# Synthesis, Characterization and Antimicrobial Activity of Metal Complexes of Substituted α-Benzoinoximes

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***Abstract***- Novel metal benzoinoxime complexes have been synthesized substituted from substituted benzoinoximes.They were characterized by element and spectral analysis. The synthesized complexes were screened for antimicrobial activity at a concentration of 1000µgm/ml which was serially diluted to determine their MIC value of Furionoxime -Cu(II).

***Index Terms***- Antimicrobial activity,metal complexes, O-Hyroxybenzoinoxime,4-Dimethylaminobenzoinoxime.

## I. INTRODUCTION

Benzoinoxime are well known for their biological activity. Co-ordination compounds containing ONS as donor atoms are reported to possess antimicrobial activity[1]. Complexes of Mn(II) with the tridentate oxime ligand 2,6 diacetylpyridine dioxime by Madan Mohan[2]. It was observed that antimicrobial activity of some drugs increased markardly. When they are applied in the from of metal complexes[3]. Inerstiations on variety of oximes and Schiff bases and their transition metal complexes was carried out by several workers[4-5]. Benali[6] reported the extraction of U(VI), W (VI), Mo(IV) and some transition metal of the iron family as the complexes of benzoinoxime. Sulekh Chandra[7]. Reported synthesis. EPR and electronics spectral studies on Cr(III) and Mn(II) complexes of some oxime. Ibrahim Demir[8] carried out synthesis and characterization on of Ni(II),Cu(II), Co(II), Zn(II), Cd(II) and Hg (II) with iminoxime. Iron(III) complexes of O-vanillinoxime have been synthesized and characterized by different physicochemical techniques[9] Mohaptra[10],reported the complexes of divalent ion with benzyl-oxime patil[11], studied the antimicrobial effect of Cu(II) complexes containing oxime ligands Attia[12] transition metal complex of substituted benzoinoxime are reported.

## II. EXPERIMENTAL

The benzoinoxime were prepared by refluxing substituted benzoines with hydroxylamine hydrochloride in presence of alkaline medium for 3-4 hours, the reaction mixtures were kept overnight. The solid products formed were isolated and washed several times with water alcohol mixture thee purity was checked by TLC paper. Their structural details were confirmed on the basis of and spectral analysis. In order to synthesize the complexes the equimolar mixture of each of the ligand (0.01 M) and metal salts was refluxed on a water bath for 6-8 hours in presence of sodium acetate in ethanol / methan, carried out synthesis and characterization of mononuclear and binucler chromium(III) complexes of α - benzoinoxime. In the present work, novel ol the reaction mixture was reflux overnight. The product formed were isolated washed several times with cold water ethanol mixture. The characterization of synthesized complexes was made with elemental analysis, IR and UV- VIS spectra

## III. RESULT AND DISCUSSION

IR spectral data of the ligand and it's metal complexes ($cm^{-1}$)

**Table no.1**

| Sr.no | Ligand and its complexes | Colours | M.P. ($^oc$) | IR Key band ($cm^{-1}$) |
|---|---|---|---|---|
| 1. | 4-DMABO | Yellow | 145 | 3423 (O-H), 1660 (C=N) |
| 2. | FURO | Brown | 207 | 3395.4 (O-H), 1651.2 (C=N) |
| 3. | 2-HBO | Light Brown | 180 | 3412 (O-H), 1666 (C=N) |
| 1a | 4-DMABO-Cu(II) | Red | 273 | 3393 (O-H), 1640 (C=N) |
| 2a | FURO-Cu(II) | Red | 278 | 3380(O-H), 1616 (C=N) |
| 3a | 2-HBO-Cu(II) | Brown | 282 | 3386 (O-H), 1610 (C=N) |
| 1b | 4-DMABO-Co(II) | Brown | 281 | 3118 (O-H), 1651 (C=N) |
| 2b | FURO-Co(ii) | Black | 290 | 3383 (O-H), 1604 (C=N) |
| 3b | 2-HBO-Co(II) | Dark Brown | 325 | 3369 (O-H), 1607 (C=N) |
| 1c | 4-DMABO-Mn(II) | Black | 276 | 3412 (O-H), 1605 (C=N) |

| | | | | |
|---|---|---|---|---|
| 2c | FURO-Mn(II) | Brown | 286 | 3351(O-H), 1592 (C=N) |
| 3c | 2-HBO-Mn(II) | Brown | 323 | 3343(O-H), 1602 (C=N) |

The infrared spectra of ligand shows band at 3423 υ(O-H) of oxime. In 4-DMABO complex, which decreases to 3393 $cm^{-1}$ indicating linkage through hydrogen oxygen[22]. However 1660 (C=N) significantly decreases to 1640 $cm^{-1}$ showing linkage through nitrogen of oximino group[23]. In FURO ligand show band at 3395$cm^{-1}$ υ(O-H) ,in FURO-Cu(II) complexes showed band at 3380$cm^{-1}$ However 1651$cm^{-1}$ υ(C=N) significantly decreases to1616$cm^{-1}$.In 2-HBO ligand show band at 3412$cm^{-1}$ υ(O-H),in 2-HBO-Cu(II) complexes shows band at decreases to 3386$cm^{-1}$ showing linkage throught nitrogen .However,1666 $cm^{-1}$ υ(C=N) significantly decreases to 1610$cm^{-1}$.

**Table No. 2 – Elemental Analysis data of the complexes found / (Calculated) %**

| Complexes | Elemental analysis data Found / (Calculated ) % | | | |
|---|---|---|---|---|
| | C | H | N | M |
| 4-DMABO-Cu(II) | 62.76 (63.84) | 4.57 (5.65) | 9.31 (9.31) | 9.68 (10.55) |
| FURO- Cu(II) | 57.51 (58.32) | 2.94 (3.88) | 5.91 (6.80) | 14.55 (15.43) |
| 2-HBO-Cu(II) | 60.44 (61.36) | 3.49 (4.38) | 4.23 (5.11) | 10.072 (11.59) |
| 4-DMABO-Co(II) | 63.44 964.32) | 4.73 (5.69) | 9.38 (9.38) | 8.4 (9.87) |
| FURO-Co(II) | 58.03 (58.97) | 2.98 (3.93) | 5.94 (6.88) | 13.60 (14.48) |
| 2-HBO-Co(II) | 60.93 (61.88) | 3.57 (4.42) | 4.27 (5.15) | 9.93 (10.85) |
| 4-DMABO-Mn(II) | 63.48 (64.76) | 4.77 (5.73) | 9.44 (9.44) | 8.53 (9.26) |
| FURO-Mn(II) | 58.64(59.56) | 3.02(3.97) | 6.06(9.94) | 12.73(13.63) |
| 2-HBO-Mn(II) | 57.17 (58.03) | 3.29 (4.14) | 3.90 (4.83) | 8.55 (9.48) |

**Antimicrobial activity of complexes :-**

The compound were assayed for their antimicrobial activities[13] against four test organisms E.coli, S.aureus, P. aeruginosa, B.subtilis at a concentration of 1000µgm / ml by agar well technique[14]. Further their MIC value against these organisms were determined by serial dilution method using DMF as a solvent. The result obtained are given in table.

MIC values in µgm/ml of compounds

**Table No 3 :**

| Complexes | E.Coli. | S.aureus | P.aeruginosa | B.subtilis |
|---|---|---|---|---|
| 4-DMABO-Cu(II) | 125 | 125 | 250 | 250 |
| FURO-Cu(II) | 250 | 250 | 250 | 125 |
| 2-HBO-Cu(II) | 125 | 125 | 125 | 125 |
| 4-DAMBO-Co(II) | 61 | 125 | 125 | 250 |
| FURO-Co(II) | 250 | 125 | 125 | 125 |
| 2-HBO-Co(II) | 125 | 125 | 63 | 63 |
| 4-DAMBO-Mn(II) | 125 | 125 | 125 | 125 |
| FURO-Mn (II) | 125 | 125 | 125 | 250 |
| 2-HBO-Mn(II) | 125 | 250 | 125 | 250 |

The complex 4-DMABO–Cu(II), FURO-Mn(II) is found to be effective against maximum number of organisms followed by 4-DABO-Co(II) and 2-HBO-Co(II). They showed antimicrobial activity against E.coli, s.aureus, p.aeruginosa, B.subtilis (Lowest MIC value). The enhanced antimicrobial activity in case of the compound, 2-Hydroxybenzoinoxime-Co(II) may be attributed to the presence of hydroxy group.

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