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Determination of Etoricoxib in Bulk and Pharmaceutical Dosage Forms by UV Spectrophotometric Method

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Abstract: A Simple, rapid, accurate and economical UV Spectrophotometric method is developed for determination of etoricoxib in bulk and tablets. In chloroform, the λmax of the drug was found to be 247 nm. Using double-beam Analytical Technologies Limited, model T60 UV-Visible spectrophotometer connected to computer loaded with UV Win 5.0 software, in this proposed method etoricoxib follows linearity in the concentration range 1 – 40µg/ml with a correlation coefficient of 0.998. Assay results were in good agreement with label claim. The methods were validated statistically and by recovery studies. The relative standard deviation was found to be 0.2319 with excellent precision and accuracy. The proposed method is specific while estimating the commercial formulations without interference of excipients and other additives. Hence, this method can be used for the routing determination of Etoricoxib in bulk samples and pharmaceutical formulations

Key words: Etoricoxib, UV spectroscopy, Chloroform.

1. INTRODUCTION

Etoricoxib is a non steroidal anti inflammatory drug and highly COX-2 inhibitor[1-12]. Etoricoxib , 5-chloro-6'-methyl-3-[4-(methylsulfonyl)phenyl]-2,3'-bipyridine,produces dose dependent inhibition of COX-2 without inhibition of COX-1.It does not inhibit gastric prostaglandin synthesis and has no effect on platelet function.COX-2 inhibition provides anti-inflammatory and analgesic effects[13-14]. It is used for symptomatic management of osteoarthritis[15-19], rheumatoid arthritis[20-24] primary dysmenorrhoea, postoperative dental pain, acute gouty arthritis[25], cancer treatment and prevention and migraine[26-31]. According to the literature survey it was found that few analytical methods such as Visible, UV, HPLC other methods were reported for etoricoxib(S.R. Shahi,et al 2008,M.J.Rose,et al 2002,,Robert Hartaman,et al[32-34].)The objective of the proposed methods to develop simple and accurate method for the determination of etoricoxib by UV spectrophotometric method in Pharmaceutical dosages forms.

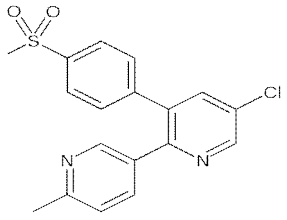

Fig-1 Etoricoxib

2. METHODS AND MATERIALS

Instruments

A double-beam Analytical Technologies Limited, model T60 UV-Visible spectrophotometer connected to computer loaded with UV Win 5.0 software. The instrument has an automatic Wavelength accuracy of 1 nm and matched quartz cells of 10 mm path length.

Chemicals and Reagents

Etoricoxib, Chloroform (A.R.GRADE), Tablet formulation (RETOZ-60)

Preparation of standard stock solution and study of calibration curves

The standard stock solution was prepared by dissolving etoricoxib in chloroform to make final concentration of 100 µg/ml. Different aliquots were taken from stock solution and diluted with chloroform separately to prepare series of concentrations from 1-40 µg/ml. The λ_{max} was found by UV spectrum of etoricoxib in chloroform, in the range of 200-400 nm and it was found to be 247 nm. Absorbance was measured at 247 nm against chloroform as blank. The calibration curve was prepared by plotting absorbance versus concentration of Etoricoxib. The calibration curve was shown in fig-2, UV spectra fig-3.

Preparation of sample solution

20 tablets of marketed formulation containing Etoricoxib were taken and powdered. The powder equivalent to 10mg of Etoricoxib was dissolved in 50 ml of chloroform, sonicated for 10 mins and filtered, and total volume is adjusted to 100ml with chloroform. . Different aliquots were taken from sample stock solution and diluted with chloroform separately to prepare series of concentrations from 1-40 µg/ml. The λ_{max} was found by UV spectrum of etoricoxib in chloroform, in the range of 200-400 nm and it was found to be 247 nm. Absorbance was measured at 247 nm against chloroform as blank. The prepared solutions were measured at 247nm against chloroform as blank. Then the amount of drug present in the formulations was calculated .The results were shown in Table-1.

Figure -1

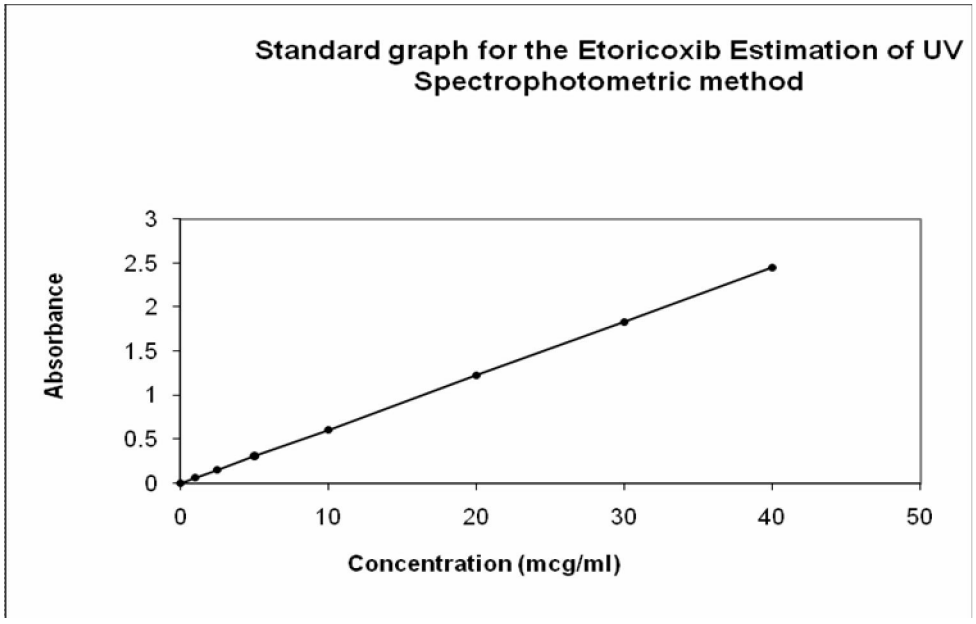

Figure-2

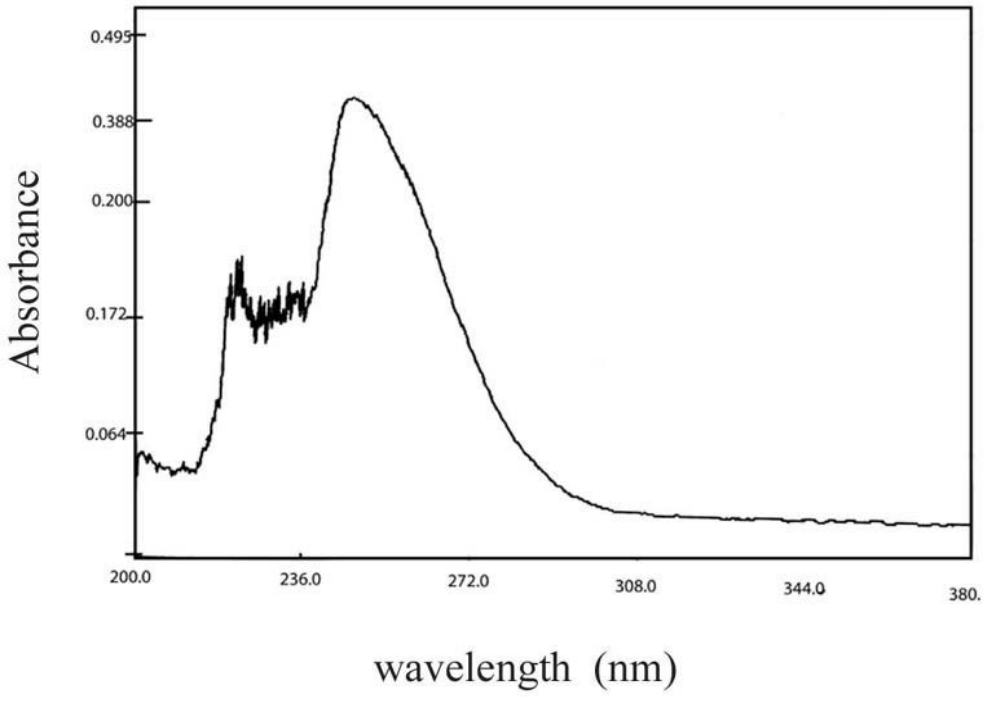

Table -1: Results of assay

Drug	Sample No	Amount Labeled (mg/tab)	Amount Estimated (mg/tab)	% of label Claim	% Deviation
Etoricoxib	1	60	59.64	99.4	0.6
	2	60	59.66	99.43	0.57
	3	60	59.66	99.43	0.57

Table-2: Summary of UV Method

UV METHOD	Etoricoxib
Absorption Maximum	247
Linearity Range (µg/ml)	1 - 40
Slope	0.0613
Correlation Coefficient (r)	0.999
% RSD of slope	6.76
Label claim (mg/tablet)	60
Amount found	59.65
S.D	0.0115
RSD%	0.01935
% Recovery	99.01

3. METHOD VALIDATION

Precision

The precision of the proposed method was ascertained by actual determination of eight replicates of fixed amount of the drug. Results given below in Table-3.

Recovery studies

The recovery studies were carried out at three different levels i.e. 80%, 100% and 120% level. To ensure the reliability of the above method, recovery studies were carried out by mixing a known quantity of standard drug with the preanalysed sample formulation and the contents were reanalyzed by the proposed method. The percentage recovery was found and shown in Table-4.

Table -3:Precision (Etoricoxib)

S.N.	Concentration (µg/ml)	Absorbance	Average	S D	%RSD
1	20	1.228	1.228	0.000756	0.0615
2	20	1.230			
3	20	1.229			
4	20	1.228			
5	20	1.229			
6	20	1.228			
7	20	1.228			
8	20	1.228			

The proposed method shows the precision with SD 0.00075 and %RSD 0.0615

Table -4

Drug	Amount Added (µg/ml)	Amount recovered (µg/ml)	Percentage recovery (%)	Average Recovery	%RSD
Etoricoxib	16	15.97	99.81	99.01	1.2276
	20	19.92	99.6		
	24	23.96	99.8		

4. RESULTS AND DISCUSSION

From the optical characteristics of the proposed method it was found that the drug obeys linearity within the concentration range of 1-40 µg/ml. From the results it was found that the percent RSD is less than 2% which indicates that the method has good reproducibility, the percent recovery values of pure drug from the preanalysed solutions of formulations were in between 99.81 -99.8%, which indicates that the method is accurate and which reveals the commonly used excipients and additives present in the pharmaceutical formulations did not interfere in the proposed method.

The proposed method was simple, sensitive and reliable with good precision and accuracy. The proposed method is specific while estimating the commercial formulations without interference of excipients and other additives. Hence, this method can be used for the routing determination of Etoricoxib in bulk samples and pharmaceutical formulations.

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