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EVALUATION OF VALSARTAN TABLETS ON LIQUID CHROMATOGRAPHY – UV SPECTROSCOPY AND ITS DISSOLUTION & DISINTEGRATION STUDIES

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ABSTRACT

The Liquid Chromatography determination of Valsartan Tablets was performed by using water, acetonitrile and 1% glacial acetic acid solvent system as mobile phase / isocratic elution technique. The dissolution and disintegration studies were evaluated by using potassium buffer pH 6.8. The UV-Spectroscopic determination performed by using potassium buffer pH 6.8 as solvent absorbance maximum detection at 273 nm. The Valzaar- 40 mg Tablets and standard Valsartan pure drug assay was evaluated and compared by UV-Spectroscopy & isocratic elution technique, high performance liquid Chromatography methods. The content and percentage purity results were comparable for both UV-Spectroscopy and Liquid Chromatography (HPLC) methods are showed appreciable accuracy & precision values.

Keywords: Valsartan Tablets, Buffer, Dissolution, Disintegration, UV Spectroscopy, isocratic elution, LC, HPLC.

INTRODUCTION

Valsartan is an orally active non peptide triazole -derived antagonist of angiotensin II with antihypertensive properties. Valsartan selectively and competitively blocks the binding of angiotensin II to the AT1 subtype receptor in vascular smooth muscle and the adrenal gland, preventing ATII - mediated vasoconstriction, aldosterone synthesis and secretion, and renal reabsorption of sodium, and resulting in vasodilation, increased excretion of sodium and water, a reduction in plasma volume, and a reduction in blood pressure.[1]

Valsartan is a medication used to treat high blood pressure, heart failure, and diabetic kidney disease it is a reasonable initial treatment for high blood pressure. Valsartan is an angiotensin II receptor blocker used alone or in combination with other agents to treat hypertension and reduce cardiovascular mortality after myocardial infarction. Valsartan is associated with a low rate of transient serum aminotransferase elevations and has been linked to rare instances of acute liver injury. It is taken by mouth. Versions are available as the combination valsartan/hydrochlorothiazide, valsartan/ amlodipine, valsartan/ amlodipine/hydrochlorothiazide.

Valsartan is indicated for the treatment of hypertension to reduce the risk of fatal and nonfatal cardiovascular events, primarily strokes and myocardial infarctions. It is also indicated for the treatment of heart failure and for left ventricular dysfunction or failure after myocardial infarction when the use of an angiotensin-converting enzyme inhibitor (ACEI) is not appropriate.

Valsartan is chemically named as N-Pentanonyl-N-(1H-tetrazol-5-yl) biphenyl-4-Valine. The soluble in chloroform, and ethanol, methonal phosphate buffer pH4, 0.1N Sodium hydroxide, and insoluble in 0.1N Hydrochloric acid. Dosage forms:only oral dosage form is available. Dosage: Adult initially, 80 mg once daily, increased to 160 mg. Max: 320mg. Elderly:> 75 yr: Initially, 40 mg once daily.

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The review of literature survey reveals that following analytical techniques, UV-Spectrophotometry [2-8], simultaneous spectrometric method [9-13],Second derivative spectrophotometric method [14], HPLC [15-17] , RP-HPLC [18-22], LC/MS and HPTLC [23-25] have been reported for valsartan individually and in combination with other drugs but there is no evidence for the study of valsartan by UV Spectroscopy using Potassium buffer pH 6.8 and isocratic liquid chromatography method. Thus the main objective of the work is to develop a simple, easy to perform cost effective, accurate, precise method for validated UV Spectroscopy and Liquid chromatography methods for the evaluation of Valsartan in bulk and tablet dosage forms. We developed a UV Spectroscopy method with potassium buffer pH 6.8. at 273 nm and liquid chromatography / isocratic elution technique method with solvent system - water, acetonitrile and 1% glacial acetic acid as mobile phase.

EXPERIMENTAL

Dissolution test:

Medium: 900ml of phosphate buffer ph6.8, Speed and time: 50 rpm and 45 minutes, a suitable volume of the medium and filter. Measure the absorbance of filtered solution. Suitably diluted with medium if necessary, at the maximum at about 256nm. Calculated the amount of $C_{14}H_{10}N_4O_2$ in the medium of from the absorbance obtained from a solution of known as concentration of valsartan RS prepared by dissolving in minimum amount of methanol and diluted with the dissolution medium.

Assay:

Determined by liquid chromatography

Test solution:

Weigh and powder 20 tablets. Disperse a quantity of powder containing 50mg of valsartan in 25 ml of the mobile phase and dilute to 100 ml with the mobile phase and filter. Dilute 5 ml of this solution to 50 ml with the mobile phase

Reference solution:

A 0.005 percent w/v solution of valsartan RS in the mobile phase.

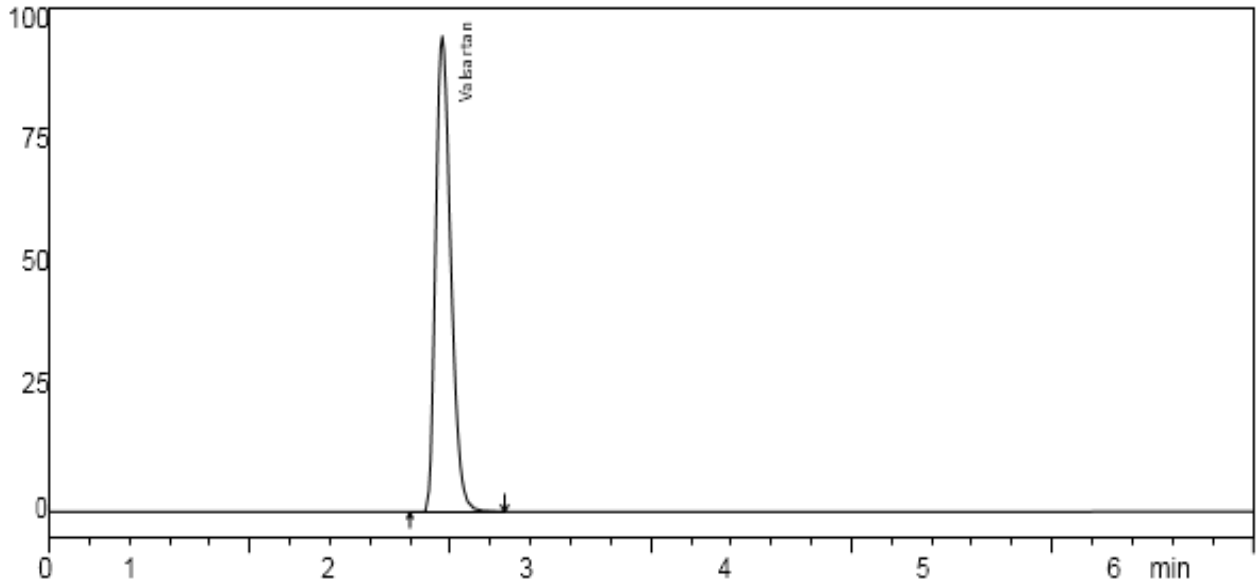
Chromatographic system

The Stainless Steel column 25 cm x 4.6 mm, packed with octadecylsilane bonded to porous silica , - Mobile phase: a mixture of 50 volumes of water, 50 volume of acetonitrile and 0.1 volume of glacial acetic acid,- Flow rate: 1 ml per minute,- Spectrophotometer set at 273 nm- Injection volume: 10 µl.

Inject the reference solution. The test is not valid unless the tailing factor is not more than 2.0 and the relative standard deviation for replicate injection is not more than 2.0 per cent. Inject the reference solution and the test solution. Calculate the content of $C_{14}H_{10}N_4O_2$ in the tablets.

LIQUID CHROMATOGRAPHY SOLUTION ANALYSIS REPORT

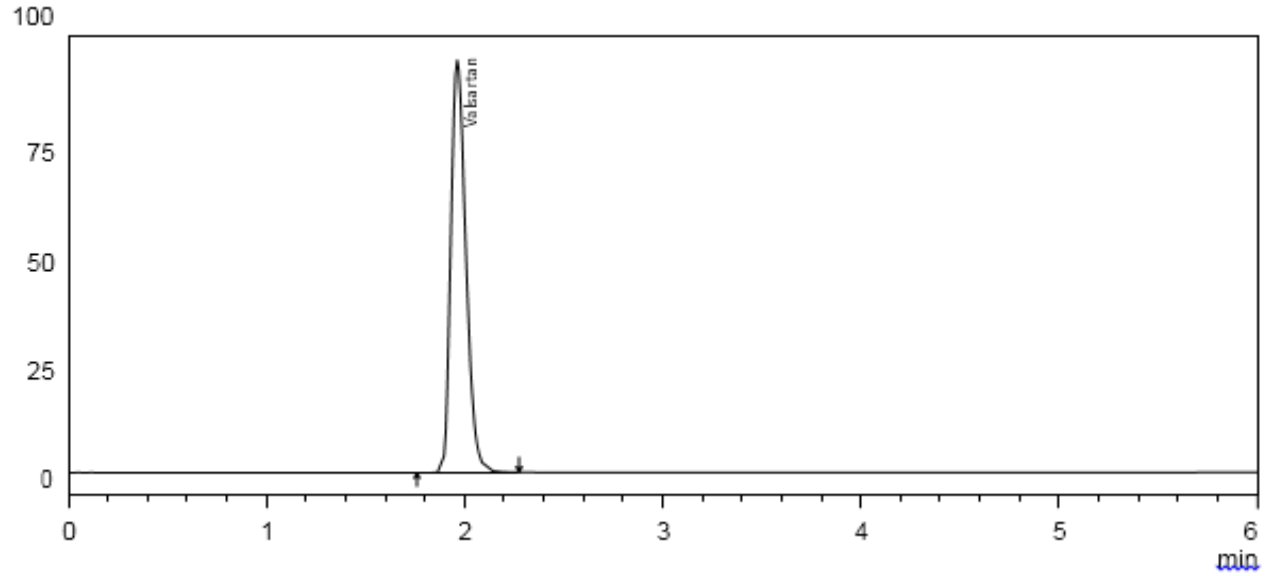
Graph–1, Standard Valsartan – Chromatogram mV



Peak Table -1: Detector – 273 nm

Name	Ret.Time	Area	Area%	Theoretical Plate	Tailing Factor
Valsartan	1.95	506493	100.00	2666	1.41
		506493	100.00		

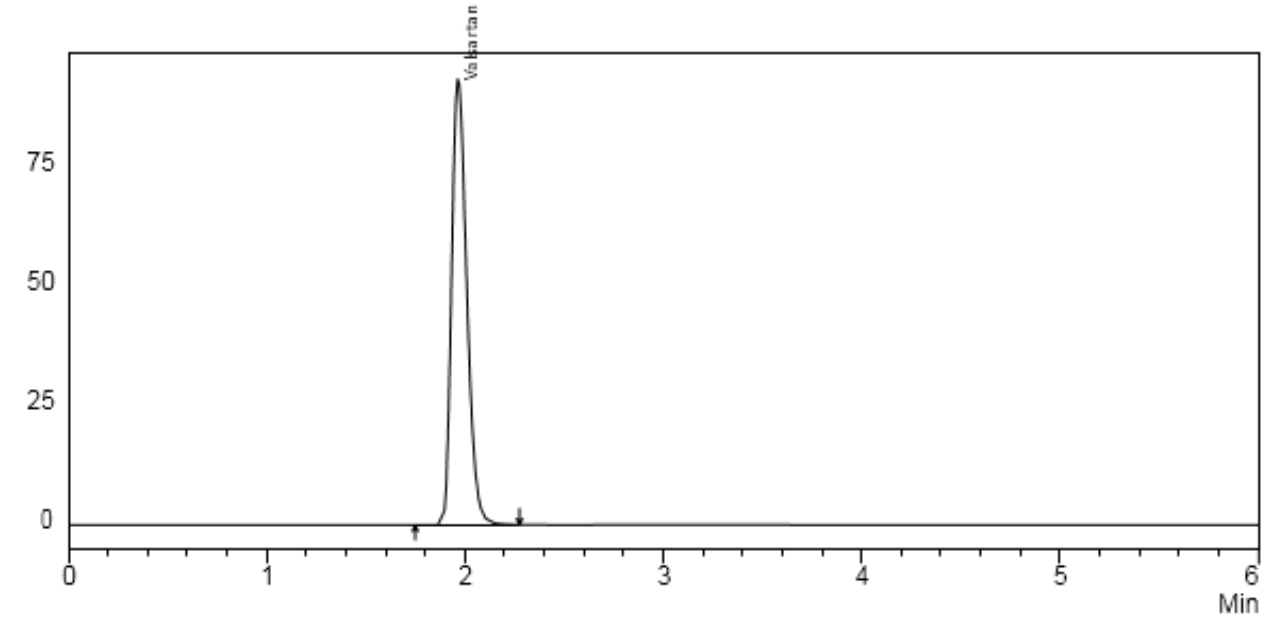
Graph–2, Valzaar Test-1 : (Valzaar- 40) – Chromatogram mV



Peak Table -2 : Detector – 273 nm

Name	Ret.Time	Area	Area%	Theoretical Plate	Tailing Factor
Valsartan	1.95	499963	100.00	2649	1.40
		499963	100.00		

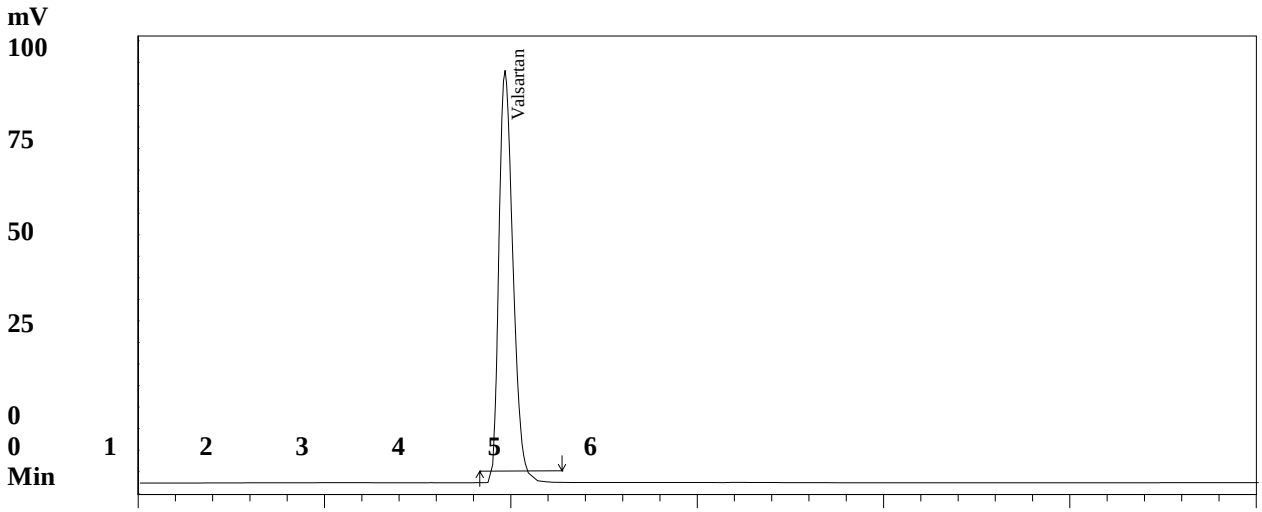
Graph–3, Valzaar Test-2 : (Valzaar - 40) – Chromatogram mV



Peak Table – 3: Detector-273nm

Name	Ret.Time	Area	Area%	Theoretical Plate	Tailing Factor
Valsartan	1.96	498091	100.00	2573	1.40
		498091	100.00		

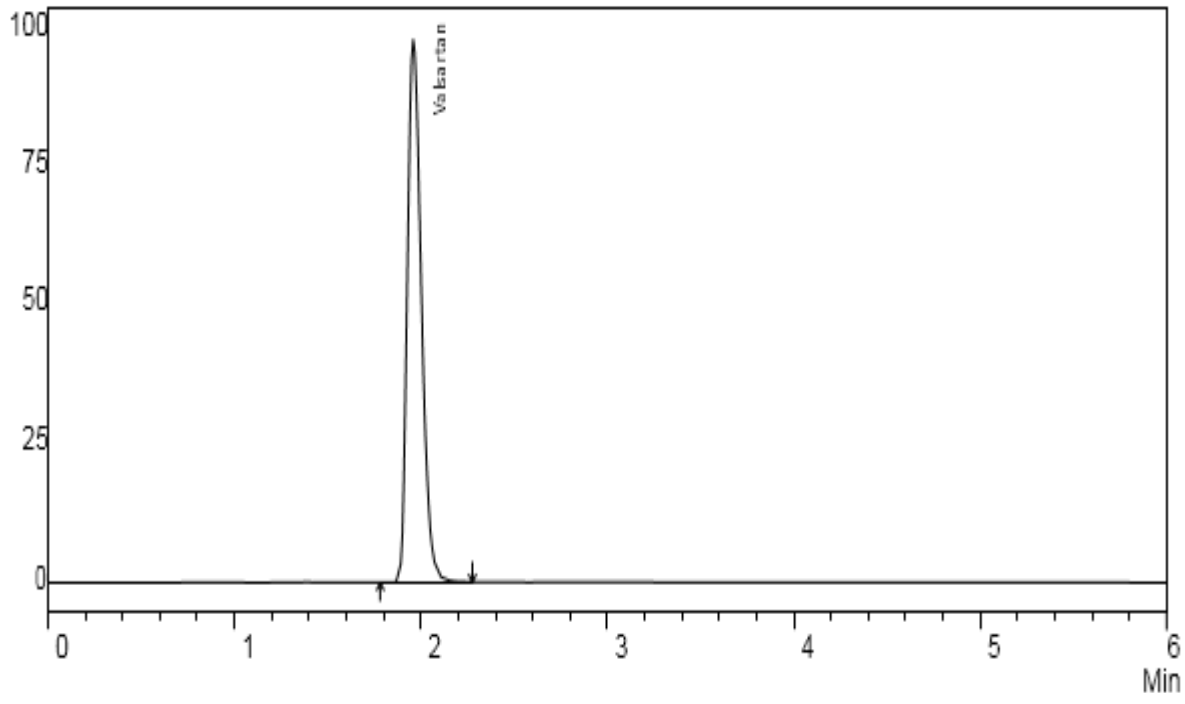
Graph–4, Valzaar Test-3 : (Valzaar - 40) – Chromatogram



Peak Table-4: Detector – 273 nm

Name	Ret.Time	Area	Area%	Theoretical Plate	Tailing Factor
Valsartan	1.95	500324	100.00	2675	1.41
		500324	100.00		

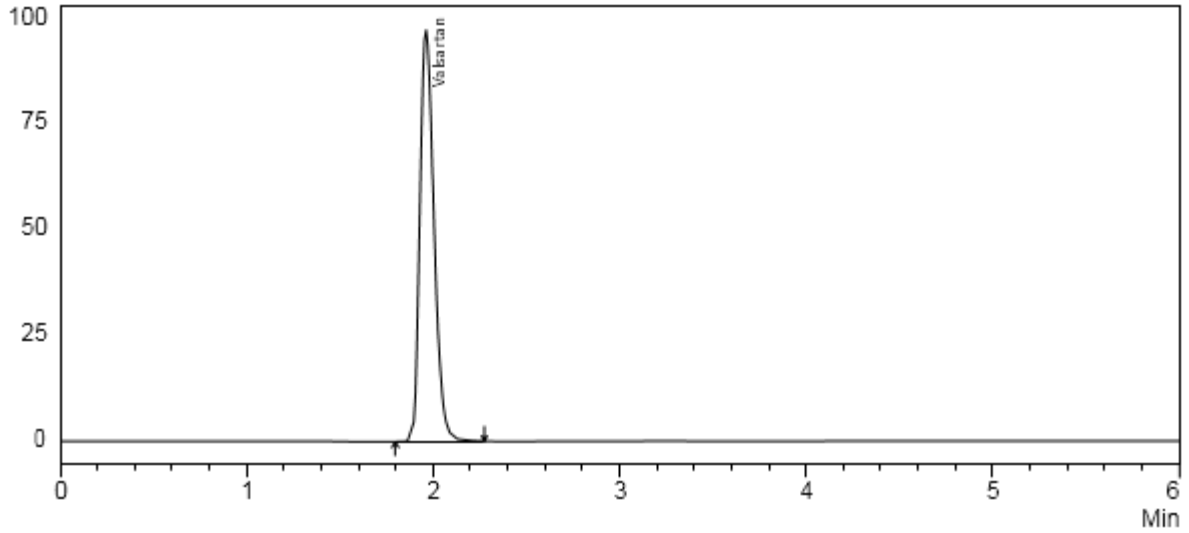
Graph–5, Valzaar Test-4 : (Valzaar - 40) – Chromatogrm mV



Peak Table – 5: Detector – 273 nm

Name	Ret.Time	Area	Area %	Theoretical Plate	Tailing Factor
Valsartan	1.96	508360	100.00	2705	1.40
		508360	100.00		

Graph–6, Valzaar Test-5: (Valzaar - 40) – Chromatogrm mV



Peak Table - 6 Detector -273 nm

Name	Ret.Time	Area	Area %	Theoretical Plate	Tailing Factor
Valsartan	1.95	506250	100.00	2683	1.41
		506250	100.00		

Table -7. The accuracy is tabled below

Valsartan content by UV-spectroscopy	Valsartan % Purity by UV-spectroscopy	Valsartan content by HPLC	Valsartan % Purity by HPLC
40.66	101.65%	39.76	99.41%

CALCULATION SHEET FOR DISSOLUTION

Name of the product : VALSARTAN — Dt.of analysis : 16.10.2021
Batch Number : 2HK4H002
Mfg.Date : Jan-21
Exp.Date : Dec-22

Label Claim
Each filmcoated tablet Contains
VALSARTAN 40 mg — Potency 99 % — Factor 1

Dissolution Conditions :
Medium : phospate buffer6.8PH
Volume : 900ml
Type : Paddle
RPM : 50
Time : 45 MINS

DILUTIONS

Std.Dilution
25.05 mg-----> 50 mL----> 2 mL----> 100 mL----> 1 mL----> 1 mL

Spl.Dilution
1 Tablet 900 mL----> 5 mL----> 20 mL

Std.Area : 0.302

RESULTS — **LIMIT** **NLT 70% D**

Vessel No.	Spl. Area	Amount Dissolved	%
1	0.346	40.91	102.29
2	0.349	41.27	103.17
3	0.344	40.68	101.69
4	0.350	41.39	103.47
5	0.332	39.26	98.15
6	0.342	40.44	101.10
	MINIMUM :	39.26	98.15
	MAXIMUM :	41.39	103.47
	AVERAGE :	40.66	**101.65**
	S.D. :	0.8	1.9
	% R.S.D. :	1.9	1.9

Analysed by: — Checked by:

Dissolution test procedure:

Place the stated volume of the dissolution medium in each vessel. Equilibrate the dissolution medium to 37°± 0.5.Place one dosage - form unit in each of the six reciprocating cylinders. Operate the apparatus. During the upward and downward stroke, the reciprocating cylinder moves through a total distance of 9.9 to 10.1cm. Within the time interval specified withdraw a portion of the dissolution under test from a zone midway between the surface of the dissolution medium and the bottom of each vessel. Perform the analysis as directed in the individual monograph.

Disintegration test procedure:

Place one dosage unit in each of the six tubes of the basket, and if specified add a disc. Operate apparatus

using water as the immersion fluid unless another liquid is specified and maintain its temperature at 35 C to 39 C. At the end of the specified time, lift the basket from the fluid and observe the dosage units: All of the dosage units have disintegrated completely. If one or two dosage units fail to disintegrate, repeat the test on 12 additional dosage units. The requirements of the test are met if not less than 16 of the 18 dosage units tested are disintegrated.

RESULT AND DISCUSSION

We analyses the valsartan tablet in bulk dosage form (raw material) and marketed tablet dosage form (valzarr-40mg) by two analytical methods as follows, chromatography & Spectroscopy. Then we conclude the result of the test values are check by standard values to determine the level of valsartan tablet dosage form and bulk dosage form.

The evaluation identification test, uniform weight test, hardness, disintegration, dissolution, friability, thickness and dissolution test were performed successfully for valsartan tablets by routine pharmaceutical analysis methods. Here, we used the HPLC and UV-spectroscopy for estimation of valsartan dosage form. The chromatographic method is developed for the determination of test procedures of assay for valsartan in bulk drug and tablet dosage form were simple, reliable, sensitive, and less time consuming.

The test and standard dilution were made by use using phosphate buffer at pH 6.8 and complies with the dissolution test by estimating the UV spectroscopy detected at 273 nm. Assay content values are found to be minimum - 38.26, maximum - 41.39, average - 40.66 and it gives SD - 0.8, RSD - 1.9 and percentage purity - 101.65%.

The HPLC method was performed by the brand name valzarr 40mg tablets. By using water, acetonitrile and 1% glacial acetic acid (50:50) as mobile phase. According to result, assay content -39.763 and percentage purity - 99.41%.

The advantage of present test procedure was does not require complicated mobile phase and it is simple isocratic method. This method can be confidently be used for rapid and precise quantitation of valsartan, procedure can be a major interest in analytical chemistry. The present work shows a validated, highly sensitive method for determination of valsartan tablets. Hence, proposed HPLC and UV spectroscopy methods are found to be satisfactory and could be used for routine analysis for valsartan in the tablet dosage form.

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