WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.084
Volume 11, Issue 1, 1192-1197. Research Article ISSN 2277– 7105

AREA UNDER CURVE BY UV SPECTROPHOTOMETRIC METHOD FOR DETERMINATION CARBIMAZOLE IN BULK

Shingote Vishakha Shankar*, Bornare Snehal Laxman and S. D. Mankar

Pravara Rural College of Pharmacy, Pravaranagar, Tal: Rahta, Dist: Ahmednagar 413737, India.

Article Received on
02 November 2021,

Revised on 23 Nov. 2021,
Accepted on 14 Dec. 2021

DOI: 10.20959/wjpr20221-22627

***Corresponding Author**
Shingote Vishakha Shankar
Pravara Rural College of Pharmacy, Pravaranagar, Tal: Rahta, Dist: Ahmednagar 413737, India.

ABSTRACT

The aim of present investigation is to establish simple, precise, and rapid Spectrophotometric method for the quantification of Carbimazole in Active Pharmaceutical Ingredient. In this, work is carried out to for estimation of Carbimazole bulk by utilizing an Area under Curve (AUC) method using UV – Visible Spectrophotometry. The study is designed to validate the developed methods as per ICH guidelines. For this purpose the wavelength range between 200-400 nm was selected. alcohol and acetone(50 ml acetone used for stock solution and serial dilution in 25 ml distilled water) was used as a solvent throughout the work. Linearity was obtained in concentration range 2 to 10 µg/ml (r2 = 0.992) for the method. The developed method was found to be simple, linear, accurate, precise and highly sensitive and which can be used for routine quality control analysis for Spectrophotometric estimation of Active Pharmaceutical Ingredient.

KEYWORD: Carbimazole**,** linearity, AUC, spectrophotometer, alcohol, and Acetone.

INTRODUCTION

A Carbimazole derivatives is antithyroid drugs, Carbimazole is structurally related to carbimazole that is effective against many diseases. It is also called as (propylthiouracil)-carbimazole. Pharmacologically Carbimazole is a increases the risk of treatment failure. The principal mechanism of action of action for Carbimazole is by its have a lower rate of reemision which results in the impact of long term antithyroid drugs.[1] Carbimazole predominantly used in treatment of such thyroid peroxidase, and inhibits it and decreases the uptake inorganic iodine by thyroid it also reduces the formation of di-iodotyrosine and

thyroxine incorporation that causes cysts in head and neck. Carbimazole is practically insoluble in water and sparingly soluble in Acetonel. Hence the analysis of Carbimazole is carried out in mixture of water and alcohol. The aim of this present work is to develop simple, precise and accurate Spectrophotometric method for the routine determination of Carbimazole in bulk.[2]

Fig. no. 1: Structure of Carbimazole.

MATERIALS AND METHODS

Chemicals

Carbimazole was obtained at collage sample of Pravara Rural College of Pharmacy, Pravaranagar, Loni. alcohol, and acetone was used as solvent throughout the experimentation.

Instrumentation

A Shimadzu (Kyoto, Japan) model UV- 1800 double beam UV- Visible spectrophotometer attached with computer operated by software with UV probe 2.33. Spectral width of 2 nm, wavelength accuracy of 0.5 nm and pair of 1 cm matched quartz cells was used to measure absorbance of the resulting solutions. Digital Analytical balance, Mettler Toledo (Model JL 1503-C) was used for weighing purpose.

Experimental Work

A) To check the solubility of Carbimazole

Qualitative solubility analyses of drugs were done by dissolving 5 mg of Carbimazole in 5 ml solvent such as alcohol, and acetone.[3]

B) To identify the ʎ max of Carbimazole

Weigh10 mg of the pure drug (Carbimazole) and dissolve it in small portion ofalcohol and make up the volume up to 100 ml using acetone to obtained a standard stock solution of 100µm/ml this solution is sonicate for 5 min to obtained clear solution. From above solution withdraw 0.5, 1, 1.5, 2, 2.5 ml and dilute with distilled water to get standard solutions of concentrations: 2,4,6,8 and 10 µm/ml.[4,5] Spectrum peak details are shown in Figure No 2.

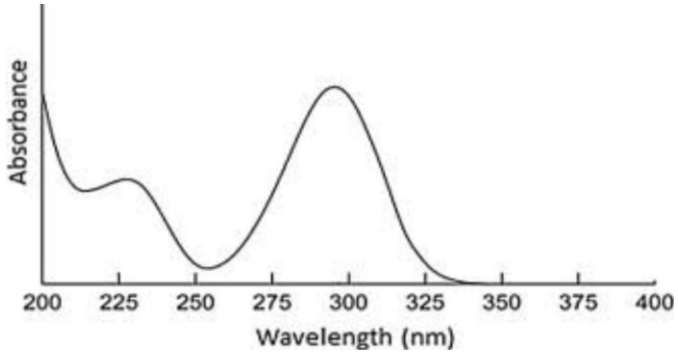

Fig no 2: ʎ max of Carbimazole, Spectrum peak pick.

C) Analytical Method Development and Validation

Linearity / calibration curve

The linearity of an analytical procedure is the interval between the upper and lower concentration of Analyte in the sample. For which demonstrated that the analytical procedure is of linearity. The standard solution of Carbimazole (2, 4, 6, 8 and 10 µm/ml) 0.5, 1, 1.5, 2, and 2.5 ml solution was pipette out in a separated series of 25 ml volumetric flask. Make up the volume with alcohol and acetone mixed well. The absorbance maxima and area under curve for the solutions was measured at 471nm and range of nm for two methods respectively against distilled water as blank. Calibration Curve table of Carbimazole is shown in table no 1. Calibration curve of Carbimazole.[6]

Table no 1: Calibration curve of Carbimazole.

Conc. µg/ml	Absorbance
2	0.993
4	0.996
6	0.998
8	0.999
10	0.999

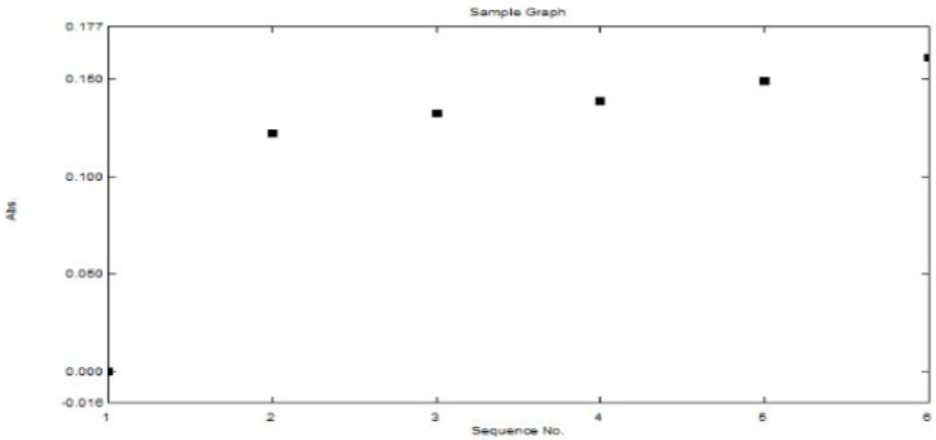

Fig. No. 3: linearity of Carbimazole.

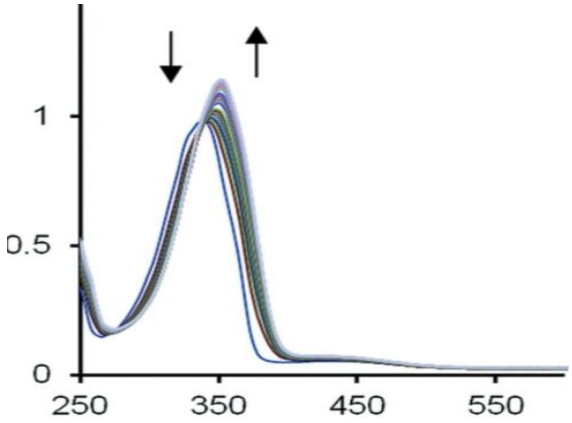

Fig no. 4: Overlay spectrum of Carbimazole 2 to 10 µg/ml solution.

D) Area Under Curve Method

In case of AUC (Area under Curve) method is applicable for there is sharp peak or broad spectra are got. It involves the calculation of integrated value of absorbance with respect to the wavelength between the two selected wavelengths ʎ1 and ʎ2. Area calculation processing item calculates the area bound by the curve and the horizontal axis. The horizontal axis is selected by the putting the wavelength ranges over which area has to be calculated. This wavelength range is selected on the basis of repeated observation so as to get the linearity between area under curve and concentration. The above mentioned spectrums were used to calculate AUC. Thus, the calibration curve can be constructed by plotting concentration Vs AUC.[7]

RESULTS AND DISCUSSION

The AUC (Area under Curve) spectra for Carbimazole were recorded at the wavelength of 471nm.

A] Calibration Curve for Drug

Absorbance maxima method

The absorbance maxima of Carbimazole were found to 471 nm in alcohol + acetoner. Under the Experimental conditions described, the graph obtained for the absorbance maxima for pure drug showed linear relationship (Figure 5). Regression analysis was made for the slope, intercept and correlation coefficient values. The regression equations of calibration curve were y = 0.004x + intercept 0.112 R^2 = 0.992 at 471 nm for absorption maxima the range was found to be 2 to 10µm/ml by the UV Spectrophotometric analysis. Calibration Curve is shown in Table. 1. Calibration Curve of Carbimazole. Calibration curve of Carbimazole is shown in Figure. 4. Calibration Curve of Carbimazole.

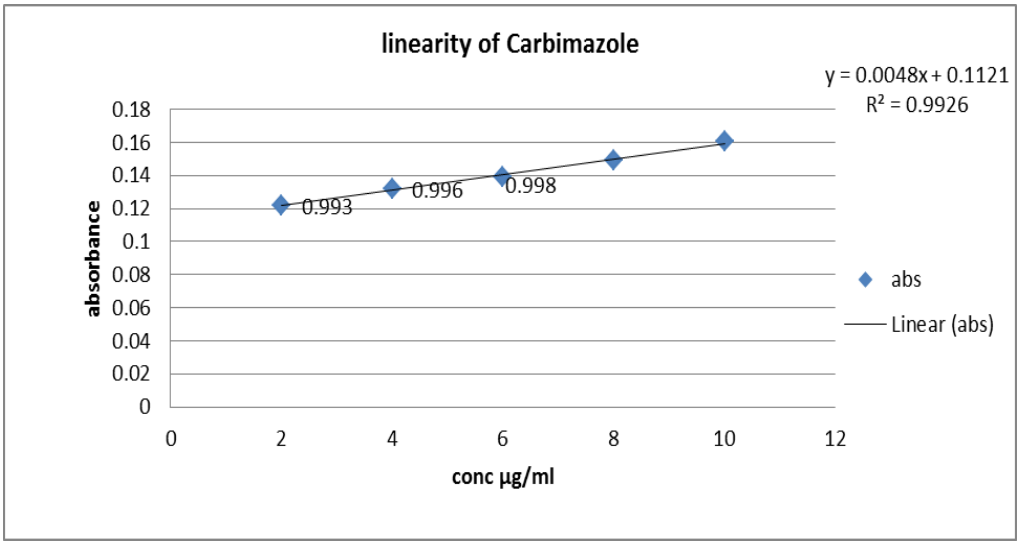

Fig. No 5: Calibration curve of Carbimazole.

B] Area Under Curve Method

In the Experimental conditions described, the graph obtained of the Area Under Curve (AUC) spectra shows linear relationship (Figure 6). Regression analysis was made of the slope, intercept and R^2 values. The equation is Y = 0.004x + intercept 0.112 R^2 = 0.992 at 471 nm in between range 200 – 400 nm for Area Under Curve Spectrophotometry analysis. The range was found to be 2 to 10µm/ml for the Area Under Curve UV Spectrophotometric analysis.

Table 2: Area Under curve of Carbimazole.

Parameter	AUC
Wavelength Range (nm)	200 – 400
Concentration Range (µm/ml)	2 -10
Slope (m)	0.004
Intercept (c)	0.112
Correlation Coefficient (r2)	0.992

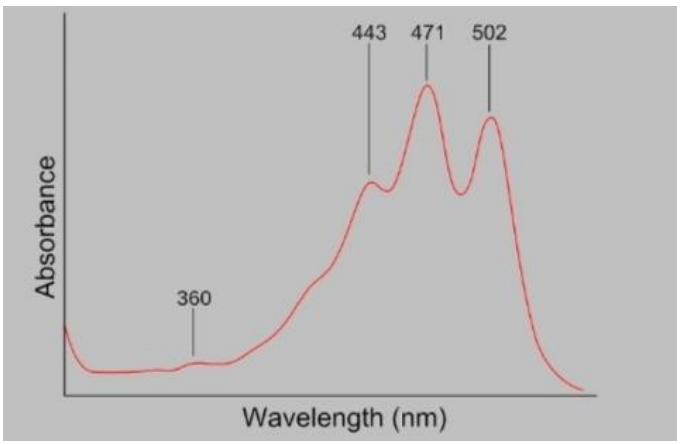

Fig. no 6: Area Under Curve of Carbimazole.

CONCLUSION

There is no any Spectrophotometric methods have been described for AUC determination of Carbimazole. Therefore simple, fast and precise method for area under curve was developed by UV spectrophotometrically for the routine analysis of Carbimazole. The developed Method can be concluded as simple, accurate, sensitive and precise and can be easily applicable in the pharmaceutical formulation.

ACKNOWLEDGRMENT

The authors are thankful Pravara Rural College of Pharmacy, Pravaranagar, Loni, for constant motivation and also for providing necessary facilities. We should like to thank our principal Dr. S. B. Bhawar for providing us suitable environment for this work.

REFERENCES

1. https://www.drugbank.ca/drugs/DB00518
2. https://pubchem.ncbi.nlm.nih.gov/compound/Carbimazole
3. Shivani Kala and Divya Juyal; Preformulation and characterization studies of aceclofenac active ingredient; The Pharma: 463- Innovation Journal, 2016; 5(9): 110-119.
4. Beckett, A. H., Stenlake, J. B., Practical Pharmaceutical Chemistry, 4th edition, CBS Publishers and Distributors, New Delhi, 2002; 2: 275-295.
5. Rajaiya Prashant, Mishra Rakesh, Nandgude Tanaji*, Poddar Sushilkumar, Solubility and Dissolution Enhancement of Carbimazole by Spherical Crystallization, ajbps, 2016; 6(52): 09-14.
6. Christian G D. Analytical chemistry 6th edition, John Willey and Sons, PA, 1-2,604-620, 2003.
7. Blessy M. A review – development and stability indicating studies. Journal of Pharmaceutical Analysis, 2013.