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SPECTROPHOTOMETRIC DETERMINATION OF TIZANIDINE WITH 2,3 - DICHLORO-5, 6 DICYANO-1,4-BENZOQUINONE

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ABSTRACT

The reaction between Tizanidine and 2,3 - dichloro 5,6-dicyaxo-1,4-benzoquinona (DDQ) in the presence of chloroform was investigated by spectrophoto metric method were proposed the determination was based on the formation of a charge transfer complex of drug solution with DDQ-Chloroform Mixture. The Orange coloured product under standardized conditions is scanned over the range 400-575mm. The calibration curve for the determination of drug, constructed by recording absorbance. Results of analysis of this method was validated statistically evaluated.

Key Words: Tizanidine, chloroform, Mixture.

INTRODUCTION

Tizanidine (GFN) chemically, 3-chlore – N- (4,5 – dihydr -1h – imidazol – 2 – y) – 8 – Thia – 7, 9 –diazabicyclo (4.3.) nona – 2,4,6,9 - tetraen -2 – amine. It is freely soluble in chloroform. It is convencially called as Tazapa. It is used as pain killer. A survey of literature revealed a few high performance liquid chromatographic methods. The structure of Tizanidine represented as in figure-1.

The present investigation was under taken with the action of developing new simple, rapid and accurate method. This spectrophometric method based on a charge-transfer complexation reaction.

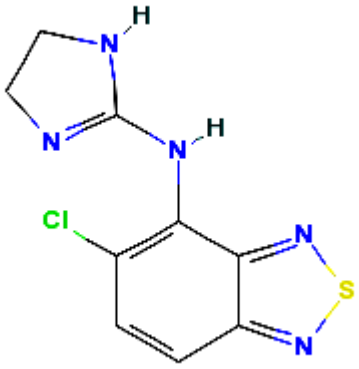

Fig 1: Tizanidine

EXPERIMENTAL

Apparatus

A Spectronics 1001 spectrophotometer with 10 mm Matched quartz cuvettes was used for absorbance values of the drug solution.

Preparation of Reagents and Drug Solutions

All chemicals used were of analytical reagent grade used for preparation of Reagents and drug solutions in the present investigation.

1. DDQ :- i.e. 2,3 - Dichloro-5,6-Dicyano-1,4-Benzoquinone DDQ Solution 1.0 X 10^{-3} = 0.001N, Powder is dissolved in chloroform and the resulting solution is made up to the mask in the 50 ml standard flask with chloroform.

2. Tizanidine Solution

An accurately weighted 50mg of Tizanidine is dissolved in chloroform. The Volume is made up to the mask in the 50 ml standard flask with chloroform. It was further diluted with chloroform to obtain the final comentration 100 □g / ml of Tizanidine Solutions.

SPECTROPHOTOMETRIC METHOD

Estimation of Tizanidine in Pharmacential Formulations

This method was applied to the estimation of the drug from the market tablet formulations. Tablets were weighed and finally powdered and an accurately weighed portion of the powder, equivalent to 50mg of Tizanidine was placed in a 50ML Volumetric flask containing 30 ML of chloroform. The contents of the flask were shaker well and made up to the mask with distilled water to get concentration of 1 mg/ml. This stock solution was further diluted to

obtain working concentration of 100 µg / ml . In a series of 25 ml volumetric flasks, aliquots of Tizanidine solution (1.0, 1.5, 2.0 ml) were placed. The Volume in each flask was brought to 15 ml with D.D.Q. Solution and chloroform.

The contents of each flask are thoroughly mixed and allowed to stand for 10 minuted to complete the reaction. A stable orange - red coloured solution was developed. The absorbance of the orange - red colour was measured at 470 mm by using of spectrophotometer, against a blank solution which formed Absorption Spectrum of Tizanidine drug by the present Method. Fig -2.

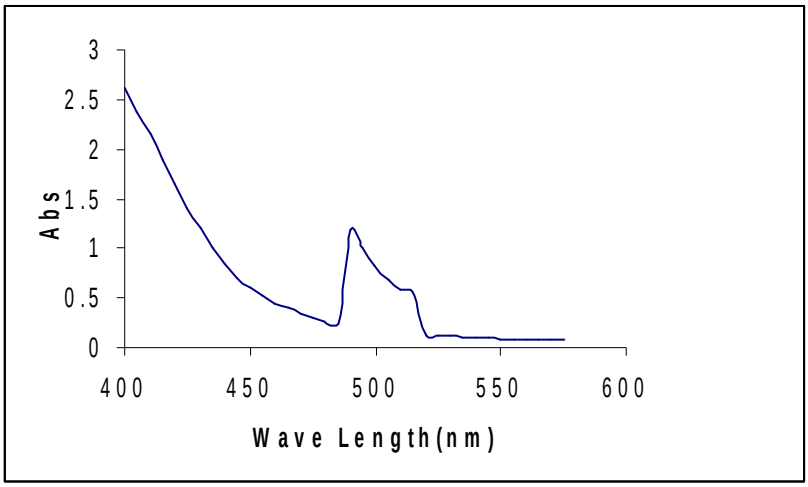

Figure 2: spectrum of Tizanidine

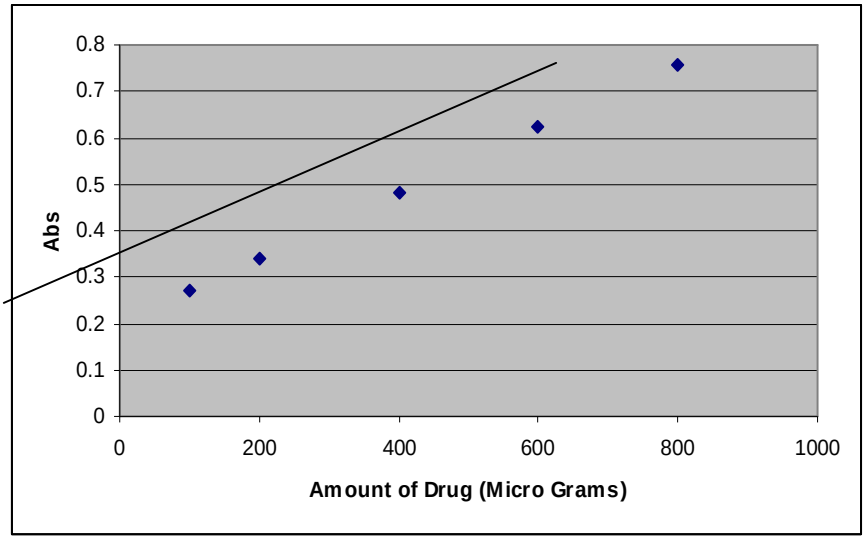

Figure 3: calibration curve for Tizanidine

Table 1 : Spectral data for calibration of Tizanidine

Amount of Drug (Micro Grams)	Abs at 400 - 575
100	**0.269**
200	**0.338**
400	**0.481**
600	**0.622**
800	**0.758**

In order to study the accuracy and reprocibility and reproducibility of the proposed method. The recovery values ranging from 99.99-100.05% indicates the accuracy of the proposed Method. calculated using the equation.

% recovery = N.....

Where 'X' is the amount of standard drug added, Y is the amount of drug found (µg / ml) and Ni represented the total number of observations. The results are presented in a Table - 1.

Sample	Labeled Amount mg/tab	Amount found mg/tab	% Recovery
Tablet-1	200	199.98	99.99
Tablet-2	200	199.60	99.98
Tablet-3	200	200.10	100.05

TABLE-2 : STATISTICAL ANALYSIS OF ESTIMATION OF TIZANIDINE

Sample	Labeled Amount mg/tab	Standard Deviation	Co-efficient of variation	t_{cal}*	t_{tab}*
Tablet-1	200	0.3563	0.1781	0.1255	2.78
Tablet-2	200	0.5099	0.2554	0.1813	
Tablet-3	200	0.3162	0.1580	0.7072	

* Average of five determinations based on label claine *t_{tab} = Tabulated Value (or) Theoretical Value

Statistical analysis

The Statistical analysis was performed on the statistically significant variables using the statistical software. The following parameter were determined, standard deviation, co-efficient of variation and student t-test. That is clearly indicate the high accuracy, precision and reproducibility of the sample applications and the results are summarized in Table-2.

RESULTS AND DISCUSSION

The present study was carried out to develop a simple, rapid, sensitive, precise, reproducible and accurate spectrophotometric method dosage forms. The proposed DDQ Method was simple, less time consuming, low cost and found to be one of the best versatile analytical techniques employed for the assay and pharmaceutical formulation.

Tizanidine on oxidation with 2,3-dichloro 516-dicyano-1,4 benzoquinone (DDQ) in chloroform solution are added to stand for 10 minutes to complete the reaction. A stable orange – red coloured solution is developed the absorbance of orange – red coloured solution was measured at 470 mm. The amount of Tizanidine in the sample was estimated from the calibration curve. The result obtained by the proposed method is in good agreement with the label claim of the tablets. The additive and excipients usually present in tablets do not interfere.

The statistical analysis was studied by the proposed method. The values of standard deviation and co-efficient of variation were satisfactorily low, indicating the accuracy and the reproducibility of the method. Student t-test shows that the calculated ‘t’ values are less than the theoretical value 2.78 with 4 degrees of the freedom at 5% level of significance, Indicating that there is no significant difference between the proposed method and standard method.

In conclusion, the results indicate that the proposed DDQ method was found to be simple, rapid precise and accurate and less time consuming. Therefore, it may be preferably used for routine analysis of Tizanidine in pharmaceutical formulation.

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