

**NEW SPECTROPHOTOMETRIC DETERMINATION OF PREGABALIN BULK AND PHARMACEUTICAL DOSAGE FORM**

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**ABSTRACT**

A new, selective and sensitive visible spectrophotometric method have been developed for the estimation of Pregabalin in bulk and pharmaceutical preparations. The method is based on the reaction of pregabalin with 2, 3-dichloro-5, 6-dicyano-1, 4-benzquinone (DDQ) to form red colour charge-transfer complex with a  $\lambda_{max}$ . 465nm extracted in methanol. Beer's law is obeyed in the concentration range of 50 to 250 $\mu$ g/ml for the method. The method is extended to pharmaceutical formulations and there was no interference form any common pharmaceutical excipients and diluents. The result of analysis has been validated statistically and by recovery studies.

**KEYWORDS:** Spectrophotometric determination, DDQ, pregabalin

**INTRODUCTION:**

It is used in treatment of naturopathic pain. Pregabalin is described chemically as (S)-3-(aminomethyl)-5-methylhexanoic acid. The molecular formula is C-8H17NO2 and the molecular weight is 159.23. Pregabalin is a white, crystalline solid with a  $pK_{a1}$  of 4.2 and a  $pK_{a2}$  of 10.6. It is freely soluble in water and both basic and acidic aqueous solutions. The log of the partition coefficient (n-octanol/0.05M phosphate buffer) at pH 7.4 is - 1

In this method the drug having an aromatic secondary or tertiary amino group or aromatic phenolic group or alkoxy group reacts with DDQ i.e (2,3-dichloro 5,6-dicyano 1,4-benzoquinone) to form colored charge transfer complex. The resultant charge transfer complex in methanol is formed from donor-acceptor mechanism of Lewis acid-base reaction between the pregabalin and DDQ chemical constituents. The transfer of an electron pair from donor to acceptor is readily possible during charge transfer phenomenon.

In charge transfer complex phenomenon Pregabalin acts as electron pair donors and DDQ acts as electron pair acceptor due to presence of strong electron withdrawing cyano group. The  $\pi$  electron pairs are transferred from drug as  $\pi$ -donor to DDQ as a  $\pi$ -acceptor. The solvents like methanol, acetonitrile, being polar solvents facilitates the complete transfer of charge from donor to acceptor with the formation of radical anion as the predominant chromogen.

Hence this reaction is chosen to develop a novel spectrophotometric method for the estimation of

pregabalin having a aromatic amino group. By using this method Pregabalin is determined.

**EXPERIMENTAL:**

All spectral measurements were made on MAPADA double beam UV-Visible 1600 spectrophotometer.

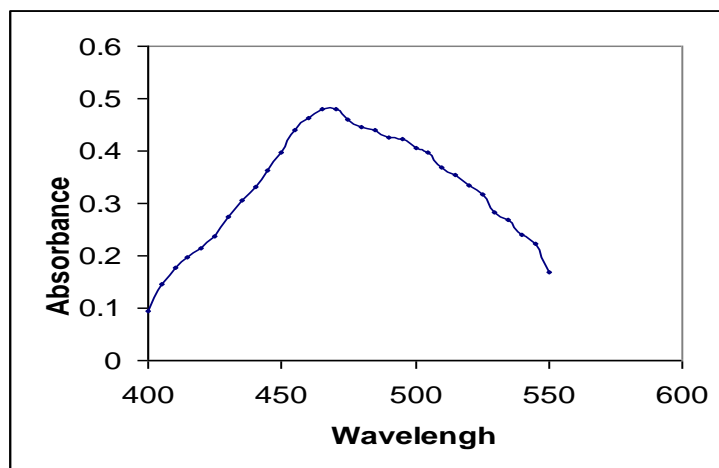
**METHOD:**

The method is based on the reaction of Pregabalin having amino (aliphatic) group forms complex with DDQ. The absorbance of charge-transfer complex is measured at a  $\lambda_{max}$ . 465nm. absorbance for Pregabalin against the reagent blank and the amount of Pregabalin is determined from the calibration curve made between the absorbance and the amount of Pregabalin.

**SPECTRUM OF PREGABALIN TREATED WITH DDQ:**

The wavelength of maximum absorbance of the pregabalin drug treated with DDQ solution is ascertained by the following procedure.

1 ml of pregabalin solution (100  $\mu$ g/ml) is transferred into a standard flask. To this solution 3.0 ml of DDQ reagent is added to form red colour solution. The final volume is brought to 10 ml with methanol. The resultant solution is well mixed and allowed to stand for 5 min for complete the reaction. The absorbance of the red colour solution is measured in the wavelength range of 400 to 550 nm, against the reagent blank. The spectrum is given in fig.



Spectrum of pregabalin

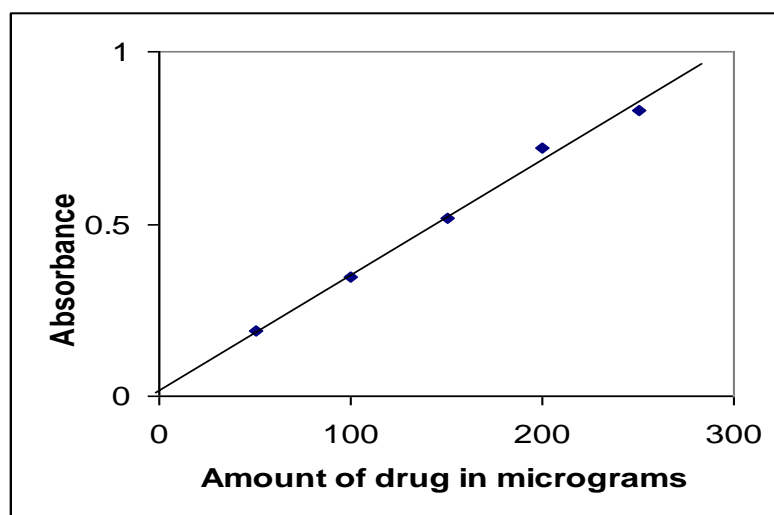
From fig. it is clear that the pregabalin drug treated with DDQ solution has maximum absorbance at 465 nm. Hence, all further studies are made at 465 nm.

**ASSAY PROCEDURE:**

To study the effect of drug concentration on the absorbance of the charge-transfer complex under optimal conditions now arrived is studied by the following method to know the suitability of the method for the assay of pregabalin.

Various aliquots of the standard pregabalin solution ranging from 0.5-2.5 ml are transferred into a series of standard flasks. To each flask, 3.0 ml of DDQ

solution is added. The final volume is brought to 10 ml with methanol. The reaction mixture in each flasks is well shaken and allowed to stand for 5 min to complete the reaction. The absorbance of the red colour solution is measured at 465 nm, against the reagent blank prepared in similar manner omitting drug solution. Calibration graph is obtained by plotting absorbance values against the concentration of pregabalin solution. The calibration curve is found to be linear over a concentration range of 50 to 250 µg/ml of pregabalin. The amount of pregabalin present in the sample is read from the calibration graph. The results are presented in fig.



Calibration curve of pregabalin

**ASSAY OF PREGABALIN IN PHARMACEUTICAL FORMULATIONS:**

The method is then applied to the determination of the drug from the marketed tablet formulations. Tablets are weighed and contents are powdered and well mixed. The powder equivalent to 50 mg of pragabalin is dissolved in methanol, filtered, residue is washed with methanol and

the volume is made upto 50 ml with methanol. Further dilution is made as described in the preparation of standard solution of pregabalin. Further analysis is carried out as per procedure described above and results are summarized in the Table. The amount of drug present in the sample is estimated from calibration graph.

## Assay of pregabalin in tablets

Sr. No.	Sample (mg)	*Amount Found(mg) $\pm$ S.D*	Percentage of Label claim	C.V*	*t <sub>cal</sub>
1	150	150.12 $\pm$ 0.45	100.08	0.303	0.5899
2	150	150.02 $\pm$ 0.37	100.01	0.2047	0.1208
3	150	149.98 $\pm$ 0.23	99.98	0.1597	0.1874

**RESULTS AND DISCUSSION:**

In this method the drug react with DDQ solution to form red coloured charge complex. The red coloured charge complex solution formed is measured at 465 nm against reagent blank. The amount of drug read from calibration curve. The calibration curve is linear over the range of 50-250  $\mu$ g/ml of pregabalin. The values of Standard deviation, coefficient of variation values and t<sub>cal</sub> are shown in Table. The values of standard deviation and coefficient of variation values are low, indicates high accuracy and reproducibility of the method. The data of assay values of commercial formulations is subjected to statistical evaluation for student 't' test to study the proposed method. The calculated 't' values are less than 't' theoretical values with 4 (n-1= 5-1) degrees of freedom at 5% level of significance indicate that there is no significant difference between proposed method and standard method.

The proposed method is found to be simple, precise, accurate and time saving, reproducible and can be conveniently adopted for routine analysis of estimation of pregabalin in bulk drugs samples and pharmaceutical formulations.

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