ISSN 2349-7203

IJPPR
INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
An official Publication of Human Journals

HUMAN

Human Journals
Research Article
February 2015 Vol.:2, Issue:3

New Spectrophotometric Determination of Cisapride in Bulk and Pharmaceutical Dosage Form

IJPPR
INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
An official Publication of Human Journals
ISSN 2349-7203
HUMAN

Dr. A. J. PRATAPAREDDY

HOD of chemistry, K.V.R. College Nandigama.

Submission: 20 January 2015
Accepted: 11 February 2015
Published: 25 February 2015

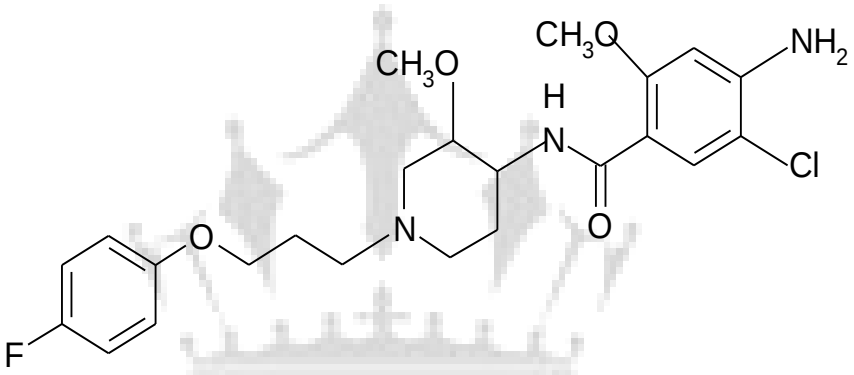
Keywords: Spectrophotometric determination, Cisapride, Resorcinol and diazotization

ABSTRACT

The new, selective and sensitive visible spectrophotometric method has been developed for the estimation of Cisapride in bulk and in pharmaceutical preparations. The amino group in Cisapride is diazotized with sodium nitrite and hydrochloric acid at 0^0C temperature. After diazotisation, the diazonium salt is coupled with resorcinol. The orange red coloured chromogen formed in the method is stable for more than 24 hours. The orange red coloured chromogen is used to determine the Cisapride spectrophotometrically.

INTRODUCTION

Cisapride is chemically, Cis –4- amino-5- chloro- N- {1-[3- (4-fluoro phenoxy) – Propyl] –3- methoxy –4- piperidyl} –2- methoxybenzamide monohydrate. Its molecular formula is $C_{23}H_{28}N_3O_4.H_2O$. It is freely soluble in methanol. It is a recently developed prokinetic drug. It stimulates gastrointestinal motility and is used in the management of gastro – oesophageal reflux disease, non- ulcer dyspepsia. Cisapride appears to be devoid of dopaminergic blocking activity and it does not influence the concentration of prolactin in plasma or cause extra pyramidal symptoms. The structure of Cisapride monohydrate is given below:



Structure of Cisapride

Various spectrophotometric methods are available in the literature for estimation of drugs by diazotization and coupling reaction. The reagents such as acetylacetone, benzoyl acetone dibenzyl methane, 1-naphthyl ethylene diamine 1:1 ammonia: water solution, 2-napthol, 3-amino phenol, etc., are used for the estimation of drugs by diazotization method. But all have certain limitations. In these methods more steps are involved, heating is necessary; the colour development is not instant and not reproducible values. The recently proposed method using 1:1 ammonia: water solution is less sensitive, time consuming and involves several steps.

No method is reported in the literature for estimation of the selected drugs by using resorcinol as the coupling reagent. Hence, it is proposed to use resorcinol as coupling reagent for the estimation of the selected drugs by spectrophotometry. The method is simple, rapid, reproducible, precise, and needs no extraction or heating, colour development is instantaneous,

and the colour is stable for more than 24 hours. Further, the controlling of experimental conditions is minimum.

MATERIALS AND METHODS

The proposed method general procedure:

The drug containing amino group is treated with cold solution of sodium nitrite in acidic medium at 0-5^{o}C temperature. The resultant solution is allowed to stand for five minutes for the diazotization to complete. Then the drug is treated with resorcinol to produce coloured species. The absorbance of the coloured species is measured at the wavelength of maximum absorbance for each drug against the reagent blank and the amount of drug is determined from the calibration curve made between the absorbance and the amount of drug.

EXPERIMENT

Spectrum of diazotized Cisapride treated with resorcinol:

The wavelength of maximum absorbance of the diazotised drug treated with resorcinol solution is ascertained by the following procedure.

1 ml of Cisapride solution (200 µg/ml) is transferred into a 10 ml volumetric flask. 2.0 ml of 0.1N hydrochloric acid and 1.0 ml of cold 0.1N sodium nitrite solution are added into it. The resultant solution is well mixed, and then allowed to stand for five minutes at 0-5^{o}C temperature for diazotization. 1.0 ml of 1 % urea solution is added and shaken frequently for nitrogen gas to escape. Then 1.0 ml of 0.5 N sodium carbonate and 1.0 ml of 1 % resorcinol solution are added and the volume is made up to 10 ml with methanol.

The absorbance of the orange red colour formed is measured in the wavelength range of 380 to 590 nm, against the reagent blank. The spectrum is given in Figure 1:

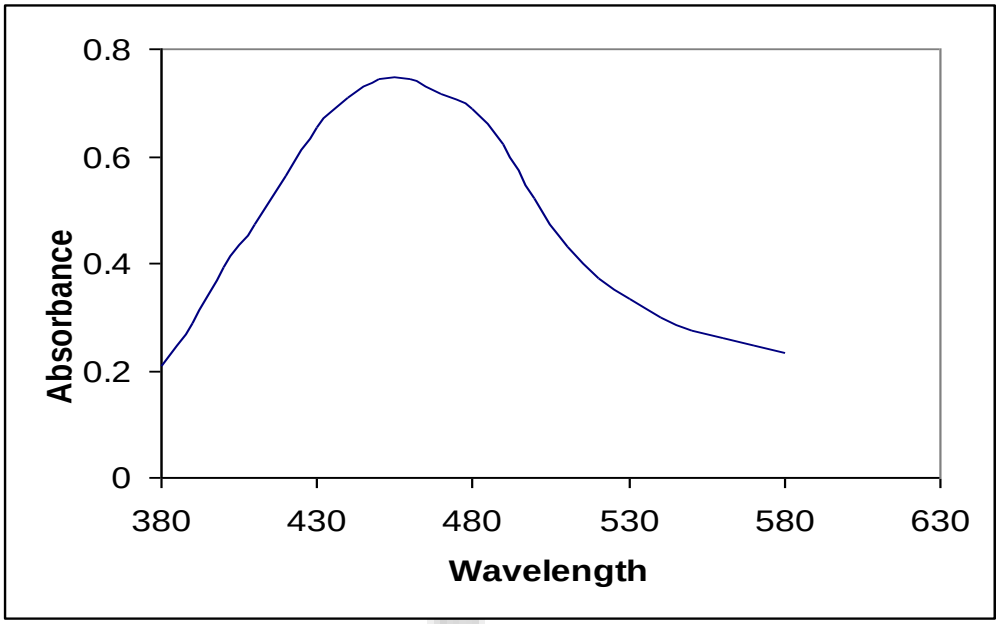


Figure 1. Spectrum of diazotisedCisapride treated with resorcinol

From the above spectrum, it is clear that diazotised drug treated with resorcinol solution has maximum absorbance at 460 nm. Hence, all further studies are made at 460 nm.

The optimal conditions for the determination of Cisapride are arrived at by the following steps. Various aliquots of the standard Cisapride solution ranging from 0.2-1.0 ml are transferred into a series of 10 ml volumetric flasks. To each flask, 2.0 ml of 0.1 N hydrochloric acid solution and 1.0 ml of cold 0.1 N sodium nitrite solution are added. The resultant solution in each flask is well shaken and allowed to stand for five minutes at 0-5^{o}C temperature for diazotisation to complete. 1.0 ml of 1 % urea solution is added to each flask and the solution is shaken frequently to allow nitrogen gas to escape. Then 1.0 ml of 0.5 N sodium carbonate solution and 1.0 ml of 1 % resorcinol solution are added and the volume in each flask is made upto 10 ml with methanol. An orange red colour is formed. The maximum absorbance of the orange red colour solution is measured at 460 nm against the reagent blank. Calibration graph is obtained by plotting absorbance values against the concentration of Cisapride solution. The calibration curve is found to be linear over a concentration range of 40 to 200 µg/ml of Cisapride. The amount of Cisapride present in the sample is estimated from the calibration graph. The results are presented in Figure 2.

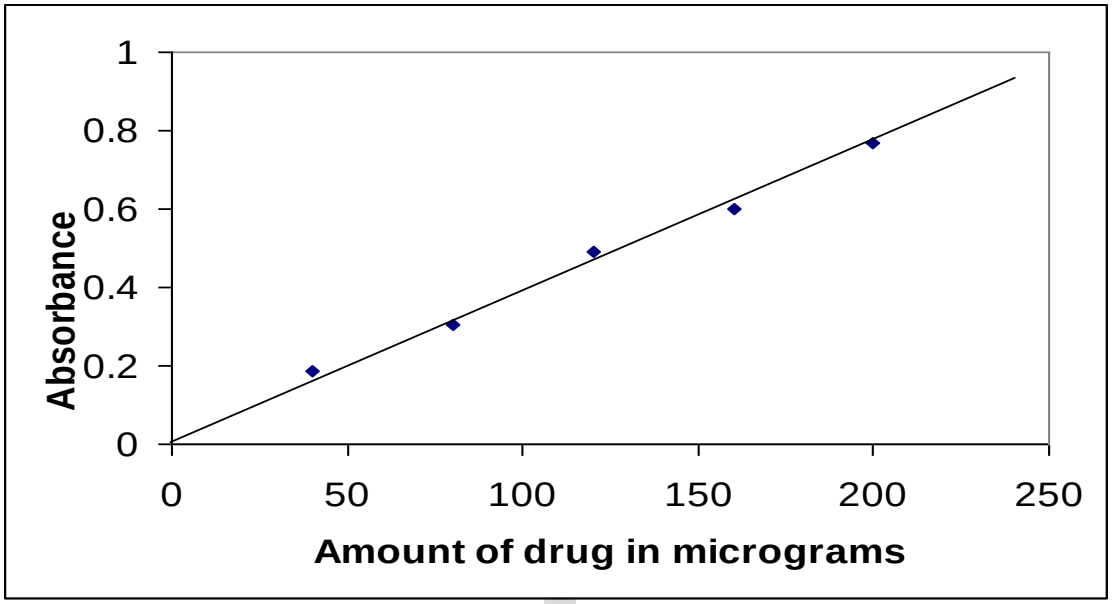


Figure 2. Calibration curve of Cisapride

Assay of Cisapride in pharmaceutical formulations:

The proposed procedure for the assay of Cisapride is applied for its determination in commercial tablets.

Preparation of the sample solution:

Powdered tablet equivalent to 50 mg of the drug is weighed accurately and transferred into a 50 ml beaker and mixed well with 30 ml of methanol. The solution is filtered and transferred into a 50 ml volumetric flask and the volume is made upto 50 ml with methanol. The concentration of the drug solutions is now 1 mg/ml. This stock solution is further diluted to obtain the working concentration of 200 μg/ml.

The above prepared pharmaceutical preparation is analysed by the following procedure.

Assay Procedure

Drug formulation prepared above with known volume is transferred into a series of 10 ml volumetric flasks and 2 ml of 0.1 N hydrochloric acid solution, 1.0 ml of 0.1 N sodium nitrite solution. The resultant solution in each flask is shaken well and allowed to stand for five minutes at 0-5^{0}C temperature for diazotisation. Then 1.0 ml of 1 % urea solution, 1.0 ml of 0.5 N sodium

carbonate and 1.0 ml of 1 % resorcinol solution is added. The absorbance of the resultant solution is measured at 460 nm. The amount of Cisapride in the pharmaceutical formulation is evaluated from the predetermined calibration plot. The results are presented in Table 1.

Table 1. Assay of Cisapride in pharmaceutical formulations

Sample	Labelled amount (mg)	*Amount found ±S.D*	Percentage of Label claim	**t_{cal}
Tablet 1	10	9.98 ±0.31	99.98	0.1436
Tablet 2	10	10.06 ±0.3	100.06	0.4402
Tablet 3	10	10.02±0.32	100.02	0.1367
Tablet 4	10	10.04±0.24	100.04	0.3714

***Average of five determinations based on the label claim**

RESULTS AND DISCUSSION

Cisapride undergoes diazotisation when treated with sodium nitrite and hydrochloric acid. The excess nitrous acid during the diazotisation is removed by the addition of urea solution. The solution was shaken frequently to allow the nitrogen gas to escape. The diazoniumcation reacts with the coupling reagent, resorcinol by electrophilic substitution at the o-position of the coupling agent to produce an orange azo product. This orange red product shows maximum absorbance at 460 nm. The colour of the product is stable for more than 24 hours. The calibration curve (concentration v/s absorbance) is linear over the range of 40-200 µg/ml of Cisapride. The standard deviation values are low indicates high accuracy and reproducibility of the method. The 't' calculated values are compares well with the theoretical value of 2.78 there by indicating that the precision of the method is good. There is no effect of additives and excipients such as starch, calcium lactose and glucose in the concentrations of those present in general pharmaceutical preparations.

CONCLUSION

The proposed method is found to be simple, precise, accurate and time saving, reproducible and can be conveniently adopted for routine analysis of estimation of Cisapride in bulk drugs samples and pharmaceutical formulations.

ACKNOWLEDGEMENT

The author is thankful to U.G.C.S.E.R.O., Hyderabad for financial assistance for the sanction of M.R.P. (No.F-4689/14 SERO/UGC).

REFERENCES

1. N. AlizadehR. Khakinahad andA. Jabbari, , 63(11), 791-795, 2008.
2. N. Rajendraprasad, K. Basavaiah and K.B Vinay, Indian Journal of Chemical Technology, 7(3),220-228, 2010.
3. Youssef Nadia Fayek and Taha ElhamAnwer, Chemical and pharmaceutical bulletin, 55(4), 541-545, 2007.
4. M. Nahed El-Enany, T. Dina El-Sherbiny, Amina A. Abdelal and Fathalla F. Belal, Journal of Fluorescence, Volume 20(2), 463-472, 2010.
5. Manuela Contin, Monica Balboni, Erica Callegati, Carmina Candela, FiorenzoAlbani, Roberto Riva, AgostinoBaruzzi, Journal ofChromatography B, 828(1-2), 113-117, 2005.
6. T.A.C. Vermeijand P.M. Edelbroek, Journal of Chromatography B,857(1), 40-46, 2007.
7. Manuela Contin, Susan Mohamed, Carmina Candela, FiorenzoAlbani, Roberto Riva and AgostinoBaruzzi,Journal of Chromatography B, 878(3-4), 461-465, 2010.
8. M.F. Cholbi-Cholbi, J.J. Martínez-Pla, S. Sagrado, R.M. Villanueva-Camañas and M.J. Medina-HernándezJournal of Liquid Chromatography & Related Technologies, 27(1), 153-170, 2004.
9. J. Daniel Platzer and A. Brent White, Journal of Pharmaceutical and Biomedical Analysis, Volume 41(1), 84-88, 2006.
10. J. Emami, N. Ghassami and F. Ahmadi,Journal of Pharmaceutical and Biomedical Analysis, 40(4), 999-1005, 2006.
11. Donatella Londero and Paolo Lo Greco, Journal of Chromatography B: Biomedical Sciences and Applications, 691(1),139-144, 1997.
12. Pela Angelis-Stoforidis, Denis J. Morgan, Terence J.O. Brien and Frank J.E..Vajda, Journal of Chromatography B: Biomedical Sciences andApplications, 727(1-2), 113-118, 1999.
13. NádiaRezende Barbosa and AntônioFlávioMídio, Journal of Chromatography B: Biomedical Sciences and Applications, 741(2), 289-293, 2000.
14. Manuela Contin, Monica Balboni, Erica Callegati, Carmina Candela, FiorenzoAlbani, Roberto Riva,Journal of Chromatography B, 113-117, 2005.