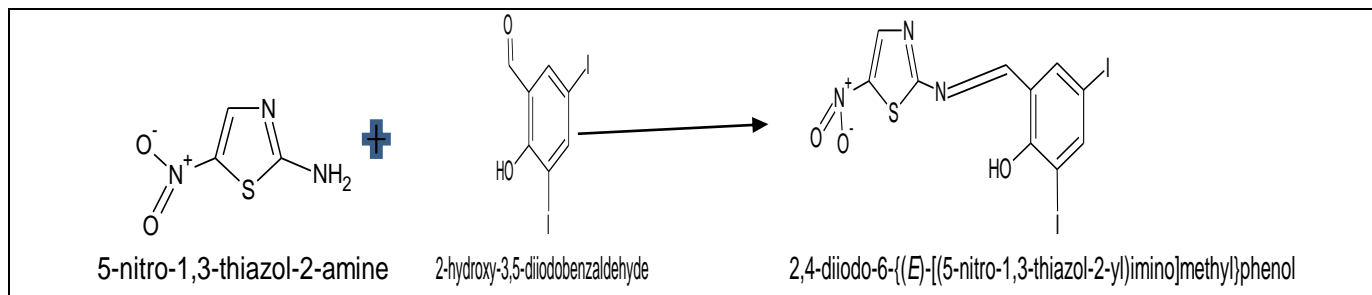


MATERIAL AND METHODS

Microwave assisted Synthesis of schiff base ligand

2-amino 5-nitro thiazole (0.01 mol) and 3,5-diiodosalicylaldehyde (0.01 mol), and were mixed thoroughly in ethanol and small amount of glacial acetic acid was added and were taken in Erlen Meyer flask capped with a funnel placed in a microwave

oven and irradiated an interval of 1 min at 450W for about 5-8 min. After completion the reaction, the reaction mixture was allowed to attain room temperature and solid separated was filtered. The resulting product was then recrystallized with ethanol, finally dried under reduced pressure over anhydrous CaCl₂ in a desiccator. Yield: 70-90%.



Scheme-1, Microwave assisted synthesis of schiff base

EXPERIMENTAL

ANTIMICROBIAL ACTIVITY

The newly synthesized schiff base ligand 2,4-diiodo-6-((E)-[(5-nitro-1,3-thiazol-2-yl) imino] methyl) phenol and its copper complex were evaluated for in vitro bacterial activity against as example of Gram-positive bacteria (*staphylococcus aureus* and *Bacillus Subtilis*) and gram negative bacteria (*E. coli*, *Pseudomonas putida*) by disc diffusion method was for the determination of the preliminary antibacterial activity.

The bacterial cultures were incubated at 30 ± 0.1 °C for 24 hours by inoculation into nutrient agar. The compounds were dissolved in test solution (DMSO) and the disc of Whatman filter paper No. 41 having the diameter 4mm were prepared and soaked in it. These soaked discs were placed on nutrient agar plates inoculated with bacteria. These plates were incubated for 36 hrs at 30 °C. The inhibition zone was observed after 36 hr.

Anti-fungal screening: The fungal strains were directly mixed with the PDA medium (potato dextrose agar) and dispersed into the petri plates. Filter paper discs of 4 mm diameter were prepared prior to the experiment. These discs were soaked in DMSO in which the schiff base and its copper complex were dissolved and DMSO was used as a control. The filter paper discs were placed on

nutrient medium mixed with fungal strains. These Petri dishes were incubated at 35°C for 48 hrs. The growth of the fungus was measured by recording the diameter of fungal mycelia.

The result was recorded for schiff base and its copper complex as the average diameter of inhibition zones (IZ) of bacterial growth around the discs in mm. The antibacterial activity of schiff base and their copper complex in DMSO against of Gram-positive bacteria (*staphylococcus aureus* and *Bacillus subtilis*) and gram negative bacteria (*E. coli*, *Pseudomonas putida*) is shown in Table-1 and fungal activity results shown in Table-2.

RESULTS AND DISCUSSION

Antibacterial activity results, Table 1 showed that free Schiff base ligand showed no activity against bacterial strains. The schiff base Cu(II) complex exhibited moderate activity against *S. aureus*, and *E. coli* and had a higher effect against *Bacillus subtilis* but no activity against *Pseudomonas putida* microorganism. The results of antifungal activities of synthesized complex are summarized in table 2. The in vitro antifungal activity of metal complex showed very good inhibition than the schiff's base ligand against fungal strains under investigation.

Antibacterial and antifungal activities of the schiff base ligand and its copper complex were compared

with those of the standard drugs ampicillin and fluconazole. The discrepancy in the activity of copper complex against different microorganisms depends on the permeability of the cell or differences in the ribosomes in the microbial cells. (S. K. Sengupta, 1998;) The lipid membrane surrounding the cell of microorganism favours the passage of any lipid soluble materials and it is known that liposolubility is an important factor controlling antimicrobial activity (J. Parekh, 2005; Y. Vaghassia, 2004;). It was evident from the data that in vitro significantly increased on

coordination. Moreover, coordination reduces the polarity (B.C.J. Bayer, 1962; R. Pal, 2014;) of the metal ion mainly because of the partial sharing of its positive charge with the donor groups (A.B.P. Lever, 1984) within the chelate ring system formed. This process, in turn, leads to increase in the lipophilic character of metal chelate so as to make it more permeable through the lipid layer of microorganism (Chohan ZH, U.M. Hassan, 2002;) thus destroying them more aggressively.

Table -1: Antibacterial Activity of the Schiff's base Ligand and its complex

S.No	Compound code	Zone of Inhibition (diameter in mm)			
		<i>E.coli</i>	<i>S. Aureus</i>	<i>Pseudomonas putida</i>	<i>B. Subtilis</i>
1	ATDI-S	-	-	-	-
2	ATDI-C	-	15	-	26.5
3	Positive Control	40	24	34	46

Table-2: Antifungal activity of schiff base ligand and its copper complex

S.NO	Compound Code	Zone of Inhibition (diameter in mm)	
		<i>Candida albicans</i>	<i>Aspergillus niger</i>
1	ATDI-S	11	-
2	ATDI-C	20	19
3	Positive Control	24	25

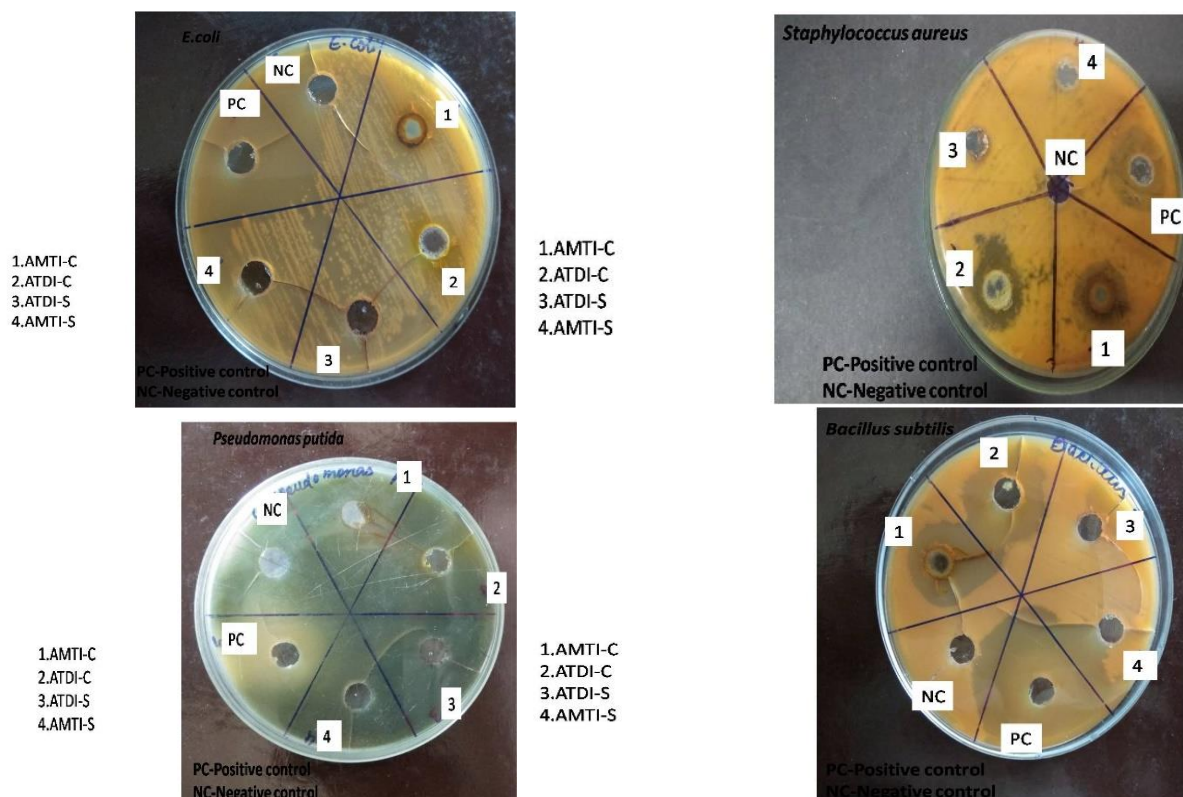


Fig-1 Antibacterial activity of schiff base and its copper complex.

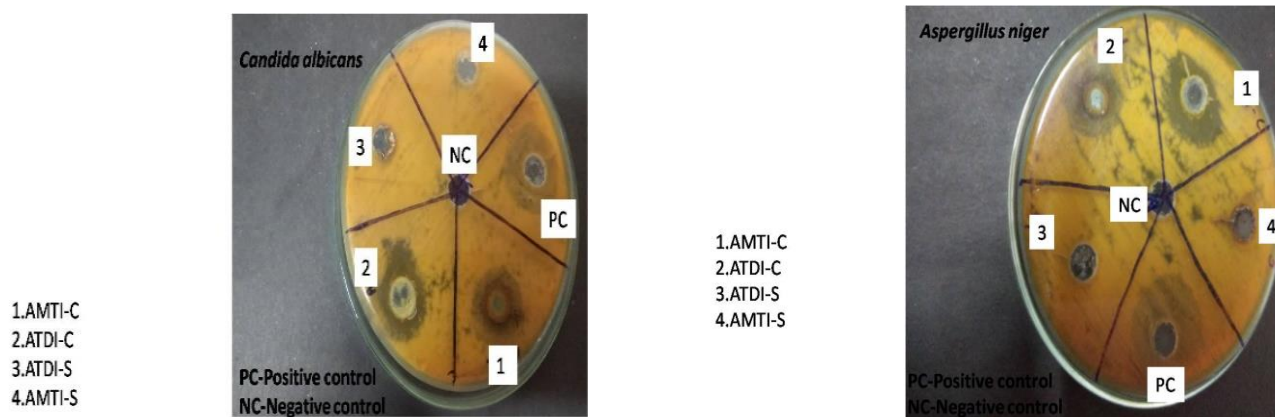


Fig-2 Antifungal activity of schiff base ligand and copper complex

CONCLUSION

In present study we reported a nonconventional microwave assisted synthesis of schiff base ligand 2,4-diiodo-6- $\{(E)-[(5\text{-nitro-1,3-thiazol-2-yl) imino] methyl}\}$ and their copper complex. In vitro antimicrobial activity of copper complex and ligand were studied and it has been observed that copper complex of schiff base were found to display higher antibacterial activity than free schiff base ligand under identical experimental condition. Some structural modification in free schiff base ligand (2,4-diiodo-6- $\{(E)-[(5\text{-nitro-1,3-thiazol-2-yl) imino] methyl}\}$) can tune the antimicrobial activity and may serve as a model compound for the development of some efficient antimicrobial activity.

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Conflict of Interest: None

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