Int. J. Chem. Sci.: 10(4), 2012, 2171-2174
ISSN 0972-768X
www.sadgurupublications.com

SPECTROPHOTOMETRIC DETERMINATION OF ALMOTRIPTAN IN PHARMACEUTICAL DOSAGE FORMS

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ABSTRACT

A simple and sensitive spectrophotometric method has been developed for the determination of almotriptan malate in pharmaceutical preparations. In this method 2, 3-dichloro-5,6-dicyano-*p*-benzoquinone (DDQ) was utilized for determination of almotriptan malate forming charge transfer complex with maximum absorbance at λmax 390 nm. Optimization of the reaction conditions has been investigated. Obediance to Beer's law permitted the assay of almotriptan malate in their dosage form. The proposed method is simple, rapid accurate, precise, reproducible, and economic and can be used for routine quantitative analysis of almotriptan malate in pure and tablet dosage form.

Key words: Ultraviolet-visible Spectrophotometry, Almotriptan malate, 2,3-dichloro-5,6-dicyano-*p*-benzoquinone, (DDQ), Preparations.

INTRODUCTION

Almotriptan malate is a selective and potent serotonin 5-hydroxy trytamine1B/1D (5-HT 1B/1D) receptor agonist. It is chemically designated as 1 [[[3-[2-(Dimethyl amine) ethyl]-1H-indol-5-yl] methyl] sulfonyl] pyrrolidine ± -hydroxy butanedioate1 (1 : 1). Its empirical formula is $C_{17}H_{25}N_3O_2S.C_4H_6O_5$ representing molecular weight of 469.56. It is a white to slightly yellow crystalline powder that is soluble in water and sparingly soluble in methanol. Almotriptan is available in market as conventional tablets (AXERT). The drug is absorbed well orally, with an absolute bioavailability of around 70%. The drug is used to treat severe migraine headaches and vascular headaches; acute treatment of migraine attacks

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with or without aura. Various methods were reported in literature for the estimation of almotriptan malate which includes, spectrophotometric method[1-5], fluorimetric and colorimetric methods[6], RP HPLC method[7,8] and HPTLC method[9].

This work describes a simple visible spectrophotometric method for the determination of almotriptan malate by exploiting its basic nature and electron donating property. This method is based on the charge transfer complexation reaction of almotriptan malate with 2,3-dichloro-5,6-dicyano-p-benzoquinone (DDQ) in methanol medium. Therefore, the need for a fast, simple, sensitive, low-cost, and selective method is obvious, especially for a routine quality control analysis of almotriptan malate in drug formulations

EXPERIMENTAL

Materials and methods

All absorbance measurements were made on a Spectronic 1001 plus spectrophotometer (Milton Roy Company, USA) with 1 cm matched quartz cells**.** Glasswares 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.

Chemicals and reagents

All the solutions were freshly prepared. All solvents and other chemicals used through this study were of analytical grade. 2,3-dichloro 5,6-dicyano-p-benzoquinone (DDQ; Merck, Schuchardt, Munich, Germany) solution (0.1%) solution was freshly prepared in methanol and it was prepared a fresh daily.

Preparation of standard stock solution

A standard stock solution containing 1 mg/mL was prepared by dissolving 100 mg of almotriptan malate in 100 mL of distilled water. From this, a working standard solution containing 100 μg/mL was prepared for the proposed method.

Assay procedure

Aliquots of standard drug solution of almotriptan malate 0.2-1.0 mL were transferred into a series of 10 mL calibration flasks. To each flask 1.0 mL of the DDQ solution was added, and the reaction was allowed to proceed at room temperature ($25 \pm 5^{o}C$). The reaction was achieved instantaneously. The solutions were diluted up to the mark of the calibration flask with methanol. The absorbance of the resulting solutions was measured at the wavelengths of maximum absorption 390 nm against reagent blanks treated similarly.

Beer's law is obeyed in the concentration of 20-100 µg/mL of almotriptan malate. Calibration curve was plotted from absorbance values against concentration of drug

Preparation of sample solution

Twenty tablets of almotriptan malate were accurately weighed and powdered. Tablet powder equivalent to 100 mg of almotriptan malate was dissolved in 50 mL of methanol, sonicated for 15 mins, filtered and washed with methanol. The filtrate and washings were combined and the final volume was made to 100 mL with methanol. The solution was suitably diluted and analyzed as given under the assay procedure for bulk samples. The results are represented in Table 1.

Table 1: Assay of Almotriptan malate in pharmaceutical dosage form

Tablets	Labeled amount (mg)	*Amount found (mg) ± S.D*	% of label claim	% RSD*	*t value
Tablet 1	12.5	12.46 ± 0.2	99.68	1.663	0.4314
Tablet 2	12.5	12.34 ± 0.18	98.72	1.533	1.1820

*Average of five determination based on label claim

RESULTS AND DISCUSSION

The method was based on the charge transfer reactions of almotriptan malate as *n*-electron donor with acceptor, 2,5-dichloro-3,6-dihydroxy-1,4-benzoquinone. The absorbance of the highly intensive coloured solution was measured at 390 nm against reagent blank treated similarly. The conditions required for the formation of colored complexes were optimized. Statistical analysis was carried out and the results were found to be satisfactory. The percent relative standard deviation, standard deviation and student's 't' test values calculated from the five measurements of almotriptan malate are presented in Table 1. Relative standard deviation values and standard deviation were low that indicates the reproducibility of the proposed methods. In the student's 't' tests, no significant differences were found between the calculated and theoretical values of both the proposed methods at 95% confidence level. This indicated similar precision and accuracy in the analysis of almotriptan malate in its tablets.

CONCLUSION

The proposed methods are simple, sensitive, accurate and economical for the routine estimation of almotriptan malate in bulk and in its tablet dosage form.

REFERENCES

1. A. Suneetha, R. Ravi Teja and S. Kathirvel, Spectrophotometric Estimation of Almotriptan Malate in Bulk and Pharmaceutical by Multivariate Technique, Int. J. Medicinal Chem. Anal., **2(2)**, 76-80 (2012).

2. M. Syam Bab, U. Viplava Prasad and B. Kalyna Ramu, Development of New Visible Spectrophotometric Methods for Quantitative Determination of Almotriptan Malate Using Quinones as Chromogenic Reagents, Chem Sci Trans., **1(2)**, 297-302 (2012).

3. U. Viplava Prasad, M. Syam Bab, B. Kalyana RamuVisible Spectrophotometric Analysis of Almotriptan Malate In Bulk And Formulations, Int. J. Scientific and Technol. Res., **1(5)**, 86-91 (2012).

4. A. Suneetha and B. Syamsundar, New Simple UV Spectrophotometric Method for Estimation of Almotriptan Maleate in Bulk and Pharmaceutical Dosage Form, Asian J. Res. Chem., **3(1)**, 142-144 (2010).

5. U. Viplava Prasad, M. Syam Bab and B. Kalyana Ramu, Quantitative Assay of Almotriptan Malate in Pure Drug and Pharmaceutical Preparations using Simple and Convenient Visibl Spectrophotometric Methods, Int. J. Pharma. Sci. Res., **3(5)**, 379-386 (2012).

6. I. Ramzia, EI-Bagary, N. G. Mohammed and H. A. Nasr, Fluorimetric and Colorimetric Methods for the Determination of Some Anti-migraine, Drugs, J. Chem. Pharmaceut. Res., **3(4)**, 304-314 (2011).

7. A. P. Kumar, V. R. L. Ganesh, D. V. Subba Rao, B. Anil, B. Venu Gopal Rao and V. S. Hari Krishna, A validated RP-HPLC Method for Determination of Process Related Impurities in Almotriptan Maleate API, J. Pharmaceut. Biomed. Anal., **46(4)**, 792-798 (2008).

8. A. Suneetha A and B. Syama Sundar, A Validated RP HPLC Method for Estimation of Almotriptan Malate in Pharmaceutical Dosage Form, J. Chin. Chem. Soc., **57(5A)**, 1067-1070 (2010).

9. A. Suneetha and B. Syama Sundar, Development and Validation of HPTLC Method for the Estimation of Almotriptan Malate in Tablet Dosage form**,** Indian J. Pharmaceut. Sci., **72(5)**, 629-632 (2010).

Accepted : 23.10.2012