## **IJARSCT**



International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)

Volume 2, Issue 4, April 2022

# The Anti-Microbial Activity of Metal Complexes Derived from Schiff's Bases

## Sandipkumar M. Devraye

Department of Chemistry
Late Ramesh Warpudkar ACS College, Sonpeth, Parbhani, Maharashtra, India
smdevraye@gmail.com

**Abstract:** Co(II), Ni(II), Cu(II) complexes of the Schiff base derived from substituted benzaldehyde and maninobenzoic acid were synthesized and characterized by elemental analysis, IR, UV–Vis,. The IR results demonstrate the bidentate binding mode of the ligand involving azomethine nitrogen and carboxylate oxygen atoms. The antimicrobial activity of the synthesized ligand and its complexes were screened by disc diffusion method. The results show that the metal complexes were found to be more active than the ligand.

Keywords: Schiff's Base, Ligands, Transition Metal Complexes, Anti-Microbial Activity.

#### REFERENCES

- [1]. Gupta, K.C., Sutar, A.K., "Catalytic activities of Schiff base transition metal complexes". Coord. Chem. Rev. 252 (12–14), 1420–1450. 2008.
- [2]. Budhani, P., Iqbal, S.A., Bhattacharya, S.M.M. "Synthesis, characterization and spectroscopic studies of pyrazinamide metal complexes." J. Saudi Chem. Soc. 14, 281–285. 2010.
- [3]. P. V. Bernhardt, P. Chin, P. C. Sharpe, J. Y. C. Wang, and D. R. Richardson, "Novel diaroylhydrazine ligands as iron chelators: coordination chemistry and biological activity," Journal of Biological Inorganic Chemistry, vol. 10, no. 7, pp. 761–777. 2005.
- [4]. C. Imrie, P. Engelbrecht, C. Loubser, and C. W. McCleland, "Monosubstitutedthermotropicferrocenomesogens: an overview 1976–1999," Applied Organometallic Chemistry, vol. 15,no. 1, pp. 1–15, .2001.)
- [5]. M. Bakir, I. Hassan, T. Johnson et al., "X-ray crystallographic, electrochemical and spectroscopic properties of 2-pyridinio 2- pyridyl ketone phenyl hydrazone chloride hydrate," Journal of Molecular Structure, vol. 688, no. 1–3, pp. 213–222. 2004.
- [6]. S. M. Emam, F. A. El-Saied, S. A. Abou El-Enein, and H. A. El-Shater, "Cobalt(II), nickel(II), copper(II), zinc(II) and hafnium(IV) complexes of N\_-(furan-3-ylmethylene)-2-(4- methoxyphenylamino)acetohydrazide," SpectrochimicaActa Part A, vol. 72, no. 2, pp. 291–297.2009.
- [7]. K. Andjelkovic, G. Jakovljevic, and M. Zlatovic, "Acid-baseequilibria of the Zn(II) and Fe(III) complexes with condensation products of 2-acetylpyridine and the dihydrazide of oxalic and malonic acid," Journal of the Serbian Chemical Society, vol. 69, pp. 651–660, 2004.
- [8]. P. V. Bernhardt, P. Chin, P. C. Sharpe, J. Y. C. Wang, and D. R. Richardson, "Novel diaroylhydrazine ligands as iron chelators: coordination chemistry and biological activity," Journal of Biological Inorganic Chemistry, vol. 10, no. 7, pp. 761–777, 2005.
- [9]. N. Terzioglu and A. G¨ursoy, "Synthesis and anticancer evaluation of some new hydrazone derivatives of 2,6-dimethylimidazo[2,1-b][1,3,4]thiadiazole-5-carbohydrazide," European Journal of Medicinal Chemistry, vol. 38, no. 7-8, pp. 781–786, 2003.
- [10]. Vogel, A.I., 1978. "A Textbook of Quantitative Inorganic Analysis Including Elementary Instrumental Analysis" fourth ed. Longman, London.
- [11]. B. S. Furniss, A. J. Hannaferd, and V. Rogers, "Vogel's Textbook of Practical Organic Chemistry", Longman, Inc., New York, NY, USA, 4th edition, 1981.
- [12]. M.S. Nair et al., "Synthesis, characterization, antifungal, antibacterial and DNA cleavage studies of some heterocyclic Schiff base metal complexes.", King Saud University. Production and hosting by Elsevier B.V. 2010

DOI: 10.48175/IJARSCT-3461

# **IJARSCT**



### International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)

#### Volume 2, Issue 4, April 2022

- [13]. C. Anitha,S. Sumathi,P. et al.., "Synthesis, Characterization, and Biological Activity of Some TransitionMetal Complexes Derived from Novel HydrazoneAzo Schiff Base Ligand." Hindawi Publishing Corporation International Journal of Inorganic Chemistry, Article ID 493942, 8 pages. Volume 2011
- [14]. Bauer, A.W., Kirby, W.M.M., Sherris, J.C., Turck, M.,." Antibiotic susceptibility testing by a standardized single disc method". Amer. J. Clin. Pathol. 45, 493–496. 1966
- [15]. Nayaz Ahmed et.al. "Synthesis, Characterisation, and Biological Evaluation of Zn(II) Complex with Tridentate (NNO Donor) Schiff Base Ligand."Hindawi Publishing Corporation International Journal of Inorganic Chemistry, Article ID 607178, 5 pages. Volume 2015
- [16]. Jitendra N. Boraseet.al., "Design, synthesis and biological evaluation of heterocyclic methyl substituted pyridine Schiff base transition metal complexes.", SN Applied Sciences 3:197. (2021)
- [17]. Thierry Y Fonkuiet.al.,"Microbial activity of some heterocyclic Schiff bases and metal complexes: A review.", Tropical Journal of Pharmaceutical Research; 17 (12): 2507-2518. December 2018
- [18]. W. Walke and Niren E. Kathale., "Synthesis and Characterization of some Metal Complexes prepared from Schiff Base Ligand having Heterocyclic unit"., Journal of Scientific Research, Volume 65, Issue 6, 2021
- [19]. R. Gup and B. Kirkan, "Synthesis and spectroscopic studies of copper(II) and nickel(II) complexes containing hydrazonic ligands and heterocyclic coligand," SpectrochimicaActa Part A, vol. 62, no. 4-5, pp. 1188–1195, 2005.
- [20]. Deacon, G.B., Phillips, R.J., "Relationships between the carbon–oxygen stretching frequencies of carboxylato complexes and the type of carboxylate coordination". Coord. Chem. Rev. 33 (3), 227–250. 1980.
- [21]. Nakamoto, K., "Infrared and Raman Spectra of Inorganic and Coordination Compounds", third ed. John Wiley and Sons. 1978.
- [22]. Shebl, M., "Synthesis, spectral studies, and antimicrobial activity of binary and ternary Cu(II), Ni(II), and Fe(III) complexes of new hexadentate Schiff bases derived from 4,6-diacetylresorcinol and amino acids." J. Coord. Chem. 62 (19), 3217–3231. 2009.
- [23]. V. D. Bhatt and A. Ray, "Synthesis, characterization and electrical conductivity of polyesters, polyamides and doped polymers," Synthetic Metals, vol. 92, no. 2, pp. 115–120, 1998.
- [24]. D. Prakash, C. Kumar, S. Prakash, A. K. Gupta, and K. R. P. Singh, "Synthesis, spectral characterization and antimicrobial studies of some newbinuclear complexes of CullandNiII Schiff base," Journal of the Indian Chemical Society, vol. 86, no. 12, pp. 1257–1261, 2009.
- [25]. M. L. HariKumaran Nair and L. Shamla, "Synthesis, spectral and thermal studies of copper(II) complexes of azodyes derived from 2,3-dimethyl-1-phenyl-4-amino-5-pyrazolone," Journal of the Indian Chemical Society, vol. 86, no. 2, pp. 133–138, 2009.
- [26]. V. Reddy, N. Patil, and B. R. Patel, "Synthesis and characterization of Co(II), Ni(II), and (II) complexes with O,N and S donar ligands," Journal of Indian Council of Chemists, vol. 23, no. 2, pp. 1–3, 2006.
- [27]. P. Tharmaraj, D. Kodimunthiri, C. D. Sheela, and C. S. ShanmugaPriya, "Synthesis, spectral characterization, and antimicrobial activity of copper(II), cobalt(II), and nickel(II) complexes of 3-formylchromoniminopropylsilatrane," Journal of Coordination Chemistry, vol. 62, no. 13, pp. 2220–2228, 2009.
- [28]. Kettle, S.F.A.,. Coordination Compounds. ELBS, Essex, UK. 1969
- [29]. Cotton, F.A., Wilkinson, G.,. Advanced Inorganic Chemistry. Wiley-Interscience, New York. 1998
- [30]. Parjanya Kumar Shukla et.al., "Significance of Nitrogen Heterocyclic Nuclei in the Search of Pharmacological Active Compounds.", New Perspective in Agriculture and Human health., Researchgate March 2017
- [31]. K. Sadana, Y. Mirza, K. R. Aneja, and O. Prakash, "Hypervalent iodine mediated synthesis of 1-aryl/hetryl-1,2,4-triazolo[4,3-a] pyridines and 1-aryl/hetryl 5-methyl-1,2,4-triazolo[4,3-a]quinolines as antibacterial agents," European Journal of Medicinal Chemistry, vol. 38, no. 5, pp. 533–536, 2003.

DOI: 10.48175/IJARSCT-3461