Synthesis, Characterization and Biological activity of Salicylidene-o-aminibenzoic acid, Salicylidine-o-aminothiophenol and their lead complexes.

(Key words : Schiff-bases, lead complex, biological studies, Salicylidene derivative.)

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ABSTRACT

Metal chelates of salicylidene-o-aminobenzoic acid and salicylidene-o-aminothiophenol with lead (II) have been synthesized and characterized on the basis of elemental analysis, Infra-red spectral studies. Ligands and their metal chelates were also screened for their anti-bacterial and antifungal activity on staphylococcus – aureus (gram +ve) and E. Coli (gram –ve) bacterial and Aspergillus nigar and candida albican's two common fungi.Interesting results have been obtained in terms of increased activity of ligands on being coordinated with the metal ion.

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INTRODUCTION

Schiff-bases having azomethine group are found to be very active against micro organism[1-7]. It is reported[8] that the biocidal activity of a ligand is several times increased on being co-ordinated with a suitable metal Ion.[8-12] In view of the above, it is considered to investigate the reported. Schiff-bases and their metal complexes against the mentioned bacteria and fungi.

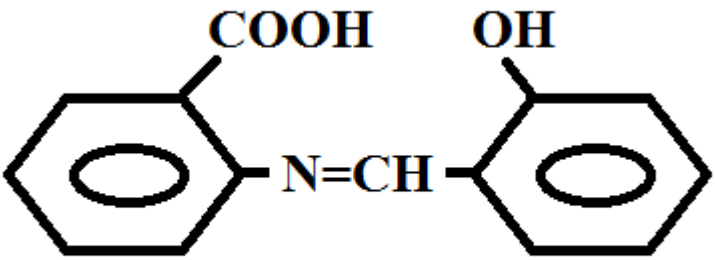
Experimental :-

(a) PREPARATION OF SCHIFF-BASIS :-

(i) o-aminobenzoic acid + salicyldehyde

Reflux ↓ 2 hrs

Schiff-base

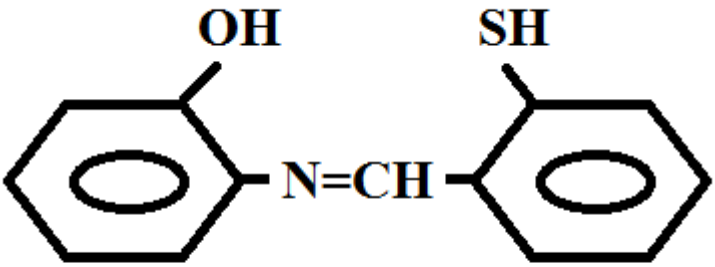


(S.A.B.A.)

(ii) o-aminothiophenol + salicyldehyde

Reflux ↓ 4 hrs

Schiff-base



(S.A.T.P.)

(b) PREPARATION OF METAL CHELATES :-

Pb (II) + Ligand -→ Pb – Complex.

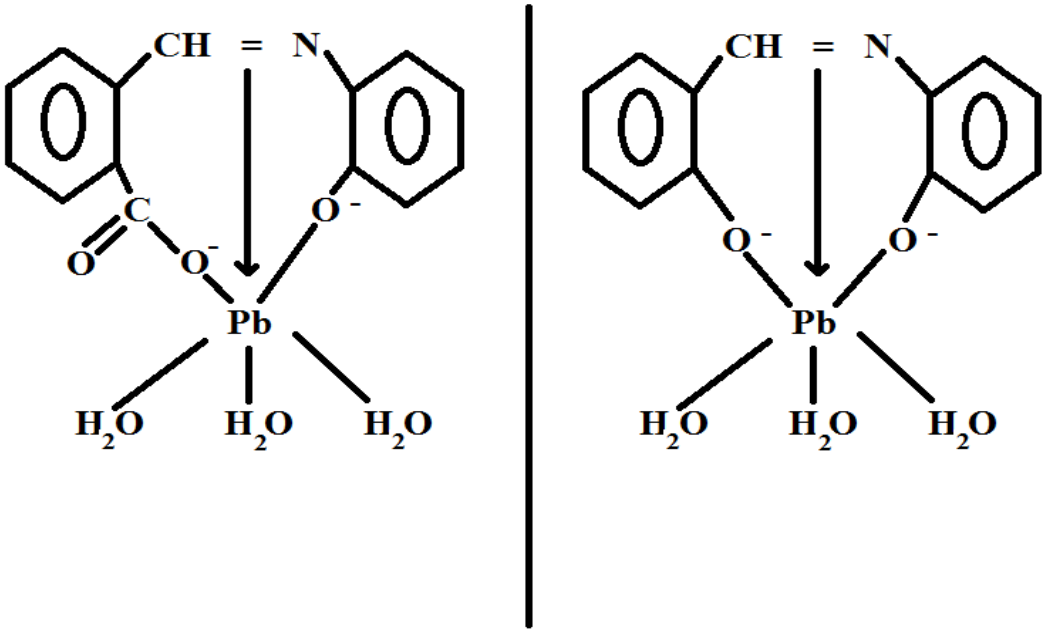


Table – I

S. No.	Compound	Colour	Dp/mp ^{0}C	% Analysis : Found (Calculated)					Molar Conductance Ohm^{-1} cm^2 $Mole^{-1}$	F.W. Calculated	Molecular Formula	Mol. Wt.
				C	H	N	S	Metal				
1.	S.A.B.A.	Orange Red	196	69.00 (69.71)	4.34 (4.56)	5.30 (5.81)	---	---	---	241	$C_{14}H_{11}No_3$	---
2.	S.A.T.P.	Light Yellow	135	68.01 (68.12)	4.74 (4.80)	6.30 (5.11)	13.07 (13.97)	---	---	229	$C_{13}H_{11}NSO$	---
3.	Pb (II) S.A.B.A.	Buff-White	258	32.92 (33.60)	2.87 (3.00)	2.81 (2.80)	---	40.82 (41.40)	1.05	500	$Pb(C_{14}H_{11}No_3)$-$(H_2O)_3$	492.72
4.	Pb (II) S.A.T.A.	Orange	252	30.02 (31.97)	2.89 (3.07)	2.69 (2.87)	5.98 (6.56)	41.04 (42.41)	1.25	488	$Pb(C_{13}H_{11}NSO)$-$(H_2O)_3$	479.92

S. NO.	S.A.B.A.	Pb (II) S.A.B.A.	Probable assignments
1.	1600 (s)	1580 (m)	Aromatic C=C stretching
2.	1490 (m)	1440 (s)	Aromatic C=C stretching
3.	1370 (s)	1395 (s)	-C-O stretching
4.	1050 (s)	1035 (b)	-C-O stretching
5.	790 (m)	755 (m)	Out of plane –CH bending
6.	--	820 (w)	Co-ordinated water molecule
7.	715 (s)	715 (w)	C-S stretching
8.	--	445 (s)	M-O stretching
9.	--	390 (w)	M-N stretching
10.	--	305 (s)	M-S stretching

Table – II

I.R. Spectral data (in Cm^{-1}) of S.A.B.A. and its metal (II) Complexes

S. NO.	S.A.B.A.	Pb(II)-S.A.B.A.	Probable assignments
1.	3450 (w)	--	-OH (Phenolic) stretching
2.	--	3390 (s)	Co-ordinated water molecule
3.	1700 (s)	1675 (s)	-C=O stretching (acid)
4.	1645 (s)	1630 (s)	C=N azomethine stretching
5.	1630 (s)	1620 (s)	Aromatic C=C stretching
6.	1550 (s)	1545 (ms)	Aromatic C=C stretching
7.	950 (w)	--	-OH bending (acid)
8.	785 (m)	780 (m)	Out of plane – CH bending
9.	745 (s)	750 (m)	Out of plane – CH bending
10.	--	425 (ms)	M-O stretching
11.	--	365 (m)	M-N stretching

Table – III

I.R.Spectral data (in Cm^{-1}) of S.A.T.P. and its metal (II) Complexes

S. NO.	S.A.T.P.	Pb(II)S.A.T.P.	Probable assignments
1.	3500 (w)	--	-OH Phenolic stretching
2.	--	3440 (b)	Co-ordinated water molecule
3.	2570 (w)	--	-S-N stretching
4.	1650 (s)	1625 (s)	-C=N azomethine stretching

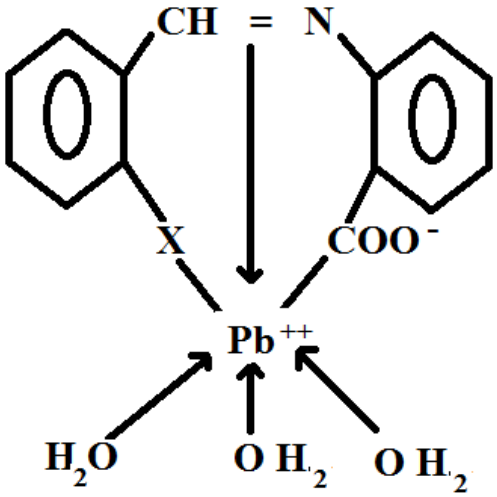
Table – VI

Minimum Inhibitory Concentration (M.I.C.) in ug/ml of organic ligands and their metal Complexes

Temp = 37^0C Temp used = 28^0C

Compound		Bacteria		Fungi	
		S.aureus	E.coli	A.Niger	C.Albicans
1.	S.A.B.A.	100	>100	50	>50
2.	S.A.T.P.	>100	>100	50	50
3.	Pb (II) S.A.B.A.	50	50	50	<50
4.	Pb (II) S.A.T.A.	>100	<50	50	<50

Structure of complex



X=S in S.A.T.P.
X=O in S.A.T.P.

RESULT AND DISCUSSION

Analytical data of the metal complexes indicate that one molecule of (A.F.A.) / (A.F.A.T.P.) and (A.F.A.P.) (A.F.A.Py.) is co-ordinated to a metal ion having three water moleculers as determined by thermal studies. The observed values of molar conductance for all the chelates suggest their non-ionic character (Table-I).

M.I.C. values presented in (Table-VI) reveals that antimicrobial activity of the metal chelates in comparison to their respective synthesized organic legands is considerably increased due to their combined activity effect.

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