

## SYNTHESIS, CHARACTERIZATION AND ANTIBACTERIAL ACTIVITY OF FERROCENE LIGANDS AND THEIR BINUCLEAR COMPLEXES

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**Abstract.** 6-Chloro-2-ferrocenyl-1H-benzimidazole and (E)-((4-chloro-2-hydroxyphenylimino)methyl)ferrocene ligands and their Fe(III), Co(II), Cu(II), Zn(II) and Pd(II) complexes were synthesized. The structures of compounds were confirmed on the basis of elemental analysis, FT-IR, <sup>1</sup>H and <sup>13</sup>C NMR, UV-Vis spectroscopy and mass spectrometry. In addition, magnetic moment and molar conductivity measurements were performed for the complexes. The Fe(III), Cu(II), Zn(II) and Co(II) complexes do not manifest electrolytic properties while Pd(II) complexes have electrolytic properties. All the complexes coordinate in a 1:1 M:L ratio. Benzimidazoles have a potential to be used as antibacterial agents alternative to current antibiotics to which bacteria gain resistance day by day. The antibacterial activity of the ligands and the complexes was investigated against *Staphylococcus aureus* and *Escherichia coli*. The obtained complexes generally show considerable high activity compared to the ligands, and it was revealed that the complexes of benzimidazole presented a more pronounced activity in comparison to other investigated compounds. The high activities of the Co complex of the benzimidazole ligand and the Zn complex of the Schiff base ligand against *Staphylococcus aureus* (2 and 4 mg/mL, respectively), are noteworthy.

**Keywords:** azomethine, binuclear complex, organometallic, transition metal complex, antibacterial property.

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