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Research Article

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Synthesis and antimicrobial activity of some transition metal ion chelates of 2-(cinnamyl)-4-bromo-6-methyl benzothiazolyl hydrazones

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ABSTRACT

Cr, Fe, Ni, Cu metal ion Chelates have been synthesized by reacting metal chloride with 2-(Cinnamyl)-4-bromo-6-methyl benzothiazolyl hydrazones. These metal ion chelates screened for their antibacterial, antifungal activity. The geometry of the metal chelates ion has been proposed. The ligand system coordinates with the metal ion in a bidentate manner through nitrogen atom of hydrazones.

Key words:- Hydrazones, metal ion chelates, antibacterial activity, antifungal activity.

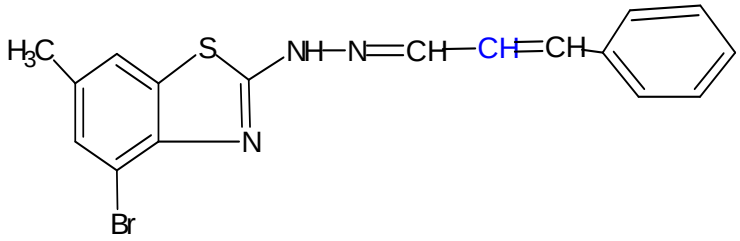
INTRODUCTION

Hydrazones are heterocyclic compound containing S,N, atoms. Hydrazones have the ability to form metal ion chelates. Literature survey indicate that there are many transition metal ion chelates with hydrazone[1-3].There are many metal ion chelates which are found to be active as antibacterial[4], antifungal[5-7], antimalarial, antiviral, antilepral activity. Due to the wide importance of transition metal ion chelates increases the interest in the study of hydrazones metal ion chelates. There are no any reference in literature survey regarding the transition metal ion chelates with 2-(Cinnamyl)-4-bromo-6-methyl benzothiazolyl hydrazones as a ligand . In the present work we have used 2-(Cinnamyl)-4-bromo-6-methyl benzothiazolyl hydrazones as a ligand to synthesis of Cr, Fe, Ni, Cu metal ion chelates and these chelates are screened for antimicrobial activity.

EXPERMENTAL SECTION

Synthesis of metal ion chelates:-.
The ligand 2-(Cinnamyl)-4-bromo-6-methyl benzothiazolyl hydrazones is dissolved in ethanol and treated with ethanolic solution of Cr, Fe, Ni, Cu metal chloride in separate flask. The pH of all solutions are adjusted to 5.5-6.5 by using buffer solution. Obtained precipitate digested and filtered and characterized by different methods. Elemental analysis is given in table no 1and I. R. data is given in table no.2. These metal ion chelates are used to screened the antimicrobial activity.

Structure of ligand



Antibacterial activity:-.The antibacterial activity of compound was tested by agar diffusion method. For bacterial activity nutrient agar was used.

The culture of E. Coli and B. Substilis was prepared in distilled water. The culture was poured over the surface of the media under sterile condition and then it was allowed to stand for few minutes and remaining culture was drained of form media and dried. 5 mm diameter paper disc were prepared and were sterilized in autoclaves after dipping the disc in the suspension of compounds in D.M.S.O., then these discs were put in Petri dish containing culture coated media. The paper disc were allowed to settle on media and then all the petri dishes were incubated for 18-24 hours at 37°C . after incubation the zone of inhibition was measured.

Antifungal activity:-.The fungi used as test organism is Aspergillus niger and Aspergillus flavus. The spore suspension was prepared by adding 8-10 ml sterilized distilled water in slant on which fungus are grown by scraping of nicrome wireloop. The spore suspension was poured on the surface of the media in the petri dish. The testing compounds were taken in cups at concentration of 10 ml per cup with D.M.S.O. control solvent. The plates were then incubated at 37°C for 40-48 Hours and zone of inhibition recorded. Anitimicrobil activity data is given in table no. 3.

RESULTS AND DISCUSSION

Table. 1-Elemental analysis

compound	M Wt.	C%	H%	N%	Cl%	M%
CBMBTH	372	55.04	3.50	11.32	-	-
$[Cr(CBMBTH)_2Cl_2]ClH_2O$	920.51	44.36	3.26	9.29	11.56	5.65
$[Fe(CBMBTH)_2Cl_2]Cl\ 2H_2O$	942.35	43.33	3.25	9.10	17.66	6.05
$[Ni(CBMBTH)Cl]ClH_2O$	719.71	39.29	3.13	9.46	11.16	6.58
$[Cu(CBMBTH)ClH_2O]Cl$	524.54	38.98	3.05	8.01	13.53	12.32

Table. 2- I.R. spectral data

Sr.No.	Compound	OH cm^{-1}	C=N cm^{-1}(ring)	C=N cm^{-1} (azomethine)	M-N cm^{-1}
1	CBMBTH	-	1642	1608	-
2	$[Cr(CBMBTH)_2Cl_2]ClH_2O$	-	1620	1580	665
3	$[Fe(CBMBTH)_2Cl_2]Cl\ 2H_2O$	-	1612	1595	495
4	$[Ni(CBMBTH)Cl]ClH_2O$	-	1600	1570	560
5	$[Cu(CBMBTH)ClH_2O]Cl$	3445	1625	1590	620

From the table no.2. I.R. data indicate that the ligand show one band at 1642 it is due to the C=N (ring nitrogen) and another band is observed at 1608 it may be due to C=N (azomethin nitrogen). Both bands are shifted ±50 in metal chelates it indicate that the ring nitrogen and azomethine nitrogen involved in the chelates formation. One new band is observed in all chelate

it may be due to the formataion of metal-ligand bond. Thus ligand act as bidentate ligand.

Table3. Microbial activity data

Sr.No.	Compound	Zone ofInhibition		Zone of Inhibition	
		E.coli	B.subtilis	A.niger	A.flavus
1	CBMBTH	-	1.1	-	-
2	$[Cr(CBMBTH)_2Cl_2]ClH_2O$	0.8	1.0	-	-
3	$[Fe(CBMBTH)_2Cl_2]Cl\ 2H_2O$	0.8	1.1	-	-
4	$[Ni(CBMBTH)Cl]ClH_2O$	1.3	1.8	3.5	1.5
5	$[Cu(CBMBTH)ClH_2O]Cl$	2.5	2.0	1.6	1.4
6	Control (D.M.S.O)	1.0	1.4	00	00
7	Positive control (Streptomycine/Fluconazole)	2.4	3.0	1.0	1.5

Antibacterial activity.:- From table no.3 the data indicate that the ligand show – ve antibacterial activity against E.Coli as well as B. Substilis and Cr , Fe complexes also show –ve antibacterial activity while Ni complex shows mild antibacterial activity but Cu complex show remarkable antibacterial activity.

Antifungal activity.:-The ligand CBMBTH and its Cr, Fe complexes shows –ve antifungal activity against A. niger and A. flavus while complex of Ni and Cu shows +ve antifungal activity, Cu complex shows remarkable antifungal activity against A. niger.

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