

# Spectrophotometric method for the determination of Microgram Quantities of Co(II) and Fe(II) using Taxim-of

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**Abstract-** Taxim-of reagent is used for the simultaneous determination of Co(II) and Fe(II). The reagent gives colour complexes in acidic medium with the metal ions. The maximum absorbance is at 450 and 570nm for Co(II) and Fe(II).

**Index terms:** Spectrophotometric method, Taxim-of and Co(II) and Fe(II)

## I. INTRODUCTION

Taxim-of is a combination of cefixime and ofloxacin. This is a synthetic chemotherapeutic antibiotic of the flouroaminolone drug class considered to be a second generation flouroaminolone.

Cefixime is a fast acting antibiotic that can treat and cure gonorrhoea in a single dose, providing relief from symptoms. Ofloxacin is a racemic mixture which consists of 50% levofloxacin and 50% of its "mirror image". These two drugs are considered to be one and the same and hence interchangeable. Ofloxacin is a broad spectrum antibiotic that is active against both gram positive and gram negative bacteria.

Taxim-of is a powerful antibiotic. It is a combination of cerixime and ofloxacin. These two components contain oxygen and nitrogen atoms. Therefore they form complexes with metal ions.

Iron is used in large quantities than any other metal. Iron is also the more important transition element in plants and animals. Iron is essential in small amounts for both plant and animal life.

Biologically iron is the most important element. Pure iron is silvery in colour and it is not very hard and is quite reactive. The rusting of iron is special case of corrosion and is of great practical importance. The process is very complex.

Cobalt is harder and has a higher strength Co(II) is bluish white and lustrous in appearance. Cobalt is relatively unreactive and does not react with water. Though it react with stream, Co(II) dissolves slowly in dilute acids. Co(II) dissolves slowly in dilute acids. Co(II) forms a large number of co-ordination compounds. The present investigation is simple and selective method for the determination of Co(II) and Fe(II).

## MATERIALS AND METHODS

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

## REAGENTS AND EQUIPMENT

All the chemicals used were of analytical reagents grade and the solvents were of spectroscopic grade, Analytical balance, ELICO digital pH meter, uv-visible recording spectrophotometer.

## EXPERIMENT

The standard solution of Taxim-of is taken and they are finely grounded into a powder. 100 milligrams of drug is taken and dissolved in 100ml of distilled water.

## II. RESULTS AND DISCUSSION

### EFFECT OF pH

Absorption spectral characteristics were studied in the pH range 1 to 8 and the absorption spectrum of the complex recorded in the range 350 to 700nm. The Taxim-of – Co(II) complex exhibits maximum absorbance at 450nm at pH-6 (Fig-1) and those corresponding to Taxim-of – Fe(II) complex are 570nm at pH-5 (Fig-2)

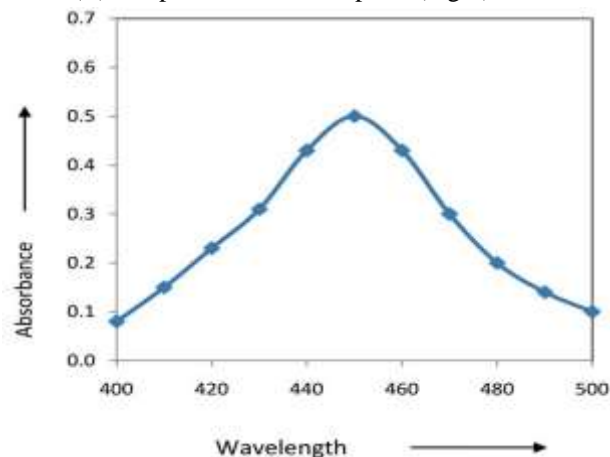
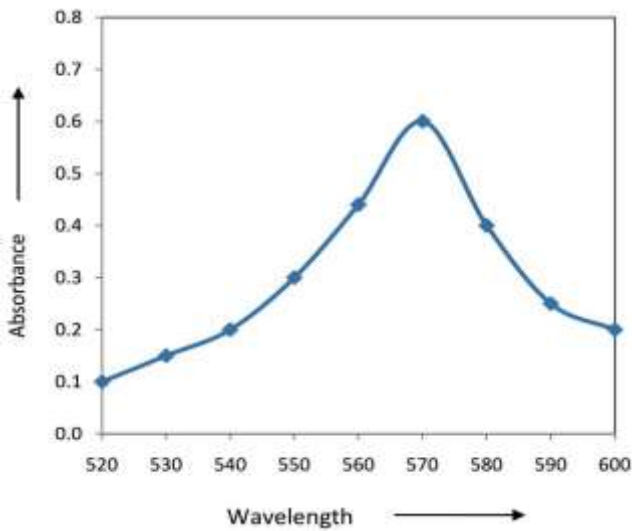


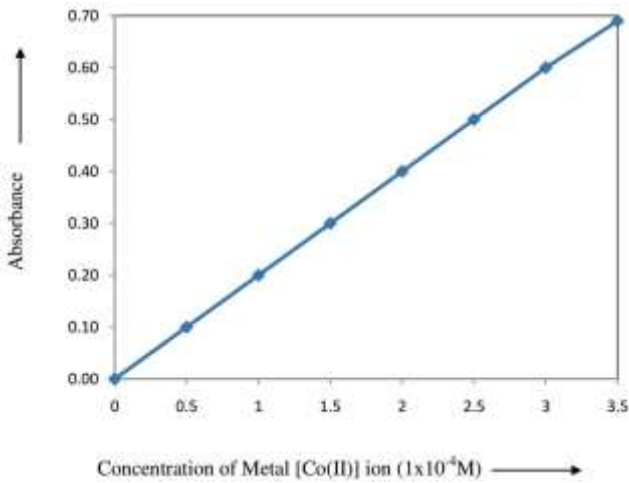
Figure 1



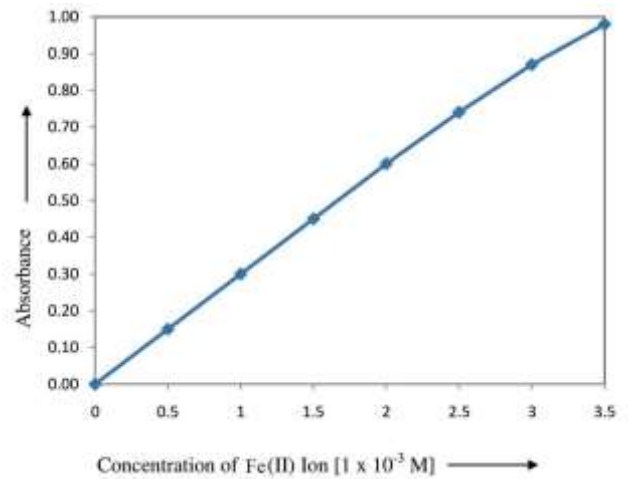
**Figure 2**

**METAL ION CONCENTRATION**

The concentration of the drug was maintained constant. Studies relating to the effect of metal ion concentration were carried out by varying the Taxim-of concentration. The linear calibration plots are shown in Fig-3 and Fig-4 respectively for Co(II) and Fe(II). The corresponding Beer's law ranges are 0.73 – 5.15 µg/25ml for Co(II) with Taxim-of and 0.698 – 4.98 µg/25ml of Fe(II) with Taxim-of.



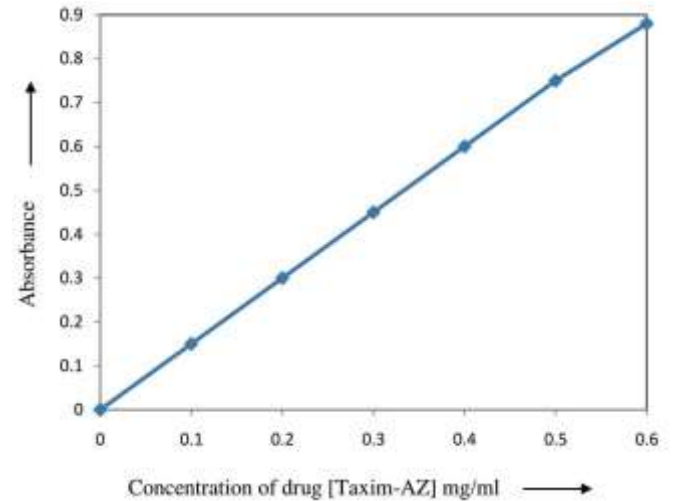
**Figure 3**



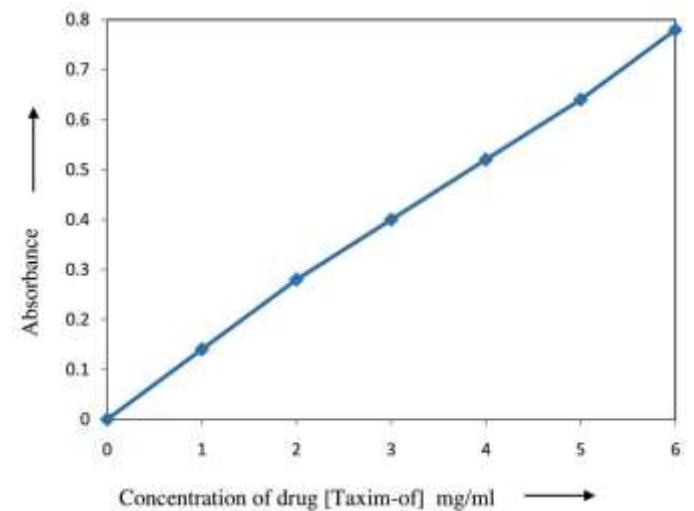
**Figure 4**

**DRUG CONCENTRATION**

The concentration of the Co(II) and Fe(II) were maintained constant. The absorbance values are measured by varying the Taxim-of concentration. The linear calibration plots are shown in Fig-5 and Fig-6. From the data the drug can be determined in the range of 0.1 to 0.6 mg/ml.



**Figure 5**



**Figure 6**

INTERFERENCE STUDIES

The effect of foreign diverse ions on Co(II) and Fe(II) ions are studied under optimum conditions. By measuring the absorbance of solutions containing certain amounts of

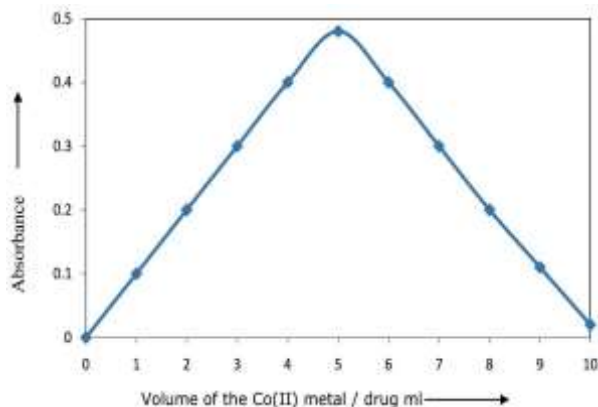
metal ions and varying amount of diverse ions. The tolerance of various ions are presented in Table-1.

**Table-1: Tolerance limit of Foreign Ions**

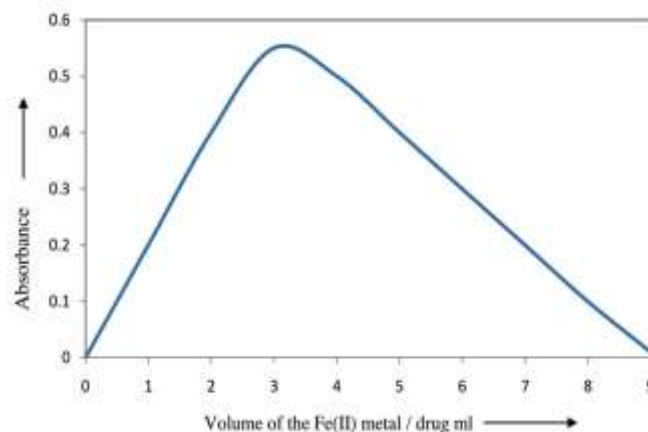
Foreign Anions	Tolerance limit $\mu\text{g/ml}$	Foreign Cations	Tolerance limit $\mu\text{g/ml}$
Thiosulphate	15.5	Fe (III)	4.68
Oxalate	8.85	Cr (VI)	5.18
Nitrate	130.53	Se (IV)	5.45
Iodide	253.80	Pd (II)	0.12
Chloride	54.62	Cu (II)	0.45
Fluoride	20.54	Ni (II)	0.612
Acetate	43.70	Ti (IV)	6.96
EDTA	1667	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

COMPOSITION OF THE COMPLEX

The complex solution exhibits a pink colour in the case of Taxim-of with Co(II) and an yellow colour in the case of Fe(II) with Taxim-of. The author conducted Job’s method of continuous variation to determine the stoicheiometric ratio of Taxim-of and metal ions. The corresponding Job’s curve are shown in the Fig-7 and Fig-8



**Figure 7**



**Figure 8**

## DISCUSSION

Taxim-of with Cobalt(II) form a pink coloured solution and Iron(II) with Taxim-of forms a yellow coloured solution due to the complexation between Taxim-of with metal ions.

Results reveal that a pH of 5 and 6 is optimum for the complexation of Taxim-of with Co(II) and Fe(II) respectively. The complex is found to be highly stable and reproducible in these media. The media of lower pH are not recommended as the complex is not stable. Therefore the selected pH is used to determine the composition of the corresponding complexes.

## VI CONCLUSION

The proposed method is rapid, simple, sensitive and can readily be adopted for the routine analysis. The method are found to be selective, linear, accurate and precise in the respective linear concentration ranges. .

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