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Synthesis of Schiff bases by organic free solvent method

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ABSTRACT

A New Schiff bases have been Synthesized by the condensation of 2-aminobenzothiazole with different aldehydes under organic solvent free condition efficiently in the presence of water. Their structures are confirmed by IR, NMR Spectra. The compound were screened for their antimicrobial activities

Key words: Schiff bases, Organic solvent free, Antimicrobial activity.

INTRODUCTION

The Schiff bases constitute one of the most active class of the compound posses biological activities such as antitubercular[1], anticancer[2], plant growth inhibitors[3], insectisidal[4-5], CNS depressant[6], antibacterial[7-14]. The Schiff bases can be prepared by the acid catalysed reaction of amine and ketone or aldehyde. Schiff bases are used as starting material for the synthesis of various bioactive heterocyclic compound like 2 azetidinones, benzoxazines and formazans. The Schiff bases are an intermediate in the biologically important trasamination reactions.

The Schiff bases used as a protective agent in natural rubber[15] and amino protective groups in organic synthesis. Dabholkar and More[16] have synthesized schiff bases under microwave irradiation. The Schiff bases[17-18] have been synthesized by condensing carbonyl compound and amine in water suspension medium. Arshi Naquvi et.al[19], reported the synthesis of Schiff baess by environmentally benign synthetic methods. Khadsan et.al[20], synthesized a Schiff bases via eco-friendly and energy efficient greener methodogies .Busnure et.al[21] can studied

comparative study of new novel Schiff bases and their antimicrobial screening.Devidas et.al[22] synthesized Schiff bases catalysed by P_2O_5 Under free solvent condition.Mustabha et.a[23] synthesized novel Schiff bases and their transition metal complex. Zamani et.al[24] synthesized Schiff bases as sensing material.

It was thought worthwhile to synthesize schiff bases using organic solvent free method.

EXPERIMENTAL SECTION

Melting point was determined in open capillary tube using Presion Digital Melting Point Apparatus and is uncorrected .The IR Spectra were recorded on Perkin-Elmer Spectrophotometer instrument using KBr disc. NMR Spectra were recorded on 200 MHz Spectrophotometer instrument using Chloroform solvent and TMS as internal standard.

Synthesis of Schiff bases:
A mixture of 2 - aminobenzothiazoles (0.01M) and different aromatic aldehyde (0.01M) were taken in mortar, added to conc. H_2SO_4 (0.25ml), water (5ml) and stirred at room temperature for 30-40 minutes. After completion of reaction, water 25 ml added. Separate a solid was filterred, washed with water and crystallized from ethyl alcohol.

Scheme

Ar-NH_2 + O=CH-Ar'---------Ar-N=CH-Ar'
Ar- benzothiazole

Table: 1

Compound	Ar'
I	o-nitrobenzaldehyde
II	m-nitrobenzaldehyde
III	p-methoxybenzaldehyde
IV	p-dimethylaminbenzaldehyde
V	3, 4 methylenedioxybenzaldehyde.
VI	Furfuraldehyde

Spectral Analysis:
Compound IV:
IR(υ in cm^{-1}) : 3019 (Ar-H),1613(CH=N Stretching),1588(=CH-H Stretching),1530(C=C Stretching), 1216 (C-N Stretching), 2912(C-H Stretching).; **NMR (δ in ppm) :** 8.84 (s ,CH=N,1H), 2.03(s,N-$(CH_3)_2$,6H) ,6.5-8 (m, Ar-H ,8H)

Compound : V
IR(υ in cm^{-1}): 2958 (C-H),1528 (C=C),1216 (C-N),1061 (C-H),1638 (C=O),775 (C- Cl), 1036(C-O).; **NMR (δ in ppm):** 6.5-8(m, Ar-H ,8H), 6.12 (dd,CHH_A 1H), 6.30 (dd,CHH_B 1H), 2.03(s, N-$(CH_3)_2$,6 H).

Physical parameters of synthesized Schiff bases:

Table-2

Comp.	Mol. wt.	Melting point	% yield	Colour	Molecular formula
a	281.38	180^0	77%	Yellow	C_{16} H_{15} N_3 S
IIa	283.309	162^0	70%	Yellowish green	$C_{14}H_9$ N_3 SO_2
IIIa	268.338	186^0	65%	Grey	C_{15} H_{12} N_2 SO
Iva	228.273	185^0	65%	Pale yellow	C_{12} H_7 N_2 SO
Va	282.321	188^0	67%	Greenish yellow	C_{15} H_{10} N SO_2
Via	283.309	162^0	70%	Yellowish green	$C_{14}H_9$ N_3 SO_2

RESULTS AND DISCUSSION

In this way ,we have prepared new Schiff bases under organic solvent free condition from amino compound and different aldehyde taken in morter and added it trace of H_2SO_4 and water to it, wait the reaction mixture . The raeaction mixture grinded for 30-40 minutes. After reaction completion of reaction water was added and stirred. Separate solid was washed with water and recrystallised from ethyl alcohol .The structure of Schiff bases confirmed by IR, NMR Spectra.

CONCLUSION

This procedure of synthesis of a new Schiff bases eliminate the use of organic solvent. Reaction complete within 30-40 minutes and isolation of product is very simple.

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