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A Validated Non-Aqueous Potentiometric Titration Method for the Quantitative Determination of Oxolamine Citrate from Pharmaceutical Preparation

Rajan V. Rele[1]*, Sachin S. Patil[1]

1. Research laboratory of chemistry, D.G. Ruparel college, Matunga , Mumbai 400016.

ABSTRACT

A simple precise, rapid, accurate and sensitive non-aqueous potentiometric titration method was developed for quantitative determination of oxolamine citrate from pharmaceutical dosage form. The titration was carried out using standardized 0.1 N perchloric acid. The proposed method was found to be precise with % RSD <1 (n = 6). The method showed strict linearity ($r^2 > 0.99$) between 20 % to 100 % of 100 mg of drug substance weight. The percentage recovery of oxolamine citrate in the optimized method was between 99.773 to 101.229 %. The method is also found to be rugged when checked by different analysts and using different lots of reagents and different makes of titrators.

Keywords: Oxolamine citrate, perchloric acid , potassium hydrogen phthalate ,glacial acetic acid.

*Corresponding Author Email: drvinraj@gmail.com

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INTRODUCTION

In this communication the present work proposes non aqueous potentiometric titration method for assay of oxolamine citrate from bulk drug and pharmaceutical formulation. It's chemical name is 5- (2 -[diethyl amino] ethyl) 3-phenyl-1,2,4 oxadiazole citrate. Oxolamine is an anti-inflammatory drug. This drug is in Chemical Abstracts Service Registry Number [1]. Drug is not official in any pharmacopeia. Literature survey reveals liquid chromatography methods[2,3] for assay of this drug. A rapid, simple and reliable non aqueous potentiometric titration method is developed for the determination of oxolamine citrate. This method can be used for the routine analysis and research organization. In the proposed work optimization and validation of this method are reported.

MATERIALS AND METHODS

Instrumentation

An potentiometric titrator was used (VEEGO-MATIC) for assay method development and validation. A Shimadzu analytical balance with 0.01 mg was used.

Reagents and chemical

Reference standard of oxolamine citrate was obtained from reputed firm with certificate of analysis. Potassium hydrogen phthalate, perchloric acid and glacial acetic acid of A. R. grade were used.

General procedure

Standardization of 0.1 N perchloric acid

About 0.350 mg of potassium hydrogen phthalate (previously powdered lightly, dried at 120^{o}C for 2 hours) was weighed accurately into clean and dry titration jar. It was dissolved in 50 ml of glacial acetic acid. About 0.1 ml of crystal violet solution (0.5 % w/v in anhydrous glacial acetic acid) was added. It was titrated with 0.1 N perchloric acid until violet colour changes to emerald green. Blank determination was performed out for necessary correction.

The titration was performed in duplicate.

One ml of 0.1 N $HClO_4$ is equivalent to 0.2042 gm of potassium hydrogen phthalate ($C_8H_5KO_4$)

Normality of perchloric acid = W/ B.R. x 0.2042

Where W is weight of potassium hydrogen phthalate in g.

B.R. is burette reading in ml.

Quantitative determination of oxolamine citrate

About 0.100 g. of oxolamine citrate test sample was weighted accurately into a clean and dried titration jar. It was dissolved in 35 ml. of anhydrous glacial acetic acid in presence of 15 ml 5% (w/v) of mercuric acetate solution.

It was titrated with 0.1 N perchloric acid potentiometrically.

Blank determination was also carried out for necessary correction.

One ml of 0.1 N perchloric acid is equivalent to 0.1458 g. of oxolamine citrate ($C_{14}H_{19}N_3O.C_6H_8O_7$)

% Oxolamine citrate on the dried basis was calculated as below

$$\% \text{ assay} = B.R. \times N \times 0.1458 \times 100 / W$$

Where B.R. is burette reading in ml at the potentiometric end point.

N is actual normality of 0.1 N perchloric acid.

W is weight of the sample taken in g.

RESULT AND DISCUSSION

Determination of oxolamine citrate

The objective of this work was to determine accurately the content of oxolamine citrate. The assay of oxolamine citrate (on the dried basis) of various batches of oxolamine citrate test sample was analyzed using the above method. It was in the range of 100.137 % to 101.957 %.

Analytical method validation

The method precision was checked after analyzing six different preparations of homogeneous test sample of oxolamine citrate. The % RSD of results obtained was found to be 0.4581 %. It confirms good precision of the method. The results are presented in table 1.

Table 1 Method of precision

Weight of Oxolamine in g	Burette reading in ml	Normality of perchloric acid	%Assay
0.100	6.90	0.0999	100.501
0.100	6.95	0.0999	101.229
0.100	6.90	0.0999	100.501
0.100	6.85	0.0999	99.773
0.100	6.90	0.0999	100.501
0.100	6.90	0.0999	100.501
		Standard deviation	**0.4604 %**
		%RSD	**0.4581 %**

Table 2 Linearity

Level	Weight of Oxolamine in g	Burette reading in ml	Normality of perchloric acid	%Assay
1	0.020	1.40	0.0999	101.957
2	0.040	2.75	0.0999	100.137
3	0.060	4.15	0.0999	100.744
4	0.080	5.50	0.0999	100.137
5	0.100	6.90	0.0999	100.501
			Mean	**100.695%**
			Standard deviation	**0.7509 %**
			% RSD	**0.7457 %**

Linearity

For the establishment of method linearity ,five different weights of oxolamine citrate test samples corresponding to 20 % ,40 %, 60 % , 80 % and 100 % of the about weight (0.1 g.) were

taken and analyzed for % of oxolamine citrate content. The results are in table 2. The potentiometric titration was conducted once at each level. Calibration curve was drawn by plotting test sample weight in gram on x axis and titre values on y axis. The values of correlation coefficient, slope and intercept are given in table 3.

Table 3 Regression values

Correlation coefficient	0.9999
Slope (m)	68.75
Intercept (c)	0.015
Regression equation	y = 68.75x + 0.015

Accuracy and recovery

Accuracy was determined at five different levels i.e., 20 % , 40 % ,60 % ,80 % and 100 % of the nominal concentration. (0.100 g.) The titration was conducted in triplicate at each level and the titre value was recorded. The titre value obtained in linearity study was considered as true value during the calculation of percentage (%) recovery. The percentage recovery is calculated using following equation.

Percentage recovery = Titre value x 100/ True titre value

The percentage range recovery of oxolamine citrate was in 99.233 to 100.129%. It confirms the accuracy of the proposed method. (Table 4).

Table 4 Accuracy and recovery

Level	Weight of Oxolamine added (g.)	Weight of Oxolamine found (g.)	% Assay	Mean
1	0.020	0.0203	100.451	100.129
	0.021	0.0206	98.988	
	0.020	0.0202	100.948	
2	0.040	0.0402	99.639	99.233
	0.040	0.0401	99.887	
	0.041	0.0408	98.173	
3	0.060	0.0603	100.243	100.023
	0.061	0.0608	99.418	
	0.060	0.0602	100.409	
4	0.080	0.0804	99.639	99.728
	0.080	0.0795	100.767	
	0.081	0.0811	98.779	
5	0.100	0.1005	100.001	99.809
	0.100	0.0998	100.702	
	0.101	0.1018	98.724	

Ruggedness

The ruggedness of the method is defined as degree of reproducibility of results obtained by analysis of oxolamine citrate sample under variety of normal test conditions such as different laboratories, different analysts and different lots of reagents. Quantitative determination of oxolamine citrate was conducted

potentiometrically on one laboratory. It was again tested in another laboratory using different instrument by different analyst. The assays obtained in two different laboratories were well in agreement. It proved ruggedness of the proposed method.

CONCLUSION

The proposed method of non-aqueous potentiometric titration was found to be precise, accurate and rugged. The values of percentage recovery and standard deviation showed sensitivity. The method was completely validated. It showed satisfactory data for all the parameters of validation. Hence it can be applied for routine quality control application.

REFERENCES:

1. Chemical Abstract Service Register Number 1949-20-8.
2. Ozan Pirol, Morat Sukuroglu and Tancel Ozden, Simultaneous determination of paracetamol, phenylephirne hydrochloride, oxolamine citrate and chlorpheniramine maleate by HPLC in pharmaceutical dosage form. J Chemistry, 2011;8(3):1275- 1279.
3. Rele RV, Patil SP. Reverse phase high pressure liquid chromatographic technique for determination of oxolamine citrate from pharmaceutical formulation, Res J. Pharm. Tech. 2011;4(5):787-789.