

## ABSTRACT

Lanthanide and transition metal complexes are gaining significant interest in the field of material science, pharmaceuticals, and analytical chemistry these days. These complexes are photoreactive and possess anti-cancer, anti-oxidants and antimicrobial activities. They are used in redox flow batteries, in display devices. Heterocyclic ring containing ligands e.g, pyridine 2,6-dimethanol (pdmH<sub>2</sub>), pyridine 2,3-dicarboxylic acid are used in complex synthesis which are interesting oxygen and nitrogen donor moieties. The use of pdmH<sub>2</sub> as ligand and phthalic acid as co-ligand in copper nitrate, BaCl<sub>2</sub>.2H<sub>2</sub>O, Ni(SO<sub>4</sub>)<sub>3</sub>.H<sub>2</sub>O, CuCl<sub>2</sub>.2H<sub>2</sub>O chemistry was carried out. The reaction of these salts with ligand and co-ligand gave different metal complexes using mixture of solvents like water and methanol by hydrothermal, refluxing and stirring methods. The synthesized complexes were characterized by melting points, solubility, fourier transform infrared spectroscopy and powder x-ray diffraction techniques. Anti-oxidants biological activities are performed for these complexes.