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UV SPECTROPHOTOMETRIC ESTIMATION OF METAXALONE IN BULK DRUG AND TABLET FORMULATION

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ABSTRACT

Two simple, economical, accurate, and precise UV and first derivative spectrophotometric methods have been developed for the estimation of metaxalone in tablet formulation. Metaxalone has the absorbance maxima at 278 nm (Method-A), and in the first order derivative spectra, showed zero crossing at 278 nm (Method-B). Beer's law is obeyed in the concentration range of 40-240 µg/mL in these two methods. The results of analysis were validated statistically and the recovery studies were found to be satisfactory. The additives and common excipients did not interfere in their determinations.

Key words: Metaxalone, UV Spectrophotometry, First order derivative spectroscopy, Ethanol.

INTRODUCTION

Metaxalone is a muscle relaxant used to relax muscles and relieve pain caused by strains, sprains, and other musculoskeletal conditions. It may impair mental and/or physical abilities required for performance of hazardous tasks, such as operating machinery or driving a motor vehicle, especially when used with alcohol or other CNS depressants. It is chemically 5-(3,5dimethyl phenoxy) methyl) oxazolidin-2-one.

Literature survey has indicated that, no spectroscopic method has been developed for the determination of metaxalone in tablets. UV and first order derivative spectroscopy provide greater selectivity than common spectroscopy and offer powerful approaches for resolution of band overlapping. The aim of the present study is the development of simple, accurate and sensitive UV and first derivative spectroscopic methods for the determination of metaxalone.

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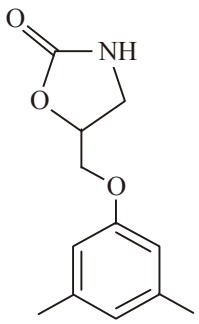

EXPERIMENTAL

Instrumentation

Spectroscopic analysis was carried out on a double beam Shimadzu UV/Visible spectrophotometer. The zero order absorption spectra were recorded over the wavelength range of 200 -400 nm, against solvent blank, in quartz cuvettes with 1 cm matched cell.

For all solutions, the first order derivative spectra were obtained over 200-400 nm. All the measurements were made using Shimadzu UV visible spectrophotometer with 1 cm matched quartz cells. All the solutions were freshly prepared in distilled water.

Preparation of standard stock solution

Standard and calbration solutions

Standard stock solutions of metaxalone were prepared using ethanol. Appropriate volume of standard stock solution was diluted with ethanol to get a concentration of 100 µg/mL of metaxalone. Further dilutions were made from these solutions in distilled water to get standard linearity concentrations in the range of 40-240 µg/mL for metaxalone.

Sample preparation

A total number of twenty tablets were accurately weighed and powdered in a mortar. Quantities of the powdered tablets equivalent to 50 mg were accurately weighed and transferred to a 50 mL volumetric flask. Weighed powder was dissolved in 30 mL of ethanol. Then the volume made upto 50 mL with ethanol, mixed thoroughly and shaken for 10 minutes. Solution obtained was filtered through Whatman No. 42 filter paper and few mL of the filtrate was discarded and then diluted with the distilled water solvent to get the required concentration.

Method A: Calibration curves were constructed by analysis of working standard

solutions of metaxalone. Each concentration was analysed in triplicate. UV absorption spectra were recorded. Calibration curve was plotted by taking absorbance on Y-axis and concentrations on X-axis. The relation between drug concentration (x) and its corresponding absorbance (y) is expressed by the equation (Y = mx + b), where m is slope and b is intercept.

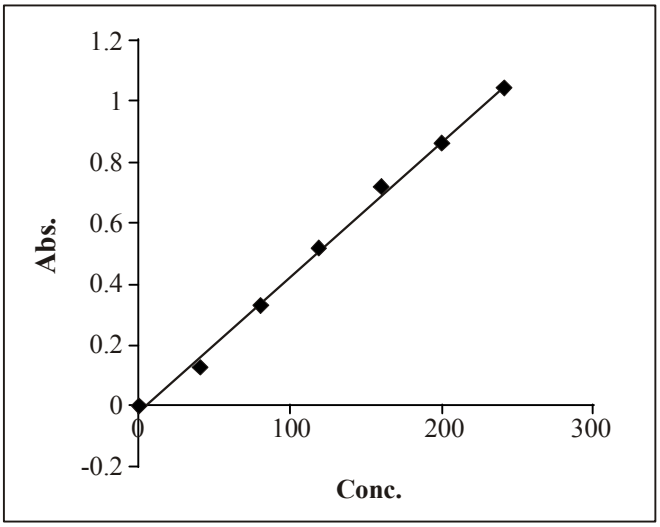

Fig. 1: Standard calibration curve

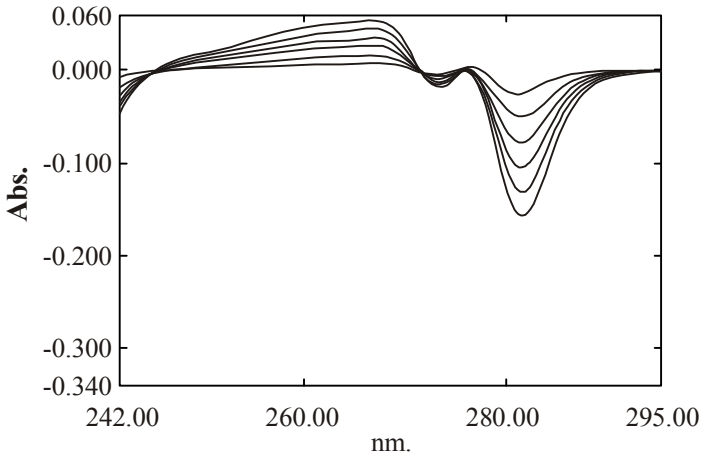

Fig. 2: Over lay spectrum, first order derivative

Method B: Calibration curves were constructed by analysis of working standard solutions of metaxalone. Each concentration was analysed in triplicate. UV absorption

spectrum was derivatised. First derivative amplitude values (D_1) of metaxalone were measured. Calibration curve was plotted by taking first derivative values (D_1) on Y-axis and concentra-tions on X-axis. The relation between drug concentration (x) and its corresponding first derivative value (D_1) value (y) is expressed by the equation (Y = mx + b), where m is slope and b is intercept.

Sample analysis

Applicability of the proposed methods for the UV Spectrophotometric estimation of metaxalone was studied by assay of commercial tablets. The results obtained are given in Table 2.

RESULTS AND DISCUSSION

The optical characteristics such as absorption maxima, Beer's law limits, and regression characteristics like slope (b), intercept (a), correlation coefficient (r), and standard error were calculated and the results are summarised in Table 1.

Table 1: Optical characteristics

Parameters	UV spectroscopy	Derivative spetroscopy
Wave length (nm)	278 nm	278 nm
Beer's law limits (µg/mL)	40-240 µg/mL	40-240 µg/mL
Slope (m)	0.0043	0.2928
Intercept (c)	-0.0155	0.1428
Regression (y = mx + c)	0.08743X + (-0.0155)	0.2928X + 0.1428
Correlation coefficient (r)	0.9988	0.9997
Standard error	0.01831	0.5255

*Average of three determinations

To study the accuracy and reproducibility of the proposed method, recovery experiments were carried out by adding a known amount of drug to pre-analysed sample and the percentage recovery was calculated. The results are furnished in Table 2. The results obtained are in good agreement with the lable claim.

Two rapid, simple and specific UV and first derivative spectroscopic methods have been developed for estimation of metaxalone. These two methods are successfully applied for determination of drug in tablet dosage forms. These can be useful for the routine drug analysis in quality control laboratories.

Table 2: Assay and recovery

Tablet	Label claim	Amount found by proposed method	% Amount by the proposed method	% recovered by the proposed method
Olmeasrtan	20 mg	20.86 mg	99	98.45
Amlodipine	5 mg	4.76 mg	100	97.80

*Average of three determinations

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