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RESEARCH ARTICLE

CHARGE TRANSFER COMPLEX METHOD FOR THE ESTIMATION OF ETORICOXIB IN TABLETS

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ABSTRACT

A simple and sensitive spectrophotometric method employing acid-dye technique was developed for the estimation of etoricoxib in pharmaceutical dosage form. The proposed method is based on the formation of ion-pair complex of etoricoxib with an acid dye, which is extracted into chloroform and the absorbance measured at the λ_{max} of the complex. The λ_{max} of the ion-pair complex was found to be 414nm. Beer's law was obeyed in the concentration range of 10-80 µg/ml .The proposed method is statistically validated and found to be useful for the routine determination of etoricoxib in tablets.

Keywords: Etoricoxib, Spectrophotometry, Charge transfer complex, Tablets, Validation.

INTRODUCTION:

Etoricoxib (ETX) is a specific type of an anti-inflammatory drug most commonly used for the relief of pain and swelling suffered by individuals[1,2]. Chemically it is 5-chloro-3-[4-methanesulfonyl phenyl]-2-[6-methyl pyridin-3-yl] pyridine[3]. Literature review revealed very few analytical methods including HPLC[4], HPTLC[5], LC-MS[6], Capillary zone electrophoresis[7] and Ultraperformance liquid chromatography[8] for simultaneous determination of etoricoxib in pharmaceutical dosage forms. In the present study spectrophotometric method employing acid-dye technique[9] for determination of etoricoxib in pure form and tablets is described. The method is based on the formation of a charge transfer complex of the drug with an acid-dye, whose absorbance is measured at the λ_{max} of the complex, after extraction into chloroform.

MATERIALS AND METHODS:

Instrumentation:

All spectral and absorbance measurements were made on Shimadzu UV-VIS Spectrophotometer-1650.

Reagents:

Chloroform, bromothymolblue solution (0.3%w/v), buffer of different pH from 2.2 to 4.0 as per I.P.1996. All reagents used were of analytical grade.

Preparation of standard solution:

A 1 mg/ml stock solution of ETX was prepared by dissolving 100 mg of drug in 100 ml of ethanol.

Procedure:

Appropriate aliquots of the standard drug solution were pipetted out into a series of eight separating funnels. To each funnel 2 ml of buffer and 5 ml of dye solution were added and mixed thoroughly. The complex was extracted with three successive quantities each of 8 ml of chloroform into 25 ml volumetric flask and made upto volume with chloroform. The absorbance of the ion-pair complex was measured at the λ_{max} of the dye in the solvent against the reagent blank. The solutions were scanned in the spectrum mode in the wavelength range of 400-800 nm. The λ_{max} of the complex was found to be 414nm as shown in fig-1.The analytical curve was constructed by plotting concentration versus absorbance.

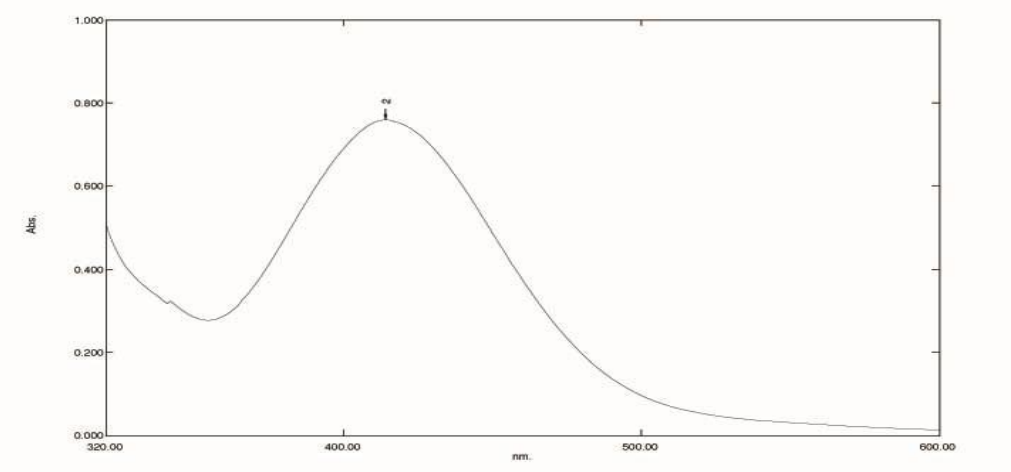

Figure 1: λ_{max} of the ion-pair complex of ETX

Sample Analysis:

Twenty tablets were weighed and powdered. A quantity equivalent to about 100mg of etoricoxib was weighed accurately, transferred to a beaker, disssolved in ethanol, filtered through Whatmann filter paper No.1 into 100ml volumetric flask and made upto volume with ethanol. Appropriate aliquots (within Beer's law concentration) were subjected to the above procedure and the amount of etoricoxib was determined from the calibration curve. The results are furnished in Table- 2.

RESULTS AND DISCUSSION:

Etoricoxib was found to yield a coloured product with the dye bromothymolblue due to the formation of an ion-pair complex. The λ_{max} of the etoricoxib complex with bromothymol blue was found to be 414nm. The optimum pH for the formation of complex was found to be 2.2. The optical characteristics such as absorption maxima, Beer's law limits, molar absorptivity and Sandell's sensitivity are furnished in Table-1. The regression characteristics like slope(m), intercept(c), correlation co-efficient(r), percent relative standard deviation(% RSD) and standard error(SE) were calculated and the results are summarized in Table-1. The amount of drug determined was in good agreement with the label claim showing the accuracy of the proposed method. To study the accuracy and reproducibility of the proposed method, recovery experiments were carried out by adding a known amount of drug to preanalysed sample and the percentage recovery was calculated. The percentage of recovery was around 100% proving the reproducibility of the method. The results are furnished in Table-2. The results indicate that there is no interference of other ingredients present in the formulations.

Table 1: Optical and Statistical Parameters

Parameters	Results
λ_{max}(nm)	414
Beer's law limits(µg/ml)	10-80
Molar absorptivity(L mol^{-1} cm^{-1})	359.35
Sandell's senstivity(µg/cm^2/0.001absorbance unit)	0.00892
Regression equation(*y)	0.0111x+0.0019
Slope(m)	0.0111
Intercept(c)	0.0019
Correlation co-efficient (r)	0.9998
%RSD	0.005382
Standard error(SE)	0.1141

**y=mx+c, where c is the concentration of ETX in µg/ml*

Table 2: Assay and recovery of ETX in dosage form

Drug	Labelled amount (mg)	Amount obtained (mg)*	Percentage recovery*
Etoricoxib	60	60.005	100.03

**Average of 6 determinations*

CONCLUSION:

The proposed method is simple,economical,sensitive,accurate,reproducible and useful for the routine determination of etoricoxib in tablets.

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