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SYNTHESIS OF SCHIFF BASE OF 1,2,4-TRIAZOLE BY GREEN METHOD AND THEIR ANTIMICROBIAL ACTIVITY

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ABSTRACT
A new Schiff base ligands derived from substituted aldehyde and 1,2,4-triazole. Schiff base ligands were screened for antibacterial activity against *Pseudomonas Aeurogenosa* and *Escherichia coli and fungicidal activity were tested against Aspergillus Niger and Trichoderma.*

KEYWORDS: Schiff bases, 1,2,4-triazole,Green method, antibacterial, fungicidal activity

INTRODUCTION
1,2,4-Triazole and it's derivatives represent one of the most biologically active class of heterocyclic compounds. 1,2,4-Triazole derivatives are known to exihibit antimicrobial [1-4]. Aromatic aldehydes especially with an effective conjugation system, form stable Schiff bases, where as those aliphatic aldehydes are unstable and readily polymerize[5]. Schiff base ligands with aldehydes are formed more readily than with ketone (carbonyl carbon). Schiff bases have very flexible and different structures. A wide range of Schiff base compounds and their behavior studied because these compounds have very flexible and diverse structure[6]. Schiff bases are generally are bi ,tri, or tetra-dentate chelate ligands and form very stable complexes with metal ions.
Their chemical and physical properties in various field such as preparative uses, identification, or protection and determination of aldehyde or ketones, purification of carbonyl and amino compounds or production of these compounds in complex or sensitive reactions have studied by various workers [7,8]. Schiff base ligands have significant importance in chemistry , especially in the development of Schiff base complexes , because Schiff base complexes are potentially capable of forming stable complexes with metal ions, Many Schiff base complexes show excellent catalytic activity in various reaction at high temperature and in the presence of moisture . Over the past few years, there have been many reports on their applications in homogeneous and heterogeneous catalysis, hence the need for a review article highlighting the catalytic activity of Schiff base complexes.
Iminium salt ($R_2C=N+R_2$) at the other extremes are very rapidly hydrolyzed by water and have to be prepared under rigorously anhydrous conditions. The facility of iminium salt

hydrolysis has been put to use in a synthesis of secondary amines from primary amines which involves conversion into the aldimine ($R_1CH=NR_2$) and then by alkylation in to the iminium salt [$R_1CH=N^+R_2$ (R_3) X^-] followed by hydrolysis to give the secondary amines (R_2NHR_3). Because of the involvement of Schiff base hydrolysis in a number of enzyme mediated processes.

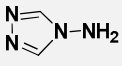
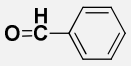
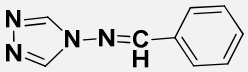
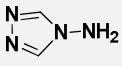
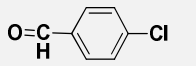
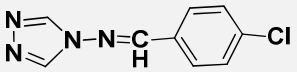
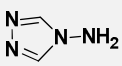
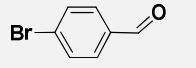
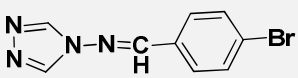
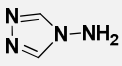
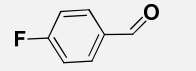
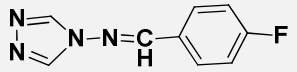
MATERIALS AND METHODS

Synthesis and characterization of Schiff base of 1, 2,4-triazole ligands

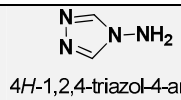
The equimolar quantities of substituted aldehyde and 1,2,4-triazole were taken in 500 ml round bottomed flask, 5ml ethanol and 2-3 drops of glacial acetic acid was added and shaked reaction mixture for 1-2 minute at room tempreture, solid crude product was obtained, poured on crushed ice and recrystallised from minimum quantity of ethanol. Purity of product was checked by *TLC* and melting point.

All synthesized ligands were stable to air and moisture. Soluble in ethanol, methanol, chloroform, dichloromethane and insoluble in water. One representative ligand was scanned for UV-Vis, H1NMR, Mass spectrum. Following are the scanning results are given below.UV-Vis studies UV-Vis (EtOH), nm 218 and 316. IR (KBr in cm-1), 1603 (-C=C- aromatic), 1574 (-NH), 1361 (C-N)1H NMR spectral studies(DMSO-d0,δ,ppm): 10.04 (s,1H NH), 8.32 (s 1H C=N) 6.81 (d, J=8.4 Hz, 2H from aromatic ring)Mass spectral studies1,2,4-Triazoles have a strong molecular ion peak with the cleavage of bonds between N_1-N_2 and N_4-N_5 has been observed. The ligands prepared are shown in Table 1.

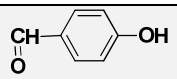
Table 1. Synthesis of ligand

Sr.	Reactant	Reactant	Product
1	 4*H*-1,2,4-triazol-4-amine	 benzaldehyde	 *N*-benzylidene-4*H*-1,2,4-triazol-4-amine
2	 4*H*-1,2,4-triazol-4-amine	 4-chlorobenzaldehyde	 *N*-(4-chlorobenzylidene)-4*H*-1,2,4-triazol-4-amine
3	 4*H*-1,2,4-triazol-4-amine	 4-bromobenzaldehyde	 *N*-(4-bromobenzylidene)-4*H*-1,2,4-triazol-4-amine
4	 4*H*-1,2,4-triazol-4-amine	 4-fluorobenzaldehyde	 *N*-(4-fluorobenzylidene)-4*H*-1,2,4-triazol-4-amine

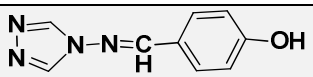
5



4*H*-1,2,4-triazol-4-amine



4-hydroxybenzaldehyde



4-(((4*H*-1,2,4-triazol-4-yl)imino)methyl)phenol

RESULT AND DECUSSION

Antibacterial activity

Antibacterial activity of all ligands, sulphonamides and substituted sulphonamides against *Escherichia Coli* species were screened by disc diffusion method. The test compounds were dissolved in THF. For each compound 100ug/ml was taken for microbial screening against the *Escherichia Coli.* The bacteria were maintained in Nutrient agar Medium (NAM). Aseptic techniques were employed to prepare the culture medium of the test microorganisms were maintained on nutrient agar slant at 4^{o}C temperature.

Table.2 Antibacterial activity of ligands at concentration 100µg/ml at tempreture 370c+10c and at 28 hours

Test species- Escherichia coli

Sr.no.	Test compound	Diameter of inhibition zone (mm)
1	N-benzylidene-4H-1,2,4-triazole-4-amine(L1)	25
2	N-(4-Chlorobenzylidene-4H-1,2,4-triazole-4-amine (L2)	19
3	N-(4-bromobenzylidene-4H-1,2,4-triazole-4-amine (L3)	18
4	N-(4-fluorobenzylidene-4H-1,2,4-triazole-4-amine (L4)	30
5	N-(4H-,2,4-triazole-4-yl)imino)methyl phenol (L5)	34

Antifungal activity

Aspergillus niger Conidia of *Aspergillus niger* are always present in the air and cause contamination in laboratory cultures of bacteria and fungi. It is also called as 'weed of the laboratory'. Over 30 species of *Aspergillus nige r* have been recorded so far in India. Thom and Raper [5] recognized more than 78 species of *Aspergillus.* These are of great importance because of their harmful as well as useful activities. When *Aspergillus* infects lungs in human being[6] the symptoms resemble tuberculosis[7]. *Aspergilli*are now known to produce several deadly toxins on various food feed-stuffs which when eaten cause mycotoxicoses in animals and human beings. The fungi are always associated with fruits, vegetables. Food grains during storage and cause spoilage to these stored products. Strains of *Aspergillus niger* are used in the manufacture of citric acid, gluconic acid and itanoic acid [8].

Table. 3 STUDY OF ANTIFUNGAL ACTIVITY OF SCHIFF BASES AGAINST A. NIGER

Schiff base ligand	Mycelial dry weight(in mg) at		
	Conc (250 ppm)	Conc (500 ppm)	Conc (1000 ppm)
Control (C)	60	60	60
N-benzylidene-4H-1,2,4-triazole-4-amine(L1)	35	26	20
N-(4-Chlorobenzylidene-4H-1,2,4-triazole-4-amine (L2)	70	65	48
N-(4-bromobenzylidene-4H-1,2,4-triazole-4-amine (L3)	89	100	50
N-(4-fluorobenzylidene-4H-1,2,4-triazole-4-amine (L4)	64	86	68
N-(4H-,2,4-triazole-4-yl)imino)methyl phenol (L5)	50	62	78

CONCLUSION

We have successfully developed and easy access for the synthesis of aromatic Schiff base in by green technique. The staring chemicals were easily available as aromatic aldehyde, and amine. There is no requirement of heating, stirring and catalyst. Very less time period required for synthesis.

REFERENCES

1. Kaplancikli ZA, Turan-Zitouni G, Ozdemir A and Revail G. Eur J Med Chem, 2008, 43, 155.
2. Mishra R, Kumar R, Kumar S , Majeed J, Rashid M and Sharma S, J Chil Chem Soc, 2010, 55, 359.
3. Muhi-Eldeen Z, Nadir M, Aljobory N R, Hussan F and Stohs S, Eur J Med Chem, 1991,26 ,237.
4. Upmanyu N, Kumar S, Kharya M D, Shah K and Mishra P, Acta Pol Pharm, 2011, 68, 213.
5. P.Paul,Proc. Indian Acad. Sci(Chem. Sci.), 269,2002,114 .
6. Paquette LA, Benjamin WA, Principles of Modern Heterocyclic Chemistry 318(1968).
7. Yoshizawa M, J.Am.Chem.Soc,127, 2005, 2798.
8. Zerkocoski SA, Seto CT and Whitesiders GM, J.Am.Chem.Soc,114, 1991 5473.
9. Thom C and Raper KB, A Manual of the Aspergilus XII +3- 73 Williams and Wilkins Co.-Baltimore, 76 (1945).
10. Skinner CE, Emmiens CW, and Tsuchiya HM, Mold of yeasts and Actenomycets, John Wiley and Sons.2nd Edn., New York (1947).
11. Fine gold SM, Will D, and Murray JF, Aspergillosis A review and report of twelve cases Amer.,J Med, 27, (1959), 463-482 .
12. Under LA Kofler, and Hickey RJ, Industrial Fermentation Chem.Publ.Co., New York **(1954).**

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