



## Synthesis, Characterization and Antibacterial activity of Benzimidazole Derivatives and their Cu (ii),Ni (ii) and Co (ii) complexes

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### KEYWORDS:

Antibacterial;  
Benzimidazole;  
Metal complex;  
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### ABSTRACT

Benzimidazole is one of the privileged nitrogen-containing heterocyclic compounds, which is found in many bioactive compounds, benzimidazole and its derivatives have evolved as an important heterocyclic system due to their potency in a wide range of biologically active compounds like anthelmintic, antibacterial, antifungals, anti-inflammatory, antiviral, and so on. Derivatives of 1-arylsulfonylbenzimidazole and their respective Cu (II), Ni (II) and Co (II) complexes were successfully synthesized. The structures of all the synthesized ligands were confirmed by using IR, UV-Visible, <sup>1</sup>H NMR, and <sup>13</sup>C NMR spectroscopy. The Cu (II), Ni (II) and Co (II) complexes were confirmed by using IR and VU-Visible spectra. The IR spectra of ligands and its metal complexes imply that the benzimidazol derivative ligands behave as basic bidentate ligands coordination through the azomethine nitrogen and oxygen atom. *In-vitro* antibacterial activity of all the synthesized ligands and their metal complexes were evaluated by using disc diffusion method against *K. pneumoniae*, *E. coli*, and *S. aureus* bacterial species. The tested compounds and metal complexes exhibited from good to excellent activity (zone of inhibition (ZI) ranged 10 mm to 23 mm). Compound BIL1 exhibited better activity than the standard drug against *E. coli* (ZI of 15 mm) and *K. pneumoniae* (ZI of 5 mm) compared with gentamycin ((ZI of 15mm). Complex CoC exhibited better activity against *S. aureus* (ZI of 23 mm) compared with *gentamicine* (ZI value of 21 mm). This compound is a good starting point to develop new drug for treating pathogenic diseases. Therefore, synthesis of more analogue were recommended for further discovery of a new drug candidate.

### INTRODUCTION

Microbial resistance is one of the critical public health issues and the greatest challenges of the twenty-first century (Marinescu, 2021) especially as increasing numbers of strains are becoming resistant to multiple antimicrobial agents, with some bacteria now being resistant to all available

antibiotics, there is an urgent need to develop new drugs with novel mechanisms of action (Fatmah et al., 2015). Nitrogen-heterocycles play a vital role in medicinal chemistry and they have been intensively used as scaffolds for drug development, among nitrogen containing heterocyclic compounds, benzimidazole is continuously drawing the interest of many researchers for the

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