



Synthesis of Transition Metal Ion Complex of 2-aminobenzoxazole and Antibacterial Activity

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Received: 11-04-2017; Revised: 20-05-2017; Accepted: 15-07-2017.

ABSTRACT

In view of the fact that a large number of derivatives of benzoxazole have been found to exhibit a wide variety of antimicrobial activities. Heterocyclic compounds play an important role in medicinal chemistry and exhibit wide range of biological activities. Complexes of 2-aminobenzoxazole (L) with chloride of iron (II), was synthesized. The molar ratio metal: ligand in the reaction of the complex formation was 1:2. It should be noticed, that the reaction of all the metal salts yielded bis (ligand) complex of the general formula $M(L)_2(Cl)_2$. The complex was characterized by elemental analysis, melting point, FT-IR, 1H NMR, and mass spectral data. The antimicrobial activity of the complex against *E.coli* ATCC25922, *Salmonella abony* ATCC6017, *Pseudomonas aeruginosa* ATCC27853, *Staphylococcus aureus* ATCC25923, *Bacillus subtilis* ATCC11774, benzoxazole derivative have been reported Antibacterial activity.

Keywords: 2-Amino Benzoxazole, Antibacterial activity, fe(II).

INTRODUCTION

The derivative of benzoxazole is 2-amino benzoxazole is present in compounds involved in research aimed at evaluating new metal ion complex that possess interesting biological activities like antimicrobial activities. Benzoxazoles derivative have been reported to show a broad spectrum of biological activities. Notable among these are antiviral¹, antifungal² and antibacterial³ activities⁴, etc. The prominent role of 2-amino benzoxazole in biological activity⁵. Keeping the above facts in mind our present paper involve synthesis⁶ and antibacterial activity of fe(II)complex with ligand 2-amino benzoxazole⁷.

MATERIALS AND METHODS

All the reagents and solvents used were of sigma Aldrich or use after distillation⁸.

Preparation of complex- The complex was prepared by refluxing for two hours⁹, the respective metal chloride with ligand in 1:2 molar ratio in ethanolic medium on concentrating¹⁰, the complex so formed was suctioned, filtered, washed with alcohol¹⁴ and dried in vacuum¹¹. On the basis of analytical data the complex was found to possess molecular formulae mL_2x_2 where $m=fe(II)$, $l_2=2$ -aminobenzoxazole and $x_2=cl$ ¹².

Table 1: Elemental analysis data

Complex	%Found/Calcu.						
	C	H	N	O	Cl	M.P.	SOLUBILITY
$[Fe(C_7H_6N_2O)_2]Cl_2$	42.28	4.61	13.34	16.99	15.36	120.c	Ethanol
	(42.3)	(4.59)	(13.32)	(16.96)	(15.38)	-	-

The metal complex was analysed using standard procedure¹³. The IR Spectra of the metal complex was recorded on Spectrophotometer employing KBr pellets ("FTIR-Imaging System"). UV spectra recorded on UV Spectrophotometer and mass and CHNO, HNMR spectra recorded on (LCMS) "High Resolution Liquid Chromatography mass Spectrometer" and (CHNO) Elemental Analyzer, Nuclear Magnetic Resonance Spectrometer HNMR spectra of complex were recorded in DMSO at SAIF, I. I. T Mumbai.

Table 2: I.R. spectral data of Ligand and its Metal Complex

Ligand	Fe(II)	Tentative assignment
3050	3153	v C-H
3336	3336	vN-H
1618	1618	vC=C
1661	1661	vC-O
1251	1251	vC-N
	261	vM-Cl
	360	vM-N

Table 3: Physical data of compound

Compound	M.P.(oC)	Yield (%)	Molecular Formula
1.	120 oC	90%	[Fe(C ₇ H ₆ N ₂ O) ₂]Cl ₂

Table 4: ¹HNMR Spectral data of compound

Protons	NMR Spectra (DMSO)
ArH	6.8-8.0
NH ₂	3.5-6.0

Table 5: Antimicrobial activity data

10 mg/ml solution in DMSO, serially diluted,

Used 50 µl for test

Test Bacteria	10 mg/ml	1 mg/ml	100 µg/ml	10 µg/ml	1 µg/ml	NC
Fe Compound	Zone of inhibition in mm					
E.coliATCC25922	16	13	12	10	10	0
Salmonella abonyATCC6017	10	10	8	8	0	0
Pseudomonas aeruginosaATCC27853	12	10	8	8	6	0
Staphylococcus aureusATCC25923	18	15	12	0	8	0
Bacillus subtilisATCC11774	21	18	14	8	0	0

RESULTS AND DISCUSSION

The IR Spectra of metal complex has been recorded in table 2. It is the spectra of metal complex. The band appearing in the region 3153 and 1618 cm⁻¹ are assigned to ν(C-H) and ν(C=C) vibration, respectively and are suggestive aromatic character of the complex. The band appearing in the region 1251,3336,260-265 cm⁻¹ due to the presence of ν(C-N),ν(N-H) and ν(M-Cl) vibrational mode respectively¹⁸. A band at region 1661 cm⁻¹ assignable to ν(C-O) frequency. In the metal complex amino group shows shift suggesting the co-ordination of nitrogen with metal ion. Chloro complex of Fe (II) in possess characteristic band of ν (M-Cl) and ν(M-N) which is observed at 280 and 260-370 cm⁻¹ respectively. The purity of the synthesized compound were confirmed by their sharp melting point¹⁹. Also some ¹H NMR spectra were useful for some protons in the compound such as δ 6.80-8.0 ppm indicates the presence of phenyl ring protons and ArNH₂δ 3.5-6.0 ppm occasionally raised lines usually broadened. Mass spectrum of the compounds gives mass of compound.

Acknowledgement: Author is thankful to Govt. M.H. College of home science and science for women autonomous Jabalpur Madhya Pradesh, India for providing necessary support for this research work. We are thankful to SAIF, IIT Bombay for providing analytical and spectral data of compound.

Biological Activity

The synthesized compounds were screened for antimicrobial activity by zone of inhibition method¹⁵. Antibacterial activity was observed for the complex using five strains of Gram (+ ve) and Gram (-ve) bacteria¹⁶. E.coli ATCC25922, Salmonella abonyATCC6017, Pseudomonas aeruginosa ATCC27853, *Staphylococcus aureus* ATCC25923, Bacillus subtilis ATCC11774¹⁷.

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Source of Support: Nil, **Conflict of Interest:** None.

