Research Article

NEW SIMPLE UV SPECTROPHOTOMETRIC METHOD FOR THE ESTIMATION OF VALGANCICLOVIR IN BULK AND ITS FORMULATION

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ABSTRACT:

A simple, sensitive and economical UV spectrophotometric method has been developed for the determination of Valganciclovir in bulk and tablet dosage form. Valganciclovir is a prodrug of ganciclovir that is used for the treatment of cytomegalovirus retinitis in patients with AIDS. Valganciclovir shows maximum absorbance at 254 nm in methanol. Beer's law was obeyed within the concentration range of 5-30 mcg/ml with the correlation coefficient of 0.9999. The standard plot was clearly showed a straight line passing through the origin. The results of analysis were validated statistically and by recovery studies and found to be satisfactory. The proposed method was extended to pharmaceutical formulations and there was no interference of additives and excipients.

KEY WORDS: Valganciclovir, UV spectrophotometry, Tablet dosage form.

INTRODUCTION:

Valganciclovir (Fig. 1) is a prodrug of ganciclovir that is used for the treatment of cytomegalovirus retinitis in patients with AIDS. It is chemically known as 2-[(2-amino-6-oxo-6, 9-dihydro- 3*H*-purin-9-yl) methoxy]-3-hydroxypropyl (2*S*)-2-amino-3-methylbutanoate [1].

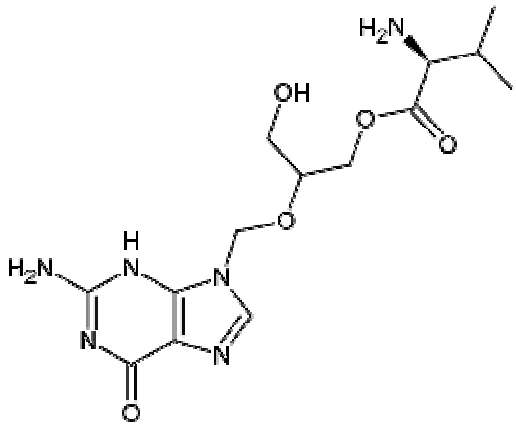

Fig.1: Molecular structure of Valganciclovir

Literature survey reveals that various methods have been reported for the estimation of Valganciclovir In biological matrices such as plasma with the help of liquid chromatography [2- 14]. To the best of knowledge, no spectroscopic method has been developed for the determination of Valganciclovir in bulk and tablet dosage forms. Present study involved development of a simple UV spectrophotometric method for the estimation of Valganciclovir in bulk and tablet dosage forms. An absorbance maximum was found to be 254 nm and the spectrum was scanned for the drug dissolved in methanol.

MATERIALS AND METHODS

CHEMICALS AND REAGENTS:

Valganciclovir was obtained as a gift sample from Orchid pharmaceuticals Ltd., Chennai. All the chemicals used were of analytical grade. The tablet formulations of three bands were procured from local pharmacy.

INSTRUMENTATION:

Spectroscopic analysis was carried out on Systronics UV- Visible spectrophotometer-117 with one cm matched quartz cells.

PROCEDURE:

Standard stock solution of concentration 100mcg/ml was prepared by dissolving accurately weighed 10 mg of Valganciclovir in 100ml volumetric flask and the volume was made upto 100ml with methanol. Working standard solution as prepared above was scanned in the range of 200-400 nm against methanol as blank to determine the wavelength of maximum absorption. The plot revealed maximum at 254 nm.

PREPARATION OF CALIBRATION CURVE:

Aliquots of solution 0.5-3 ml (100mcg/ml) were transferred into a series of 10 ml volumetric flask and the volume was made up to 10 ml with methanol. The absorbance was measured at 254 nm against a reagent blank. Calibration curve was plotted between concentration of Valganciclovir and measured absorbance. The data was processed statistically to calculate parameters like coefficient of correlation, linearity, range, slope, intercept, etc. The slope was found to be 0.031 and -0.0066 was the intercept value obtained from the corresponding graph. The optical characteristics such as absorption maxima, Beer's law limits, correlation coefficient, slope, intercept, molar absorptivity and Sandell's sensitivity as presented in Table 1.

Table 1: Parameters

PARAMETERS	VALUES
Absorbance maximum (nm)	254
Beer's law limit (µg/ml)	5-30
Regression equation*(Y)	0.9999
Slope (m)	0.031
Intercept (c)	-0.0066
Molar absorptivity (l/mol.cm)	0.1469×10^5
Sandell's sensitivity	0.0280
Relative standard deviation (%)**	0.7550
Limit of Detection (µg/ml)	0.30
Limit of Quantification (µg/ml)	0.93

*Y=mX+c, where X = Concentration in (µg/ml) and Y = Absorbance at respective λ_{max}

** Average of six determinations

PREPARATION OF SAMPLE SOLUTION:

The marketed tablet formulations of three brands were analyzed by the proposed method. Twenty tablets of Valganciclovir were accurately weighed and ground to fine powder equivalent to 10 mg of Valganciclovir was transferred into a 100ml volumetric flask. Weighed powder was dissolved in 50 ml of methanol and shaken for 15 minutes. The solution was filtered through whatmann filter paper no 40 into 100ml volumetric flask and diluted with the same solvent to get the concentration within the linearity. The absorbance was measured at 254 nm and concentration was determined from regression equation of calibration curve.

METHOD VALIDATION:

All the tablet formulations contained excipients and binders, which were added along with the active drug constituents. These substances cause some interference during estimation of the active drug constituents. Interference from the excipients was confirmed by performing the recovery experiments for which standard addition method was employed. So in order to ensure the accuracy and reproducibility of the results obtained, recovery studies were carried out by the addition of known amount of standard drug solution of Valganciclovir to preanalysed tablet sample solution at three different concentration levels within the range of linearity. The resulting mixtures were analysed by the proposed method. The statistical data obtained for the determination of Valganciclovir in tablet formulation by the proposed method is shown in Table 2. Also the experiment was repeated 3 times in a day to determine intraday precision and on the 3 different days to determine interday precision. The percent coefficient of variance (%CV) was calculated at each concentration level.

RESULTS AND DISCUSSION

The development of new dosage form involves a number of stages and the analytical methods that are specific, accurate and precise plays a vital role in many of the essential features required for an identical analytical system. Taking into account the above, an accurate, economical and rapid spectrophotometric method was developed for the quantitative estimation of Valganciclovir in bulk and tablet dosage forms. The linearity range of Valganciclovir was determined in methanol and found to be 5-30 mcg/ml.

Table 2: Analysis of Valganciclovir in Tablet Formulation

S. NO.	PHARMACEUTICAL DOSAGE FORM (TABLETS)[A]	LABELED AMOUNT (MG/TABLET)	% LABEL CLAIM ESTIMATED[B]	PERCENT RECOVERY[C]
1	T1	3	99.26 ± 0.76	99.66 ± 0.53
2	T2	4	99.32 ± 0.33	100.1 ± 0.77
3	T3	4	99.04 ± 0.51	99.89 ± 0.46

[a]T1, T2, T3 are tablets from different manufacturers. [b]Average of five determinations. [c]Average of recovery studies at three different concentration levels.

Commercial formulations (tablet) containing Valganciclovir was successfully analysed by the proposed method. S.D. values were low that indicated reproducibility of the proposed method. As an additional demonstration of accuracy, recovery experiments were also performed by adding known amount of free drug to previous analyzed by the proposed method. The results are summarized in Table 2. The percentage of drug recovered (99.6 - 100.1%) was in good agreement with the added amount and labeled claim indicating reproducibility of the methods. Other pharmaceutical additives and excepients usually present in the pharmaceutical dosage form did not interfere with the proposed analytical method. The intraday and interday precision studies showed the %RSD as 0.477 and 0.523 respectively.

CONCLUSION

The applicability of the proposed method for the assay of pharmaceutical preparation was examined. The results of recovery studies were performed at three different levels showed high degree of reproducibility and precision of the methods. Also S.D. calculated was low indicating the suitability of the proposed method for the routine examination of tablet dosage forms with good precision, sensitivity and accuracy. Hence the developed method can be used for the routine quality control analysis of Valganciclovir in bulk drug and formulations.

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