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Research Article

QUANTITATIVE ESTIMATION OF LOSARTAN POTASSIUM IN PHARMACEUTICAL DOSAGE FORMS BY UV SPECTROPHOTOMETRY

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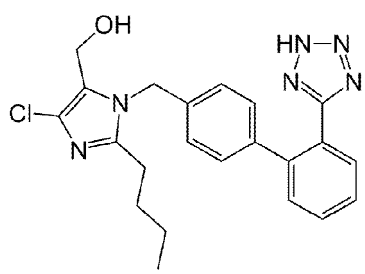
ABSTRACT

A literal and specific standard second derivative UV- spectrophotometric method was raised for the estimation for Losartan potassium in solid pharmaceutical dosage form. The λ-max of losartan potassium was found to be 234nm to both crude and marketed sample and is analyzed using Beer-Lamberts law. Beer's law was obeyed at the concentrations ranging 8-22 µg/ml. The second derivative spectrum shows results that were resolved through excipients. The developed methods were absolute, definite, explicit and consistent and found to be a prototype for routine determination for losartan potassium. The method was validated statistically and by recovery studies .The LOD (limit of detection) and LOQ (limit of quantification) for second derivative spectra were found to be 9.7µg/ml and29.74µg/ml.The correlation coefficient value was found to be 0.9989. The purity was found to be 98%. .

Keywords: Losartan potassium, Methanol, UV-visible spectrophotometer

INTRODUCTION

Losartan potassium (2-butyl-4-chloro-1-{[2'-(1*H*-tetrazol-5-yl) biphenyl-4-yl] methyl}-1*H*-imidazol-5-yl) methanol is used in the treatment of hypertension.



Structure of Losartan

Second Derivative Spectroscopy

The second derivative spectrum characterised by two satellite maxima and an inverted band of which the minimum corresponds to the λ-max of the fundamental band.

Experimental Method

UV – Visible Spectroscopy

Insrument

Labindia Ltd. UV 3000+, with bandwidth of 1nm, wavelength accuracy of 0.5T% and matched quartz cells are used. UV win software was used.

Chemicals

Losartan potassium, methanol, distilled water

Preparation of Standard Stock Solution

A standard stock solution (1000µg/ml) was prepared by dissolving accurately 50mg of crude losartan potassium in pure methanol. This stock solution was used to prepare further standard solutions of the drug. And a 100µg/ml (stock solution2) solution was prepared by dissolving 1ml of standard stock solution in 10ml of methanol.

Establishment of Optimal Level of Various Parameters

Absorption Maximum

Standard stock solution of drug was diluted to yield different concentrations of 8-22µg/ml. The absorbance was measured between 200-400nm.The standard curve was plotted against concentration versus absorbance of dilutions. The concentration 8-22µg/ml was obeyed beers law. And square correlation coefficient was found to be 0.9989.

Market Sample Analysis

Twenty tablets were weighed and powdered .A quantity equivalent to 50mg of losartan potassium was weighed accurately transferred into a volumetric flask dissolved in solvent, filtered through whattmann filter paper and made up to 50ml with solvent. And the amount of losartan potassium was found by the calibration curve (10µg dilution of drug).

Wavelength of Marketed Sample

The wavelength of marketed sample of losartan potassium (LOSAR) was found was found to be 233.50nm. Correlation coefficient value was found to be 0.9971.

Recovery Studies

To study the accuracy and reproducibility of the proposed methods, recovery experiments were carried out by adding a known amount of drug to preanalysed sample and the percentage recovery was calculated.

RESULT AND DISCUSSION

The two simple methods inclusive of simple UV-Spectroscopy and second derivative spectrophotometric methods were developed for the estimation of losartan potassium in pharmaceutical dosage forms. The λmax of losartan potassium was found to be 234nm. Linearity was found to be 8-22µg/ml. Correlation coefficient (0.9989) indicate good linearity between concentration and slope area. The amplitude of the respective derivative spectrum is converted in terms of absorbance. Beer's law was obeyed by the fundamental spectrum. Both the methods were found to be simple, accurate, and economical for the routine analysis of losartan potassium and its dosage forms. Recovery studies were found to be close to 99% that indicated the accuracy and precision of the above two proposed methods.

Quantitative analysis

%Assay = sample absorbance/standard absorbance x100

= 0.517/0.524 x100

=98%

Calculations

LOD (LIMIT OF DETECTION)

It is the lowest amount of analyte, in a sample that can be detected. Limit tests merely sustained that the amount of analyte is above or below a certain level.

DL=3.3/s.d.S

LOQ (LIMIT OF QUANTIFICATION)

It is the lowest concentration of an analyte in sample that can be determined with acceptable precision and accuracy.

QL=10/s.d.S

SANDELL'S SENSITIVITY

It is useful to detect the metals present in the sample; it is mainly useful for coloured compounds

Sand ell's sensitivity =molecular weight x no. Of atoms present in molecule/Molar absorpitivity

Molar absorpitivity

$$\varepsilon = E^{1cm}_{1\%} \text{ x molecular weight } /10$$

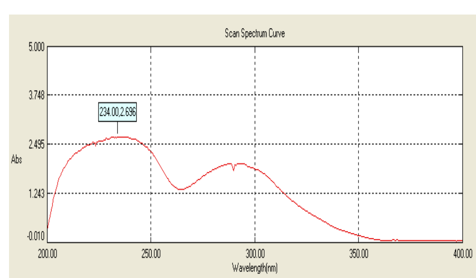


Fig 1: λ-max of Losartan Potassium

Table 1

No.	P/V	Wavelength (nm)	Abs
1	Peak	234.00	2.696

Table 2: ABSORBANCE AT 234nm

S.No.	ID	Type	Conc [ug/ml]	Abs Wavelength (234nm)
1	losartan1	Standard	8.0000	0.455
2	losartan2	Standard	10.0000	0.524
3	losartan3	Standard	12.0000	0.618
4	losartan4	Standard	14.0000	0.722
5	losartan5	Standard	16.0000	0.803
6	losartan6	Standard	18.0000	0.919
7	losartan7	Standard	20.0000	0.988
8	losartan8	Standard	22.0000	1.097

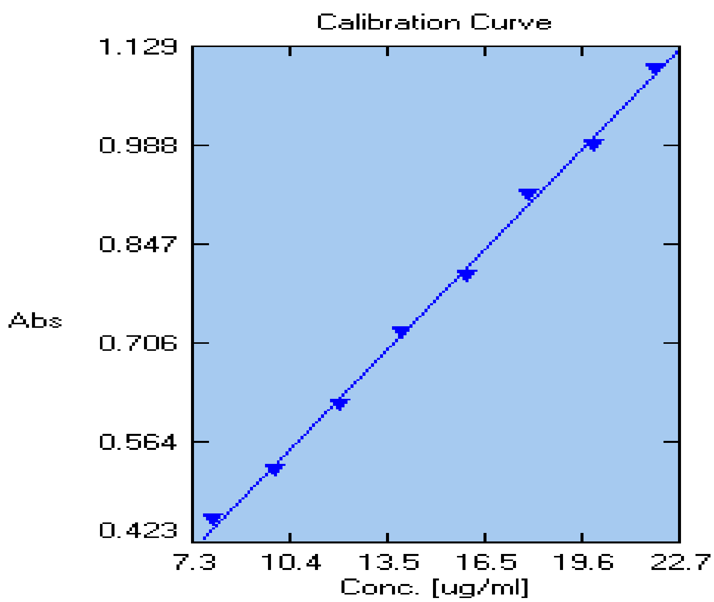


Fig 2: Linearity Graph of Losartan Potassium

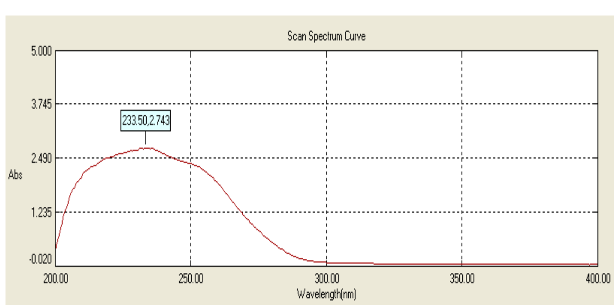


Figure 3: Wavelength of marketed sample

Table3

No.	P/V	Wavelength (nm)	Abs
1	Peak	233.50	2.743

Table 4: ABSORBANCE AT 234nm

No.	ID	Type	Conc. [Ug/ml]	Abs (Wavelength 234.00 nm)
1	losartan test1	Standard	8.0000	0.428
2	losartan test2	Standard	10.0000	0.517
3	losartan test3	Standard	16.0000	0.812
4	losartan test4	Standard	18.0000	0.865
5	losartan test5	Standard	20.0000	0.936
6	losartan test6	Standard	22.0000	1.065
7	losartan test7	Standard	12.0000	0.596
8	losartan	Standard	14.0000	0.707

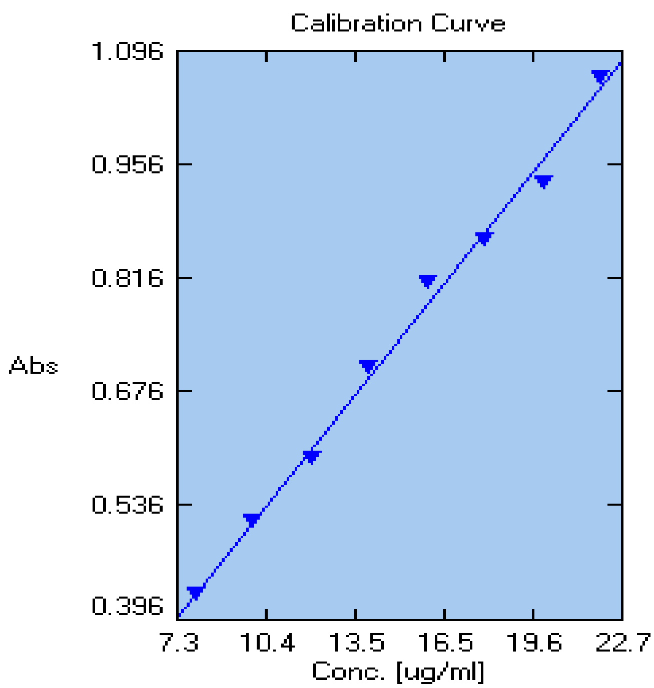


Figure 4: Linearity Graph of Losartan Potassium

Table 5: ANALYSIS OF LOSARTAN POTASSIUM TABLETS

Drug	label Claim	amount found tab(mg)	%label claim	%deviation	S.D
Losartan Potassium	50	50.40	100%	0.8%	0.1633
	50	50.60	101.12%	1.2%	0.1633
	50	50.20	100.4%	0.4%	0.1633

Table 6: Recovery studies

Sample Added (mg)	amount of drug recovered (mg)	amount of drug	recovered
1	**20**	**19.95**	**99.75**
2	**10**	**09.96**	**99.76**
3	**10**	**10.12**	**101.2**

Figure 5: Second derivative spectrum

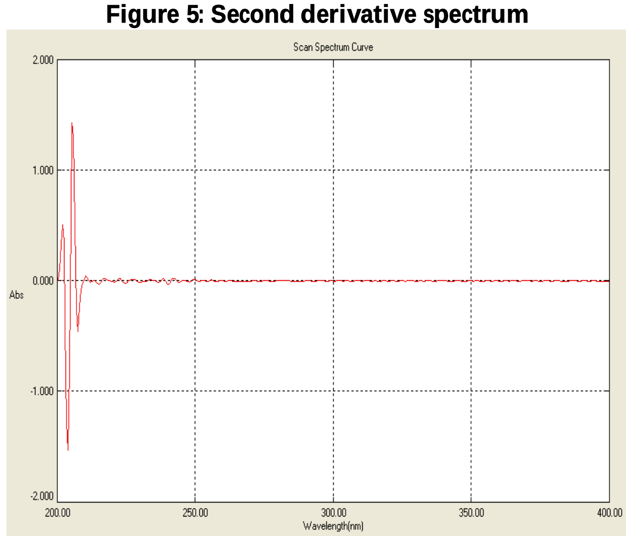
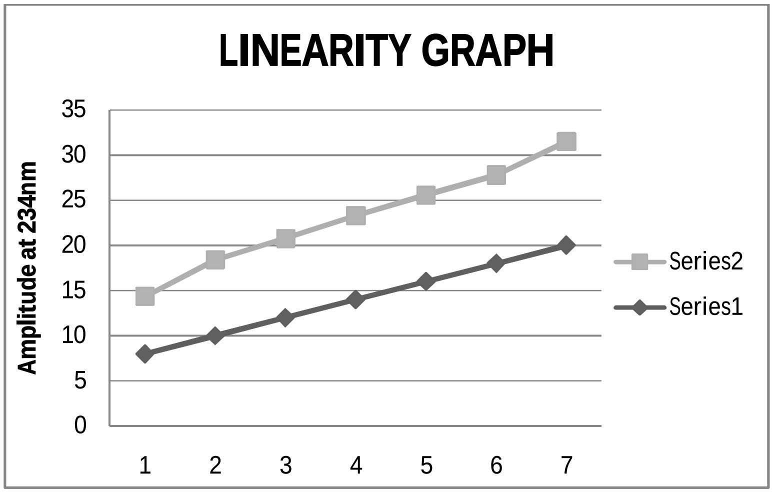


Table 7

No.	P/V	Wavelength(nm)	Abs
1	Peak	205.50	1.433
2	Valley	204.00	-1.532
3	-	234.00	0.011

Table 8

Conc(µg/ml)	Amplitude
8	6.36
10	8.42
12	8.79
14	9.27
16	9.59
18	9.8
20	11.5
22	13.6



Series 1: concentration
Series 2: amplitude

Fig 6: Linearity Graph

Table 9: Analysis of Losartan Potassium Tablets

Drug	label Claim	amount found tab(mg)	%label claim	%deviation	S.D
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2	**10**	**09.96**	**99.76**
3	**10**	**10.12**	**101.2**

Table 11: Parameters

S.No	Parameters	Losartan potassium
1	λmax	233.50nm
2	Linearity	8-150μg/ml
3	slope(m)	0.05
4	Intercept	0.032
5	corelation coefficient	0.9989
6	Regression equation	Y=0.05x+0.032
7	Molar absorptivity	1.27×10^4
8	Sandells sensitivity	0.22μg/ml
9	Limit of detection	9.7μg/ml
10	Limit of quantification	29.74μg/ml

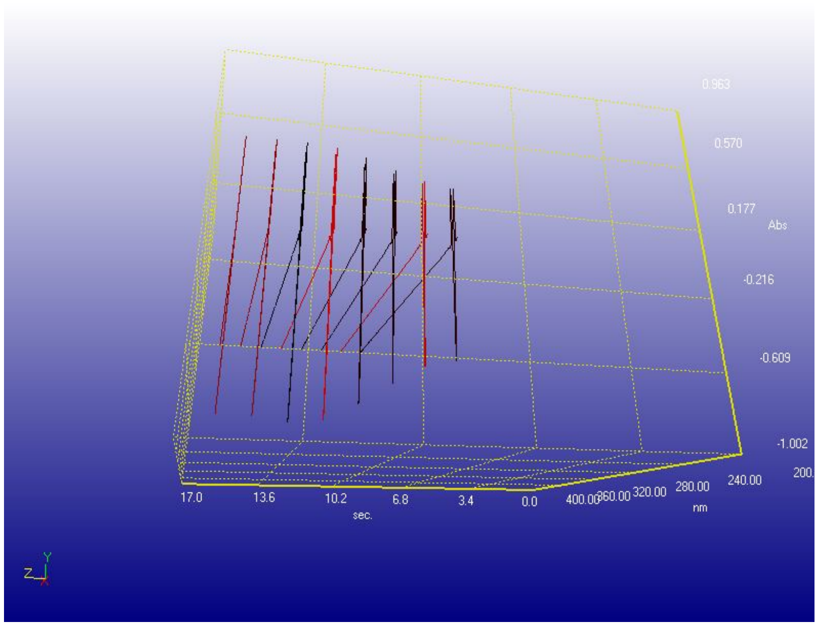

Fig 7: Second derivative spectrum

CONCLUSION

The second derivative spectroscopic method of analysis though expensive, can also be used in the routine analysis of losartan potassium in formulations, because multiple samples can be analysed simultaneously. The results obtained by these methods including recovery studies were comparable which proves the repeatability and suitability of the method

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