Research Article

Quantification and Method Validation for Valacyclovir Hydrochloride in Pharmaceutical Dosage Forms by Absorption Spectroscopy

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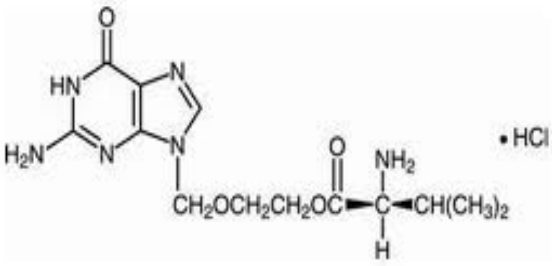
ABSTRACT

Simple and precise standard absorbance methods (UV Spectrophotometry) were developed for the estimation of Valacyclovir Hydrochloride in pharmaceutical dosage form. The λmax of Valacyclovir Hydrochloride was found to be 252nm. Linearity of proposed method lies in the concentration of range of 4-24 µg/ml. The proposed methods are sensitive, accurate, reproducible and useful for routine determination of Valacyclovir Hydrochloride in Pharmaceutical dosage forms.

Keywords: Valacyclovir Hydrochloride, Distilled water.

INTRODUCTION

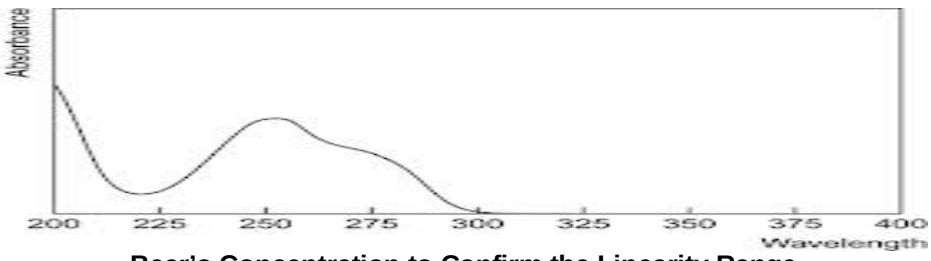
Valacyclovir is a prodrug, an esterified version of acyclovir that has greater oral bioavailability (about 55%) than acyclovir (10-20%). It is converted by esterases to the active drug acyclovir via hepatic first-pass metabolism. Acyclovir is selectively converted into a monophosphate form by viral thymidinekinase, which is far more effective (3000 times) in phosphorylation than cellular thymidinekinase. Subsequently, the monophosphate form is further phosphorylated into the active triphosphate form, aciclo-GTP, by cellular kinases. Acyclo-GTP is a very potent inhibitor of viral DNA polymerase; it has approximately 100 times higher affinity to viral than cellular polymerase. Chemically it is2-[(2-amino-6-oxo-6, 9-dihydro-3-purin-9-yl) methoxy] ethyl (2)-2-amino-3-methylbutanoate. Literature review revealed different analytical methods such as LC_MS/MS for the quantitative determination of Valacyclovir Hydrochloride and its metabolites in human plasma. The present work deals with estimation of Valacyclovir Hydrochloride in Pharmaceutical dosage forms by Standard absorbance method. The Structure of Valacyclovir Hydrochloride is



MATERIALS AND METHODS

Standard absorbance method

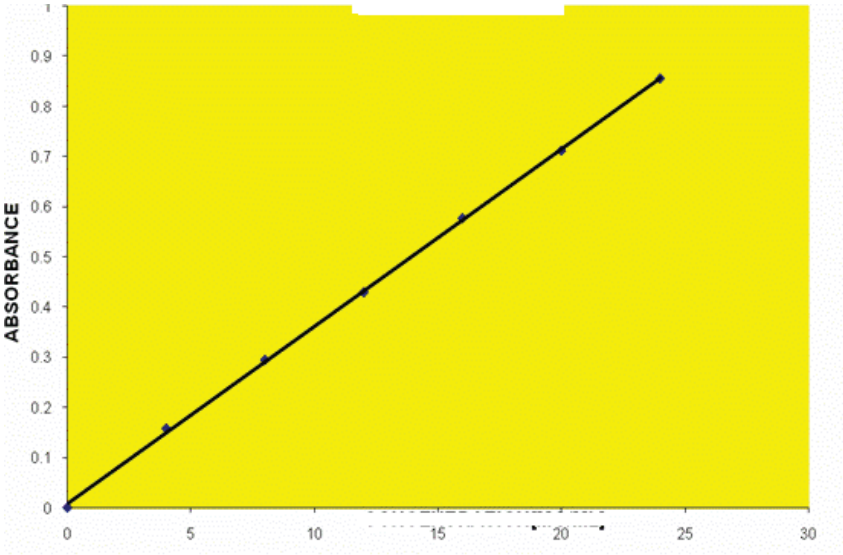
Standard stock solution of analyte was suitably diluted to yield varying concentration of 4-24 µg/ml. The absorbance was measured at about 252nm, and was plotted against concentration. The analytical curve was constructed by plotting concentration versus absorbance. (Table1)



Beer's Concentration to Confirm the Linearity Range

Table 1: Absorbance at 252nm

S.No.	Concentration (in µg/mL)	Absorbance
1	4	0.118
2	8	0.228
3	12	0.412
4	16	0.600
5	20	0.700
6	24	0.850



UV calibration curve of Valacyclovir in distilled water

The beer's concentration range was found to be 4-24 µg/ml. twenty tablets of formulation (Valacyclovir) containing 500 mg of Valacyclovir was accurately weighed to find out the average weight and powdered. Powdered tablet equivalent to 250 mg of Valacyclovir was transferred into a 250 ml volumetric flask, added distilled water to dissolve and made up to the volume. Then the solution was sonicated for 10 minutes. After sonication, the solution was filtered through what man filter paper No.41. From the clear solution, 1.2ml of the solution was transferred into a 100 ml standard flask and made up to the mark with distilled water to produce 12 µg/ml concentration. The absorbance measurements were made six times for the formulation at 252 nm. The amount of Valacyclovir present in formulation was determined by using slope and intercept values from calibration graph.

Recovery studies

To study the accuracy, precision and reproducibility of the proposed method, recovery study was carried out by adding a known quantity of drug to pre- analyzed sample and the percentage recovery was calculated and the results obtained are presented.

RESULTS AND DISSCUSION

OPTICAL PARAMETERS (SIMPLE UV SPECTROSCOPY)

The optical parameters that have been determined for the estimation of Valacyclovir in solid dosage form are given in the**.**

Optical characteristics of valacyclovir by UV method

Parameters	Values
λmax (nm)	254
Beer's law limit (µg/ml)	4-24
Sandell's sensitivity (µg/cm^2/0.001 A.U)	0.0282542
Correlation Coefficient (r)	0.99984

Regression equation (y=mx+c)	Y=0.035392X+0.0082857
Slope(m)	0.035392
Intercept(c)	0.0082857
LOD (µg/ml)	0.315585574
LOQ (µg/ml)	0.956319921
Standard error of mean of Regression line	0.005980922

Quantification of formulation-valacyclovir by UV method

S.No	Label claim (mg/tab)	Amount found (mg/tab)	Percentage purity	%Average	S.D	% RSD	S.E
1	500	502.33	100.46				
2	500	495.24	99.04				
3	500	497.62	99.52	99.92	0.6275	0.628	0.2561
4	500	502.33	100.46				
5	500	497.01	99.52				
6	500	502.33	100.52				

Recovery studies for formulation-valcivir

S.No	Percentage	Amount Present (µg/ml)	Amount Added (µg/ml)	Amount Estimated (µg/ml)	Amount Recovered (µg/ml)	% Recovery	S.D.	% RSD	S.E
1	100%	12.056	12	24.01	11.954	99.61			
2	75%	11.886	9	20.98	9.094	101.04	0.9027	0.8969	0.520
3	50%	11.942	6	18.02	6.077	101.28			

CONCLUSION

The proposed methods were found to be simple, rapid and economical for routine quantitative determination. The amount of drug recovered by the above methods was in good agreement with the label claim and the percentage recovery 99.61 to 101.28 in Spectrophotometry indicates the reproducibility of the proposed method. The proposed methods are sensitive, accurate, reproducible and useful for routine determination.

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