Journal of Chemical Health Risks
www.jchr.org
JCHR (2023) 13(3), 1496-1499 | ISSN:2251-6727

# Antibacterial Efficacy Show by Novelthiazolo-Imidazole Containing 8-Hydroxyquinoline Derivatives (HL1-HL4))

**Yogendra Lavavanshi[1]*, Arun Singh[2], Diwa Mishra[3]**
[1]*Research Scholar, Govt. Maharani Laxmi Bai Girls' Autonomous P.G. College Bhopal- 462 001 (India)
[2]Professor, Govt. Maharani Laxmi Bai Girls' Autonomous P.G. College Bhopal - 462 001 (India)
[3]Professor, Govt. Geetanjali Girls' Autonomous P.G. College Bhopal- 462 001 (India)

***(Received: 04 August 2023 Revised: 12 September Accepted: 06 October)***

**KEYWORDS**
Staphylococcus aureus, Kllebsiella promioe, B. subtili, Antibacteria acivity and E. coli

**ABSTRACT**:
The novel Thiazolo-imidazole containing 8-hydroxyquinoline containing derivatives **(HL1-HL4)** were prepared. The Metal complexes of all the four ligands, 5-(3-substituted phenyl imidazo[2,1-b]thiazol-6-yl)-8-hydroxy quinoline **(HL1-HL4)** were prepared by using $Cu^{+2}$,$Co^{+2}$,$Ni^{+2}$, $Zn^{+2}$ and $Mn^{+2}$ metal ions. We want to find out, Thiazolo-imidazole containing 8-hydroxyquinoline containing derivatives **(HL1-HL4)** has any antimicrobial activity on ***B. subtilis, Staphylococcus aureus, Kllebsiella promioe*** and ***E. coli***. In SCDA media, every study result has demonstrated antibacterial activities against challenging microorganisms. The test results indicate that ***B. subtili*** had a greater inhibition zone (24mm) the other studied microorganisms, ***Staphylococcus aureus, Kllebsiella promioe*** and ***E. coli***. The sample containing the chemical exhibits stronger antibacterial activity. Based on the findings of the experiment, it has been determined that the molecule found in the sample plays a significant role in pharmaceuticals, particularly in terms of its antibacterial properties.

**Introduction:**
2-aminothiazole and its derivatives are the backbone of different drugs due to their extraordinary activity against various diseases. Many heterocyclic compounds are important in pharmaceutical because of very powerful biological properties (1,7). RNA and DNA nucleic acids include thru imidazole ring. Due to its polarity, it enhances the pharmacodynamics properties which lead to medicinal value of molecules. The imidazole medications have led to many treatments of diseases antiviral, anti T. B., anti-diabetic and antimalarial (8,9). Imidazole [2, 1-b] thiazole derivatives are prominent for medicinal value due to broad range of biological properties. OX is an important compound has ability to co-ordinate with many bivalent metal ions through N and O atoms of OX (10,11).

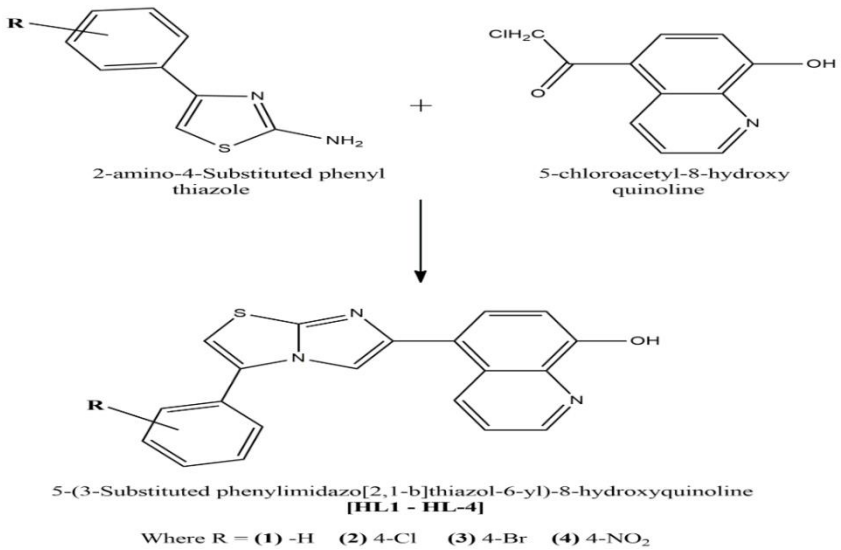



**Figure No. 01** for HL1, HL2, HL3 and HL4.

Journal of Chemical Health Risks
www.jchr.org
JCHR (2023) 13(3), 1496-1499 | ISSN:2251-6727

**2. Material and Method:**

**SCDA:**

Dissolve 40.0 grammes in 1000 ml of distilled or filtered water. If heat is required to entirely dissolve the medium, do so. Stir thoroughly, then pour into tubes or flasks as needed. Sterilise via autoclaving for 15 minutes at 121 degrees Fahrenheit and 15 pounds of pressure. The final pH is 7.33.

There is clearly observable growth of microorganisms equivalent to that got with recently tried and approved parcel of medium while inoculating no more than 100 cfu for the shortest period feasible between 30 and 35 degrees Celsius for 18 to 24 hours (bacteria) and 5 days (fungi)). According to IP guidance, growth promotion is done.

**0.1% Peptone water:**

Dissolve 0.100 grammes in 1000 ml of distilled or filtered water. If heat is required to entirely dissolve the medium, do so. Stir thoroughly, then pour into tubes or flasks as needed. Sterilise via autoclaving for 15 minutes at 121 degrees Fahrenheit and 15 pounds of pressure. The final pH is 7.33.

There is clearly observable growth of microorganisms equivalent to that got with recently tried and approved parcel of medium while inoculating no more than 100 cfu for the shortest period feasible (bacteria need 18-24 hours at 30°C, but fungi need 5 days at that temperature.). According to IP guidance, growth promotion is done.

**Culture Enumeration:**

Readymade culture of ***S. bongori B. subtilis*** and ***etc.*** is used or culture enumeration activity.

**Antibacterial efficacy test:**

Bacillus subtilis, Staphylococcus aureus (gramme +Ve), and Kllebsiellapromioe, E. coli (gramme -Ve) were used to test the antibacterial activity of the synthesised ligands and their metal complexes. The agar-cup plate methods were applied to measure activity.

**Zone of Inhibition method:**

Transfer media plates of SCDA agar to the biosafety cabinet. Remove the culture tubes, then continue with the spare plate procedure. Use two SCDA plates for testing and create one cup with a diameter of 6.0 mm using a cork borer on each plate. Pour 100 microliter of each of the sample solutions for the extracts into a petri dish. To allow for solution diffusion, keep the plates in this position for 1 hour. So that no dilution spills into the cups, carefully transfer the plates into an incubator that is set at 30-35 °C. For 24 hours, incubate the Petri dishes at 30-35°C. After incubation on an appropriate Vernier, measure the circumference of the white zone created by the sample solution of ethanol extract.

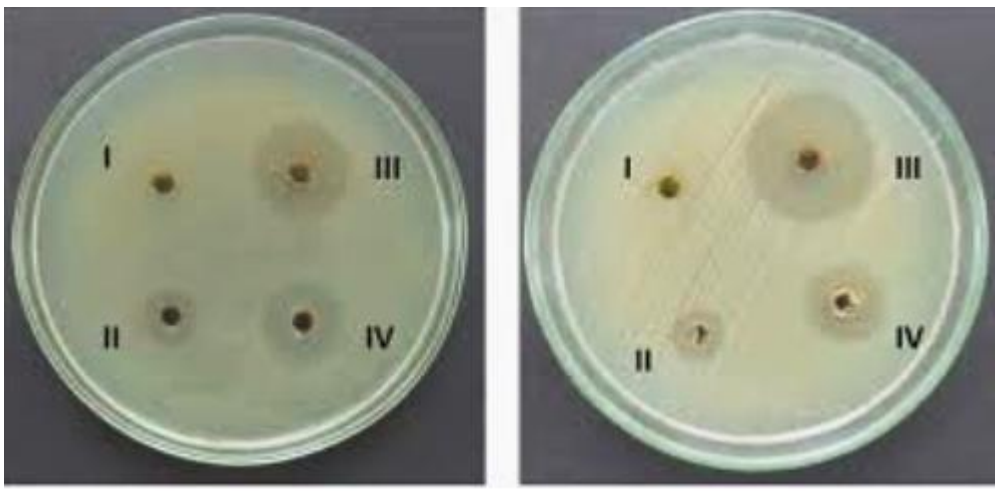



**Figure No. 01** Typical figure of Antibacterial Activity by Agar cup method

**4. Result and Discussion:**

***Bacillus Subtilis:***

To determine its antibacterial efficacy, the zone of inhibition method's area diameter of sample Ligands HL1, HL2, HL3 and HL4 was examined. All of the bacteria in the test tube were killed by the sample Ligands HL1, HL2, HL3, and HL4. The deliberate restraint zones for a bunch of Ligands each of HL1, HL2, HL3, and HL4 was 13, 22, 17, and 19 millimeters. Refer table No.01 and Graph no. 01.

***Staphylococcus aureus:***

To determine its antibacterial efficacy, the zone of inhibition method's area diameter of sample Ligands HL1, HL2, HL3 and HL4 was examined. All of the bacteria in the test tube were killed by the sample Ligands HL1, HL2, HL3, and HL4. The HL1, HL2,

Journal of Chemical Health Risks
www.jchr.org
JCHR (2023) 13(3), 1496-1499 | ISSN:2251-6727

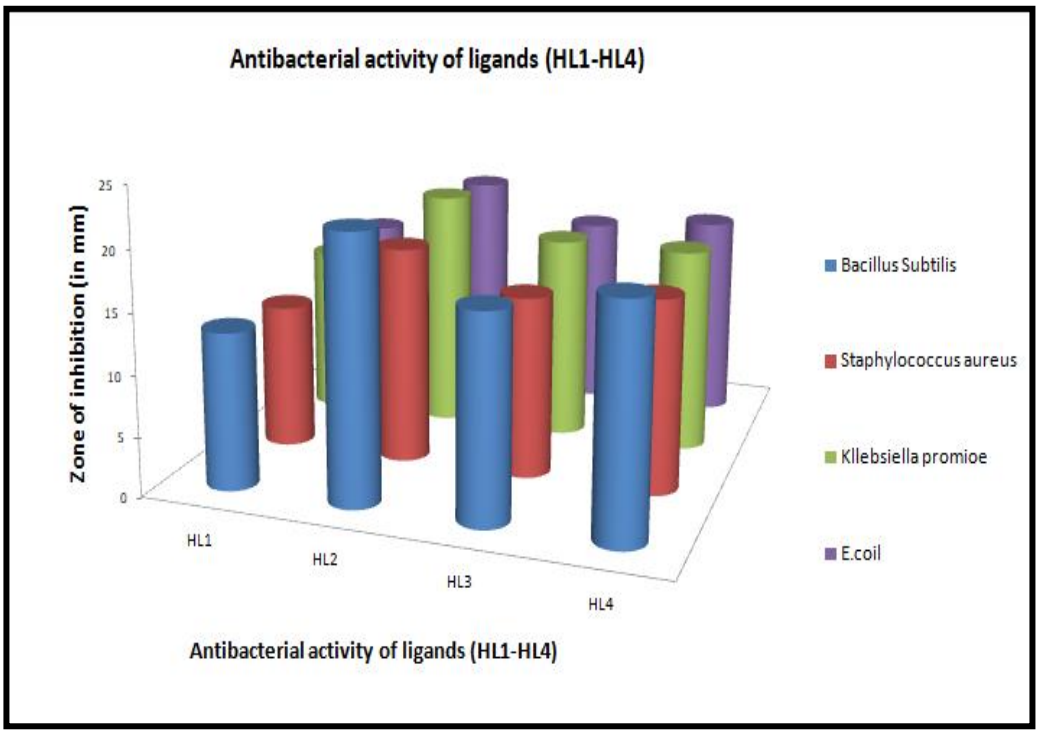
HL3, and HL4 ligands all have distinct regions of inhibition estimated to be 12 millimeters, 18 millimeters, 15 millimeters, and 16 millimeters, separately. Refer table No.01 and Graph no. 01.

***Kllebsiella promioe:***
To determine its antibacterial efficacy, the zone of inhibition method's area diameter of sample Ligands HL1, HL2, HL3 and HL4 was examined. All of the bacteria in the test tube were killed by the sample Ligands HL1, HL2, HL3, and HL4. The 14mm, 20mm, and 17mm constraint zones for the HL1, HL2, HL3, and HL4 tests were decided upon. Refer table No.01 and Graph no. 01.

***E.coil:***
To determine its antibacterial efficacy, the zone of inhibition method's area diameter of sample Ligands HL1, HL2, HL3 and HL4 was examined. There was no bacterium that the sample Ligands HL1, HL2, HL3, and HL4 couldn't kill. A sample of Ligands HL1, HL2, HL3, and HL4 showed inhibitory zones of 14, 19, 16, and 17 millimetres, respectively. Refer table No.01 and Graph no. 01.

**Table No. 01** for Antibacterial activity of ligands (HL1-HL4)

| **Ligands** | **Zone of inhibition (in mm)** | | | |
|---|---|---|---|---|
| | ***Gram + Ve*** | | ***Gram -Ve*** | |
| | ***Bacillus Subtilis*** | ***Staphylococcus aureus*** | ***Kllebsiella promioe*** | ***E.coil*** |
| **HL1** | **13** | **12** | **14** | **14** |
| **HL2** | **22** | 18 | **20** | **19** |
| **HL3** | 17 | **15** | 17 | 16 |
| **HL4** | 19 | 16 | 17 | 17 |




**Graph No.01** of Antibacterial activity of ligands (HL1-HL4)

**Conclusion:**
Antibacterial activity data for metal complexes of HL1 and HL4 show that these compounds are more toxic than the ligand against the bacteria used in the study. The Cu+2 complex of each ligand is the most hazardous to the bacteria studied, outperforming the other metal complexes.

**References:**
1. Yan, S. J., Liu, Y. J., Chen, Y. L., Liu, L., & Lin, J. (2010). Bioorganic & medicinal chemistry letters, 20(17), 5225-5228.
2. Zhao, C., Rakesh, K. P., Ravidar, L., Fang, W. Y., & Qin, H. L. (2019). European journal of medicinal chemistry, 162, 679-734.

Journal of Chemical Health Risks

www.jchr.org

JCHR (2023) 13(3), 1496-1499 | ISSN:2251-6727

3. Sharma, R., Tiwari, A., & Parate, A. (2015). Pharmaceutical Chemistry Journal, 49(8), 537-542.
4. Chand, K., Hiremathad, A., Singh, M., Santos, M. A., & Keri, R. S. (2017). Pharmacological Reports, 69(2), 281-295.
5. Mustafa, Y. F. (2018). Saudi pharmaceutical journal, 26(6), 870-875.
6. Mazimba, O. (2015). Journal of King Saud University-Science, 27(1), 42-48.
7. Wang, X., Gao, S., Yang, J., Gao, Y., Wang, L., & Tang, X. (2016). Natural product research, 30(6), 682-688.
8. A. R. Katritzky; Rees. Comprehensive Heterocyclic Chemistry, 1984, 5, 469-498
9. Pozharskii, A.F, Heterocycles in Life and Society. John Wiley & Sons, 1997.
10. Chityala, V. K. Kumar, S. K. R, M. Parthasarathy, T.Sh. (2014) Bioinorganic chemistry and applications., 3,11-21.
11. Khedr A.M., El-Bindary A.A., and Abd El-Gawad A.M. (2005) Chem. Paplication.,59(5),336—342.
12. F.D. Spooner and G. Sykes, Laboratory Methods in Microbiology, Academic Press, London, **1972**.
13. D. Greenwood, R.C.B. Slak and J.F. Peuther, Medical microbiology,14$^{th}$ Edi., ELBS, London, 1992.
14. EUCAST (European Committee on Antimicrobial Susceptibility Testing) Antimicrobial Susceptibility Testing, EUCAST dist diffusion method, version 9.0,**2021**.
15. J. Hudzieck, Kirby-Bayer Disk Diffusion Susceptibility Tat Protocol, American Society for microbiology, **2019**.
16. B. Esterhyzen and K.J.V.D. Mervve, Mycologia, **1977**,69,975.
17. A.W. Bayer, M.M.W. Kirby, C.V. Shrris, and M. Turk, American Journal of Clinical Pathology, **1999**,45,493.
18. A.L. Barry, The Antimicrobial Susceptibility Test: Principal and Practices,4th ed., edited by Illuslea and Feger, Philadelphia,**1976,**180-182.