



DEVELOPMENT OF UV SPECTROPHOTOMETRIC METHOD FOR ESTIMATION OF MEFENAMIC ACID IN BULK AND PHARMACEUTICAL DOSAGE FORMS

HARINDER SINGH*, RAJNISH KUMAR, PINDERJIT SINGH

State Food, Drug and Excise Laboratory, Punjab, Sector – 11 D, Chandigarh, India, (Department of Health and Family Welfare, Punjab)
Email: harindersingh.pharm@gmail.com

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ABSTRACT

A simple, sensitive and specific UV spectrophotometric method was developed for the estimation of Mefenamic acid in tablet dosage form. The optimum conditions for the analysis of the drug were established. The wavelength maxima (λ_{max}) for Mefenamic acid were found to be 285 nm. Beer's law was obeyed in the concentration range of 5-60 mcg mL⁻¹ with 10.2799x10⁴ L mol⁻¹ cm⁻¹, the slope, intercept, correlation coefficient, detection and quantization limits were also calculated. The proposed method has been applied successfully for the analysis of the drug in pure and in its tablets dosage forms.

Keywords: Mefenamic acid, UV spectrophotometer

INTRODUCTION

Mefenamic acid (MFNC) is 2-[(2,3-dimethylphenyl) amino] benzoic acid and is used as an analgesic and antiinflammatory agent¹. The drug is official in British Pharmacopoeia with estimation of the drug by non-aqueous titrimetric method². Literature survey reveals that spectrophotometric, HPLC and LC3-7 methods have been reported for the estimation of MFNC from pharmaceutical formulations. But to the best of our knowledge, there is no work in the literature reported about the UV spectrophotometric method for the analysis of MFNC in pharmaceuticals. Hence, the authors have made an attempt to develop a simple and rapid UV spectrophotometric method for the estimation of MFNC in the bulk and in pharmaceutical formulations. Developed spectrophotometric methods were found to be simple, rapid, accurate, reproducible and economical in comparison to reported methods used for analysis of single drug.

MATERIAL AND METHODS

Instrument and apparatus

Perkin Elmer UV-Visible Spectrophotometer Lambda 25 model was used for spectral measurements with spectral band width 1 nm,

wavelength accuracy is 0.5 nm and 1 cm matched quartz cells. Glassware used in each procedure were soaked overnight in a mixture of chromic acid and sulphuric acid rinsed thoroughly with double distilled water and dried in hot air oven.

Reagents and materials

All chemicals and solvents were of analytical reagent grade and double distilled water was used to prepare solutions.

Standard drug solution

Pharmaceutical grade MFNC was kindly provided by Cipla Ltd., India. A stock standard solution equivalent to 1mg/mL MFNC was prepared by dissolving 50 mg of pure drug in 0.1 M HCl and diluting to 50 mL in calibrated flask with 0.1M HCl.

Method

Different aliquots (0.0, 0.5, 1.0,....., 7.0 mL) of 1 mg/mL MFNC solution were accurately measured and transferred into a series of 100 mL volumetric flasks and volume made up to the mark with 0.1 M HCl. Then all dilutions were scanned between 200-400 nm against blank which shows the maximum absorbance at 285 nm (Fig. 1).

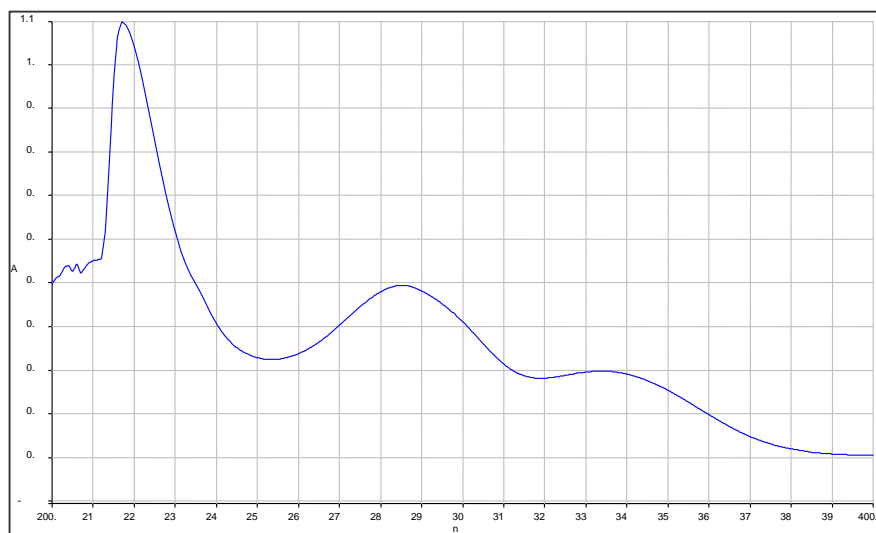


Fig.1: UV spectra of MFNC

The same λ_{max} was used for further measurement of drug. A calibration curve for absorbance vs. concentration was plotted (Fig. 2).

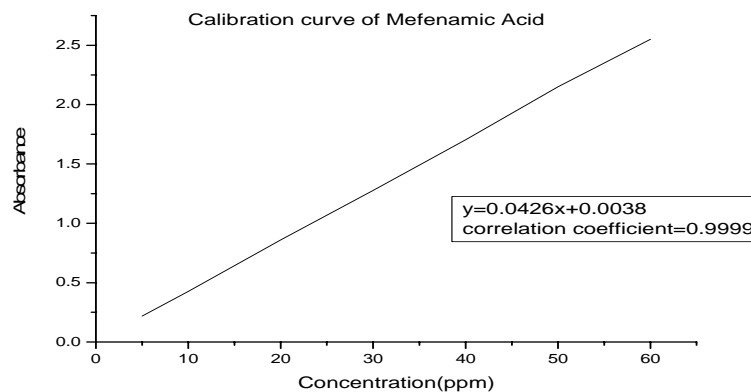


Fig. 2: Standard plot for MFNC (Absorbance at 285 nm)

Assay of pharmaceutical formulations

Twenty tablets were weighed accurately and ground into a fine powder. Powder equivalent to 100mg of MFNC was weighed accurately and transferred into a 100 mL volumetric flask with 60 mL 0.1 M HCl. The content was shaken for 15-20 min, diluted to volume with 0.1 M HCl, and filtered using a Whatman No. 42 filter paper. First 10 mL portion of filtrate was discarded and subsequent portions were subjected to analysis.

RESULTS AND DISCUSSION

The absorption spectrum of MFNC was measured in the range 200–400 nm against the blank solution 0.1 M HCl similarly prepared. The standard solution show maximum absorbance at λ max for each three systems as recorded in Table 1. And the method was validated by studying the following parameters

Table 1: Parameters for determination of MFNC against blank

Parameters	Values
λ max, nm	285
Beer's law limit, $\mu\text{g mL}^{-1}$	5– 60
Molar absorptivity, $\text{L mol}^{-1} \text{cm}^{-1}$	10.2799×10^4
Regression equation	
Slope (m)	0.0426
Intercept (c)	0.0038
Correlation coefficient	0.9999

The accuracy of the above method was ascertained by comparing the results obtained with the proposed and reference methods in the case of formulation are presented in Table 2.

Table 2: Assay and recovery of MFNC in pharmaceutical dosage forms

Formulation	Label claim (mg)	Amount found (mg)	% Recovery proposed method #	% Recovery reference method*
F1	100	99.67	99.67	99.09
F2	100	99.73	99.73	98.83

F1 and F2 are tablets from different batches (Meftal - P, Blue Cross Laboratories Ltd, India)

* Reference method 3.

Recovery amount was the average of six determinants.

As an additional check on the accuracy of these methods, recovery experiments were performed by adding known amounts of pure drug to pre-analyzed formulation and percent recovery experiments were also done. Recovery experiments indicated the absence of interferences from the commonly encountered pharmaceutical additives and excipients.

CONCLUSION

It could be concluded that the developed method for estimation of MFNC in pharmaceutical dosage forms and in bulk is simple, sensitive, relatively precise and economical. The proposed methods are used for the routine analysis of the drugs in the quality control.

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