆O₄]

MOLECULAR WEIGHT: 652.81

DESCRIPTION: A white or almost white, crystalline powder, odourless, Freely soluble in water, soluble in methyl alcohol,

slightly soluble in alcohol, very slightly soluble in ethyl acetate A 2% Solution in water has a P^H of between 7.0 & 7.6 protect from sun light.

MECHANISMS OF ACTION

Metoprolol succinate is a cardio selective beta blocker blocked the action of catecholamine mediated through beta receptor it decrease heart rate forced of contraction cardiac output and blood pressure.

INDICATION AND USAGE

Metoprolol succinate an extended release tablets it is often used in the treatment of hypertension, congestive heart failure, symptomatic edema and the angina pectoris cardiac arrhythmias and also used in the management of

hyperthyroidism and in the prophylactic treatment of migraine.

DOSES AND ADMINISTRATION

Metoprolol succinate extended release tablets take by mouth. It usually is taken once or twice a day. If you are to take it once a day, take it in the morning; if you are to take it twice a day, take it in the morning and in the late afternoon to avoid going to the bathroom during the night. Take this medication with a meal or snack.

Side effect: Chest pain, dizziness, confusion, light headaches or fainting spells arrhythmia

AIM AND PLAN OF WORK

- ✓ Solubility study by using various solvents
- ✓ Determination of related substance by Thin Layer Chromatography
- ✓ Estimation of Drug in Doses Form
- ✓ Method development of the drug by UV- spectroscopy

II. MATERIALS AND METHODS

MATERIALS USED

CHEMICALS AND REAGENTS USED

- ✓ Acetone-(Merck), Dilute NaOH-(Merck), Water-(Merck), Ethanol-(Merck), Methanol-(Merck), Dilute HCL-(Merck), Isopropanol Benzene-(Merck), Acetic Acid-(Merck) Carbon tetrachloride-(Merck) Silica Gel GF 254 Ethyl Acetate. - (Merck)
- ✓ Metoprolol succinate Reference Standard (supplied by Madras Pharmaceuticals Pvt. Ltd, Pondicherry)
- ✓ Metoprolol succinate test sample (supplied by Sun Pharmaceuticals Pvt. Ltd.)
- ✓ INSTRUMENT USED
- ✓ Ultraviolet Double beam Spectrophotometer-systronics 2202
- ✓ U.V. Fluorescence Analysis Cabinet.

SOLUBILITY STUDY

S. No.	SOLVENTS	SOLUBILITY
1	Water	Freely Soluble
2	Methanol	Soluble
3	Ethanol	Sparingly soluble
4	Dichloromethane	Slightly soluble
5	2-propanol	Slightly soluble
6	Ethyl acetate	Insoluble
7	Acetone	Insoluble

QUALITATIVE ANALYSIS

Determination of related substances presents in the given standard and sample solution by using Thin Layer Chromatography.

THIN LAYER CHROMATOGRAPHIC PREPARATION

1	Stationary phase	Silica Gel GF-254
2	Mobile phase	Ethyl acetate
3	Sample injection	4µl(both standard & sample)
4	Development Techniques	One-Dimensional- Ascending (Against gravitational force)
5	Mode of Separation	Adsorption
6	Detection	Ultra Violet Fluorescence at 254

RESULT DATA FOR T.L.C.

No. of Parameters	Standard Metoprolol Succinate	Test Solution
Distance travelled by solvent front	7.2	6.5
Distant travelled by solute	6.1	6.2
R. F. Value	0.84	0.95
Report	There is no any related substances present in given test solution were its compared with standard	

Estimation of Metoprolol Succinate by UV Spectroscopy method.

- ✓ Each tablet contain: 25mg
- ✓ Manufactured by: Mankind Pharma Ltd
 - Spectral Condition: 202nm
- ✓ A systronics UV Double Beam Spectrophotometer was used for the analysis.
 - Temperature Room temperature-20 ±2c°
 - Solvent used Methanol.
 - Detection wave length 224nm
 - Detector Photo detector
- ✓ Estimation of Metoprolol Succinate Dosage Form by UV spectroscopy

PREPARATION OF STANDARD SOLUTION

25 mg of metoprolol succinate was taken into 100 ml of standard flask, to this 100 ml of methanol was added (Standard stock solution A).

10 ml of (Standard stock solution A) was taken into 100 ml standard flask & made up to 100 ml with methanol. (Which consist of 100µg/ml use for the analysis?)

- ✓ Preparation of Sample Solution for Calibration Curve

From the above solution, the sample solution was prepared from five different concentrations. Using methanol as solvent like 10, 20, 30, 40 & 50µg/ml were used for the calibration curve analysis

- ✓ Preparation of Sample solution

20 tablets, each containing 25 mg metoprolol succinate were weighed and finely powdered. From the powdered tablets, a quantity of powdered equivalent to 25 mg of metoprolol succinate were taken into 100 ml of standard flask

& add 3x30 ml of acetone by shaking for 5-10 minute. Evaporate the combined acetone, extract & make up the residue in methanol to produce 100 ml (Sample stock solution B).

10 ml of (Sample stock solution B) was taken into 100 ml of standard flask & made up to 100 ml with methanol. (which consist of 100µg/ml use for the analysis)

FLOW CHART FOR STANDARD PREPARATION

25 mg of metoprolol succinate was taken into 100 ml of standard flask
 ↓
 Dissolve in 100 ml of methanol
 ↓
 Make up to 100 ml with methanol (Standard stock solution A).
 ↓
 10 ml of (Standard stock solution A) was taken
 ↓
 Make up to 100 ml with methanol. (Which consist 50µg/ml use for the analysis).

FLOW CHART FOR SAMPLE PREPARATION

Weigh and finely powdered 20 tablets
 ↓
 Weigh a quantity of powdered equivalent to 25 mg of metoprolol Succinate
 ↓
 Extract with 3x30 ml of acetone combined the extract & make up to 100 ml methanol (Sample stock solution B).
 ↓
 10 ml of (Sample stock solution B) made to 100 ml methanol. (Consist of 100µg/ml use for the analysis)

CALCULATION

Amount of drug present in given solution

$$= \frac{\text{Test Absorbance}}{\text{Standard Absorbance}} \times \frac{\text{Standard Dilution}}{\text{Test Dilution}} \times \text{Average Weight}$$

Calculation

$$= \frac{0.595 \times 100 \times 100 \times 1 \times 0.1 \times 100 \times 1}{0.574 \times 0.1 \times 10 \times 10 \times 100 \times 10 \times 10}$$

$$= \frac{0.595}{0.574} \times 0.025$$

$$= 0.0259 \text{ gm}$$

$$= \frac{0.0259}{0.025} \times 100$$

$$= 103.65\% \text{ w/v}$$

REPORT: The per cent content of drug present in the given sample was found to be 103.65 % w/v.

III. RESULTS AND DISCUSSION

Estimation of Metoprolol Succinate by U.V spectroscopy method was carried out. The standard & sample solutions were prepared & the U.V spectrums were recorded. The spectrums of standard & sample solution were presented in figures.

The absorbance's of standard & sample solution were calculated. The assay procedure was repeated according to mean concentration of standard & sample assay were calculated.

The present of individual drug found in formulation were calculated & presented in tables.

The result of analysis shows that the amounts of drug were in good agreement with the label claim of the formulation.

DRUG	LABEL LED AMOUNT	AMOUNT TAKEN FOR ASSAY		ULTRAVOILET SPECTROSCOPY DETERMINATION
Metoprolol succinate			AMOUNT	% LABEL CLAIM
Metoprolol succinate	25mg	0.025	0.0259 mg	103.65% w/v

Table 1: Analysis of Formulation

S.NO	CONCENTRATION OF METOPROLOL SUCCINATE (ug/m)	ABSORBENCE
1	10	0.156
2	20	0.215
3	30	0.364
4	40	0.489
5	50	0.640

Table 2

IV. CONCLUSION

The U.V. spectroscopy methods for the estimation of Metoprolol succinate in dosage form are accurate, linear and rapid. The newly develop analytical method may be used in.

- ✓ Research Institution.
- ✓ Quality Control Department In Industries
- ✓ Approved Testing Laboratories
- ✓ Bio-pharmaceutics & Bio-equivalent Studies
- ✓ Clinical Pharmacokinetic Studies

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