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TITRIMETRIC AND UV SPECTROPHOTOMETRIC EVALUATION OFCOMMERCIALLY AVAILABLE METFORMIN TABLETS

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ABSTRACT

The aim of this study was to quantify six brands of Metformin hydrochloride tablets. Quantification of different brands of Metformin hydrochloride tablets marketed in India using non-aqueous titrimetry and UV spectroscopic method are done to ensure whether both the methods give similar results for all brands as per labelled claim. UV spectroscopy is a method of analysis is based on measuring the absorption of a monochromatic light by colorless compounds in the near ultraviolet path of a spectrum (200-400nm). Distilled water is used as solvent. The λ max was found to be 232 nm. Solvent of choice in non- aqueous titrimetry is glacial acetic acid.

KEYWORDS: Metformin, UV Spectrophotometry, Non aqueous titration.

INTRODUCTION

Metformin is a first-line therapy for type 2 diabetes mellitus (T2DM, formerly ‘non-insulin-dependent diabetes mellitus’), and is one of the most commonly prescribe drugs worldwide. As a biguanide agent, Metformin lowers both basal and postprandial plasma glucose. Chemically it is N,N-dimethylimido dicarbonimidic diamidehydrochloride and it is not chemically or pharmacologically related to any other classes of oral antihyperglycemic agents.

UV SPECTROSCOPY

UV-Visible Spectroscopy is based on a firm theoretical basis, more selective, efficient, fast and reproducible analytical methods can be developed. In general terms, there are two major measurement techniques; how much analyte is in the sample (quantitative analysis) and

which analyte is in the sample (qualitative analysis). A molecule or ion will exhibit absorption in the visible or ultraviolet region when radiation causes an electronic transition within its structure. Thus, the absorption of light by a sample in the ultraviolet or visible region is accompanied by a change in the electronic state of the molecules in the sample. Potentially, three types of ground state orbitals may be involved.

NON- AQUEOUS TITRATION

Titrimetric methods employing non-aqueous solvents are extensively used for the assay of certain materials which cannot be easily titrated in aqueous systems. In a non-aqueous solvent such as glacial acetic acid, weak organic bases and their salts can be titrated with acetous perchloric acid solution. Weak organic acids, such as carboxylic acid, phenols, barbiturates, sulphonamides or enols may be titrated in non-aqueous medium using a strong base like sodium or potassium or lithium salts of methanol. In both type of titration, acid or base, the sharp end point may be determined by indicators or potentiometrically. It has been observed through experiments that the moisture content in non-aqueous titration should not be more than 0.05%. Further, the temperatures during standardization in non-aqueous titrimetry should not be allowed to vary.

AIM AND OBJECTIVE

AIM

To perform the evaluation of Metformin tablet by using non aqueous titration and UV Spectrophotometric method.

OBJECTIVE

- Selection of drug
- Collection of pure sample
- Determination of ƛ max
- Determination of absorbance by UV spectrophotometry
- Determination of percentage purity by UV spectrophotometry
- Determination of percentage purity by Non-aqueous titrimetry
- Comparison of result obtained
- Development of conclusion

METHOD DEVELOPMENT

Determination of ƛ max by UV Spectrophotometry

100 mg of pure sample was dissolved in 100 ml distilled water and from that 10 ml of the solution was pipette out and make up to 100 ml with distilled water. From above solution 10 ml was taken and make up to 100 ml.20 ml of solution is taken in another standard flask and make up to 100 ml. ƛ max of 10 µg/ml and 20 µg/ml solution were determined.

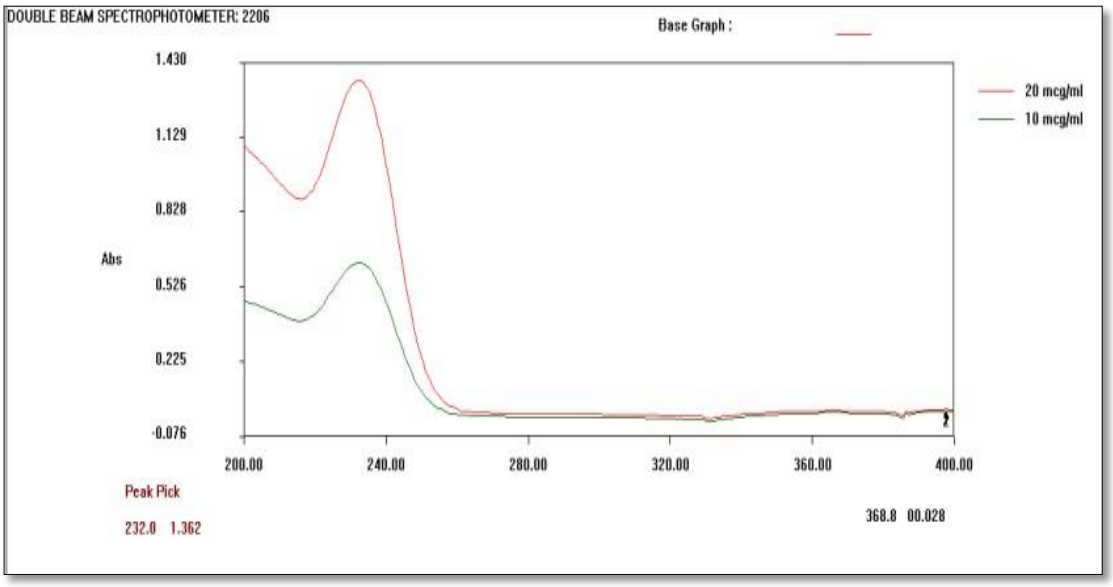
Estimation of marketed brands of Metformin by UV spectrophotometry

Preparation of sample solution: 20 tablets were powdered and 0.1 g was taken, to it 70 ml of distilled water was added and shake for 15 minutes. The volume was made up to 100 ml with the distilled water and filterd.The filtrate was collected from which 10 ml pipette out and made up the volume up to 100 ml. Again from the solution 10 ml was taken and made up the volume up to 100 ml using distilled water.Absorption of the solution was taken in the wavelength 232 nm.

Estimation of Metformin by Non-aqueous titrimetry

1. Preparation of 0.1 N acetous Perchloric acid and potassium hydrogen phthalate: 0.1 N acetous Perchloric acid and potassium hydrogen phthalate were prepared and standardized as per the official procedure prescribed in the IP.
2. Standardization of 0.1 N Perchloric acid: Accurately weigh about 700 mg of potassium hydrogen phthalate, previously washed lightly and dried at 120^0C for 2 hours, and dissolve it in 50 ml of glacial acetic acid in 250 ml conical flask. Add 2 drops of crystal violet, and titrate with the Perchloric acid solution until the violet colour changes to blue-green. Deduct the volume of the Perchloric acid consumed by 50 ml of the glacial acetic acid.
3. Assay of Metformin tablet:20 tablet of Metformin HCl of each marketed brand were taken.60 mg of accurately weighed pure Metformin HCl was shaken well with 4 ml of formic acid.50 ml of glacial acetic acid was added to the solution and titrated against acetous Perchloric acid using crystal violet as indicator. Determination of blank was performed.

RESULTS



λ Max of Metformin at 232 nm

BRANDS		TITRIMETRIC METHOD		UV SPECTROSCOPIC METHOD	
DRUG	**BATCH NO**	**BURETTE READING (ml)**	**PERCENTAGE PURITY(%W/W)**	**ABSORBANCE**	**PERCENTAGEPURITY (%)**
METGEM	SID1721A	4.6	99.02	0.782	99.03
DIAMET	DMT400	4.7	100.20	0.792	100.21
X-MET	05210672	4.1	99.90	0.791	99.59
METSMALL	E2300056	4.8	100.35	0.797	100.30
KERALA GOVERNMENTSUPPLY	DS3116	4.7	101.18	0.799	100.12
KARNATAKA GOVERNMENTSUPPLY	6207422	3.5	101.43	0.799	100.12

DISCUSSION

UV-Visible Spectroscopy is based on a firm theoretical basis, more selective, efficient, fast and reproducible analytical methods can be developed. The pharmaceutical analysis by UV-Visible Spectroscopy comprises the procedures necessary to determine the "identity, strength, quality and purity" of compounds. In UV spectroscopy the scan range was set between 200-400nm to obtain the maximum absorption by the compound. Distilled water was used as solvent. The wavelength at which Metformin showed maximum absorbance was found to be 232nm.Non aqueous titrimetry is also an efficient method to determine the percentage purity using glacial acetic acid as solvent. Percentage purity of different brands of Metformin were checked by titrimetric and UV spectroscopic method. Metgem, Diamet,

Xmet, Metsmall, Kerala governmentsupply and Karnataka government supply are the brands used here.

All the brands of Metformin shows percentage purity within the range. Percentage purity range of Metformin is 99-101%. In both titrimetric and UV spectroscopic method all the brands shows high level of purity.

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