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**Spectroscopic and biological activities studies of bivalent transition metal complexes of Schiff bases derived from condensation of 1,4-phenylenediamine and benzopyrone derivatives**

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**Abstract**

Many tools of analysis such as elemental analyses, infrared, ultraviolet-visible, electron spin resonance (ESR) and thermal analysis, as well as conductivity and magnetic susceptibility measurements were used to elucidate the structures of the newly prepared Co(II), Ni(II) and Cu(II) complexes with Schiff bases derived from the condensation of 1,4-phenylenediamine with 6-formyl-7-hydroxy-5-methoxy-2-methylbenzo-pyran-4-one (H<sub>2</sub>L) or 5,7-dihydroxy-6-formyl-2-methylbenzopyran-4-one (H<sub>4</sub>L). The data showed that all formed complexes are 1:1 or 2:2 (M:L) and non-electrolyte chelates. The Co(II) and Cu(II) complexes of the two Schiff bases were screened for antibacterial activities by the disc diffusion method. The antibacterial activity was screened using *Escherichia coli* and *Staphylococcus capitis* but the antifungal activity was examined by using *Aspergillus flavus* and *Candida albicans*. The Results showed that the tested complexes have antibacterial, except Cu-H<sub>4</sub>L, but not antifungal activities.

**Keywords:** Schiff bases, transition metal complexes, biological activities

**1. Introduction**

Salen-type ligands, one of the oldest classes of ligands in coordination chemistry, have been used extensively to complex transition metals [1]. The majority of salen ligands reported in the literature are symmetric and available as their N,N'-disubstituted derivatives [2]. Salen-type ligands have been studied widely especially in regard to their use in catalytic synthesis [3, 4]. In addition to, the C=N linkage in azomethine derivatives is an essential structural requirement for biological activity. Several azomethines have been reported to possess remarkable antibacterial [5-9], antifungal [10-12], anticancer [13-16] and diuretic activities [17]. In view of this, we have designed a derivatives of salen type Schiff bases and their complexes. Quite recently, the Schiff bases derived from the condensation of 6-formyl-7-hydroxy-5-

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