Innovations and technologies are yet to be explored for the refinement of human life and to benefit life on earth. We have to take advantage of the development and implementation of new inventions resulting in interesting contributions to scientific knowledge. Motivated by new demands, the design and synthesis of novel materials of biological activity are of major interest over the years.

Our planet is confronted with a lot of new ecological challenges and increasing threats that require deep attention. Development must be capable of guaranteeing the challenges in the long term. Ecological goals and environmental standards have to serve as much as possible to living beings. Science and technology must help to provide us with new solutions and scientific community must find the most economic and effective ways against new constraints. The future of environmental research will be to anticipate and respond to changing circumstances and to engage in research to generate new understanding about the environment and environmental technologies.

The frequency of life threatening infections caused by pathogenic microorganism has increased worldwide and the resistance of pathogenic microbes to antibiotics leads to search for new compositions. Metal incorporated formulations play an influential role in developing such compounds and occupy key role in the development of inorganic biochemistry.

Bioinorganic chemistry lies inside the domain of coordination chemistry that embraces the chemistry of metal-integrated molecules within biological systems. Metal incorporated biologically active Schiff base ligands is one of the most impressive and exciting area of chemistry and have immense scope in this field. The thesis, entitled “Biologically active Schiff base complexes”, describes the synthesis, characterization and the in vitro antimicrobial activity of new solid complexes of lanthanides with three new Schiff base ligands derived from pyridoxal.
The main goal of our research is the characterization of the synthesized complexes from new Schiff base ligands,

1) 2,3-dimethyl-4-(iminopyridoxyl)-1-phenyl-3-pyrazoline-5-one (DIPP),

2) 5-(hydroxymethyl)-4-\{(1Z)-[2-N(2-hydroxylphenyl)ethanimidoyl]-2-methyl\}pyridine-3-ol-hydrochloride (HMHPMP\(^a\)) and

3) 5-(hydroxymethyl)-4-\{(1Z)-[2-N(3-hydroxylphenyl)ethanimidoyl]-2-methyl\}pyridine-3-ol-hydrochloride (HMHPMP\(^b\)).

The acyclic Schiff base ligands with N, O donor atoms derived from pyridoxal has excellent ability to act as chelate. The design of biologically active ligands and their lanthanide incorporated formulations provide huge scope due to their availability wide range of oxidation number. The peculiar structural features, their wide pharmaceutical applications and their importance in the biological process have placed lanthanide complexes in a superior position.

Synthesis of the Schiff base and complexes were achieved by adopting standard methods from literature. The synthesized complexes were characterized by physical methods such as melting point, solubility, electrical conductance and magnetic moment determination. The spectral methods adopted were infrared, UV-Visible and NMR spectroscopy. The stability of the complexes was examined by thermogravimetric methods. Most of the complexes were screened for their in vitro antimicrobial activity against eight selected human pathogenic bacteria, four fungal strains and four algal cultures. In most cases, metal complexes were biologically active and exhibit enhanced activity than the ligands.
The work incorporated in this thesis has been published/ is under publication as detailed below


**Presentation in National seminar.**

Antibacterial Study of Schiff base Complexes of some Rare Earth Nitrates, M.K Muraleedharan Nair, P.S Ajitha and P.K Rejimon