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Spectrophotometric Method for the Estimation of Abacavir Sulphate in Bulk and Pharmaceutical Dosage Forms in Different Solvents

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ABSTRACT

A simple and highly sensitive UV-Spectrophotometric method has been developed for the determination of Abacavir sulphate as an anti-retro viral drug in different solvents. The proposed method is based on the measurement of light absorption in UV-region in different solvents in their different absorption spectra. Beer's law in valid in the concentration range of 2-20 µg/ml. Abacavir sulphate exhibited maximum absorbance at pH 6.8 PBS, pH 1.2, and distilled water were 219.82 nm, 296.21 nm and 216.08 nm respectively with their molar absorptivity of 0.0091, 0.0056, 0.0095 lit/mol/cm. The proposed method can be successfully applied for the simultaneous determinations of Abacavir sulphate in commercial tablet preparation. The method was successfully applied to marketed formulation and % purity was found to be 99.86 %. The developed method was found to be accurate, precise, repeatable, and reproducible, could be used for the routine analysis of Abacavir sulphate in bulk drug and formulations.

Keywords: *Abacavir Sulphate, UV- Spectrophotometry, Absorbance, Molar Absorption co-efficient, Relative Standard Deviation.*

INTRODUCTION

Abacavir sulphate is a nucleoside reverse transcriptase enzyme inhibitor. It is administered alone or in combination therapy with other drugs for the treatment of AIDS. It is official in Martindale, Indian pharmacopeia [1, 2]. Survey of literature reveals that the drug was determined by using high performance liquid chromatography only, it is more economical. No spectroscopic methods are reported in different solvents of Abacavir sulphate in bulk and dosage form. Hence the objective of the present study was a simple, sensitive, accurate method for the estimation of Abacavir sulphate in different solvents like pH-6.8 phosphate buffer solutions, pH-1.2 (0.1 N HCl) and distilled water. Then compare the analytical parameters in each solvent system.

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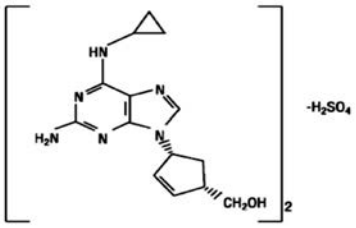
Structure of Abacavir Sulphate



Chemical Name of Abacavir Sulphate

(1S,4R)-4-[2-Amino-6-(cyclopropylamino)-9H-purin-9-yl]-2-cyclopentene-1- methanol} sulphate

Materials and Methods

Materials

Abacavir sulphate was a gift sample from matrix labs. Hyderabad, India: Other reagents such as distilled water, hydrochloric acid, and potassium dihydrogen ortho phosphate, sodium hydroxide were obtained from S.D fine Chemicals. All other reagents used were of analytical grade.

Instrumentation

Spectrophotometric measurements were made on Analytical technologies double beam UV-VISIBLE spectrophotometer was used with 1 cm matched quartz cells, coupled with computer, loaded with spectra treats 3.11.01Rel2 software.

Experimental Method

Preparation of Standard Solution:

The standard Abacavir sulphate (100 mg) was weighed accurately and transferred into volumetric flask (100 ml) in pH-6.8 phosphate buffer solution, pH-1.2 and distilled water separately to obtain the final concentration of 1mg/ml [3]. Then the resulting solution was use as working standard solution of 2-20 µg/ml in different solvents [4].

Calibration Curve:

Method: Absorption maximum method:

For the selection of analytical wavelength different concentrations of solution of Abacavir sulphate was prepared form the standard stock solution & scanned in the spectrum mode from 400 nm to 200 nm for different solvents like pH 6.8 phosphate buffer solution, pH 1.2 (0.1N HCl) and distilled water. From the spectra of drug in different solvents were shown in figures. Absorption Maximum of Abacavir sulphate was 219.82 nm in pH 6.8 PBS, 296.21 nm in pH 1.2 and 216.08 nm in distilled water [5]. The calibration curve was prepared in the concentration range 2-20 µg/ml. By using the calibration curve, the concentration of the sample solution can be measured in different solvents like pH 6.8, pH 1.2 and distilled water [6, 7].

The recovery studies of marketed tablet of Abacavir sulphate:

For the Preparation and Analysis of sample solution, each tablet containing 300 mg of ABR, 20 tablets were accurately weighed and average weight per tablet was determined [8]. The tablets were powdered and powders equivalent to 100 mg of drug was taken and treated in similar manner as that of standard [9].

Results and Discussions

The results show that the maximum wavelength of Abacavir sulphate in pH 1.2 as per beer's law due to its acidic nature, when compare with pH-6.8 phosphate buffer solution and distilled water. Different solvents like pH-6.8 phosphate buffer solution; pH 1.2 (0.1 N HCl) and water were shows absorption maximum at 219.82 nm, 296.21 nm & 216.08 nm respectively. It also has greater variation in absorbance at this particular λ_{max} at 20 µg/ml concentration for pH 6.8 PBS, pH 1.2 and distilled water 1.752, 1.158 & 1.903 respectively due to solvent effect. The optical characteristics such as beer's law limits, percent relative standard deviation, molar absorption co-efficient, regression value, intercept and slope. Linear regression of absorbance on concentration gave the equation Y= mx+c with a correlation co-efficient (r). The values of standard deviation were satisfactory and the recovery studies were close to 100 %. All of the analytical parameters for the proposed method were determined according to ICH guideline.

Table 1: Linearity of Absorbance of Abacavir Sulphate in Different Solvents

Concentration of abacavir sulphate (µg/ml)	Absorbance at 296.21 nm (0.1 N HCl)	Absorbance at 219.82 nm (pH 6.8 PBS)	Absorbance at 216.08 nm (Distilled water)
2	0.245	0.227	0.282
4	0.263	0.388	0.462
6	0.392	0.586	0.624
8	0.510	0.765	0.709
10	0.612	0.920	0.809
12	0.690	1.123	1.190
14	0.813	1.253	1.224
16	0.925	1.483	1.488
18	1.032	1.577	1.799
20	1.158	1.752	1.903

Conclusions

The proposed UV-Spectrophotometric methods are found to be simple, linear, more economic, accurate, and precise can be used in the determination of Abacavir sulphate in bulk drug and its pharmaceutical preparation in a routine work. Hence these methods are useful in the routine estimation of Abacavir sulphate in different solvent in bulk and dosage form.

Acknowledgement

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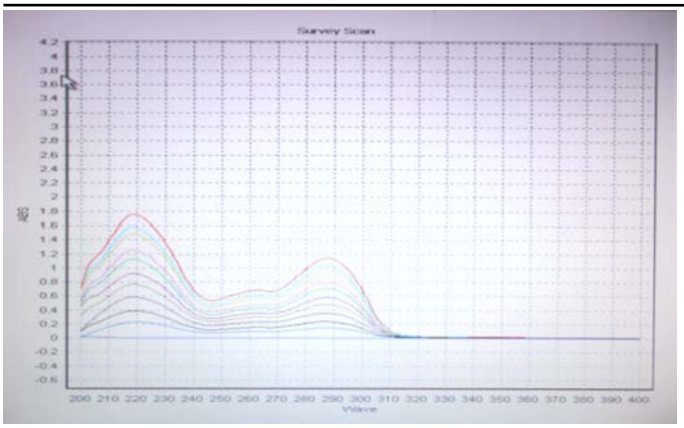

Figure 1: Absorption maximum (λ_{max} –219.82 nm) of abacavir sulphate in pH 6.8 phosphate buffer solution

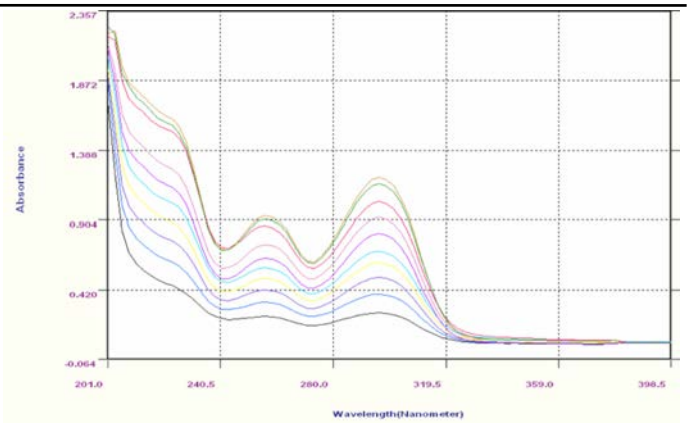

Figure 2: Absorption maximum (λ_{max}–296. 21 nm) of abacavir sulphate in pH 1.2 (0.1 N HCl) solution

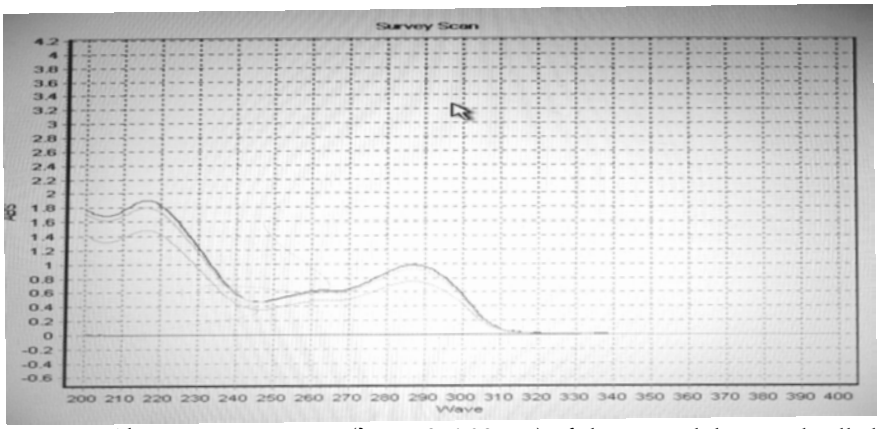

Figure 3: Absorption maximum (λ_{max} – 216.08 nm) of abacavir sulphate in distilled water

Table 2: Summary of analytical parameters of abacavir sulphate in different solvents

Parameters	pH 6.8 PBS	pH 1.2 (0.1N HCl)	Distilled water
λ_{max} (nm)	219.82	296.21	216.08
Beer's range (µg/ml)	2-20	2-20	2-20
Molar absorption co-efficient (L/mol/cm)	0.0091	0.0056	0.0095
Correlation co-efficient (r^2)	0.997	0.995	0.998
Regression	Y= 0.087x+0.046	Y= 0.054x+0.044	Y= 0.074x+0.048
Intercept	0.046	0.044	0.048
Slope	0.087	0.054	0.074
RSD (%)	0.5143	0.512	0.533

Y=mx+c, where x is the concentration in (µg/ml) and Y is absorbance unit (ΔA)
Where, PBS: Phosphate buffer solution, HCl: Hydrochloric acid, RSD: Relative standard deviation.

Table 3: Analysis of Marketed Formulation

Method	Label Claim mg	Amount Estimated	% RSD	S.D	% Recovered	Standard Error
Abamune	300	296.21	0.011	0.038	99.86	0.022

Where, RSD – Relative standard deviation, SD - Standard deviation, the values are the man of six readings at each level of recovery.

REFERENCES

1. http://www.who.int/.../QAS_144_Abacavir_monograph_23Aug-2005.
2. Zucman D, de Truchis P, Majerholc C, Stegman S, Caillat-Zucman S: **Prospective screening for human leukocyte antigen-B* 5701 avoids abacavir hypersensitivity reaction in the ethnically mixed French HIV population**. *JAIDS Journal of Acquired Immune Deficiency Syndromes* 2007, **45**:1-3.
3. Willard HH, Merritt Jr LL, Dean JA, Settle Jr FA: **Instrumental methods of analysis**. 1988.
4. Beckette AH, Stenlake JB: **Practical Pharmaceutical Chemistry, Part I**. Edited by: CBS Publishers and Distributors, New Delhi; 1997.
5. Ramana Murthy KV, Hiremath SN, Appala Raju S: **Spectrophotometric determination of abacavir sulphate**. *The Indian pharmacist* 2006, **5**:91-92.
6. Srihari G, Reddy NR, Chakravarthi IE: **Spectrophotometric Methods for the Determination of Abacavir Sulphate in Pharmaceutical Preparations**. *Global Journal of Pharmacology* 2011, **5**:172-175.
7. Raju NA, Rao JV, Prakash KV, Mukkanti K: **Spectrophotometric estimation of abacavir sulphate in pharmaceutical formulations**. *Journal of Chemistry* 2008, **5**:511-514.
8. Amudhavalli V, Lakshmi KS, Kalidindi DV, Surapaneni RS, Raju RSRK,

Pichikala VK: **Journal of Chemical and Pharmaceutical Research**. *J. Chem* 2010, **2**:502-505.
9. Sudha T, Ravikumar VR, Hemalatha PV: **RP-HPLC Method for the Simultaneous Estimation of Lamivudine and Abacavir Sulphate in Tablet Dosage Form**. *International J. of Pharmaceutical and Biomedical Research* 2010, **1**:108-113.

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