International Journal of Pharmaceutical Chemistry
ISSN: 2249-734X (Online)
Journal DOI: 10.7439/ijpc
CODEN: IJPCH3 (American Chemical Society)
Research Article

A Spectrophotometric Method for the Determination of Taxim-AZ and Vanadium (V)

B. Srinivasa Rao[1], T.R. Kishore[*2] and V. Suryanarayana Rao[3]

[1]*Department of Chemistry, S.S.B.N. Degree College, Anantapur, Andhra Pradesh, India.*
[2]*Faculty of Chemistry, Sri Chaitanya Jr. College, Anantapur, Andhra Pradesh, India.*
[3]*Department of Chemistry, Sri Krishnadevaraya University, Anantapur, Andhra Pradesh, India.*

Abstract

A new simple, accurate method has been developed for the analysis of Taxim-AZ and vanadium (V) in pharmaceutical dosage forms. It is possible to determine the V (V) and Taxim-AZ in the range of 0.636 to 4.45 µg/25ml and 0.1 to 0.6 mg/ml.

Keywords: Spectrophotometric method, Taxim-AZ and vanadium (V) system

1. Introduction

Vanadium is a silvery coloured metal with high melting point, vanadium has the highest melting point in the first row transition elements. This is associated with the maximum participation of d-electrons in metallic bonding. The pure metal vanadium is soft and ductile, but traces of impurities make it harder and brittle. It is extremely resistant to corrosion due to the formation of surface film of oxide. The chemistry of vanadium is complex as it forms variety of oxyacids in solutions. Hence determination of vanadium in microgram quantities is difficult. This method conveniently used for the determination of vanadium (V) based on its colour reaction with the drug.

Taxim-AZ is a combination of cefixime and azithromycin. Cefixime is a cephalosporin antibiotic and it is used to treat and cure bacterial infections. It is often used to treat sinusitis, tonsillitis, bronchitis, pneumonia, cystitis, kidney infection and gonorhoea. Azithromycin prevents bacteria from producing the proteins that are required to help them reproduce. It is a fast acting antibiotic which is used to treat a wide number of bacterial infections.

2. Material and Method

2.1 Reagents and equipment

Sodium meta vanadate, Taxim-AZ tablets, buffer solution, methanol, propanol, acetone, acetonitrile, sulphuric acid, distilled water, hydrochloric acid and all reagents.

Analytical balance, thermostated waterbath, digital pH meter, model CL21 of Elico company, Elico micro processor based double beam UV-VIS Spectrophotometer SL164.

2.2 Experimental Solution

One ml each of sodium meta vanadate ($1x10^{-4}$M) and 1 mg/ml Taxim-AZ are taken in a 10ml standard flask. The solution is made up to the mark with a buffer solution of required pH and shaken well for uniform concentration. Similarly a blank solution is prepared without the drug.

3. Results and discussion

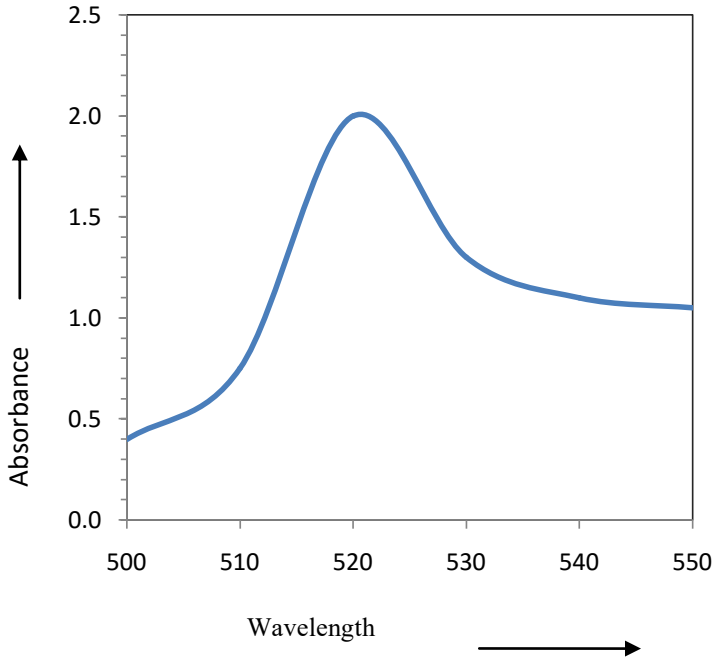
3.1 Effect of pH

Absorption spectral characteristics were studied in the pH range from 1 to 10. The colour and λ_{max} and observed that V(V) forms a yellow coloured complex in acid medium and it does not give colour in strong acid

* Correspondence Info
T.R. Kishore
Faculty of Chemistry,
Sri Chaitanya Jr. College,
Anantapur, Andhra Pradesh, India.
E-mail: kishore_iyangar@yahoo.com

medium. This may be due to slow hydrolysis of the drug. Similarly in basic medium also colour is not formed. Therefore a solution of pH-5 is chosen for further studies. The maximum absorbance is notices at 520nm. The data is presented in Fig-1.

Fig-1: Maximum absorbance



4.2 Effect of Vanadium (V) Concentration

The effect of V(V) ion concentration on the absorbance is studied. The concentration of Taxim-AZ is kept constant at pH-5. The absorbance values are measured at 520nm in all the cases. The values are shown in Table-1. From the results it may be concluded that V(V) can be determined in the range of 0.636 to 4.45 µg/25ml.

Table-1: Effect of Metal [V(V)] ion Concentration on Absorbance

pH-5 [Taxim-AZ]= 0.1 mg/ml λ_{max} = 520nm

S.No	[V(V)] 1 x 10^{-4} M	Absorbance
1	0.5	0.17
2	1.0	0.34
3	1.5	0.51
4	2.0	0.67
5	2.5	0.84

3.3 Effect of Taxim-AZ Concentration

Keeping the V(V) ion concentration constant the effect of Taxim-AZ on absorbance is studied at 520nm. The data is presented in Table-2. From the result it may be concluded that Taxim-AZ can be determined in the range 0.1 to 0.6 mg/ml.

Table-2: Effect of drug (Taxim-AZ) Concentration on Absorbance

pH-5 V (V) = 1 x 10^{-4} M λ_{max} = 520 nm

S.No	Drug [Taxim-AZ] mg/ml	Absorbance
1	0.5	0.18
2	1.0	0.36
3	1.5	0.54
4	2.0	0.71
5	2.5	0.90

3.4 Effect of time

The effect of time on absorbance is studied for a period of one hour with a ten minutes interval. It is found that the absorbance values remain constant.

3.5 Effect of organic solvents

A complexation reaction is effected by the presence of an organic solvent. The effect of methanol, acetone and acetonitrile on the colour reaction keeping them at 50% by volume are investigated. The data is presented in Table-3. From the data reveals that the absorbance value decreases when acetonitrile is used as solvent. Whereas there is no much change with other solvents.

Table-3: Effect or organic solvents on absorbance

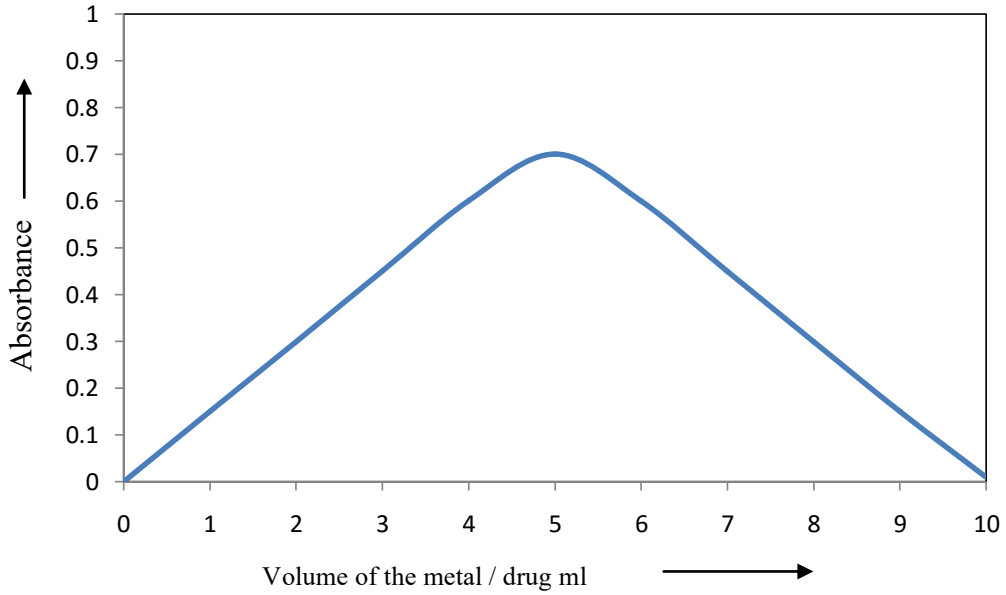
pH-5 [V(V)] = $1x10^{-4}$M [Taxim-AZ]=0.1mg/ml λ_{max} = 520nm

S. No	Organic solvent	Absorbance
1	No solvent	0.32
2	Methanol	0.31
3	Acetone	0.34
4	Acetonitrile	0.25
5	Propanol	0.32

3.6 Composition of The Complex

The composition of complex is determined by Job's method. A series of solution containing varying volumes of metal ion and drug simultaneously, measured at 520nm. The data is presented in Fig-2. From the results V(V) forms a 1:1 complex with Taxim-AZ.

Fig-2



3.7 Effect of diverse ions

The effect of foreign ions on the determination of V(V) is studied, by adding known concentration of various cations and anions was determined. The tolerance limits of various ions are presented in Table-4.

Table 4: Tolerance limit of Foreign Ions

Foreign Anions	Tolerance limit (µg/ml)	Foreign Cations	Tolerance limit (µg/ml)
Fluoride	20.54	Ti (IV)	6.96
Chloride	54.62	Cr (VI)	5.18
Iodide	253.80	Mn (II)	19.98
Nitrate	130.53	Fe (II)	4.68
Acetate	43.70	Ni (II)	0.612
Oxalate	8.85	Cu (II)	0.45
		Mo (VI)	19.20
		Ru (II)	13.26
		Pd (II)	0.12

4. Conclusion

The method is simple, sensitive and successfully applied for the micro determination of Taxim-AZ and V (V) in the range of 0.1 to 6 mg/ml and 0.636 – 4.45 µg/25ml respectively.

References

[1] Habib Bagheri and Mehrnoush Nader. (2009) *Journal of Hazardous Materials* 165, 353-8.
[2] Jingming Gong, Ting Zhou, Dandan Song, Lizht Zhang and Xianluo Hu. (2010) *Anal. Chem.* 82, 567-73.
[3] Khabarov, Y.G. and Veshnyakov, V.A. (2009) *Zhurnal Analiticheskoi Khimii* 64, 254-6.
[4] Hamza, A., Bashammakh, A. S., Al-Sibaai, A. A., Al-Saidi, H.M. and El-Shahawi, M.S. (2010) *Journal of Hazardous Materials* 178, 287-92.
[5] Perez-Ruiz, T., Ortuno, J. A. and Torrecillas M. C. (1984) *Analytica Chimica Acta 165*, 275-9.
[6] Jamaluddin Ahmed, M. and Shah Alam, Md. (2003) *Spectroscopy* 17, 45-52.