**ABSTRACT**

Cobalt(II) complex of 2-amino-6-methylbenzothiazole has been synthesized and characterized by various physico-chemical methods. The ligand 2-amino-6-methylbenzothiazole acts as monodentate, neutral ligand with N as the donor site. The molecular structure of the title complex has been determined by single crystal X-ray diffraction studies. The Co(II) complex shows significant antioxidant activity against DPPH radical. The complex shows cytotoxicity with a IC50 value of 14.12 µM against MCF-7 cell line. In addition, the complex shows good antimicrobial and anti-tuberculosis activities against various microbes and mycobacterium tuberculosis respectively. DNA binding of the title complex has been investigated by absorption spectroscopic technique, which reveals that the complex acts as minor groove binder. These results have been validated by molecular docking studies.