WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 7.523
Volume 6, Issue 15, 401-406. Review Article ISSN 2277– 7105

STUDIES OF IRON (II) – TAXIM-OF SYSTEM

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

[1]Faculty of Chemistry, S.S.B.N. Degree College, Anantapur.

[2]Faculty of Chemistry, Sri Chaitanya Jr. College, Anantapur.

[3]Department of Chemistry, S.K. University, Anantapur.

Article Received on
28 Sept. 2017,

Revised on 19 Oct. 2017,
Accepted on 10 Nov. 2017

DOI: 10.20959/wjpr201715-10118

***Corresponding Author**
B. Srinivasa Rao
Faculty of Chemistry,
S.S.B.N. Degree College,
Anantapur.

ABSTRACT

A new simple, accurate spectrophotometric method has been developed for the Analytical determination of Taxim-of and Iron(II) in pharmaceutical formulation is carried and based on a colour reaction between Taxim-of and Iron(II) forms yellow coloured complex in a buffer pH – 5. This method can be conveniently used for the determination of Iron(II) and Taxim-of, in the ranges of Iron(II) 0.698 – 4.98 µg/25ml and Taxim-of in the range of 1 to 6 mg/ml. The method is successfully applied for the determination of Taxim-of and Iron(II) in pharmaceutical formulation. Effect of various parameters, pH, metal ion concentration, drug concentration of solutions is studied. The optimum condition are established for the determination of Iron(II) and the drug.

KEYWORDS: Spectrophotometric method1, Taxim-of and Iron(II) system.

1. INTRODUCTION

Taxim-of is a synthetic chemotherapeutic antibiotic of the flouroaninolone drug class considered to be a second generation flouro auinolone. It is a combination of cefixime and ofloxacin. These two components contain oxygen and nitrogen atoms. Therefore they form complexes with transition metal ions.

Cefixime is an oral third generation cephalosporin antibiotic. It is used to treat sinusitis, tonsillitis, bronchitis, pneumonia, kidney infections and gonorrhea, oflaxacin is a racemic mixture which consists of 50% levofloxacin and 50% of its “mirror image”. Ofloxacin is a broad spectrum antibiotic that is active against both gram positive and gram negative

bacteria. It is limited to the treatment of proven serious and life threatening bacterial infection.

2. Experiment

One ml each of Taxim-of (1mg/ml) and Ferrrous Ammonium Sulphate (1 x 10^{-3} M) are taken in a 10 ml Standard Flask and the contents in the flask are made up to the mark with a solution of required pH. The solution is shaken well for uniform concentration. A blank solution is prepared without the drug. In the wavelength region of 400-750nm.

3. Effect of pH

The pH of the solution is varied from 1 to 10 by keeping the metal ion concentration and drug concentration constant. The values of pH, colour, λmax are recorded, it is noted that Fe(II) forms an yellow coloured complex in weak acidic medium (pH = 3-6). Colour formation is not observed in strong acid medium (pH = 1-2). In strong acidic medium the drug undergoes either dissociation or hydrolysis which is not favourable for complex formation. Even if the complex is formed, it hydrolyses under these experimental conditions. Therefore a solution of pH-5. The data is presented in table and fig1.

EFFECT OF pH

[Fe(II)] = 1 x 10^{-3} M [Taxim-of] = 1 mg/ml.

Table. 1.

S.No	pH	Colour	λ_{max} nm	Remarks
1	1	No colour	---	---
2	2	No colour	---	---
3	3	Light yellow	550	Colour is formed after 10 mins
4	4	Yellow	560	Colour is formed after 5 mins
5	5	Yellow	570	Colour is formed Immediately
6	6	Yellow	550	Colour is slowly formed
7	7	No colour	---	---
8	8	No colour	---	---
9	9	No colour	---	---
10	10	No colour	---	---

[Fe(II)] = 1 x 10^{-3} M [Taxim-of] = 1 mg/ml

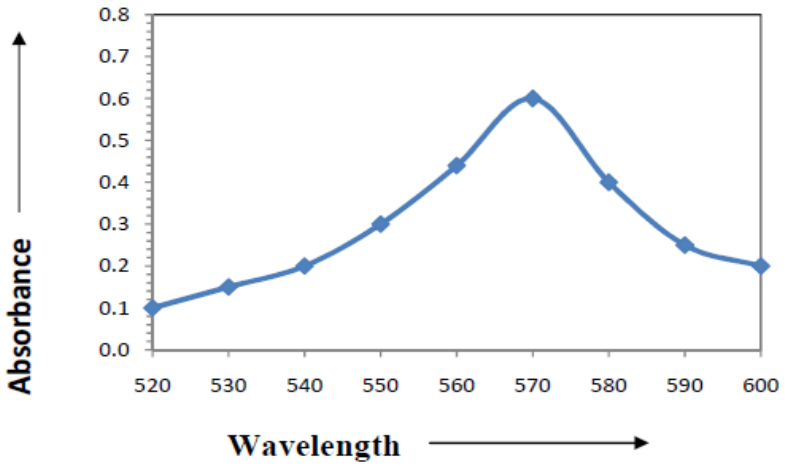

Fig. 1.

4. Effect of Fe(II) ion Concentration

The effect of Fe(II) ion concentration on the absorbance, keeping the Taxim-of concentration constant was studied. The absorbance values are measured at 570nm in each case maintaining the pH value at 5. The absorbance values are studied. From the result it conclude that Fe (ll) can be determined in the range from 0.698-4.98 µg/25ml. The data is presented in fig 2.

Effect of Metal [Fe(II)] ion Concentration on Absorbance

pH=5 λmax = 570nm [Taxim-of]= 1 mg/ml

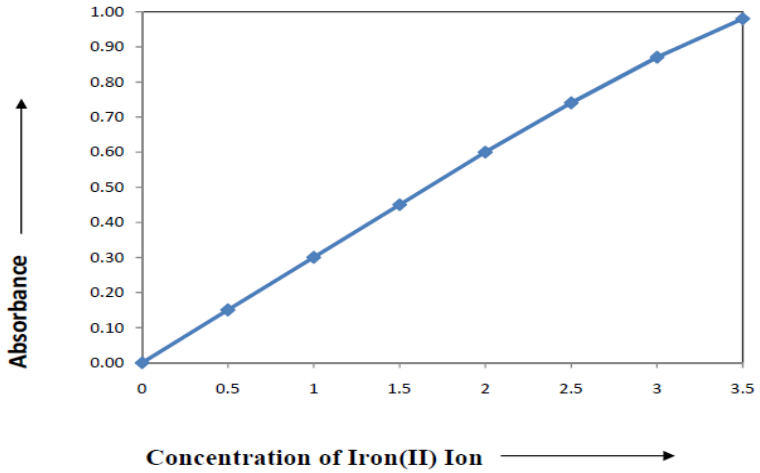

Fig. 2.

5. Effect of the drug (Taxim-of) Concentration

Keeping the metal Fe(II) ion concentration constant, the effect of drug (Taxim-of) on the absorbance was studied at 570nm. A blank solution with no drug used. In each case the absorbance values are measured at 570nm. From the result it may be conclude that Using this method we can determine the drug Taxim-of in the range of 1 – 6 mg/ml. The data is present in fig3.

Effect of drug (Taxim-of) Concentration on Absorbance

pH=5 [Fe(II)] = 1 x 10-3 M λmax = 570 nm.

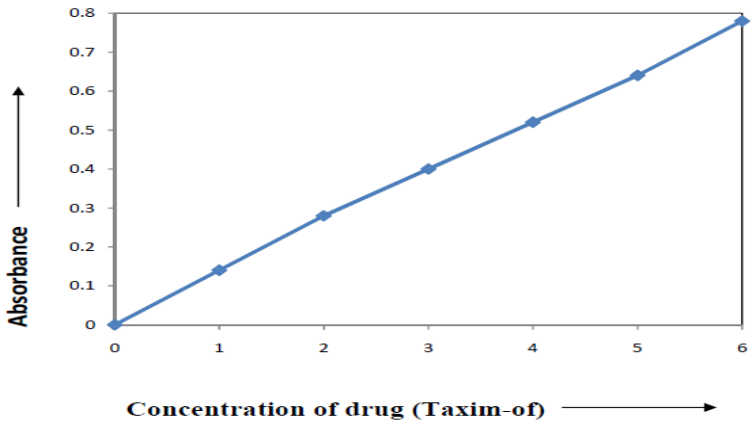

Fig-3.

6. Effect of time

In order to ascertain the stability of the complex the author has measured the absorbance values of the coloured solution containing 1x10-3 M Fe(II) ion and 1mg/ml of Taxim-of for about one hour with ten minutes interval. In observation of these values, suggess that the absorbance is not varied much with time. Hence the colour reaction is useful for remaining applications.

7. Effect of Organic Solvents

Organic solvents generally influence a complexation reaction therefore effect of methanol, propanol, acetonitrile and acetone on the colour reaction keeping them at 50% volume is investigated. From these values it concluded that the absorbance value decreases when acetonitrile is used as solvent and there is not much change with the other solvents. The data is presented in table2.

Table. 2: Effect or organic solvents on absorbance

pH=5 λ_{max} = 570nm [Fe(II)] = 1 x 10^{-3} M [Taxim-of]= 1 mg/ml.

S.No	Organic solvent used	Absorbance
1	No solvent	0.15
2	Methanol	0.16
3	Propanol	0.14
4	Acetone	0.15
5	Acetonitrile	0.10

8. Determination of composition and stability constants of the complex

When Fe(II) ion is treated with Taxim-of an yellow coloured complex is formed. The composition and stability constant of the complex are determined by the following methods.

8.1 Jobs continuous variation method

Equimolar concentrations of Fe(II) and Taxim-of are used in this method. A series of solutions are prepared by simultaneously changing the volumes of Fe(II) ion and drug Taxim-of, keeping the total volume constant. The absorbance values of these solutions are measured at 570nm. From the result we can find that Fe(ll) forms a 1:2 state complex wirh Taxim-of.

8.2 Mole ratio method

In this method concentration of the metal ion is kept constant and the concentration of the drug Taxim-of is changed. The absorbance values are measured at various concentration of the drug and it is clear that Fe(II) ion forms a 1:2 complex with the Taxim-of. Both these methods suggest that a 1:2 complex is formed between thetwo.

9. Effect of diverse ions

Under optimum conditions the effect of foreign ions on the determination of Fe(II) ion is studied. The extent of interference by various anions and cations was determined by measuring the absorbance of solutions containing certain amount of Fe(II) ion and different amount of diverse ion. tolerance limits of various ion are presented in table 3.

10. CONCLUSIONS

The proposed procedure is simple, sensitive and rapid. It is possible to determine the metalion and Taxim-of in the range of 0.698-4.98µg/25mland 1-6mg/ml respectively. The procedure is

based on the observation that Taxim forms coloured complexes with Fe(ll). The proposed method can be employed for an analytical determination of metalion in the range of micrograms, This method succesfully applied in pharmaceutical analysis.

Table. 3: Tolerance limit of Foreign Ions.

Foreign Anions	Tolerance limit µg/ml	Foreign Cations	Tolerance limit µg/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 (II)	13.26
		Mo (VI)	19.2
		Sn (II)	14.84
		Zr (IV)	10.73
		Sr (II)	12.75
		Al (II)	13.49
		Mn (II)	19.98
		Mg (II)	32.41
		U (VI)	82.80
		W (VI)	63.95
		La (II)	52.91
		Th (IV)	64.01

11. REFERENCES

1. Rajesh.N and Hari, M.S. Spectrochimica Acta part-A, Molecular and Bio molecular spectro scopy, 2008; 70: 1104-8.
2. Goh K.P., and Cherilla D.A., “Management of hyperna tremia” 2004; 69(10): 2387-94.
3. Stote R.M., and Birge J.R., “Annals of Internal Medicines” 1975; 85(5): 654-6.
4. De Troyer A, and Demanet J.C., 1975; 294(18).
5. Tolstoi L.G., “Medcap Pharmacotherapy, 2002; 4(1).
6. Lochr, G.W. “Minocycline and Pharmacogentios and preventive Medicine”, George thineme, Switzerland (1966).
7. Sandell, E.B. “Colorimetirc determination of trans of metals”, Inter science, New York, 1950; 367.
8. Jamaluddin Ahmed, M and Shah Alam, MD Spectroscopy, 2003; 17: 45-52.
9. Job, Pann.chem, 1928; 9: 113.
10. Yoe, J.H. and Jones, A.L. Ind. Engg. Chem. Anal Ed. 1944; 16: 111-5.