

SPECTROPHOTOMETRIC METHODS FOR THE ESTIMATION OF TICLOPIDINE HYDROCHLORIDE IN BULK AND DOSAGE FORM

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ABSTRACT

A simple, sensitive and precise UV Spectrophotometric method has been developed for the estimation of Ticlopidine Hydrochloride in bulk drug and in pharmaceutical formulations. The spectrophotometric methods based on the formation of yellow coloured complex with picric acid reagent and having the absorption maxima at 423.4 nm. The condition were optimized and Beer's law was obeyed for Ticlopidine Hydrochloride at 10-70 mcg/ml and proposed method 100-700 mcg/ml. Regression equation was found to be $Y = 0.0054x + 0.0115$, $Y = 0.0361x + 0.0020$ and coefficient of correlation was 1.000 and 1.0021. The proposed method is sensitive, accurate, reproducible and useful for the estimation of Ticlopidine Hydrochloride in Tablets.

Key words : Ticlopidine Hydrochloride, UV spectrophotometer, picric acid reagent.

1.INTRODUCTION

Ticlopidine is chemically 5-(2-chloro phenyl methyl) - 4,5,6,7- Tetrahydrothieno (3,2-C) Pyridine ; 5-(10-Chloro benzyl)-4,5,6,7- Tetra hydro thieno (3,2-C)Pyridine(Extra pharmacopoeia of Matrinale, 1999; Drug information for the Health care professional, 1995). Ticlopidine Hydrochloride is used in the treatment of thrombotic. Very few analytical methods(Dal, 1995; Farina, 1994; Sane, 1993; Bapat, 1993; Arnoux, 1991) have been reported for its determination. Literature review revealed only potentiometric method(British pharmacopoeia, 2007) for the estimation of Ticlopidine HCl in pharmaceutical preparations and few HPLC(Quaglia, 1993; Makopoulus, 2008; Dal, 1995; Arnoux, 1991) methods for the estimation of Ticlopidine HCl in plasma of human and other animals. The present communication have a simple spectrophotometric method(Itoh, 1987). But the newer method is estimation of Ticlopidine Hydrochloride and its proposed method by UV method. Ticlopidine Hydrochloride react with picric acid reagent (proposed method) give yellow colour and change in colour between the blank and sample. The wavelength of maximum absorbance was found to be 423.4 nm. The spectra was shown in Fig I. Absorbance spectra of Ticlopidine Hydrochloride (30 mcg/ml) was taken using solvent blank.

The absorbance was determined to be 276.4nm. was shown in Fig II.

2.EXPERIMENTAL

Materials and Methods

Instrumentation

All spectrophotometric determination were done on a systronic U.V. Spectrophotometer-118 with 10mm matched with quartz cell of 1cm path length (Shimadzu, Japan).

Chemicals and Reagents

Ticlopidine Hydrochloride and its tablet formulations were gift samples from M/S Cipla Ltd, Mumbai. Picric acid, Chloroform were AR grade and procured from ponmani chemicals, Madurai, India.

Procedure

Standard preparation

10 tablets of each formulations T_1 , T_2 , T_3 were taken. The 10 tablets were transferred into a clean glass mortar and crushed together to a fine powder. About equalent to 30mg of Ticlopidine was transferred to a 100ml volumetric flask dissolved in 50ml of distilled water, shaken for 15 minutes and filtered through G-4 sintered glass funnel. Further quantity of distilled water was added through the funnel containing tablet powder up to 100 ml. This solution was further diluted to contain 30 mcg/ml with distilled water and absorbance of the solution was determined at 276.4 nm. Regression equation was found to be $Y = 0.0054x + 0.0115$ and coefficient of correlation was 1.000 in Table I. The amount of Ticlopidine in tablet was computed from Table II.

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Proposed preparation

10 tablets of each formulation T1, T2 and T3 were taken. The whole tablets were transferred into a clean glass mortar and crushed together to a fine powder. A quantity of powder equivalent to 400mg of Ticlopidine was weighed accurately and transferred to a 100ml of volumetric flask, shaken with 50ml of chloroform for 15 minutes and filtered through whatman filter paper. Further quantity of chloroform was added through the funnel containing tablet powder and made up to 100 ml. From this 1ml was pipetted into a 10ml volumetric flask, to each 1.0ml of 0.04% w/v picric acid reagent was added and were up to 10ml chloroform solution and the absorbance of these solutions were measured at 423.4 nm against blank. Regression equation was found to $Y = 0.0361x + 0.0020$ and coefficient of correlation was 1.0021 in Table I. The amount of Ticlopidine in tablet by using picric acid reagent was computed from Table II.

Preparation of calibration curves

Solutions of the calibration graphs were prepared by convenient dilutions of the standard solution, proposed method with picric acid in order to obtain concentrations in the range of 10-70, 100-700 $\mu\text{g/ml}$. The intensity was measured immediately at a wavelength 296.4 nm, 423.4 nm.

Analysis of pharmaceutical formulation

There was no interference from the excipients commonly present in the tablet. The Ticlopidine hydrochloride content was found to be 99.30%. The developed method was found to be reproducible and can be used for routine quality control of Ticlopidine hydrochloride in bulk and solid dosage form.

3. RESULTS AND DISCUSSION

As previously mentioned for Ticlopidine, only high performance liquid chromatographic methods are cited in the literature and no spectrophotometric methods were developed. Hence new spectrophotometric methods were developed. Raw material and formulations were analysed by the existing and proposed methods. The existing method for Ticlopidine by UV showed absorbance maxima at 276.4 nm and calibration curve was linear in the concentration range 10-70mcg/ml. The proposed method for Ticlopidine by Picric acid reagent showed absorbance maxima at 423.4 nm and the calibration curve was linear in the concentration range of 100-700mcg/ml and colour developed was stable for 90 minutes.

4. CONCLUSION

The proposed methods are simple and sensitive and hence can be used for the routine determination of Ticlopidine in bulk as well as in pharmaceutical preparations as alternative to the existing methods.

Table I
Optical characteristics and precision

Parameters	Standard method	Proposed method
λ (nm)	276.4	423.4
Beer's law limits ($\mu\text{g/ml}$)	10-70	100-700
Molar absorptivity ($\text{lit.mole}^{-1}.\text{cm}^{-1}$)	1.15×10^4	2.13×10^3
Regression equation ($Y=b+aC$)		
Slope(a)	0.0054	0.0361
Intercept (b)	0.0115	0.0020
Correlation coefficient	1.0000	1.0021

$Y = b + aC$ where C is concentration in mg/ml and Y is absorbance unit.

Table II
Estimation of Ticlopidine Hydrochloride in Tablets

Formulations	Absorbance	Labelled Amount(mg)	Amount obtained (mg)	% Recovery*
Standard Method				
T1	0.465	250	251.07	100.4 \pm 0.23*
T2	0.461	250	248.92	99.5 \pm 0.16*
T3	0.459	250	247.84	99.1 \pm 0.1*
Proposed Method				
T1	0.860	250	250.50	100.23 \pm 0.52*
T2	0.856	250	249.40	99.70 \pm 0.69*
T3	0.852	250	248.20	99.30 \pm 0.15*

*Values are mean \pm S.E.M of six determinations.

Fig 1

ABSORPTION SPECTRA OF TICLOPIDINE HYDROCHLORIDE USING PICRIC ACID REAGENT

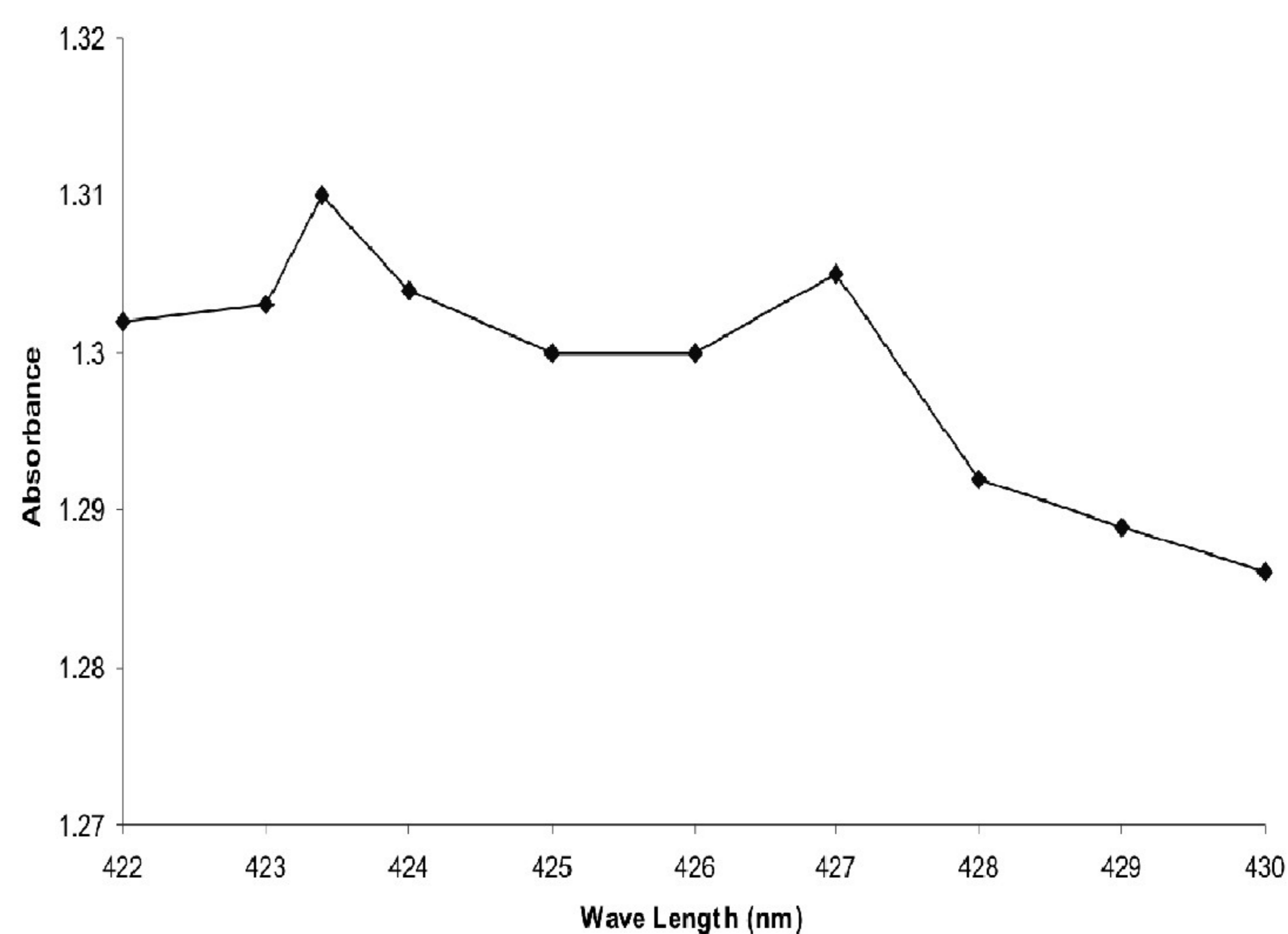
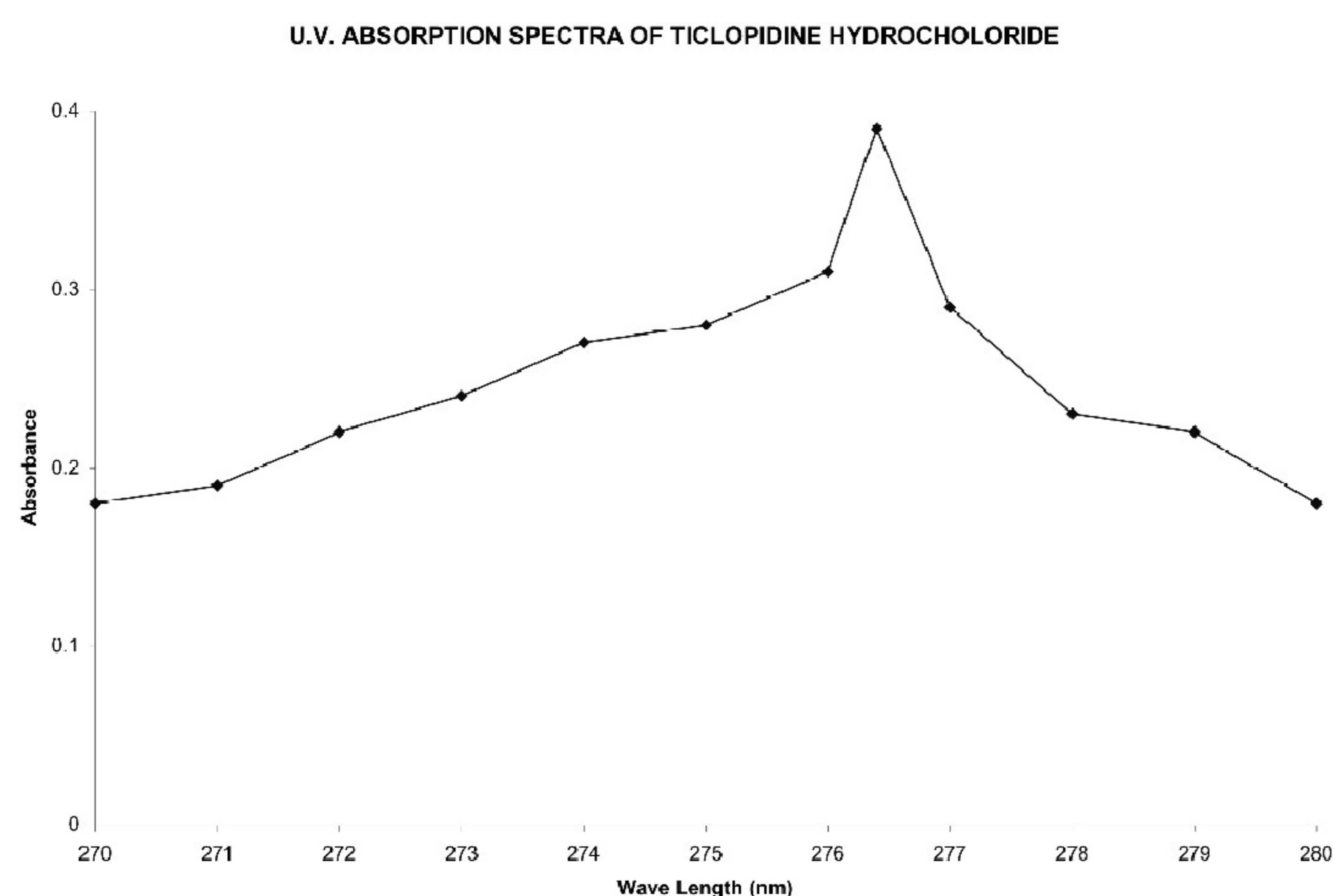


Fig 2



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