Asian Journal of Chemistry Vol. 20, No. 6 (2008), 4955-4956

NOTE

Synthesis and Antimicrobial Screening for Rhodanine Complexes of Iron, Copper and Zinc

VARSHA KSHIRSAGAR*, SANDHYA GANDHE† and MANGLA DAVE GAUTAM
Department of Chemistry,
Government (Autonomous) Holkar Science College, Indore-452 017, India
E-mail: varshakshir@rediffmail.com

In this paper, the synthesis and antimicrobial studies of rhodanine complexes with iron, copper and zinc are reported.

Key Words: Rhodanine, Complexes, Antimicrobial studies.

Rhodanine is an important class of heterocyclic compounds due to their broad range of biological activities[1,2]. Chemistry of rhodanine and its derivatives has attracted special interest due to their application as potential pharmaceutical medicinal preparations[3-6]. Consequently, a large number of synthetic protocols leading to these compounds have been reported in the literature[7]. Rhodanines play a central role as complexing agents for a large number of metal ions and can also be used as analytical reagents[8,9]. Metal complexes are well known for their biological activity[10]. The activities of drugs have increased when they are administered in the form of metal complexes[11,12].

Synthesis of rhodanine: Rhodanine prepared as reported method[13]. All the chemical were used as analytical grade reagent. Melting points were taken in open capillary and were uncorrected. Infra red spectra were recorded as KBR pellets on Shimadzu PC FTIR.

Synthesis of metal complexes: Ethanolic solutions of corresponding metal acetate (Fe, Cu and Zn) were treated separately with ethanolic solution of rhodanine in 1:2 molar ratios and refluxed on water bath for 1 h.

The solid complexes were separate out by filtration, washed with ethanol/acetic acid followed by ether and dried *in vaccuo*. The colour of Cu, Fe and Zn complex is Black/Grey, Brown and pale yellow, respectively. All the complexes are amorphous having high melting point and are insoluble in water. They are soluble in ethanol, dioxane, DMF and 30 % DMF in alcohol.

†Department of Chemistry, MLC Government Girls Post Graduate College, Khandwa-45001, India.

The elemental analysis is in complete agreement with the molecular formula *i.e.*, $C_3H_3NOS_2$ and found to contain (%) C = 27.05, H = 2.27, N = 10.52, S = 48.15; Calc. %: C = 27.01, H = 2.20, N =10.30, S = 48.04.

Antimicrobial screening: The antimicrobial activity has been studied by Tube-Dilution technique. The solution for rhodanine and its metal complexes were prepared in alcohol. The range of concentration tested will depend upon the organism and drugs which were tested. Dilution series based on 400, 200, 100, 50, 25, 12.5, 6.25 and 3.125 µg/mL. The solution were added to sterile nutrient broth then incubated.

Observation are shown in Table-1. Thus good MIC results were observed of rhodanine and their metal complexes against micro-organism. The data exhibited in Table-1 shows that compound and complexes are active against *S. epidermides, B. subtilis, P. aruginosa* and *C. albicans*.

TABLE-1
ANTIMICROBIAL ACTIVITY OF RHODANINE AND METAL COMPLEXES

Compd.	Microorganism				
	E. coli	*S. epidermides*	*B. subtilis*	*P. aruginosa*	*C. albicans*
Rhodanine	++	+	+	++	+
Cu Complex	++	+	+	++	+
Fe Complex	++	+	++	+	+
Zn Complex	+	++	++	++	++

MIC value: +++ ≥ 200 µg/mL, ++ ≤ 200 µg/mL, + 400 µg/mL

REFERENCES

1. El. Z. Gendy, R.M. Abdel Rahman, M.M. Fazy and M.B. Mahmoud, *J. Indian Chem. Soc.*, **67**, 927 (1990).
2. V. Shah, C.K. Pant and P.C. Joshi, *Asian J. Chem.*, **5**, 83 (1993).
3. P. Vicini, A. Geronikaki, K. Anastasia, M. Incerti and F. Zani, *Bioorg. Med. Chem.*, **14**, 3859 (2006).
4. Z. El-Gendy, R.M. Abdel-Rahman, M.M. Fawzy and M.B. Mahmoud, *J. Indian Chem. Soc.*, **67**, 927 (1990).
5. A. Zervosen, W.P. Lu, Z. Chen, R.E. White, Jr. T.P. Demuth and J.M. Frère, *Antimicrob. Agents Chemother.*, **48**, 961 (2004).
6. H.L. Liu, Z. Li and T. Anthonsen, *Molecules*, **5**, 1055 (2000).
7. K. Sudo, Y. Matsumoto and M. Matsushima, *Biochem. Biophys. Res. Commun.*, **238**, 643 (1997).
8. S.B. Savvin and R.F. Gur'eva, *Talanta*, **34**, 87 (1987).
9. V. Anger and S. Ofri, *Microchim. Acta*, 918 (1964).
10. M. Sen and C.D. Sathya, *Ind. J. Exp. Bio.*, **13**, 279 (1994).
11. P.N. Gupta and A. Raina, *Asian J. Chem.*, **2**, 73 (1990).
12. M. Kodama, A.B. Mahatma and A.K. Raut, *Bull. Chem. Soc.*, **63**, 592 (1994).
13. P.L. Julian and B.M. Sturgis, *J. Am. Chem. Soc.*, **57**, 1126 (1935).

(*Received*: 25 October 2007; *Accepted*: 15 March 2008) AJC-6484