CHAPTER - V

ANTIMICROBIAL STUDY OF METAL COMPLEXES

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In this chapter the report of antimicrobial studies of different metal complexes against S.Albus (gram positive), S.Aureus (gram positive), E.Coli and Pseudo monas (gram negative) micro organisms has been presented.

EXPERIMENTAL :

All the chemicals and solvents used were of A.R. or equivalent grade.

Preparation of reagents and stock solutions :

Metal complexes were prepared as described earlier in Chapter III.

Fresh solutions of all the compounds were prepared by dissolving 10 mg in 10 ml of acetone.

Micro-organisms :

The micro organisms used for the present studies were pure culture obtained from 'Department of Micro-biology' Medical College, Miraj.

The following strains were selected for antimicrobial investigation.

a) Gram positive bacteria.

1) Staphylococus Albus
2) Staphylococus Aureus

b) Gram negative bacteria

1) Escherichia Coli
2) Pseudomonas

Assay Method :

The 'Disc assay' method used in the present study is described below.

Nutrient agar was used as a test medium which was prepared by dissolving 'difco' agar, agar powder (2.5 gm), pepton (1.0 gm), sodium chloride (10.5 gm) in hot distilled water (100 ml). The solution pH (7.4) was sterilized by steam at 12 lb pressure and 120^{o}C for half an hour and then poured in sterillized petridishes.

Test tube culture of the micro organism was shaken with 5.0 ml of plain broth and was inoculated on agar plate by pouring the solution on surface. After about 15 minutes filter paper disc containing the test compounds were placed on the agar surface. Petridishes were incubated with inverted position at 37^{o}C for 24 hours and inhibition zones were measured in millimeters. All the experiments were carried out in duplicate and average values of inhibition diameters were noted. All the operations were carried out in complete aseptic condition to prevent atmospheric contamination.

RESULTS AND DISCUSSION :

The results of our present investigation are summarised in table No.1.

Antimicrobial activity of different metal complexes of α-diketone

Inhibition zone diameter in m.m.

Compound	Gram Positive		Gram Negative	
	S.albus	S.aureus	E.coli	Pseudo monas
1	10	13	14	10
2	12	8	13	15
3	16	15	13	14
4	14	10	13	9
5	5	11	7	9
6	9	13	11	13
7	10	13	11	9
8	11	8	13	11
9	13	10	12	9
10	6	10	10	7
11	10	12	8	11
12	9	10	12	8
13	15	14	10	9
14	12	14	10	9
15	10	11	9	11
16	8	10	12	8
17	10	13	11	9
18	7	10	8	6
19	10	13	11	12
20	11	9	11	12
21	14	12	14	10
22	10	13	11	12
Kanamycin	20	18	22	16

Antimicrobial Potency of different metal complexes of α-diketone

Compound No.	Gram Positive		Gram Negative	
	S.Albus	S.Aureus	E.Coli	Pseudo monas
1	+	+	++	+
2	+	+	+	++
3	+++	++	+	++
4	++	+	+	+
5	+	+	+	+
6	+	+	+	+
7	+	+	+	+
8	+	+	+	+
9	+	+	+	+
10	+	+	+	+
11	+	+	+	+
12	+	+	+	+
13	++	++	+	+
14	+	+	+	+
15	+	+	+	+
16	+	+	+	+
17	+	+	+	+
18	+	+	+	+
19	+	+	+	+
20	+	+	+	+
21	++	+	++	+
Kanamycin	+++	+++	+++	+++

\+ Low Potency (Below 13 mm inhibiting zone)

++ Moderate Potency (14-15 mm inhibiting zone)

+++ High Potency (Above 16 mm inhibiting zone)

CONCLUSION :

From the above results we conclude,that, above metal complexes have some antibacterial activity against gram positive (S. Albus,Staphylococcus Aureus) and gram negative (E.coli, P. monas) bacteria. For gram positive bacteria there is no much difference in the activity same is true for gram negative bacteria.

According to table No.2 complex III showed high potency against gram positive (S. albus) bacteria.

Complexs IV, XIII, XIV, XXI have moderate potency against gram positive bacteria (S.albus). Complex I showed moderate potency against gram negative bacteria (E.coli).

Complexes II, III, XXI have moderate potency against gram negative bacteria (P. monas).

Complexes I, II, V to XII and XV to XX showed less potency against gram positive bacteria (S.albus and S.aureus) and gram negative bacteria (E.coli and P.monas).

Compd.No.	Name of the complexes
1	dl-camph-2-one-3-N-(Phenyl)imino dichloro nickel(II)
2	dl-camph-2-one-3-N-(4-methyl phenyl) imino dichloronickel (II)
3	dl-camph-2-one-3N-(3 methyl phenyl) imino dichloro nickel (II)
4	dl-camph-2-one-3-N-(2 methyl phenyl) imino dichloro nickel(II)
5	dl-camph-2-one-3-N-(phenyl)imino dichloro maganese (II)
6	Bis-(camph-2-one-3-N-(4 methyl phenyl) imino dichloro maganese (II) adduct
7	Bis-(dl-camph-2-one-3-N-(2 methyl phenyl) imino dichloro maganese (II) o-toludine adduct
8	Bis-(dl-camph-2-one-3-N-(phenyl) imino dichloro cobalt(II) aniline adduct
9	Bis-(dl-camph-2-one-3-N-(4 methyl phenyl) imino dichloro cobalt(II) p-toludine
10	Bis-(dl-camph-2-one-3-N-(2 methyl phenyl) imino dichloro cobalt(II) o-toludine adduct
11	Bis(dl-camph-2-one-3-N-(phenyl) imino dichloro chromium(II) aniline adduct

contd....

Compd.No.	Name of the compound
12	dl-camph-2-one-3-N-(4 methyl phenyl)-imino dichloro chromium(II).
13	Bis-(camph-2-one-3-N-(2 methyl phenyl)-imino dichloro chromium (II) o-toludine adduct.
14	Bis-(dl-camph-2-one-3-N-(3 methyl phenyl)-imino dichloro chromium m-toludine adduct
15	dl-camph-2-one-3-N (phenyl)-imino dichloro copper(II)
16	Bis-camph-2-one-3-N-(2 methyl phenyl)-imino) dichloro copper o-toludine adduct
17	Bis-(dl-camph-2-one-3-N-(3 methyl phenyl)-imino dichloro copper(II) m-toludine adduct
18	Bis-(dl-camph-2-one-3-N-(4 methyl)phenyl-imino) dichloro copper p-toludine adduct
19	dl-camph-2-one-3-N-(n-butyl-imino) dichloro nickel(II)
20	dl-camph-2-one-3-N-(n-butyl)-imino dichloro cobalt(II)
21	dl-camph-2-one-3-N-(n-butyl)-imino dichloro copper(II).