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Spectrophotometric method for the determination of microgram quantities of W(V1) and U(V1) using Doxycycline

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ABSTRACT

Doxycycline reagent is used for the simultaneous determination of W(V1) and U(V1). This reagent gives colour complexes in acidic medium with the metal ions. The maximum absorbance is at 390, and 412nm for W(V1) and U(V1) and the molar absorptivities are 0.81×10^6 and 0.27×10^6 respectively.

Keywords: Spectrophotometric, Doxycycline and W(V1) and U(V1)

INTRODUCTION

A more recent addition to the tetracycline group of antibiotics available for antibacterial therapy is doxycycline (DC). It is very well absorbed from the gastro intestinal tract. Thus allowing a smaller dose to be administered. High tissue levels are obtained with it and unlike other tetracyclines. DC apparently does not accumulate in patients with impaired renal function. It is preferred for urenic patients with infections outside the urinary tract.

MATERIALS AND METHODS

Digital pH meter model CL21 (Elico) was used for measuring the pH of the buffer solution and Shimadzee 160A microcomputer based UV-visible spectrophotometer equipped with 1.0 cm quartz cells used for all absorbance studies and amplitude measurements.

REAGENTS

All the reagents used were A.R. grade. All the solutions were prepared with doubly distilled water. Stock solutions of W(V1) and U(V1) were prepared by dissolving required quantity of their salts in analytical balance and transferring it to a standard flask, dissolving and making up to mark using double distilled water. The drug solution is prepared by dissolving exactly 100mg sample of doxycycline in 100ml volumetric flask and the solution is made up to the mark with double distilled water.

EXPERIMENTAL SOLUTION

3ml of DC solution, 10ml of buffer solution of required pH and 2ml of 0.01M metal ion solutions are taken in a 25ml standard flask. The solution is made up to the mark and shaken well for uniform concentration. Similarly a blank solution is prepared without metal ion. The absorption spectra are recorded.

RESULTS AND DISCUSSION

The absorption spectrum obtained with W(VI) and doxycycline (DC) is presented in table-1. An analysis of the spectrum reveals that the wavelength corresponding to the maximum is 390nm, at pH 6.0.

Table-1 Effect of time on absorbance
pH=6.0, [W(VI)] = 4×10^{-5} M, [DC]= 0.06 mg/ml, λ_{\max} = 390 nm

Time (minutes)	Absorbance
0	0.731
15	0.769
30	0.729
45	0.739
60	0.723
75	0.733
90	0.745

Tungsten (VI) concentration is varied and its effect on absorbance value is studied. In the range of 2 to 12×10^{-5} M linear relationship exist between tungsten(VI) and absorbance. The data is presented in figure-1.

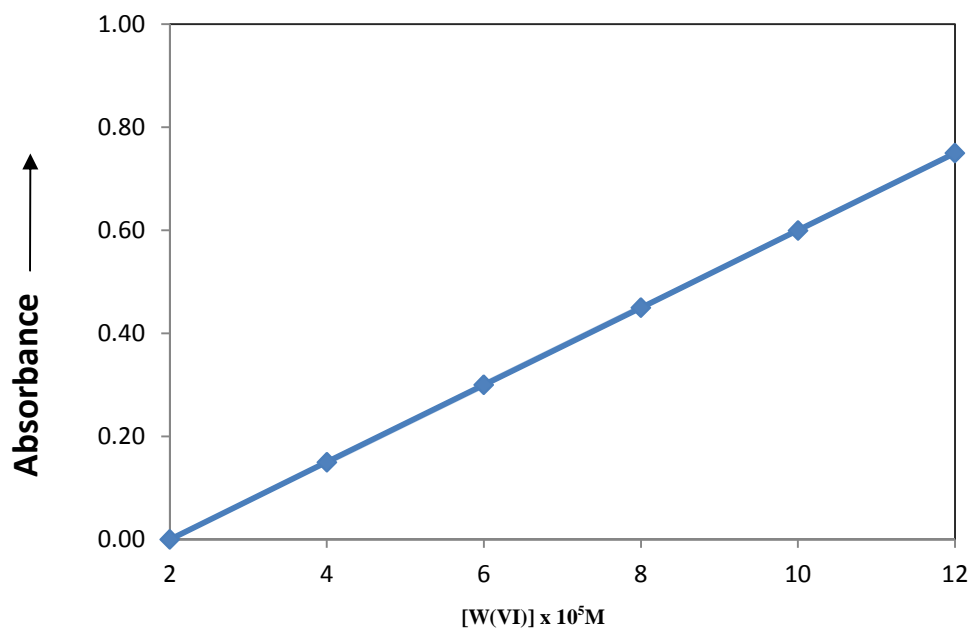


Fig-1 Effect of [W(VI)] on absorbance
pH = 6.0; [DC] = 0.06 mg/ml; λ_{\max} = 390 nm

The concentration of doxycycline is varied in the range 0.01 to 0.06 mg/ml and the absorbance values are measured at 390nm against a blank solution containing no drug. In view of the linear proportionality between the two parameters (Fig-2) the doxycycline can be determined in this range.

Job's continuous variation method is performed in order to determine the composition of tungsten (VI) and DC (Fig-3). The results revealed a 1:1 complex between the metal ion and the drug. As it is well known that presence of a non-aqueous solvent influences a complexation reaction, studies were made in presence of organic solvents (50% by volume) methanol, DMF, acetonitrile, dioxane and acetone. The effect of methanol is not much compared to the other solvents.

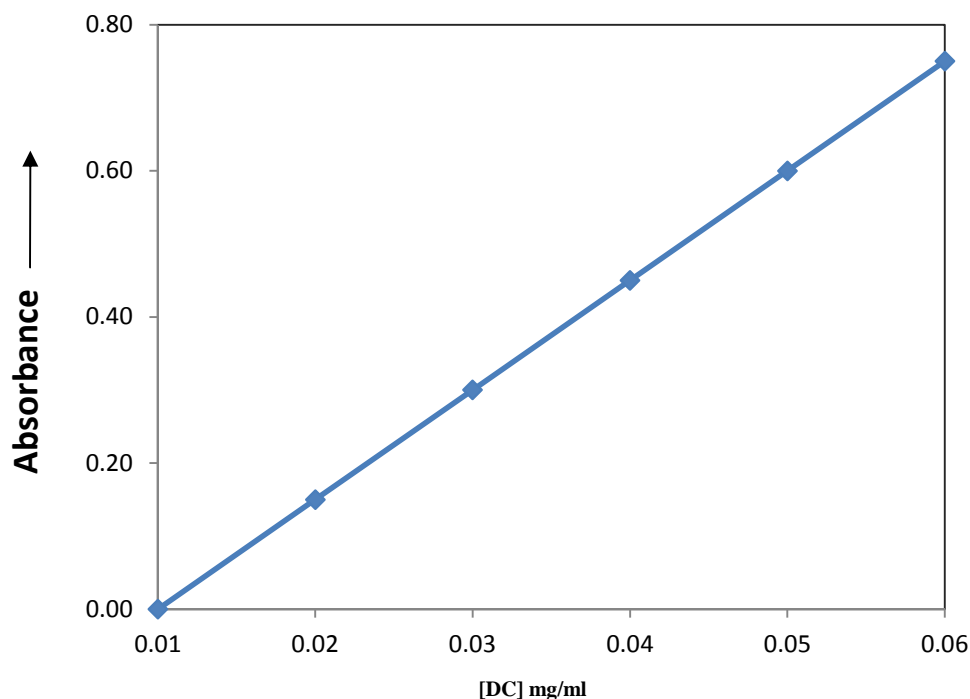


Fig-2 Effect of [DC] on absorbance
pH = 6.0; [W(VI)] = 4×10^{-5} M; λ_{\max} = 390 nm

Similar experiments were conducted with uranium(VI) and the results are tabulated in table-2.

Table-2 A comparative account of W(VI) and U(VI) Doxycycline systems

Meal ion	λ_{\max}	Range mg/ml	pH chosen	Molar absorptivity
W(VI)	390.3	0.01 – 0.08	6.0	0.81×10^6
U(VI)	412.2	0.01 – 0.08	6.0	0.27×10^6

CONCLUSION

Doxycycline reagent is used for the simultaneous determination of W(VI) and U(VI) in acidic medium in microgram quantities. The present method is simple, rapid, sensitive and selective and do not involve heating or filtration or separation.

REFERENCES

- [1] Sandell, E.B. "Colorimetric determination of traces of metals", Interscience, New York, 367 (1950).
- [2] Turczan., J. and Lau-Cam C. *Spectroc. Lett.*, 17, 353 (1984).
- [3] Utpal Saha *Analyst*, 114, 1179 (1986).
- [4] Sultan, S.M., *Analyst* 1986, 111, 97.
- [5] Tolstoi L.G., *Medcap Pharmacotherapy* 4(1), 2002.
- [6] Jamaluddin Ahmed, M and Shah Alam, MD (2003) *Spectroscopy* 17, 45-52.
- [7] Ramadevi, B. and Rao, V.S.N., *Indian J. Pharm Sci.*, 1993, 1, 40.
- [8] Suryanarayana Rao, V. *The East Pharm.*, 1994.1075.