



A NOVEL AND RAPID HPTLC METHOD FOR THE ANALYSIS OF CITALOPRAM HYDROBROMIDE IN TABLET DOSAGE FORM – DEVELOPMENT AND VALIDATION

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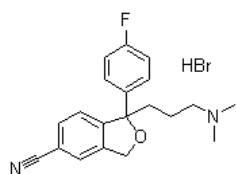
ABSTRACT

Aim of the present investigation was to develop and validated a new, simple, sensitive, selective and precise High Performance Thin Layer Chromatographic (HPTLC) method for the determination of Citalopram HBr in tablet dosage form. TLC aluminium sheets pre coated with silica gel 60F-254 were used as the stationary phase and Methanol:Water:Ethyl acetate (4:2:4) was used as the mobile phase for the linear ascending development carried out in twin trough glass chamber at room temperature ($25\pm 2^{\circ}\text{C}$). Spectrodensitometric scanning and analysis in absorbance mode at 240nm were carried out using CAMAG TLC Scanner 3. Compact spots for Citalopram HBr were observed having R_f value of 0.46 ± 0.02 . Linear regression analysis of the data for the calibration plots showed good linear relationship in the concentration range of 2-12mcg/spot with respect to peak area and r value was found to be 0.9960. The method was validated as per ICH guidelines for accuracy calculated as % recovery was in the range of 98.63% to 101.72%. The statistical analysis of the data showed that the method is reproducible and selective for the estimation of Citalopram HBr in tablet dosage form during routine analysis.

Keywords: Citalopram HBr, Method development, Validation, Tablet dosage form

1. INTRODUCTION

Citalopram is a racemic, bicyclic phthalane derivative, chemically unrelated to other selective serotonin reuptake inhibitors. The antidepressant effect of citalopram is presumed to be linked to specific serotonin (5hydroxytryptamine [5-HT]) reuptake inhibition. Citalopram, primarily through its (S) enantiomer, blocks 5-HT reuptake, leading to potentiation of serotonergic activity in the central nervous system [1,2].



Structure of Citalopram Hydrobromide

Citalopram HBr is determined by various methods including High Performance Liquid Chromatography (HPLC) [3-5], Micellar electrokinetic chromatographic method [6], Spectrofluorimetric method [7], LC-MS/MS method [8, 9], Fast fourier continuous cyclic voltammetry [10], Capillary electrophoretic method [11], Adsorptive stripping voltametric

method [12], Chiral capillary electrophoresis (CE) method [13] and UV-Spectrophotometric method [14-16] in Plasma, in pharmaceutical dosage forms and in bulk and also its impurities has determined. In this paper we describe a simple, inexpensive, sensitive and validated HPTLC method for the estimation of Citalopram HBr in tablet dosage form.

2. MATERIAL AND METHODS

Working standards of Citalopram HBr was obtained from well reputed research laboratories. HPLC grade Methanol, AR grade Ethyl acetate, Chloroform and Milli-Q water were procured from the market. The separation was carried out on HPTLC system with CAMAG TLC Scanner 3 detector using Methanol: Water: Ethylacetate (4:2:4) as mobile phase.

2.1. Preparation of standard solution

10 mg of Citalopram Hydrobromide is dissolved in 10 ml of diluent and sonicated to dissolve and made upto mark with diluent. Mixed well further pipetted out 5 ml of this solution transferred into another 10 ml volumetric flask and made up the volume with diluent upto the mark.

2.2. Preparation of test solution

0.1743mg of citalopram hydro bromide tablet powder (equivalent to 10mg of citalopram hydro bromide) is 10 ml of diluent and sonicated to dissolve and made upto mark with diluent. Mixed well further pipetted out 5 ml of this solution transferred into another 10 ml volumetric flask and made up the volume with diluent upto the mark.

2.3. Method development [17-19]

Working standard of various concentrations was prepared by taking aliquots of standard solution and diluted to get required concentration for calibration plot and which was injected. The chromatogram obtained by High Performance Thin Layer Chromatography is shown in figure no 2.

2.4. Validation

Validation was done with respect to various parameters, as required under ICH guideline [20, 21]. The method was validated with respect to parameters such as linearity, precision, accuracy, LOD and LOQ.

2.5. Precision

Ran the 6 preparations at 100% of the test concentration as per the developed method parameter and the results are shown in table no 1.

2.6. Accuracy

The accuracy of test method was carried out with 9 determinations over a 3 Concentration levels (50%, 100% and 150%) covering a specified range.

2.7. Linearity

2.7.1. Preparation of standard stock solution

Weighed 10 mg of Citalopram Hydrobromide is dissolved in 10 ml of diluent and sonicated to dissolve and made upto mark with diluent. Mixed well further pipetted out 5 ml of this solution transferred into another 10 ml volumetric flask and made up the volume with diluent upto the mark.

From the above prepared stock solution the different concentration levels of about 2, 4, 6, 8, 10, and 12 μ l of citalopram hydrobromide was prepared and injected.

3. RESULT AND DISCUSSION

The developed method was to quantitatively estimate the amount of Citalopram Hydrobromide in Pharmaceutical tablet

dosage form using HPTLC method. The calibration curves for Citalopram Hydrobromide were found to be linear in the concentration range of 2 μ g/ml -12 μ g/ml ($r=0.996$) indicating a good linearity. The linearity Chromatogram and curve of Citalopram HBr is shown in figure no 3 & 4.

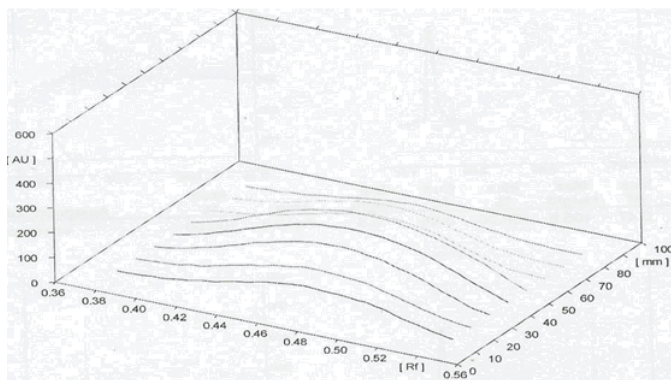


Fig. 2: Chromatogram for 2, 4, 6, 8, 10 and 12 mcg/ml Concentrations

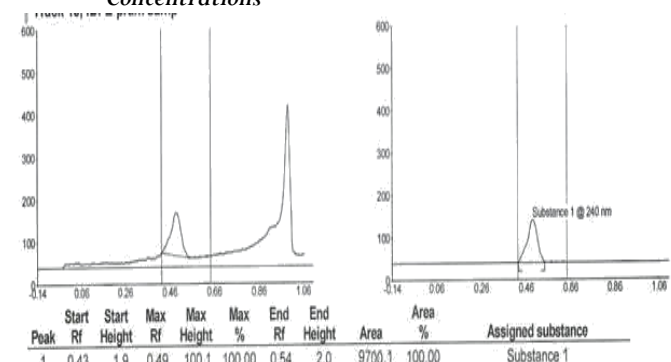


Fig. 3: Chromatogram of Citalopram HBr in tablet dosage form

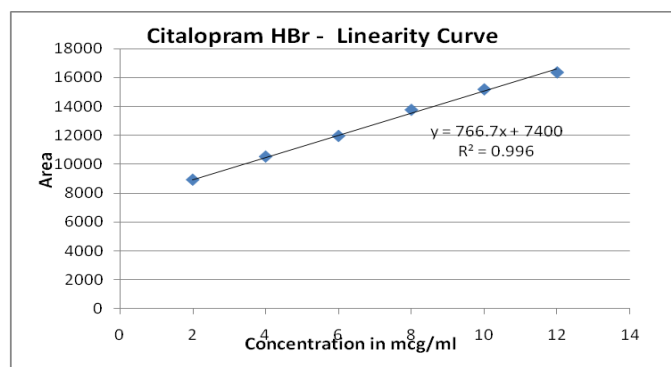


Fig. 4: Linearity Curve of Citalopram HBr

The average percentage recovery of sample was found to be 100.20%w/w for Citalopram Hydrobromide indicating the good accuracy of the method. The percentage Relative Standard Deviation (%RSD) values for method precision was found to be less than 2% and so the method is said to be precise.

The content and the percentage label claim of drugs in market sample indicate that the proposed method is rapid, precise and accurate for the estimation of Citalopram Hydrobromide in its Pharmaceutical formulation.

The proposed methods were applied for analysis of bulk and Formulation. To evaluate the validity and reproducibility of the method, known amount of pure drug was added to previously analyzed samples and these samples were reanalyzed by proposed method, the percentage recovery was found to be close to 100% for all the methods. The validation data obtained by this method is tabulated and shown in table 1.

Table 1: Data of Validation Parameters for Citalopram Hydrobromide

Parameters	Citalopram HBR
Precision(%RSD)	1.78%
Linearity range($\mu\text{g/ml}$)	2 $\mu\text{g/ml}$ -12 $\mu\text{g/ml}$
Correlation coefficient (R^2)	0.9960
%Recovery(w/w)	97.44% to 101.72%
LOQ	36.98 ng/ml
LOD	12.18 ng/ml

4. CONCLUSION

The proposed method was simple, sensitive and accurate enough for the routine estimation of bulk and products. But comparing with the developed High Performance Liquid Chromatographic methods the repeatability error is high as well as the accuracy level were less in this High Performance Thin Layer Chromatographic technique for the estimation of Citalopram HBr in tablet dosage forms. This method also used to estimate the Escitalopram present in tablet dosage forms.

5. ACKNOWLEDGEMENT

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6. REFERENCES

- Celexa User Reviews, Citalopram hydrobromide profile; 11/22/2010:1-13.
- Marcia Purse, About.com Guide, citalopram hydrobromide drug profile; 2007: 125-131.
- Menegola J, Steppe M, Schapoval EES. *J AOAC Int*, 2008; **91**: 52.
- Gandhi SV, Dhavale ND, Jadhav VY, Sabnis SS. *J AOAC Int*, 2008; **91**: 33.
- Rao RN, Raju AN, Narsimha R. *J Sep Sci*, 2008; **1729**: 31.
- Rodríguez Flores J, Salcedo AMC, Llerena MJV, Fernández LM. *J Chromatogr B*, 2008; **1185**: 281.
- Vasantharaju S, Prabu S, Jacob A. *Indian J Pharm Sci*, 2008; **70**: 647.
- Frison G, Favretto D, Vogliardi S, Terranoova C, Ferrara SD. *Ther Drug Monit*, 2008; **467**:30.
- Cao XO, Chen XY, Zhang YF, Zhong DF. *Yaoxue Xuebao*, 2007; **42**:450.
- Norouzi P, Daneshgar MR, Ganjali A, Moosavi-Movahedi J. *J Braz Chem Soc*, 2007; **18**: 231.
- Satana E, Uysal UD, Goger N, Tunçel M. *Chromatogr*, 2006; **64**: 317.
- Nouws H, Delerue-Matos C, Barros A. *Anal Lett*, 2006; **39**: 1907.
- Andersen S, Halvorsen TG, Pedersen-Bjergaard S, Rasmussen KE, Tanum L, Refsum H. *J Pharm Biomed Anal*, 2003; **33**: 263.
- Sagar GV, Sagar A. *Asian J Chem*, 2004; **16**: 1928.
- Raza, *Chem Pharm Bull*, 2006; **54**: 432.
- Raza, Ansari TM, Niazi SB. *J Chem Soc Pakistan*, 2008; **30**: 241.
- Sherma J, Fried B. *Handbook of thin layer chromatography*. 3rd ed. New York: Marcel Dekker, Inc. 2003.
- Sethi PD. *HPTLC: Quantitative analysis of pharmaceutical formulations*. 1st ed. New Delhi: CBS Publisher, 1996.
- Peter EW. *Thin layer chromatography: A modern practical approach*. UK: The royal society of chemistry, 2005.
- ICH, Q2A, Text on Validation of Analytical Procedures, International Conference on Harmonization, Geneva, October, 1994.
- ICH, Q2B, Validation of Analytical Procedures: Methodology, International Conference on Harmonization, Geneva, November, 1996.