# SPECTROPHOTOMETRIC ASSAY OF VALACYCLOVIR IN PHARMACEUTICAL DOSAGE FORMS

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**ABSTRACT**

A simple and reproducible spectrophotometric method has been developed for the determination of valacyclovir in bulk and pharmaceutical dosage forms. The proposed method was based on the formation of chloroform extractable complex of valacyclovir with wool fast blue. The absorbance of the extractable ion pair complex is measured at the wavelength of maximum absorbance 585 nm against the reagent blank prepared under identical conditions. The proposed method was validated for its selectivity, linearity, accuracy, and precision. The method was found to be suitable for the quality control of valacyclovir in bulk drug as well as in formulation.

**Keywords**: valacyclovir, Spectrophotometry, wool fast blue, formulations.

## 1. INTRODUCTION

Valacyclovir Chemically, *L*-valine-2-[(2-amino-1, 6-dihydro-6-oxo-9-hipurin-9-yl) methoxy]ethyl ester is the *L*-valyl ester prodrug of the antiviral drug acyclovir that exhibits activity against herpes simplex virus types, 1 (HSV-1) and 2 (HSV-2) and vericellazoster virus [1]. The mechanism of action of acyclovir involves the highly selective inhibition of herpes virus DN Areplication, via enhanced uptake in herpes virus-infected cells and phosphorylation by viral thymidine kinase. The substrate specificity of acyclovir triphosphate for viral, rather than cellular, DNA polymerase contributes to the specificity of the drug. Valacyclovir is available as tablet dosage form in the market. Literature survey revealed the dissolution studies[1-2], pharmacological data [3-4], spectrophotometric method[5-7], RP-HPLC Method[8], HPLC method[9]

UV-Visible spectrophotometry is the technique of choice in research laboratories, hospitals and pharmaceutical industries due to its low cost and inherent simplicity. Hence the present work deals with the spectrophotometric estimation of valacyclovir using wool fast blue dye.

## 2. MATERIAL AND METHODS

### Instrument & Chemicals

Spectral and absorbance measurements were made on a Spectronic 1001 plus Spectrophotometer with 10 mm-matched quartz cells. All the chemicals used were of AR grade. Solution of 0.2 % wool fast blue was prepared using distilled water. Buffer solutions of required pH were prepared by mixing appropriate volumes of glycine, sodium chloride and 0.1M Hydrochloric acid. AR grade chloroform was used.

### Preparation of Standard solution:

50 mg of Valacyclovir was accurately weighed and dissolved in 50 ml of methanol to get a concentration of 1 mg/ml. The stock solution was suitably diluted to get a concentration of 100 mg/ml.

### Assay procedure

Into a series of 125 ml separating funnels containing aliquots of standard drug solution (0.5-2.5 ml) and 1.0 ml of buffer solution and 1.0 ml of wool fast blue solution were added. The total volume of aqueous phase in each separating funnel was adjusted to 15 ml with distilled water and 5.0 ml of chloroform was added. The contents were shaken for 2 min. the two phases were allowed to separate and the absorbance of the separated organic layer were measured at 585 nm against a reagent blank prepared under identical conditions. The amount of valacyclovir present in the sample was computed from calibration curve and calibration graph was shown in fig 2. Beer's law is obeyed in the concentration of 50-250µg/ml of valacyclovir.

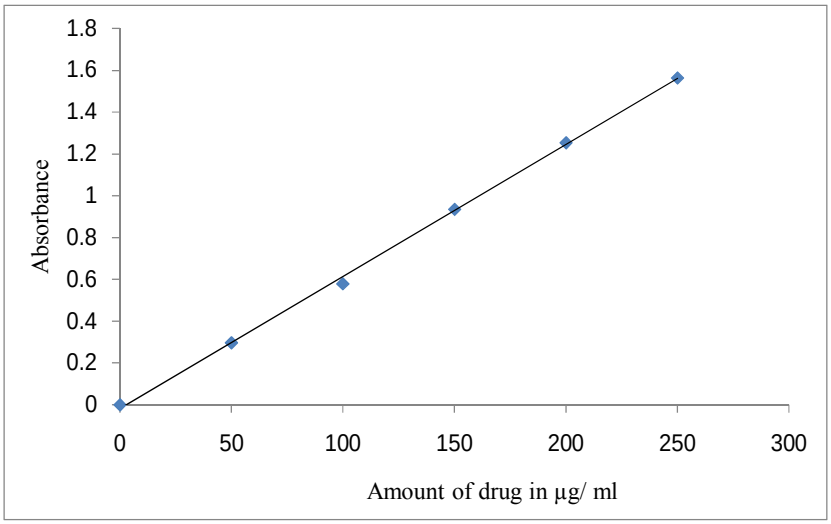


**Fig 2: calibration graph of Valacyclovir**

**Analysis of commercial pharmaceutical preparations**

Twenty tablets of valacyclovir was weighed accurately and ground into a fine powder. An amount of the powder equivalent to 50 mg of valacyclovir was weighed and transferred into 50 ml volumetric flasks, 25 ml of methanol added and shaken thoroughly for about 20 min. Then, the volume was made up to the mark with methanol, mixed well and filtered using a quantitative filter paper and analyzed as given under the assay procedures for bulk samples. The results are represented in Table 2.

**Table 2: Assay of valacyclovir in tablets**

| Formulations | Labeled Amount (mg/tab) | *Amount Found(mg±S.D) | %Recovery | %RSD* | *$t_{cal}$ |
|---|---|---|---|---|---|
| Tablet 1 | 500 | 500.24±0.66 | 100.44 | 0.1337 | 0.8018 |
| Tablet 2 | 500 | 500.12±0.39 | 100.28 | 0.0963 | 0.7251 |

*Average of five determination based on the label claim

## 3. RESULTS AND DISCUSSION

Valacyclovir forms ion-pair complexes with wool fast blue and the complex was quantitatively extracted into chloroform. The absorption spectra of the ion-pair complex extracted into chloroform are shown in Fig.1.

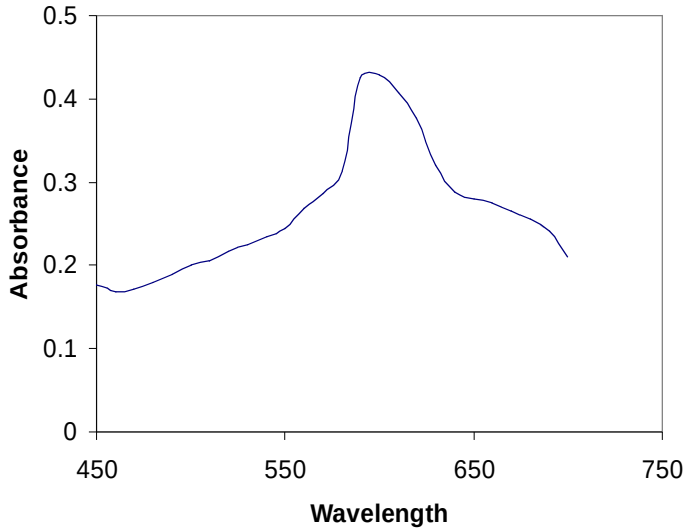


**Fig 1: Absorption spectrum of valacyclovir with wool fast blue at 585 nm**

The ion-pair complex with wool fast blue absorbed maximally at 585 nm. Beer's law obeyed in the concentration range of 50-250 µg/ml of valacyclovir. The optical characteristics such as absorption maxima, Beer´s law limits, molar absorptivity and Sandell´s sensitivity are presented in Table 1. The regression analysis using method of least squares was made for the slope (b), intercept (a) and correlation (r) obtained from different concentrations and results are summarized in Table 1. The high molar absorptivities of the resulting colored complexes indicate the high sensitivity of the methods. The percent relative standard deviation, standard deviation and student's 't' test values calculated from the five measurements of valacyclovir are presented in Table 2. Relative standard deviation values and standard deviation were low that indicates the reproducibility of the proposed methods. In the student's't' tests, no significant differences were found between the calculated and theoretical values of both the proposed methods at 95% confidence level. This indicated similar precision and accuracy in the analysis of valacyclovir in its tablets. The additives and excipients usually present in pharmaceutical preparations did not interfere.

**Table 1: Optical characteristics of proposed method**

| parameters | Proposed method |
|---|---|
| λmax (nm) | 590 |
| Beer's law limit (µg/ml) | 50-250 |
| Molar absorptivity (l mole-1 cm-1) | $5.4x10^3$ |
| Sandell's sensitivity (µg cm-2 / 0.001 absorbance unit) | 0.5395 |
| Regression equation (Y = a + bC) | Y=0.018x+0.046 |
| Slope (b) | 0.018 |
| Intercept (a) | 0.046 |
| Correlation coefficient (r) | 0.9994 |

## 4. CONCLUSION

The proposed visible spectrophotometic method was found to be simple, sensitive, accurate, precise and economical and can be used in the determination of valacyclovir in bulk and pharmaceutical dosage forms in a routine manner.

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