

Note

Estimation of Captopril by Permanganometric Titration in Pharmaceutical Formulation

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A simple direct titrimetric method for the assay of captopril as raw material and also in pharmaceutical formulation by the principle of redox titration method using potassium permanganate solution is developed. IP 1996 describes HPLC analysis for captopril tablet and Iodometric method for the assay of raw material. The method developed is not only economical but also gives accurate, precise, and reproducible results both for the raw material and in tablet formulation. This method is sensitive enough to respond to small amounts of captopril. Common excipients do not interfere with the developed method.

Introduction

Captopril is an antihypertensive agent of ACE inhibitor group. Its chemical name is 1-[(3-mercapto-2-D-methyl-1-oxopropyl)-L-proline]. It has the molecular formula $C_9H_{15}NO_3S$. While official methods for the estimation of captopril exist, but they are complex and uneconomical. Hence, a direct titrimetric method for the estimation of captopril has been developed which is simple, accurate, sensitive, and economical.

Materials and Methods

Reagents

1 Standard 0.01N Potassium Dichromate Solution

About 0.049 g potassium dichromate was weighed and dissolved in double distilled water in a 100 ml volumetric flask.

2 Standardised 0.01N Sodium Thiosulphate Solution

Approximately 0.248 g of sodium thiosulphate was weighed and dissolved in 100 ml double distilled water in a 100 ml volumetric flask. It was standardised against standard potassium dichromate solution.

3 Standardised 0.01N Potassium Permanganate Solution

Approximately 0.316 g of potassium permanganate was weighed and dissolved in 250 ml double distilled water. It was heated for 30 min at 60°C. Then it was filtered through a funnel containing sintered glass and the volume was made up to 1000 ml with double distilled water. It was standardised against standardised sodium thiosulphate solution.

Preparation of Captopril RS Solution

100 mg of captopril RS (obtained from Central Drugs Laboratory, Calcutta) was weighed accurately and dissolved in double distilled water in a 100 ml volumetric flask. Different aliquots were taken from the prepared stock solution in different conical flasks and 5 ml of 1N H_2SO_4 was added to each of the flasks. They were then titrated against standardised 0.01N potassium permanganate solution until the pink color persisted for at least 30 s. The results of the titrations show a linear relationship between the amount of captopril and the millilitres of standardised 0.01 N potassium permanganate solution consumed. The results obtained are shown in Table 1.

Table 1 — Determination of titre value of captopril RS

Sl. No.	Aliquot volume of standard stock solution (in ml)	Amount of captopril (in mg)	Volume of standard 0.01 N $KMnO_4$ consumed (in ml)		
			V1	V2	Mean
1	1	1	1.60	1.70	1.65
2	2	2	3.30	3.30	3.30
3	3	3	4.90	5.00	4.95
4	4	4	6.60	6.70	6.65
5	5	5	8.20	8.20	8.20
6	10	10	16.50	16.40	16.45

$Y = 1.6433X + 0.0197$; Correlation coefficient (r) = 0.99998

Table 2 — Estimation of Captopril in marketed samples

Sample name	Aliquot volume of test sample (in ml)	Volume of (N / 100) KMnO ₄ consumed			Calculated amount of captopril in sample (in mg)	Percentage label claimed Mean ± SD (Average of three readings)
		V1	V2	Mean		
Aceten	10	16.5	16.50	16.50	10.0409	100.409 ± 0.03045
Angiopril	10	16.4	16.50	16.45	10.1047	100.104 ± 0.03067

Preparation of Captopril Test Solution

Two separate marketed captopril tablets (Aceten, Wockhardt ; Angiopril, Torrent) were taken. Ten tablets of each market product were weighed and average weight of each tablet was obtained. The tablets were triturated. An amount of powdered sample equivalent to 100 mg of captopril was weighed and transferred in a 100 ml volumetric flask and made up the volume with distilled water. It was thoroughly shaken for 15 min and filtered.

Test Method

10 ml aliquot test solution was taken in a 50 ml conical flask and 5 ml 1N H₂SO₄ was added and mixed thoroughly. It was then titrated against standardised 0.01N KMnO₄ solution until the pink color persists for at least 30 s. The results obtained are given in Table 2.

Results and Discussion

The method developed is not only simple but also accurate, precise, reproducible, and economical. The method is sensitive enough to respond to small amount of captopril. Common excipients do not interfere with this method.

References

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