ABSTRACT

The complexes [$Zn(sul)_2.2H_2O$] **1**, [$Zn(sul)_2$(2-ampy)] **2,** [Zn(sul) (2-ammepy)] **3**, [$Zn(sul)_2$(1,10-phen)] **4**, [$Zn(sul)_2$(2,9-dimephen)] **5**, [$Co(sul)_2.4H_2O$] **6,** [$Co(sul)_2(2\text{-ampy})_2$] **7,** [$Co(sul)_2$(1,10-phen).$2H_2O$] **8**, and [$Co(sul)_2$(2,9-dimephen)] **9** were prepared. These compounds were characterized by IR-spectroscopy, UV- Visible spectroscopy, ^{1}H and ^{13}C NMR spectroscopy, single crystal X-ray diffraction and other physical techniques. Sin

gle crystal structures of complexes **4**, **5**, **6** and **9** were determined.

In-vitro biological activity of the complexes and their parent ligands were scanned to view the effect of complexation on their activity. In addition, anti-bacterial activities for the prepared complexes against Gram-positive (*Staphylococcus epidermidis, Staphylococcus aureus*) and Gram-negative (*Bordetella, Escherichia coli*) bacteria and Yeast species(*Saccharomyces and Candida*) were performed using agar well-diffusion method. Complexes **5** and **9** showed reasonable activity against yeast. All compounds showed more anti-bacterial activity against G^+ bacteria than G^-. Adding to that, Zn(II)compounds were tested for their anti-malarial activity using two methods: semi-quantitative micro assay and a previously self-developed quantitative *in-vitro* method. This method was used to study the efficiency of these complexes in inhibiting the formation of the Malaria pigment. Results showed that the efficiency of complex **5** in preventing the formation of β-Hematin was 67.6 %. The efficiency of CQ as a standard drug was reported to give 93%. Also, the phosphatase activity of Zn(II) and Co(II) complexes were studied and showed the effect of zinc or cobalt complexation on the phosphatase activity. In general, results showed that phosphate diester hydrolysis decreased in the following order complex [$Zn(sul)_2$(1,10-phen)] **4** > [$Zn(sul)_2$(2,9-dimephen)] **5** > [$Co(sul)_2$(1,10-phen).$2H_2O$] **8** > [$Co(sul)_2$(2,9-dimephen)] **9**.