Oriental Journal of Chemistry Vol. **26**(3), 1195-1197 (2010)

Novel synthesis, characterization and spectral evaluation of newly substituted Schiff bases

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(Received: April 15, 2010; Accepted: May 20, 2010)

ABSTRACT

In the present synthesis, resulting Schiff bases who is bearing chloro, methoxy and methyl groups have been synthesized by the condensation between the primary amine and various subs tituted aromatic aldehydes in the presence of pyridine as a condensing agent. The newly prepared substituted schiff bases have been characterized and established on the basis of their elemental analysis, physical properties and spectral studies viz: IR.

Key words: Primary amine, substituted aldehydes, pyridine, spectral data.

INTRODUCTION

Schiff bases are represents a class of chemical compounds having importance in medicinal and pharmacological field, it had got wide applications in both organic and inorganic branches[1], Schiff bases have been play vital role in biological field such as antiallergic[2], antibacterial[3], fungicidal[4], anti-tubercular[5], antiviral[6], antiinflammatory[7], anticancer[8] and anthelmintic[9] activities. A large number of Schiff bases have been found to possess important biological activities[10].Most of the biologically active schiff bases have structures quite suitable for chelation with metal ion. Metal complex Schiff bases have also been used in the oxidation reactions[11]. A number of subs. Schiff bases have been synthesized by various workers in our laboratory[12-15].

All the mentioned properties of schiff bases prompted us to synthesized a series of some new schiff bases. In this paper we describe here the preparation and characterization of newly synthesized Schiff bases. The Schiff bases were preparedby the condensation of primary amine with various substituted aromatic aldehydes in the presence of pyridine.

EXPERIMENTAL

Material and Methods

All the melting points are determined in open capillary tubes on Electrothermal apparatus and were uncorrected. The purities of newly synthesized compounds were checked on silica-gel-coated AI plates (Merck) by using (5% benzene / methanol)as developing solvent. IR spectra were recorded on Perkin-Elmer spectrum RX-1 FT-IR spectrophotometer in Kbr at St. John's College Agra.

All the used chemical were of analytical grade and obtained from (Sigma - Aldrich). The physical properties and analytical data of the synthesized compounds were listed in Table 1.

General procedure for the synthesis of substituted Schiff bases(1a-1j,2a-2j)

To the primary amine (2-methoxy-5-

methyl,3-chloro-4-methoxy; 0.005 mole), substituted aldehydes (0.005 mole) and 2-3 drops of pyridine were mixed and then reflux. In an oil-bath at maintained temperature 105-110°C for 4 - hours . The contents was first melted and then resolidifi ed, after cooling, the residue was recrystallized from ethanol. To obtained the substituted Schiff bases.

RESULTS AND DISCUSSION

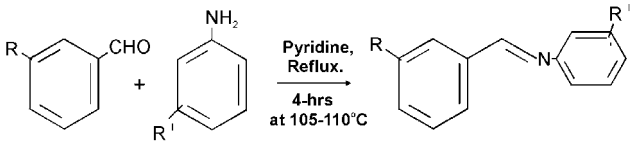
The structurally important IR spectral bands of Schiff bases are listed in Table-1.

The proposed structures was further confirmed by IR spectral data in the frequency region

Table :1 Physical and Analytical data of Newly Synthesized Compounds

Codes	Molecular Formula	Molecular Weight	M. P (°C)	Yield %	Colour	N% Cal. (Found)	IR cm^{-1} C=N cm^{-1} stretching	CH_3 cm^{-1} stretching	mono substi.
1a.	$C_{15}H_{14}N_1O_1Cl_1$	259.74	273°	58.84	light suede	05.39 (05.42)	1567.0	1459.0	670.4
1b.	$C_{15}H_{14}N_1O_1Cl_1$	259.74	sticky	70.03	dark brown	05.39 (05.41)	-	-	-
1c.	$C_{15}H_{15}N_1O_2$	241.29	198°	51.35	light wild yellow	05.80 (05.84)	1599.0	1448.7	715.9
1d.	$C_{15}H_{14}N_2O_3$	270.29	074°	72.52	dirty gold rush	10.36 (10.40)	-	-	-
1e.	$C_{16}H_{17}N_1O_3$	271.32	sticky	57.78	dark brown	05.16 (05.19)	-	-	-
1f.	$C_{16}H_{17}N_1O_2$	255.32	079°	66.66	dark walnut brown	05.48 (05.51)	-	-	-
1g.	$C_{15}H_{14}N_1O_2Cl_1$	275.74	074°	74.40	sunset orange	05.08 (05.11)	1562.5	1477.3	687.9
1h.	$C_{15}H_{13}N_1O_2Cl_2$	310.19	098°	71.34	deep orange	04.51 (04.56)	-	-	-
1i.	$C_{19}H_{17}N_1O_2$	291.35	123°	57.28	light desert	04.80 (04.84)	-	-	-
1j.	$C_{15}H_{13}N_1O_1Br_1F_1$	322.19	114°	62.05	beacon	04.34 (04.39)	-	-	-
2a.	$C_{14}H_{11}N_1O_1Cl_2$	280.16	084°	66.32	light sandstone	05.00 (05.03)	-	-	-
2b.	$C_{14}H_{11}N_1O_1Cl_2$	280.16	069°	73.06	dirty ivory	05.00 (05.05)	1558.6	1432.9	706.0
2c.	$C_{14}H_{12}N_1O_2Cl_1$	261.71	152°	64.96	broken white	05.35 (05.39)	-	-	-
2d.	$C_{14}H_{11}N_2O_3Cl_1$	290.71	100°	71.10	dark casablanka	09.63 (09.66)	1567.6	1445.2	673.0
2e.	$C_{15}H_{14}N_1O_3Cl_1$	291.74	079°	60.19	light pale cream	04.80 (04.83)	-	-	-
2f.	$C_{15}H_{14}N_1O_2Cl_1$	275.74	088°	70.64	dark dawn	05.08 (05.11)	-	-	-
2g.	$C_{14}H_{11}N_1O_2Cl_2$	296.16	138°	61.98	light mango orange	04.72 (04.76)	-	-	-
2h.	$C_{14}H_{10}N_1O_2Cl_3$	330.61	134°	67.81	deep orange	04.23 (04.27)	1592.5	1420.1	669.9
2i.	$C_{18}H_{14}N_1O_2Cl_1$	311.77	126°	53.79	light sporty yellow	04.49 (04.52)	-	-	-
2j.	$C_{14}H_{10}N_1O_1Cl_1F_1Br_1$	342.61	061°	69.72	dark sandstone	04.08 (04.11)	-	-	-

4000-500 cm^{-1} of newly synthesized compounds [1a,1c & 1g] which arise due to vibrations involving -C=N stretching between 1599.0-1567.0 cm^{-1} other bands of - CH_3 group appeared near at 1477.3-1448.7 cm^{-1} vibrations, and another band were obserbed between 715.9-670.4 cm^{-1} which are indicated the mono substitution stretching vibrations. All these observations are agreed with the assigned



Substituted Benzaldehyde **Primary Amine** **(1a-1j , 2a-2j) Schiff bases**

where, R' = 2-methoxy-5-methyl aniline, 3-chloro-4-methoxy aniline
and R = - 2 - Cl- benzaldehyde (1a,2a) , - 4 - Cl- benzaldehyde (1b,2b)
- 4 - OH- benzaldehyde (1c,2c) , - 2 - NO_2- benzaldehyde (1d,2d)
- Vanilline (1e,2e) , - 4 - OCH_3 - benzaldehyde (1f , 2f)
- 5 - Cl - salicylaldehyde (1g,2g) , - 3,5 - Cl_2- salicylaldehyde (1h,2h)
- 2 - OH-1-Naphthaldehyde (1i , 2i) , - 4-Br-2F-benzaldehyde (1j , 2j)

structures of compounds 1a,1c & 1g and other compounds (1b,1d-1f & 1h-1j).

The IR (Kbr) spectrum of substituted schiff bases [2b,2d & 2h] showed absorption in the range 1592.5-1558.6 cm^{-1} due to C=N stretching vibrations, the bands in the range 1445.2-1420.1 cm^{-1} in the Schiff bases is due to the presence of -CH_3 group, the next IR absorption band in the range 706.0-669.9 cm^{-1} indicates the involvement of mono substitution ring. The above observations are agreed with the assigned structure of compounds 2b,2d & 2h and other compounds (2a,2c,2e-2g & 2i-2j).

The IR spectral data of newly synthesized compounds of Schiff bases indicating the absorption spectrum was in agreement with the assigned structures, colouring properties, melting points.

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