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Related Study of Biocidal Activity of some Schiff Bases and its Metal Complex

Dr. Meenakshi Munjal
Department of Chemistry, D.A.V. College Abohar (Punjab)

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ABSTRACT:

A series of metal complexes derivatives Schiff base of Anisilidene pyridine and Anisilidene pyrimidene with the metal ion Cu(II), Co(II), Fe(III) have been synthesized. These compounds are subjected to study as a biocidal agent against different gram-negative and gram-positive bacteria. Antibacterial activities of Schiff bases and compare their activity with metal complexes. Study revealed that metal complexes showed better inhibition against tested bacterial strain and higher compared to parent ligand.

Key words: Schiff base, Anisilidene pyridine, Anisilidene pyrimidene, gram-negative bacteria, gram-positive bacteria, biocidal agent.

INTRODUCTION:

Metal complexes play an essential role in agricultural Pharmaceutical industrial chemistry. A metal surrounded by a cluster of ion or molecule is used for synthesis of complex compound named as Schiff base.

Metal complexes of N&S chelating ligand have attracted considerable attention because of their interesting physicochemical properties and pronounced biological activities. The N&S atom play a key role in the coordination of metal at the active site of numerous metallobiomolecule.

In view of the growing interest in the biocidal importance of Schiff base and there metal complexes and in continuation of work[1-6] we report the comparative study of antibacterial activity of parent ligand and metal complexes Cu(II), Co(II), Fe(III)

EXPERIMENTAL:

All reagent used were of chemically pure grade solvent were purified and dried according to standard procedure[7-11] biocidal studies is carried out according to plate dilution method. The antimicrobial effect is mesured by the formation of zone of inhibition around the disk.

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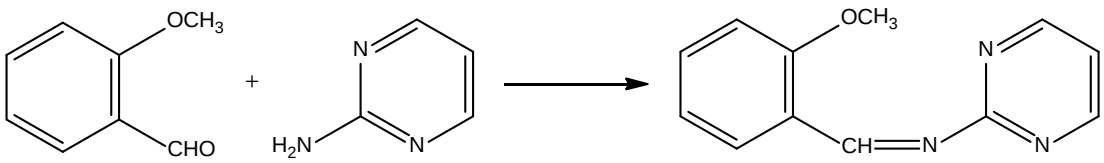
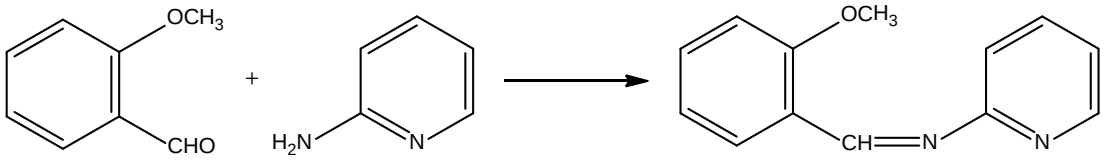
PREPRATION OF SCHIFF BASE:

Schiff base 2-Anisalidine pyrimidene prepared by refluxing equimolar quantities of 2-Amino pyrimidene and Anisaldehyde in ethanol.



2-Anisalidine Pyrimidine

Schiff base 2-Anisalidine pyridine is prepared by refluxing amino pyridine and Anisaldehyde.



2-Anisalidine Pyridine

Physical characteristics and elemental analysis of newly synthesised Schiff bases are carried out by Spectral studies based on UV,IR and NMR.[12-17]

The metal complexes of these Schiff base are also prepared by taking an aliquot of the concerned metal ion and to this 0.2% of reagent is added at the particular pH using buffer solution, metal complexes formed to be adsorbed on the foam, complex is eluted from the foam by squeezing with D.M.F.

BIOLOGICAL STUDIES:

Parents compound and the metal complexes prepared above is subjected to antibacterial activity[18-23]. For this we used more than one test organism to increase the chance of detecting antibiotic activity. The sensitivity of microorganism to free Schiff base and their complexes was determined by formation of zone of inhibition around the disk which incubated for 24 hours at 37°C ±1 by using the diffusion method against different species of gram-positive and gram-negative bacteria such staphylococci, streptococci, E.coli, pseudomonas and klebseiella species[24].

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TABLE 1. ANTIBACTERIAL ACTIVITY DATA OF DIFFERENT CONCENTRATIONS OF SCHIFF BASE 2-ANISALIDINE PYRIMIDINE

Concentration mg./ml	Pseudomonas				E. coli spp				Streptococci				Klabsiella spp			
	I	II	III	Mean	I	II	III	Mean	I	II	III	Mean	I	II	III	Mean
005	14	12	15	13.3	8	12	13	11.0	16	9	14	13.0	10	7	7	8.0
250	11	10	13	11.3	14	15	10	13.0	12	13	11	12.0	-	-	-	-
150	13	11	14	12.6	19	18	11	16.0	10	10	10	10	-	-	-	-
50	15	13	10	12.6	11	13	14	12.6	11	12	10	11	-	-	-	-

TABLE 2. ANTIBACTERIAL ACTIVITY DATA OF DIFFERENT CONCENTRATIONS OF SCHIFF BASE 2-ANISALIDINE PYRIDINE

Concentration mg./ml	Pseudomonas				E. coli spp				Streptococci				Klabsiella spp			
	I	II	III	Mean	I	II	III	Mean	I	II	III	Mean	I	II	III	Mean
500	13	11	10	11.3	12	12	13	12.3	8	16	14	16.0	-	-	-	-
250	10	12	11	11	13	10	12	11.6	11	12	11	11.3	-	-	-	-
150	12	11	10	11	14	14	14	14	14	10	12	12	-	-	-	-
50	11	10	11	10.6	12	12	11	11.6	13	9	11	11	-	-	-	-

TABLE 3. ANTIBACTERIAL ACTIVITY OF METAL COMPLAXES OF SCHIFF BASE 2-ANISALIDINE PYRIMIDINE

Concentration 500 mg./ml	Pseudomonas				E. coli spp				Streptococci				Klabsiella spp			
	I	II	III	Mean	I	II	III	Mean	I	II	III	Mean	I	II	III	Mean
Ni(II)	18	22	22	20.6	14	22	18	18	21	19	21	20.3	10	15	19	14.6
Cu(II)	14	12	14	13.3	19	24	23	22.0	24	22	24	23.3	16	20	18	18
Fe(III)	14	12	10	12	15	17	10	17.0	12	15	14	13.3	11	10	11	10.6

TABLE 4. ANTIBACTERIAL ACTIVITY OF METAL COMPLAXES OF SCHIFF BASE 2-ANISALIDINE PYRIDINE

Concentration 500 mg./ml	Pseudomonas				E. coli spp				Streptococci				Klabsiella spp			
	I	II	III	Mean	I	II	III	Mean	I	II	III	Mean	I	II	III	Mean
Ni(II)	16	18	19	17.6	15	12	11	12.6	20	19	18	19.0	12	18	17	15.6
Cu(II)	13	12	15	13.3	16	14	22	17.3	26	23	24	24.3	12	15	14	13.6
Fe(III)	11	12	15	12.6	12	13	15	13.3	10	11	14	11.6	11	15	13	13.0

Activity Range:

16-18mm	-	Moderate activity
10-16mm	-	Mild activity
Below 10mm	-	Weak or no activity

RESULTS AND DISCUSSION:

These Schiff base were subjected to find out their biocidal activity against gram-negative and Gram-positive bacteria against a Schiff base taken in work. The antibacterial activity data obtained are listed in table 1-4.

From the table it is evident that Schiff bases showed a big difference in activity against different bacteria (As high as against E. coli at 100mg/ml concentration and as low as against Klabsiella spp. At various concentration) but most of these shows activity in mild range. The synthesized metal complexes of these Schiff bases shows higher biological activities compared to the free legand.

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