Heterocyclic Letters
Vol. 7| No.3|863-866|May-July| 2017
ISSN : (print) 2231–3087 / (online) 2230-9632
CODEN: HLEEAI
http://heteroletters.org

SYNTHESIS OF SCHIFF BASE BY GREEN METHOD AND THEIR ANTIMICROBIAL ACTIVITY

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ABSTRACT
A new Schiff base ligands derived from substituted aldehyde and hydrazine hydrate by green method. The ligands were characterized by *M. P.,TLC,* ^{1}*H-NMR* and *MASS.* The 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, Green method, antibacterial, fungicidal activity

INTRODUCTION
Many drugs possess modified toxicological and pharmacological properties in the form of metal complex and probably Schiff bases are versatile C=N (Imine) containing compounds possessing broad spectrum of biological activity and incorporation of metals in form of complexes showed some degree of antibacterial, antifungal , antitumor and anti-inflammatory activity [1].Schiff base are the compound containing azomethine group (-HC=N-). They are condensation products of ketones (or) aldehydes (aldehyde and ketones) with primary amines and were first reported by Hugo Schiff in 1864[2]. Formation of Schiff base generally takes place under acids or base catalysis or with heat. The common Schiff base are crystalline solids, which are feebly basic but at least some form insoluble salts with strong acids. Schiff base are used as intermediates for the synthesis of amino acids or as ligands for preparation of metal complexes having a series of different structures. A Schiff base behaves as a flexi-dentate ligand and commonly co-ordinates through the O atom of the de -pronated phenolic group and the N atom of azomethine group[3].

In Schiff base azomethane nitrogen and other donor atoms like oxygen play a vital role in co-ordination chemistry. Hence an attempt is made to study the interaction of reduced Schiff base with transition of metals of biological interest and to investigate the co-ordination chemistry of such interactions. In the present work we described the synthesis and characterization of reduced Schiff base and its metal complexes[4]. Moreover antibacterial and analgesic activity of reduced Schiff base metal complexes is also evaluated and compared with the standards[5].

MATERIALS AND METHODS

Synthesis and characterization of Schiff base ligands

The equimolar quantities of substituted aldehyde and hydrazine hydrate were taken in 500 ml round bottomed flask. 5ml ethanol and 2-3 drops of glacial acetic acid was added and shake reaction mixture for 1-2 minute at room tempreture, solid crude product was obtained, poured on crushed ice and recrystallise 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

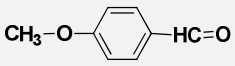
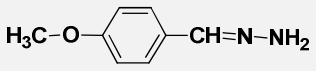
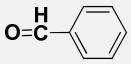
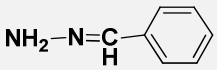
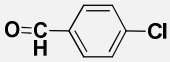
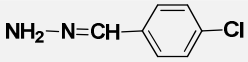
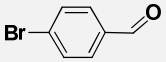
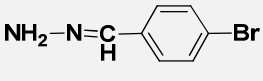
(DMSO-d0,δ,ppm): 10.04 (s,1H NH), 8.32 (s 1H C=N) 6.81 (d, J=8.4 Hz, 2H from aromatic ring)

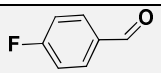
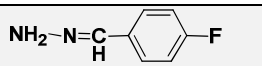
Mass spectral studies

Mass spectrum were found to match with the theoretical expected values as ES+ peak observed at 147.58with 100% and ES value was matched with 150.58 with 100% abundances.

The ligands prepared are

Table 1 Synthesized Schiff bases

Sr.	Reactant	Reactant	Product
1	H2N-NH2 hydrazine	 4-methoxybenzaldehyde	 (4-methoxybenzylidene)hydrazine
2	H2N-NH2 hydrazine	 benzaldehyde	 benzylidenehydrazine
3	H2N-NH2 hydrazine	 4-chlorobenzaldehyde	 (4-chlorobenzylidene)hydrazine
4	H2N-NH2 hydrazine	 4-bromobenzaldehyde	 (4-bromobenzylidene)hydrazine

5	H2N-NH2 hydrazine	 4-fluorobenzaldehyde	 (4-fluorobenzylidene)hydrazine

RESULT AND DECUSSION

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 niger*have been recorded so far in India. Thom and Raper [6] recognized more than 78 species of *Aspergillus.*

These are of great importance because of their harmful as well as useful activities. When *Aspergillus* infectslungs in human being[7] the symptoms resemble tuberculosis[8].

*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 [9].

Table. 2 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
4-(methoxybenzylidene)hydrazine	32	23	16
benzylidenehydrazine	72	62	40
4-(chlorobenzylidene)hydrazine	84	101	42
4-(bromobenzylidene)hydrazine	55	76	58
4-(fluorobenzylidene)hydrazine	44	52	68

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. 3 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	4-(methoxybenzylidene)hydrazine(L1)	20
2	Benzylidenehydrazine(L2)	15
3	4-(chlorobenzylidene)hydrazine(L3)	13

4	4-(bromobenzylidene)hydrazine(L4)	25
5	4-(fluorobenzylidene)hydrazine(L5)	30

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.

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Received on May 2017.