4. Work Plan and Methodology:

During the course of produced research work various methods and techniques will be used. These are as follow:

As per tentative research work will design. Different research designs will be surveyed by literature. The candidate will go through the literature pertinent to organic ligands and 8-hydroxyquinoline derivatives in chemical abstract, recent books, e-books and latest industrial products. Looking to the advantages of renewable source of organic compounds, the research topic will chosen. The internet system would be surf for the latest technological development of antibacterial and antifungal agent.

Thus experimental procedure will be designed. The high quality of materials will procured. The referred experimental techniques will adopted. The techniques like agar cup plate method for the antibacterial activities will be used for monitoring toxicity against microorganisms. The resultant data would be analyzed and interpreted.

Synthetic approach:

All the chemicals will be used analytical grade. cyanuric chloride, various phenols, 8-hydroxyquinoline, chloroform, hexane, ethanol, cyclohexanone, dimethyl formamide (DMF), formic acid and various metal salts will be purchased from E. Merck (India) Limited, Mumbai. Luriabroth and agar-agar will be purchased from SRL, India. The organic solvents will be purified by the recommended method. [58] The metal contents of the complexes were determined by the EDTA titration technique after treating them with a mixture of HClO₄, H₂SO₄ and HNO₃ (1 : 1.5 : 2.5).

Synthesis of 2,4-dichloro-6-phenoxy-1,3,5-triazine

Sodium salt of various aromatic phenols will be condensed with cyanuric chloride at low temperature to synthesis 2,4-dichloro-6-phenoxy-1,3,5-triazine.
**General Synthesis of** 5,5'-(6-phenoxy-1,3,5-triazine-2,4-diyl)bis(azanediyl)diquinolin-8-ol **derivative (Bis-ligands of CBL-1 to CBL-6)**

To a suspension of 5–amino-8-hydroxyquinoline (0.02 mol), 2,4-dichloro-6-phenoxy-1,3,5-triazine derivative (0.01 mol) in an acetone-water mixture will be added. Then \( \text{K}_2\text{CO}_3 \) (0.02 mol) will be added as an acid acceptor. [59] The resulting mixture will be refluxed for 3-4 hr with occasional shaking. The resulting suspension, which contained a green precipitate, will be neutralised and then filtered. The solid products will be collected and dried to give CBL derivatives. The products will be melted with decomposition at above 240°C (uncorrected).
**Synthesis of coordination polymers**

A solution of metal (0.01 mol) in aqueous formic acid will be added dropwise to a solution of various CBL (0.01 mol) in aqueous formic acid with stirring. The reaction mixture will be heated on a water bath for 0.5-1 hr. The reaction mixture will be made alkaline by the addition of dilute aqueous ammonia until the precipitation will be completed. The polymer separated out in the form of a suspension and will be digested on a boiling water bath for about 1-1.5 hr. Finally, the resultant solid green will be collected by filtration and washed with hot water, dimethylformamide (DMF), and then acetone. The polymer [CBL-M\(^{+2}\)] will be air-dried.

<table>
<thead>
<tr>
<th>R</th>
<th>Name of Bis-ligands</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>5,5’-(6-phenoxy-1,3,5-triazine-2,4-diyl) bis (azanediyil) diquinolin-8-ol [CBL-1]</td>
</tr>
<tr>
<td>Cl</td>
<td>5,5’-(6-(4’-chloro phenoxy)-1,3,5-triazine-2,4-diyl) bis (azanediyil) diquinolin-8-ol [CBL-2]</td>
</tr>
<tr>
<td>Br</td>
<td>5,5’-(6-(4’-bromo phenoxy)-1,3,5-triazine-2,4-diyl) bis (azanediyil) diquinolin-8-ol [CBL-3]</td>
</tr>
<tr>
<td>CH(_3)</td>
<td>5,5’-(6-(4’-methyl phenoxy)-1,3,5-triazine-2,4-diyl) bis (azanediyil) diquinolin-8-ol [CBL-4]</td>
</tr>
<tr>
<td>NO(_2)</td>
<td>5,5’-(6-(4’-nitro phenoxy)-1,3,5-triazine-2,4-diyl) bis (azanediyil) diquinolin-8-ol [CBL-5]</td>
</tr>
<tr>
<td>OCH(_3)</td>
<td>5,5’-(6-(4’-methoxy phenoxy)-1,3,5-triazine-2,4-diyl) bis (azanediyil) diquinolin-8-ol [CBL-6]</td>
</tr>
</tbody>
</table>
Techniques used for characterization:

The C, H, N contents of metal will be determined by TF-Flash-1101 EA. Infrared spectra of the synthesized compounds will be recorded on Nicolet 760 FT-IR spectrometers. NMR spectrum of ligand will be recorded on a Brucker spectrophotometer at 400 MHz. Magnetic susceptibility measurements of the synthesized complexes will be carried out on Gouy Balance at room temperature. The electronic spectra of complexes in solid will be recorded at room
temperature. MgO will be used as a reference. Antimicrobial activity of all the samples will be monitored against various gram positive(+) and gram negative(-) organisms, following the method reported in the literature [60].

The work was carried out and will be distributed into six chapters of the proposed thesis.

**Work plan**

Year-wise Plan of work and targets to be achieves.

**First-Year:**
- In first six month planning for literature survey
- Synthesis of bis ligands
- Synthesis of coordination polymers.
- To elucidate structure of newly synthesized compounds by IR and NMR Spectra.
- Publication/Presentation of Research work.

**Second-Year:**
- Synthesis of bis ligands
- Synthesis of coordination polymers.
- To elucidate structure of newly synthesized compounds by IR and NMR Spectra.
- Publication/Presentation of Research work
- Investigation of antimicrobial (Anti bacterial, Antifungal etc.) activity
- Publication/Presentation of Research work
- Preparation of Thesis work