5. A. **GENERAL:**

An antimicrobial is a substance that kills or inhibits the growth of Micro-organism such as bacteria, fungi and protozoa. Although a wide range of chemicals have this property, if a sufficiently high concentration is used. But the term is restricted to those compounds which are effective at concentration which is suitable for practical applications[1].

It is suitable to subdivide antimicrobial agents into various groups according to the actions and purposes for which they are employed. Subdivision can be based upon the group of microorganisms affected. Thus, antimicrobial agents which kill bacteria or inhibit the growth of bacteria are called bactericidal or bacteriostatic and antimicrobial agents, which kill fungus or inhibit the growth of fungus are called fungicidal or fungistatic respectively [1].

Different techniques are available for the determination of antimicrobial activity. The principle of all these
techniques are similar, viz. the preparation of concentration gradient of the compound in a nutrient medium and observation of the inhibition of growth of the microbial cultures, when the medium is seeded with the known population of microorganism and incubated at suitable temperature. Various variables are involved in sensitivity and assay tests, such as size of the inoculums, nature of the culture medium, the concentration of the antimicrobial agents, concentration of the agar in the medium, the time of incubation and composition of the antimicrobial agents [1].

Metal ions play a vital role in number of biological processes. Inorganic compounds play important role in organisms [2]. Biochemists have begun to investigate the molecular details of enzymes and other biologically active compounds, particularly metal complexes. The inorganic chemists on the other hand, have solely studied to recognize the similarities between compounds they work with, and biologically important compounds containing metal ions. These two trends have merged into active research i.e. bio-inorganic chemistry [2]. This discipline is rapidly bridging the gap between traditional inorganic chemistry and biochemistry. The emergence of bio-inorganic chemistry is related to the general development of science. Biochemistry has
evaluated to the point where biological processes can be understood and explained in terms of molecules and electrons. Inorganic chemistry has developed concepts, theories and techniques that are both sophisticated and general enough to be applied to such complex phenomena as biological processes which can be well interpreted by inorganic chemistry in evolving concepts, theories and general sophisticated techniques. There are, of course, few exceptions to these notations; for example, it has been known for more than a century that blood contains iron [2]. Micronutrients required for the growth are supplied in suitable amounts via natural processes under normal conditions. Unfortunately, techniques were not accurate enough to establish the correlation between the presence of a micro-nutrient and its biological effect. This is one of the reasons why the recognition of the essentiality of some trace elements delayed so long. A general realization of the importance of a biological orientation in all fields of human endeavor has aroused interest in many inorganic chemists to study biological systems. The presence of metals in biological matter approaching their detection limit has intrigued biologist for generation, though efforts to ascertain their functional significance has often been frustrating. The remarkable
acceleration of the rate of progress in this field, is the result of
conjoint advances in many disciplines.

Nutritional and metabolic experiments can now
be monitored both by advanced methods of analysis and through
suitable control of contaminations. Major progress in isolating and
characterizing the composition, structure and function of metal-
enzymes has immensely aided the delineation of the molecular
basis of the biological role of metals. Simultaneously, the emerging
knowledge has opened a new direction to experiments in
biochemistry, physiology, pathology, nutrition and medicine. The
resultant understanding of metal-biochemistry has given hope that
metals have played unrecognized roles in disease. The possibility
that metals could become therapeutic agents has motivated much of
the past efforts in this field [2]. The metal ions with biologically
active ligands are a subject of considerable interest. Some of the
biologically active compounds act via chelation [2-7].

Thiosemicarbazones are of considerable interest
because of their chemistry and potentially beneficial biological
activities, such as anti-tumor, antibacterial, antiviral and anti-
malarial activities [8,9].
5. B. STUDIES ON ANTIMICROBIAL ACTIVITIES:

In recent years, lot of studies have been done on antimicrobial activities of heavy metals. Heavy metals particularly silver and mercury have variety of application in controlling microbial population [73]. Vishnu Prasad et al. have reported antimicrobial effect of heavy metals, arsenic, silver, nickel, cobalt, cadmium, lead and mercury against Pseudomonas aeruginosa [73].

It is reported that nano particles of Ag, CuO and ZnO are showing antimicrobial activity against pathogenic bacteria [74].

Nitrogen heterocyclic compounds have gained importance on account of their varied types of biological activities [3-17]. Pyrazole derivatives have been reported to possess anti-diuretic [18], anti-anthelmintic [19], hypoglycaemic [20], fungicidal [21], antituberculotic [22], antineoplastic [23] and antifertility [24] activities.

Anti inflammatory and analgesic activities of certain substituted pyrazoles have been reported in the literature[25]. Certain pyrazoles have been found active against
S. aureus and E. coli [26]. Anti-cancer properties of some pyrazole derivatives are also known [27].

Nanda et al. [28] have tested the twenty six sulphur and halogen free 5-pyrazolone compounds for their fungicidal activity against the fungus P. oryzae. They have reported that twenty five out of twenty six chemicals show significant fungicidal activity. They have also suggested correlation between structure and activity.

Mohanty et al. [29] have determined the fungicidal activity of twenty one 5-pyrazolone compounds using the spore germination tests at various concentrations. They have also reported that out of 21 compounds, eight compounds inhibit the growth of P. oryzae spore germination. They have also found that the replacement of carbonyl oxygen atom by sulphur in pyrazolone nucleus enhances the fungicidal activity. They have also reported that the 4-nitroso derivative of the oxygenated compound is more active than its sulphur analog.

Galabov et al. [30] have examined the antiviral activity of some derivatives of 3-methyl-1-phenyl-5-pyrazolone as
well as their metal complexes with zinc, copper, iron and Manganese.

Jolly et al.[31] have synthesized a series of new pyrazolones and reported their antimicrobial activity against *E. coli, S. facealis, K. pneumoniae, S. aureus, C. neoformaeus, T. mentagrophytes, C. albicans* and *A. fumigatus*.

Ibrahim et al.[38] have reported the synthesis, characterization and antibacterial properties of cobalt(II), nickel(II), copper(II), cadmium(II) and mercury(II) complexes of three derivatives of 4-acetylhydrazono-2-pyrazolin-5-one and 5-thione.

Shivarama et al.[39] have studied the synthesis and biological activity of some 4-(5-aryl-2-furfurylidene)-1,3-disubstitued-2-pyrazolin-5-ones. They have evaluated antibacterial activity against both Gram-positive and Gram-negative bacteria. El-Emary et al.[40] have reported the synthesis and biological screening of new 1, 3-diphenyl-pyrazolones with different heterocyclic moieties at position-4.

Rana and Kharodawala[41,42] have reported the synthesis, characterization and antimicrobial activities of some
transition metal complexes of heterocyclic ketoxime ligands. They have reported that metal complexes inhibit the growth of *E. coli*, *B. subtilis*, *A. niger* and *T. longibrachiatum*.

Rather et al.[43] have reported that hydrazones possess antibacterial activity against pathogenic bacteria i.e. *Klebsiella* and *pseudomonas* and non pathogenic bacteria i.e. *E. coil* and *S. aureus*.

Benzoyl hydrazones are known to possess antimicrobial activity[44-46]. 4-acyl-2-pyrazolin-5-one is reported to possess antibacterial activity[47, 48].

Sandra et al.[49] have reported that thiosemicabazones complex shows higher activity but the ligand has same activity against *E. coli*. Ravansiddappa et al.[50] reveal that the antimicrobial activity could be mainly due to the structure of the complexes and also the oxidation state of the metal ions.

5. C. **PRESENT WORK:**

Brief survey of the literature cited above on the antimicrobial activities of 4-acyl-2-pyrazolin-5-one derivatives
suggests that most of the 4-acyl-2-pyrazolin-5-ones and their metal complexes are active against various microbial cultures.

An attempt was made to evaluate the antimicrobial activities of the synthesized tetradentate schiff base ligand,

(I) \( \text{H}_2\text{BCP}_2\text{-hm} \)

(II) \( \text{H}_2\text{BCP}_2\text{-mph} \)

and their complexes of Mn(III) and Fe(III) complexes against the bacterial strains such as \textit{E.coli} ATCC 8739 and \textit{B. subtilis} ATCC 6633 and Yeast strains such as \textit{S.Cerevisiae} and fungal strains such as \textit{A.niger} following the literature procedures[51-55].

Pyrazole is chemically known as 1, 2-diazole becomes a popular topic due to its manifold uses. The chemistry of pyrazolone and its derivatives are particularly interesting because of their potential applications in medicinal chemistry as analgesic[56], anti inflammatory[57], antipyretic[58], antiparasitic[59], antimalarial[60], antifungal[61] and enzyme inhibitory agent[62-64]. As an example, edarauone [3-methyl-1-phenyl-2-pyrazolin-5-one] has recently shown to produce marked attenuation of brain damage caused by ischemiaepfusion[65] and its pharmacological action is attributed to its antioxidant
activity, as a potent hydroxyl radial scavenger[66]. The useful properties of pyrazole derivatives as insecticides, fungicides and sedatives have drawn attention of many investigators.[67-74] Therefore, an attempt was made to evaluate the antimicrobial and antifungal activities of synthesized ligands and their metal complexes of Mn(III) and Fe(III).

5. D. **EXPERIMENTAL:**

5. D.1. **MATERIALS:**

All analytical grade materials were used in present study.

(i) Nutrient broth medium (Hi media, Mumbai).
(ii) Nutrient agar (Hi media, Mumbai).
(iii) Sabouraud's dextrose broth medium (Hi media, Mumbai).
(iv) Sabouraud's dextrose broth agar (Hi media, Mumbai).

5. D.2. **MICRO ORGANISMS:**

Bacterial [*Escherichia coli* ATCC 8739 and *Bacillus subtilis* ATCC 6633] and fungal [*A.niger* ATCC16404] and yeast [*S. cerevisiae*] cultures were tested with ligands (I and II) and their metal complexes.

The effect of the ligands (I and IV) and their metal complexes were investigated by standard microbiological
parameters. Concentration of the test compounds were kept constant (500 ppm) during all the experiments. The bacterial were maintained on Nutrient-agar while fungal and yeast cultures on Potato dextrose-agar and culture-tubes (slants) and were sub cultured every fortnight and stored at 2 to 8°C temperature.

5. D.3. MEDIA COMPOSITION:

For microbiological tests, Nutrient broth, containing ingredients (gm L⁻¹), distilled water, pH = 7.3 ± 0.2, was prepared and sterilized at 15 psi pressure for 15 minutes in autoclave. For the preparation of the culture-tubes, Nutrient agar was used.

For the growth and test of fungal cultures, Sabouraud's dextrose broth medium containing ingredients (g L⁻¹) was prepared and sterilized at 15 PSI pressure for 15 minutes in autoclave. Sabouraud's dextrose agar medium was used for slant preparation.

For the growth of yeast cultures following media were used.

Composition of the medium for Rhodotorula minuta:

1. Glucose - 2.0 g
2. Peptone - 1.25 g
3. KH₂PO₄ - 0.5 g
4. MgSO₄·7H₂O - 0.2 g
5. Distilled water - 100 mL

> Composition of the medium for *P. stipitis* MGYP:

1. Malt extract - 0.5 g
2. Glucose - 1.0 g
3. Yeast extract - 0.5 g
4. Peptone - 0.3 g
5. Distilled water - 100 mL

5. D.4. **INOCULUM PREPARATION:**

**BACTERIAL CULTURES:**

A loopful of cell mass from pre-grown culture slant was inoculated in a sterile Nutrient broth-tubes containing 15 mL medium and incubated at 37°C for 24 hours to get sufficient cell density (i.e. $1 \times 10^8$ cells/mL).

**FUNGAL CULTURES:**

Well sporulated culture slant was used for preparation of spore suspension. About 5.0 mL of sterile distilled water containing few drops of Tween-80 solution was added to the culture-tube (slant) and growth was scraped with sterile nichrome wire-loop and collected in sterile tube. Spore suspension thus
obtained was inoculated in the inoculum medium as 5% (v/v) and incubated at 20 – 25°C for 48 hrs. for the fungal cultures.
YEAST CULTURES:

Slants with luxurious growth of yeast culture was used for preparation of inoculum. 5.0 ml of sterile distilled water containing few drops of twin-80 solution, was added to the slants and growth was scrapped with sterile nichrome wire loop and collected in sterile tube. Inoculum thus obtained was inoculated in the test medium as 5 % (v/v) and incubated at 20 – 25°C for 48 hrs. for yeast cultures.

5. D.5. ANTIMICROBIAL ASSAY:

Antimicrobial assay was carried out by agar diffusion method which is based on the principle that the chemical substance in solution can diffuse though the agar seeded with test culture and produce zone of inhibition according to the concentration of antimicrobial agent.

For the agar diffusion method (cup method), plates were prepared in two steps.

➢ Base layer preparation – Base layer was prepared by pouring approximately 20 ml of previously cooled Nutrient agar /
Sabouraud's dextrose agar / Potato dextrose agar as per the requirement for bacterial, fungal and yeast cultures.

Seed layer preparation – Seed layer was prepared by pouring 5 ml of above mentioned medium containing the respective bacterial, fungal and yeast cultures on base layer plate, by rotating the plate quickly to get a uniform thickness of seed layer on the agar base. The medium was allowed to solidify at room temperature.

The wells were created by cork borer (0.85 cm) in the solidified nutrient agar, Potato dextrose agar and Sabouraud’s dextrose agar medium respectively contained in the Petri plates. The test compound was introduced into the well by using micro pipette. The plates were incubated at 20-25°C for yeast and fungal cultures and at 30-35°C for bacterial cultures. Microbial growth inhibition was determined by measuring the diameter of the zone of inhibition. The degree of effectiveness was measured by determining the diameter of the zone of inhibition caused by the compound. Effectiveness was classified into three zone on the basis of the diameter of zone of inhibition:

+++ : Most effective
+ + : Moderate effective

+ : Slightly effective

- : Non effective

5. E. RESULTS AND DISCUSSION:

Most of the compounds were found active against microorganisms. The results are as under Table: 5.1 to 5.2.
<table>
<thead>
<tr>
<th>Compounds</th>
<th>E.coli</th>
<th>B.subtilis</th>
<th>S.cerevisiae</th>
<th>A.niger</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\text{H}<em>2\text{BCP}</em>{\text{Z-hm}}$</td>
<td>++</td>
<td>+</td>
<td>+</td>
<td>_</td>
</tr>
<tr>
<td>$[\text{Mn}(\text{BCP}_{\text{Z-hm}})\text{NCS}\cdot\text{H}_2\text{O}]$</td>
<td>++</td>
<td>_</td>
<td>_</td>
<td>_</td>
</tr>
<tr>
<td>$[\text{Fe}(\text{BCP}_{\text{Z-hm}})\text{NCS}\cdot\text{H}_2\text{O}]$</td>
<td>+</td>
<td>++</td>
<td>++</td>
<td>_</td>
</tr>
<tr>
<td>$[\text{Mn}(\text{BCP}_{\text{Z-hm}})\text{N}_3\cdot\text{H}_2\text{O}]$</td>
<td>+</td>
<td>+</td>
<td>_</td>
<td>++</td>
</tr>
<tr>
<td>$[\text{Fe}(\text{BCP}_{\text{Z-hm}})\text{N}_3\cdot\text{H}_2\text{O}]$</td>
<td>++</td>
<td>_</td>
<td>_</td>
<td>++</td>
</tr>
<tr>
<td>$[\text{Mn}(\text{BCP}_{\text{Z-hm}})\text{OAc}\cdot\text{H}_2\text{O}]$</td>
<td>++</td>
<td>+</td>
<td>+</td>
<td>_</td>
</tr>
<tr>
<td>$[\text{Fe}(\text{BCP}_{\text{Z-hm}})\text{OAc}\cdot\text{H}_2\text{O}]$</td>
<td>+</td>
<td>_</td>
<td>++</td>
<td>_</td>
</tr>
<tr>
<td>$[\text{Mn}(\text{BCP}_{\text{Z-hm}})\text{NO}_3\cdot\text{H}_2\text{O}]$</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>$[\text{Fe}(\text{BCP}_{\text{Z-hm}})\text{NO}_3\cdot\text{H}_2\text{O}]$</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>$[\text{Mn}(\text{BCP}_{\text{Z-hm}})\text{Cl}\cdot\text{H}_2\text{O}]$</td>
<td>+</td>
<td>++</td>
<td>++</td>
<td>_</td>
</tr>
<tr>
<td>$[\text{Fe}(\text{BCP}_{\text{Z-hm}})\text{Cl}\cdot\text{H}_2\text{O}]$</td>
<td>++</td>
<td>_</td>
<td>_</td>
<td>+</td>
</tr>
<tr>
<td>$[\text{Mn}(\text{BCP}_{\text{Z-hm}})\text{SO}_3\cdot\text{H}_2\text{O}]$</td>
<td>++</td>
<td>+</td>
<td>+</td>
<td>_</td>
</tr>
<tr>
<td>$[\text{Fe}(\text{BCP}_{\text{Z-hm}})\text{SO}_3\cdot\text{H}_2\text{O}]$</td>
<td>+</td>
<td>+</td>
<td>_</td>
<td>_</td>
</tr>
</tbody>
</table>
### TABLE-5.2

**ANTIBACTERIAL ACTIVITY OF THE H$_2$BCP$_Z$-mph (control-DMF)**

<table>
<thead>
<tr>
<th>Compounds</th>
<th>E.coli</th>
<th>B.subtillis</th>
<th>S.cerevisiae</th>
<th>A.niger</th>
</tr>
</thead>
<tbody>
<tr>
<td>H$_2$BCP$_Z$-mph</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>[Mn (BCP$_Z$-mph) NCS-H$_2$O]</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>[Fe (BCP$_Z$-mph) NCS· H$_2$O]</td>
<td>++</td>
<td>++</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>[Mn (BCP$_Z$-mph) N$_3$· H$_2$O]</td>
<td>-</td>
<td>-</td>
<td>++</td>
<td>+</td>
</tr>
<tr>
<td>[Fe (BCP$_Z$-mph) N$_3$· H$_2$O]</td>
<td>++</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>[Mn(BCPz-mph) OAc· H$_2$O]</td>
<td>++</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>[Fe(BCPz-mph)OAc· H$_2$O]</td>
<td>-</td>
<td>-</td>
<td>++</td>
<td>+</td>
</tr>
<tr>
<td>[Mn(BCPz-mph) NO$_3$· H$_2$O]</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>[Fe(BCPz-mph)NO$_3$· H$_2$O]</td>
<td>++</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>[Mn(BCPz-mph)Cl· H$_2$O]</td>
<td>-</td>
<td>+</td>
<td>++</td>
<td>-</td>
</tr>
<tr>
<td>[Fe(BCPz-mph)Cl· H$_2$O]</td>
<td>++</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>[Mn(BCPz-mph)SO$_3$· H$_2$O]</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>+</td>
</tr>
<tr>
<td>[Fe(BCPz-mph)SO$_3$· H$_2$O]</td>
<td>++</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
The diamine ligand H₂BCPZ-hm, without metal was found moderately effective against E. coli, slightly effective against *B. subtillis* & *S. cerevisiae* and non-effective against *A. niger*.

The [Mn(BCPZ-hm)NCS·H₂O] complex is moderately effective against E.Coli, and non effective against B.Subtillies, S.Cerevisiae and A. niger. The [Fe(BCPZ-hm)NCS·H₂O] complex is slightly effective against E.Coli, moderately effective against B.Subtillies & S.Cerevisiae and non effective A. niger. The Mn(BCPZ-hm)N₃·H₂O] complex is slightly effective against E.Coli & B.Subtillies, moderately effective against A. niger. and non effective against S.Cerevisiae. The [Fe (BCPZ-hm) N₃· H₂O] complex is moderately effective against E.Coli & A. niger. and non effective against B.Subtillies and S.Cerevisiae. The [Mn(BCPZ-hm) OAc· H₂O] complex moderately effective against E. coli, slightly effective against *B. subtilis* & *S. cerevisiae* and non-effective against *A. niger*. The [Fe(BCPZ-hm)OAc·H₂O]complex is slightly effective against E.Coli, moderately effective against S.Cerevisiae and non effective B.subtillis and A. niger. The [Mn(BCPZ-hm)NO₃·H₂O] complex is non effective against
E. Coli and slightly effective against *B. subtilis*, *S. cerevisiae* and A. niger. The [Fe(BCPz-hm)NO$_3$·H$_2$O] complex is slightly effective against E. Coli, *B. subtilis* and *S. cerevisiae* and moderately effective against A. niger. The [Mn(BCPZ-hm)Cl·H$_2$O] complex is slightly effective against E. Coli, moderately effective against *B. subtilis*, *S. cerevisiae* and non-effective against A. niger. The [Fe(BCPZ-hm)Cl·H$_2$O] complex is moderately effective against E. Coli, non-effective against *B. Subtilles* & *S. Cerevisiae* and slightly effective against A. niger. [Mn(BCPZ-hm)SO$_3$·H$_2$O] complex moderately effective against E. coli, slightly effective against *B. subtiliss* & *S. cerevisiae* and non-effective against A. niger. The [Fe(BCPZ-hm)SO$_3$·H$_2$O] complex is slightly effective against E. Coli & B. Subtilles and non-effective against *S. Cerevisiae* & A. niger.

The diamine ligand H$_2$BCPZ-mph without metal is non-effective against *E. Coli, B. Subtilles, A. Nigar* but slightly effective against *S. Cerevisiav*. The [Mn (BCPZ-mph) NCS·H$_2$O] complex is slightly effective against *E. Coli, B. Subtilles* & *S. Cerevisiav* and non-effective against *A. Niger*. The [Fe (BCPZ-mph) NCS·H$_2$O] complex is moderately effective against *E. Coli* & *B. Subtilles* and non-effective against *S. Cerevisiae* & A. niger. The [Mn(BCPZ-mph)N$_3$·H$_2$O] complex is non-effective against
E.Coli & B.Subtilles, moderately effective against S.Cerevisiae and non effective against A. niger. The [Fe(BCPz-mph)N₃·H₂O] complex is moderately effective against E.Coli, slightly effective against B.Subtilles & A. Niger and non effective against S.Cerevisiae. The [Mn(BCPz-mph)OAc·H₂O] complex is moderately effective against E.Coli and non effective against B.subtilis, S.Cerevisiae & A. niger. The [Fe(BCPz-mph)OAc·H₂O] complex is non effective against E.Coli & B.Subtilles, moderately effective against S.Cerevisiae and non effective against A. niger. The [Mn(BCPz-mph)NO₃·H₂O] complex is non effective against E.Coli, S.Cerevisiae & A. niger. But slightly effective against B.Subtilles. The [Fe(BCPz-mph)NO₃·H₂O]complex is moderately effective against E.Coli, slightly effective against B.Subtilles & A. Niger and non effective against S.Cerevisiae. The [Mn(BCPz-mph)Cl·H₂O] complex is non effective against E.Coli & A. niger, slightly effective against B.Subtilles and moderately effective against S.Cerevisiae. The [Fe(BCPz-mph)Cl·H₂O] complex is moderately effective against E.Coli, non effective against B.Subtilles & S.Cerevisiae and slightly effective against A. niger. The [Mn(BCPz-mph)SO₃·H₂O] complex is moderately effective against E.Coli, B.Subtilles & S. cerevisiae and non effective A.
niger. The [Fe(BCPz-mph)SO\textsubscript{3}·H\textsubscript{2}O] complex is moderately effective against \textit{S. Cerevisiae} and \textit{E. Coli} and non effective against \textit{B. Subtilis}, \textit{S. Cerevisiae} and \textit{A. niger}. 
SUMMARY

The studied on antimicrobial activities of the ligand and their metal chelates are described in chapter-V.

Both the ligands and their metal complexes prepared during present investigation are tested for their antibacterial, antifungal, antifungal activity against *Escherichia coli*, *Bacillus subtilis*, *Saccharomyces cerevisiae* and *Aspergillus niger*. It is observed that Both the synthesized ligands and their metal chelates effect the growth of microorganisms and resulted in to inhibitory effect. Moderate effective inhibition was shown by the metal complexes of $\text{H}_2\text{BCP}_z$-hm followed by the metal complexes of $\text{H}_2\text{BCP}_z$-mph.


