IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

UV Theory , Principle , Instrumentation ,Application And Simultaneous Estimation Method Of Drug

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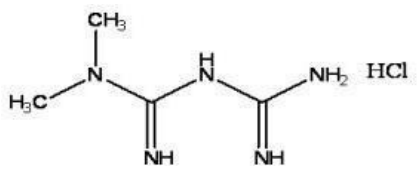
Abstract .

Simple , precise , economical , fast and reliable two UV methods have been developed for the simultaneous estimation of Metformin HCl and Glimepiride in bulk and pharmaceutical dosage form . Method A is Absorbance maxima method
, which is based on measurement of absorption at maximum wavelength of236 nm for Metformin HCl respectively . Method B is area under curve (AUC) , in the wavelength range of 217-247 nm for Metformin HCl . Linearity for detectorresponse was observed in the concentration range of 5- 25µg / ml for Metformin HCl The accuracy of the methods was assessed by recovery studies and was found to be The developed method was validated with respect to linearity , accuracy, precision and specificity . The results were validated statistically as per ICH Q2 Rl guideline and were found to be satisfactory . The proposed methods were successfully applied for the determination of for Metformin HCl in commercial pharmaceutical dosage form .

Keywords - Spectroscopy , sample cell , simultaneous estimation .

Introduction.

Metformin HCl chemically ; N dimethylimidodicarbonimidic diamide hydrochlorideis used as antidiabetic drug from the biguanide class used in the management of type 2 diabetes . Major action of metformin lay in increasing glucose transport across the cell membrane in skeletal muscle .



A survey of pertinent literature revealed that in estimation of individual as well as combination of Metformin HCI ... Simultaneous determinations of Metformin HCI dosage form were also reported like HPLC [8 , 9] , RP - HPLC [10-13] . LC [14] and UV - Spectroscopy [15 19] . Therefore an attempt was made to develop a new rapid and sensitive UV Spectrophotometric method and to validate as per ICH - guidelines . A comprehensive literature research reveals the lack of a Spectrophotometric analytical method for simultaneous estimation of Metformin HCI in pharmaceutical formulations . A successful attempt was made to develop . accurate , precise and simple method of analysis for estimation of both the drugs in combined dosage form .

Materials and Methods.

Apparatus and instrumentation

Sonication of the solutions was carried out using an Ultrasonic Cleaning Bath (Spectra lab UCB 40 , India) .Calibrated volumetric glassware (Borosil) wasused for the validation study .

Materials

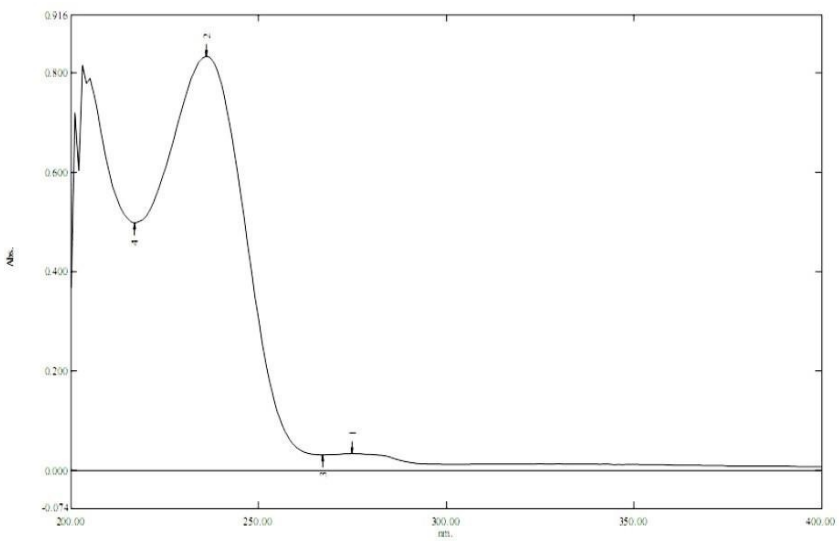
Reference standard of Metformin HCI were supplied as gift sample by 3 / 9 /Park Aurangabd . The commercial formulation Gluconorm - G 4 with label claim50 . HCI per tablet were purchased from local market Mangalwedha , Dist : -Solapur .

Method development
Preparation of standard stock solution

Stock solution was prepared by diluting 10 mg of each drug in sufficient quantity of methanol in separate volumetric flask and volume was made up to 100 ml to get the concentrations of 100µg / ml for each drug Dilutions from stock solution were preparedin the range of 5-25 pg / ml for Metformin HCI Methanol was usedas a blank solution .

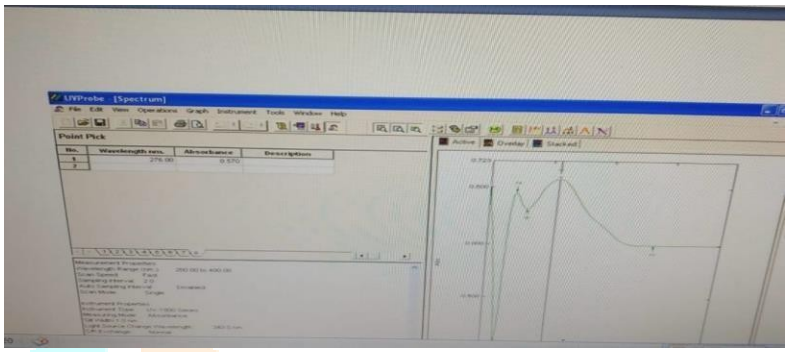
Method A : Absorption Maxima Method

For the selection of analytical wave length , standard solution of Metformin HCI were scanned in the spectrum mode from400 nm to 200 nm separately . Fromthe spectra of drug max of Metformin HCI , 236 nm]
, were selected for the analysis . Aliquots of standard stock solution were made and calibration curve was plotted .



Method B : Area under Curve Method

From the spectra of drug obtained after scanning of standard solution of Metformin HCL , area under the curve in the range of 217-247 nm was selected for the analysis . The calibration curve was prepared in the concentration rangeof 5-25 µg / ml HCI respective AUC range . Both drugs followed the Beer - Lambert's la mentioned concentration range . The calibration curves were plotted as abs concentration of HCL . The coefficient of correlation (r) , slope and intercept values of this method.



Results and Discussion

The methods discussed in the present work provide a convenient and accurate way for analysis of Metformin HCl in its bulk and pharmaceutical dosage form . Absorbance maxima of Metformin HClat236 nm were selected for the analysis . Linearity for detector response was observed in the concentration range of 5-25 µg / ml for Metformin HCI . Percent amount found for Metformin HCl in tablet analysis was found in the range of 100.18 % , 99.47 respectively. Standard deviation and coefficient of variance for three determinations of tablet formulation
, was found to be less than +
2.0 indicating the precision of the methods . Accuracy of proposed methods was ascertained by recovery studies and the results are expressed as % recovery . %recovery for Metformin HCI was found in the range of 100.23 % and 99.67 % values of standard .
deviation and coefficient of variation was satisfactorily low indicating the accuracyof all the methods . % RSD for Intradayassayprecisionfor Metformin HCl was foundtobe0.785 , 0.248 and 0.198 for Method A and B. Interday assay precision for Metformin HCI was found to be 0.681 . The LOD and LOQ were found to be 0.7480 µg / ml and 2.4491µg / ml . respectively of Metformin HCI . Based on the results obtained , it is found that the proposed methods are accurate , precise , reproducible & economical and can be employed for routine quality control of Metformin HCI in bulk drug and its pharmaceutical dosage form .

Conclusion

UV spectrophotometric methods for Metformin HC1 were developed separately in bulk and tablet dosage form by , Absorbance maxima method and Area under curve method . Further , UV Spectrophotometric methods for the simultaneous estimation of Metformin HCI were in bulk and combined dosage form . Themethodswerevalidatedasper ICH guidelines . The standard deviation and % RSD calculated for these methods are < 2 . indicating icating of the methods . The results of the recovery studies showed the high degree of accuracy of these methods . In conclusion , the developed methods are accurate , precise and selective and can be employed successfully for the estimation of Metformin HCI inbulk and pharmaceutical dosage form . high degree of precision

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