AMERICAN JOURNAL OF PHARMTECH RESEARCH

Journal home page: http://www.ajptr.com/

Development and Validation of UV Spectroscopy method for Estimation of Ranalozine in bulk and its Pharmaceutical Formulation

Ramanaiah Ganji *, D. Ramachandran, G Srinivas, Jayapal Gowardhane, Purnachanda Rao

1. Department of Chemistry, Acharya Nagarjuna University Nuzivid campus, Andhra Pradesh, India.

ABSTRACT

A rapid and sensitive UV-Visible spectroscopic method was developed for the estimation of Ranalozine in pure and its Pharmaceutical formulations. The method was validated as per International Conference on Harmonization [ICH] guidelines. The Ranalozine was monitored at 230nm with UV detection and there is interference of diluent at 230nm for Ranalozine. The method was linear (*r2* =0.999) at concentration ranging from 12 to 40µg/ml, precise (intra-day relative standard deviation [RSD] and inter-day RSD values < 1.0%), accurate (mean recovery = 100.2%), specific and robust. The results showed that the proposed method is suitable for the precise, accurate and rapid determination of Ranalozine in bulk, its capsule dosage forms.

Key Words: Ranalozine, UV-Visible spectroscopy, Validation, Dosage form.

*Corresponding Author Email: grreddy121@yahoo.com

Received 15 February 2012, Accepted 28 February 2012

Please cite this article in press as: Ganji R *et al.*, Development and Validation of UV Spectroscopy method for Estimation of Ranalozine in bulk and its Pharmaceutical Formulation. American Journal of PharmTech Research 2012.

INTRODUCTION:

Ranolazine[1-3](Figure.1) a piperazine derivative is a new antianginal agent approved for the treatment of chronic stable angina pectoris. Ranolazine has antianginal and anti-ischemic effects that do not depend upon reductions in heart rate or blood pressure. Ranolazine reduces the late sodium current and, is expected to decrease sodium entry into ischemic myocardial cells. As a consequence, ranolazine is proposed to reduce calcium uptake indirectly via the sodium/calcium exchanger. Ranolazine, chemically is (RS)-N-(2, 6-dimethylphenyl)-2-[4-[2-hydroxy-3-(2-methoxyphenoxy) propyl] piperazin-1-yl] acetamide, which was initially known to prolong the QT interval. The drug can be used in combination with other anti angina drugs for patients who have not achieved an adequate response

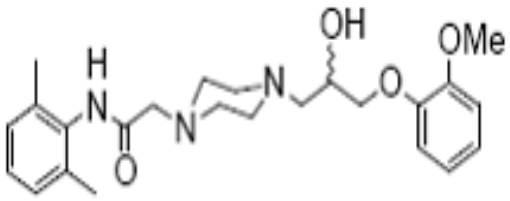

Figure-1: Chemical Structure of Ranalozine

The authors have developed a new, simple and fast analytical method by UV-Visible spectroscopy to quantify Ranalozine in bulk and its dosage forms. This validation study is carried out as per ICH guidelines.

MATERIAL AND METHODS[4-6]

Instrumentation

Lab India UV-Visible Spectrometer (Model- UV-VIS SPECTROPHOTOMETER 3000+) with UV Analyst was used for carrying out the current study.

Chemicals and solvents

Milli-Q Water, Methanol (HPLC Grade), was obtained from Qualigens Ltd., Mumbai.

Diluent preparation

Methanol used as diluent

Standard preparation: (For Ranalozine Tablets 500mg)

About 50.0mg of Ranalozine was weighed accurately and transferred into a 100mL volumetric flask and dissolved by sonication and diluted to volume with diluent to give 25µg/mL. This solution was scanned against blank solution and extracted the spectrum Based on the spectrum a λ_{max} of 230nm was selected for analysis.

Sample preparation: (For Ranalozine Tablets 500mg)

Weigh and finely powder not fewer than 20 Tablets. Accurately weigh and transfer equivalent to 50 mg of Ranalozine into a 100 mL volumetric flask add about 70 mL of diluent, and sonicate for 30minutes with intermittent shaking at controlled temperature and dilute to volume with diluent and mix. Filter the solution through 0.45 µm membrane Filter. Transfer 5.0 mL of the above solution into a 100 mL volumetric flask and dilute to volume with diluent.

RESULTS AND DISCUSSION

Method development[4-6]

To develop a suitable and robust UV method for the determination of Ranalozine, different Compositions of water, methanol and Acetonitrile were used as diluent and finally good recoveries were found with diluent of Methanol. On Scanning the Standard solution against diluent in entire UV-Visible region of 200-800 good response was found at 230nm for 25µg/mL concentration. There is no interference from diluent through the entire UV visible range of 200-800nm.

Method validation [4-6]

The developed UV method extensively validated for assay of Ranalozine using the following Parameters.

Specificity

Blank interference

To check the interference of blank at the working wavelength blank was scanned from 200-800nm.

The absorbance for Ranalozine is about 0.4. As there is no blank interference is not observed at the working wavelength of 230nm for Ranalozine, the UV spectroscopic method presented in this study is specific for Ranalozine.

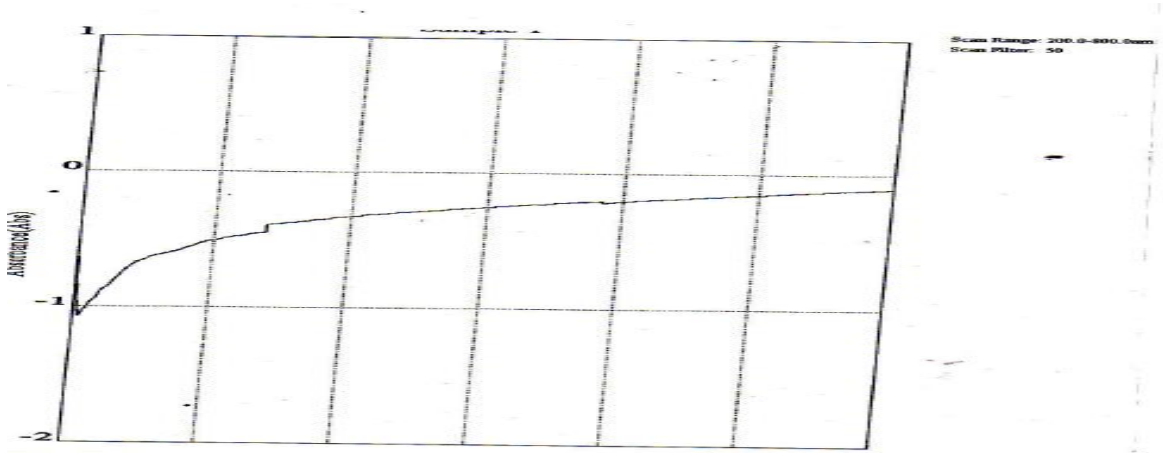

Figure 2: A typical UV spectrum showing the spectral profile of diluent for Ranalozine

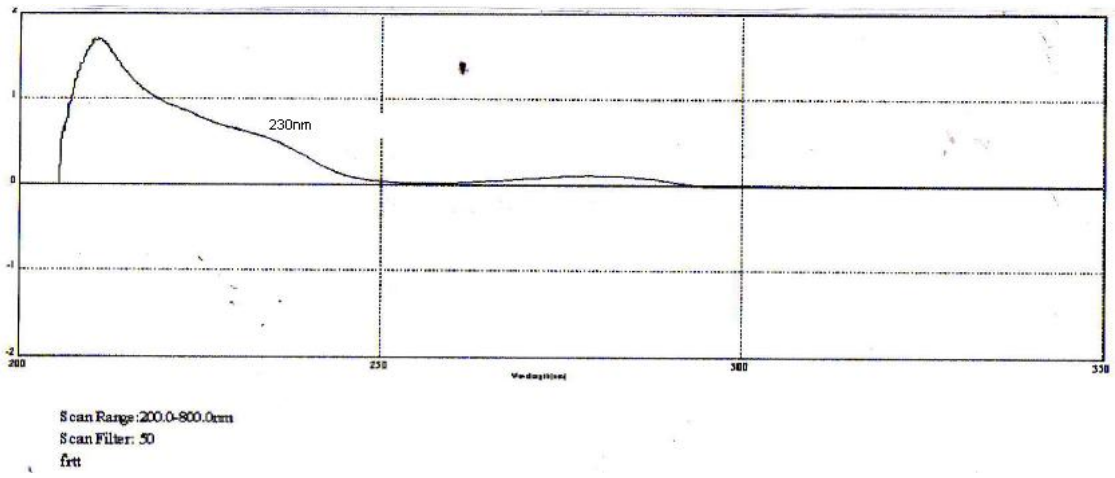

Figure 3: A typical UV spectrum showing the spectral profile of Ranalozine

The UV spectrum of Ranalozine Blank and standard spectrums using the proposed method is shown in Figure- 2 & 3.

Precision

In the study of the instrumental system precision where, a RSD of 0.04% was obtained for the absorbance obtained corresponding to the first day, being 0.65% for the second day, respectively. The method precision study for six sample preparations in marketed samples showed a RSD of 0.4% and the 95% confidence interval of 0.4 with the assay range of 99.3-100.2

For the intermediate precision, a study carried out by the same analyst working on different day. The results calculated as inter-day RSD corresponded to 0.65 %(For Standard). The same study was carried out for different analysts (n = 6 number of samples per analyst) obtaining a RSD of 0.5 %(Intermediate Precision) and 95% confidence interval of 0.6 with the assay range of 98.9-100.3 The Overall %RSD for n=12 is 0.7. Both results together with the individual results are showing that the proposed analytical technique has a good intermediate precision.

Table 1: Method Precision (Inter and Intra) studies for Ranalozine by proposed method

Method Precision(Inter &Intra Day)	
99.3	99.80
98.4	101.1
99.1	99.9
99.9	100.3
100.3	100.8
99.7	100.3
Overall Average	99.9
Overage Std Dev	0.74
Over all %RSD	0.7

Accuracy

The accuracy of the method was determined on three concentration levels by recovery experiments. The recovery studies were carried out in triplicate preparations on composite blend

collected from 20 tablets of Ranalozine and analyzed as per the proposed method. The percentage recoveries with found in the range of 99.0 to 100 with an overall %RSD of 0.58. From the data obtained which given in table-2 the method was found to be accurate.

Table 2: Recovery studies for Ranalozine by proposed method

% Level	Recovery Range	% RSD at each level	Over all %RSD
50	99.7-100.6	0.5	0.6
100	100.6-100.9	0.2	
150	99.4-100.6	0.6	

Linearity of detector response

The standard curve was obtained in the concentration range of 12-40µg/ml. The linearity of this method was evaluated by linear regression analysis. Slope, intercept and correlation coefficient [r2] of standard curve were calculated and given in figure-4 to demonstrate the linearity of the method.

Table 3: Linearity of Response for Ranalozine

% Level(Approx.)	Concentration (µg/ml)	Average Abs.
0	0	0
50	12.18	0.1757
75	17.96	0.2505
100	24.95	0.3439
125	30.94	0.4259
150	37.92	0.513
	Slope	0.0132
	Intercept	0.015
	% Y-Intercept	3.5
	STYEX	0.002
	CC	0.9999
	RSQ	0.9998
	Residual sum of squares	0.0022
	LLD	0.48
	LLQ	1.47

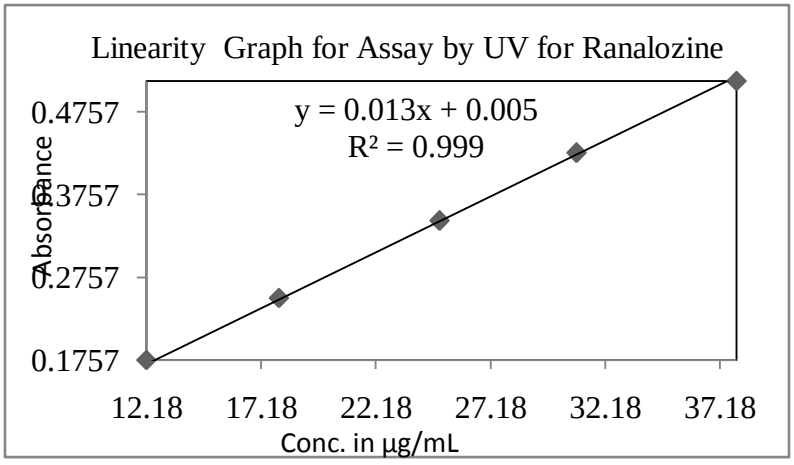

Figure 4: Calibration curve for Ranalozine

CONCLUSION

We have developed a fast, simple and reliable analytical method for determination of Ranalozine in pharmaceutical preparation using UV-Visible spectroscopy. As there is no interference of blank at the working wavelength, it is very fast, with good reproducibility and good response. Validation of this method was accomplished, getting results meeting all requirements. The method is simple, reproducible, with a good accuracy and precision. It allows reliably the analysis of Ranalozine in bulk, its pharmaceutical dosage forms.

ACKNOWLEDGMENT*:* Rainbow Pharma Labs, Kukutpally, Hyderabad, India.

REFERENCES

1. http://druginfo.nlm.nih.gov/drugportal/drugportal.jsp
2. http://www.rxlist.com/ranexa-drug.htm
3. Clare Greenaway, Neville Ratnaraj, Josemir W. Sander, Philip N. Patsalos, Therapeutic Drug Monitoring 2010;32(4):448.
4. Practical HPLC Method Development, Second Edition, Lloyd R. Snyder, Joseph J. Kirkland,Joseph I.Glajch, (1997).
5. U.S. Pharmacopeia National Formulary 2011: USP 34 NF 29 (United States Pharmacopeia/National Formulary).(2011).
6. ICH Guidelines on Validation of Analytical procedure: Text and Methodology Q 2 (R1), (2011).