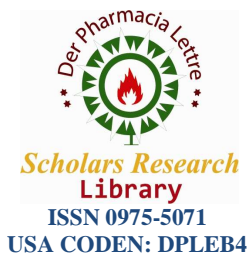




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Investigation on Taxim-AZ using spectrophotometer in bulk drug and formulation

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ABSTRACT

Analytical determination of Taxim-AZ and Cobalt(II) in pharmaceutical formulation is carried and based on colour reaction between Taxim-AZ and Cobalt(II). The method can be conveniently used for the determination of Cobalt(II) and Taxim-AZ respectively.

Keywords: Spectrophotometric method, Taxim-AZ and Cobalt(II) system

INTRODUCTION

Cobalt is harder and has a higher tensile strength. Co(II) is bluish white and lustrous in appearance. Cobalt is relatively unreactive and does not react with water, though it reacts with steam forming CoO. Co(II) dissolves slowly in dilute acids. Co(II) forms a large number of co-ordination compounds.

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 infections and Gonorrhoea. 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.

MATERIALS AND METHODS

APPARATUS

Spectral measurements are performed on an Elico SL UV-Visible Spectrophotometer. The pH measurements were made using an Elico pH meter.

PREPARATION OF SOLUTIONS

Double distilled water is employed for the preparation of solutions. All chemicals and reagents used for these studies are analytical grade.

EXPERIMENTAL SOLUTION

One ml of Taxim-AZ (1 mg/ml) and one ml of Cobalt(II) (1×10^{-4} M) are taken in a 25ml standard flask. The contents of the flask are made up to the mark with a buffer solution of required pH and shaken well for uniform

concentration. Similarly a blank solution without drug is prepared. The absorption spectrum is recorded in the wavelength region of 400-750nm.

RESULTS AND DISCUSSION

4.1 EFFECT OF pH

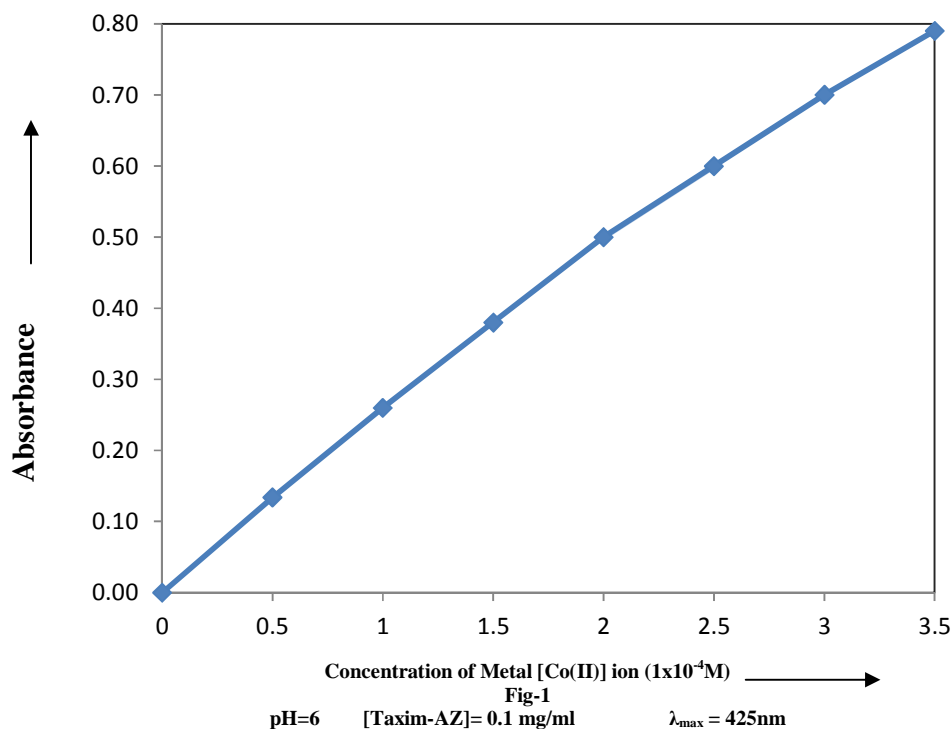
The effect of pH on the complexation is studied. The absorbance values increase from pH-4 to pH-8, the absorbance value is maximum in a solution of pH-6. Further the solution is highly stable and the spectrum is reproducible. Therefore a solution of pH-6 is chosen for further studies. The maximum absorbance is noticed at 425nm. The data is presented in Table-1.

Table-1
[Co(II)] = 1×10^{-3} M [Taxim-AZ] = 0.1 mg/ml

S.No	pH	Colour	λ_{\max} nm	Remarks
1	1	No colour	---	---
2	2	No colour	---	---
3	3	Slowly colour formation	---	---
4	4	Light Pink	410	Colour forms after 10 minutes
5	5	Light Pink	415	Colour forms after 5 minutes
6	6	Pink colour	425	Immediately colour is formed
7	7	Light pink	410	Colour forms after 5 minutes
8	8	Very light pink	405	Colour forms after 10 minutes
9	9	Colour is not formed	---	---
10	10	Colour is not formed	---	---

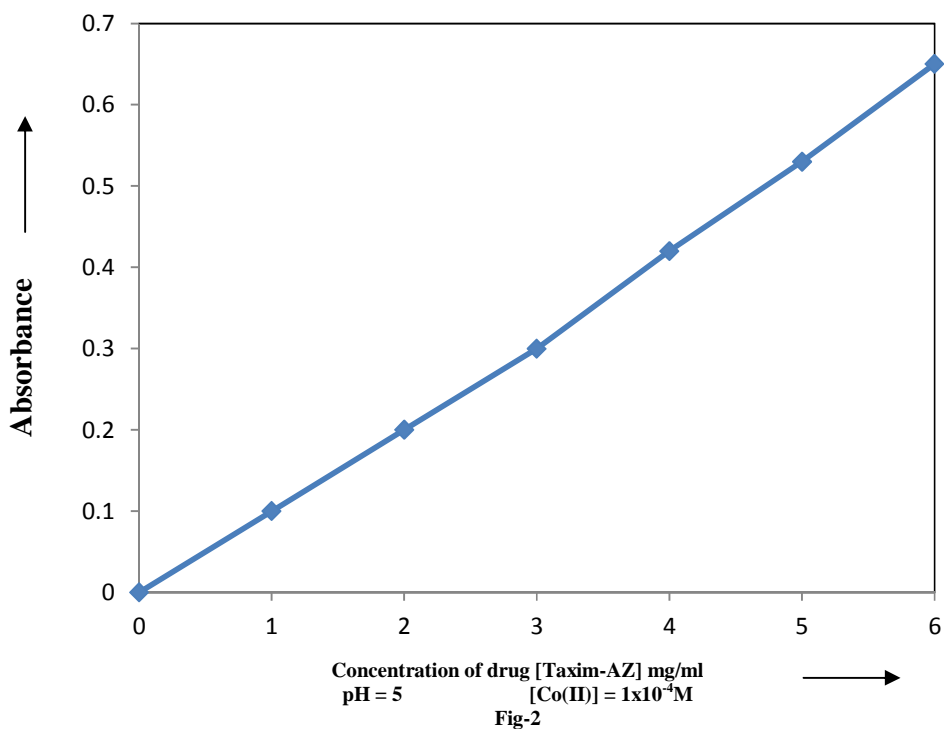
4.2 EFFECT OF COBALT(II) ION CONCENTRATION

The effect of Cobalt(II) ion concentration on the absorbance was studied. The pH of the solution is kept at 6 and the absorbance values are measured at 425nm. From the result reveals that Cobalt(II) ion can be determined in the range of 0.73 to 5.15 $\mu\text{g}/25\text{ml}$. The data is presented in Fig-1.



4.3 EFFECT OF TAXIM-AZ ON ABSORBANCE

In order to fix concentration Taxim-AZ, the absorbance of the solution containing fixed concentration of metal ion and varying concentration of Taxim-AZ was recorded in a medium of pH-6. It was found that the Taxim-AZ can be determined in the range of 0.1 to 0.6 mg/ml. The data is presented in Fig-2.



3.4 EFFECT OF TIME ON THE COLOUR REACTION

To study the effect of time on the colour reaction, the absorbance values of the solution containing fixed amount of Co(II) was measured at regular intervals of time (10 minutes). It was found that the colour formation was instantaneous and absorbance remained constant for more than an hour. This suggests that the complex was stable for a reasonable period of time. The data is presented in Table-2.

Table-2
Effect of time on absorbance
pH=6 [Co(II)] = 1×10^{-4} M [Taxim-AZ]= 0.1 mg/ml $\lambda_{\max} = 425$ nm

S.No	Time in minutes	Absorbance
1	10	0.30
2	20	0.31
3	30	0.32
4	40	0.31
5	50	0.33
6	60	0.32
7	70	0.31

3.5 COMPOSITION OF THE COMPLEX

The stoichiometry of the Co(II) – Taxim-AZ complex was determined by two methods namely Job's method Continuous Variation and Molar Ratio method.

JOB'S METHOD

In Job's method a series of solutions containing varying amounts of metal ion and Taxim-AZ solution at required concentration were taken in 10ml volumetric flask. The absorbance values of these solutions were recorded in each case and data is presented in the Fig-3. It is clear from the Fig-3 that Cobalt forms 1:2 complex with the reagent. The stability constant of the complex was found to be 1.0373×10^4 .

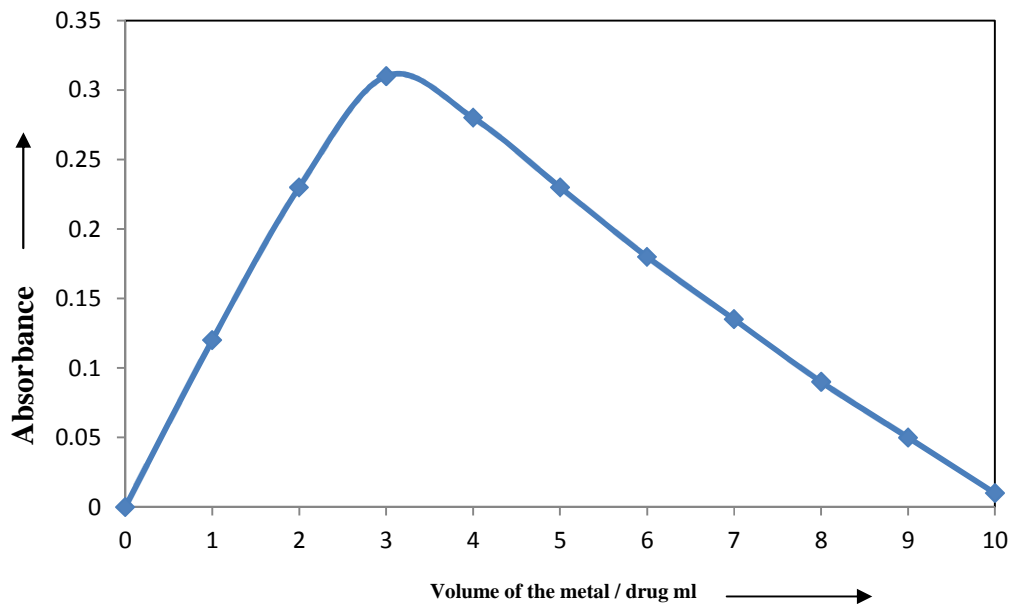


Fig-3
Jobs Curves

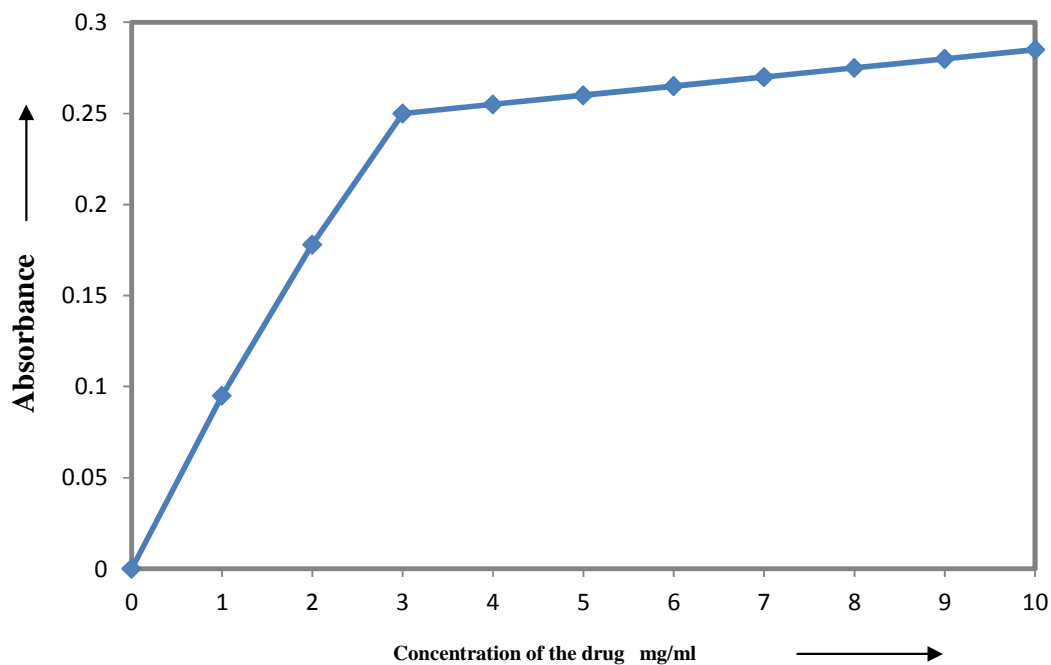


Fig-4
Mole Ratio Method

MOLE RATIO METHOD

In Mole ratio method, absorbance of the solutions containing fixed concentration of metal and varying concentration of the reagent was recorded at 425nm. The data is presented in the Fig-4. It is clear from the figure that Co(II) forms a 1:2 complex with the Taxim-AZ. Both these methods suggests that a 1:2 complex is formed between Co(I) ion and Taxim-AZ.

3.6 EFFECT OF DIVERSE IONS

The effect of interfering ion on the determination of Cobalt(II) was investigated by adding known concentration each ion to a solution containing 1×10^{-3} M of Cobalt(II) is studied. The data is presented in Table-3. From the result it is reveals that except pd(II), cu(II), cd(II) all other ions were tolerated at significant levels.

Table-3 Tolerance limit of Foreign Ions

Foreign Anions	Tolerance limit $\mu\text{g/ml}$	Foreign Cations	Tolerance limit $\mu\text{g/ml}$
Thiosulphate	15.5	Fe (II)	4.68
Oxalate	8.85	Cr (VI)	5.18
Nitrate	130.53	Se (IV)	5.45
Iodide	253.80	Pd (II)	0.12
Chloride	54.62	Cu (II)	0.45
Fluoride	20.54	Ni (II)	0.612
Acetate	43.70	Ti (IV)	6.96
EDTA	1667	Cd (II)	0.804
		Ru (III)	13.26
		Mo (VI)	19.2
		Sn (II)	14.84
		Zr (IV)	10.73
		Sr (II)	12.75
		Al (III)	13.49
		Mn (II)	19.98
		Mg (II)	32.41
		U (VI)	82.80
		W (VI)	63.95
		La (III)	52.91
		Th (IV)	64.01

CONCLUSION

The proposed procedure was simple, sensitive and rapid for the determination of metal ion and Taxim-AZ in the range of 0.73 to 5.15 $\mu\text{g}/25\text{ml}$ and 0.1 to 0.6 mg/ml respectively.

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