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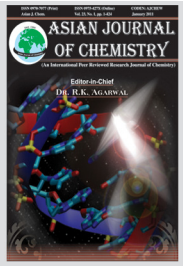

Microwave Assisted Synthesis and Characterization of Azomethines of Aryl Thiazole

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2-Chloro-N-(2-methylphenyl)acetamide compound (**I**) was prepared by treating *o*-toluidine, chloroacetyl chloride in alkali medium. The compound (**I**) was further treated with thiourea in alcohol and irradiated in microwave oven for 20 min to get (N^4-phenyl-1,3-thiazole-2,4-diamine) compound (**II**). Five different azomethines were prepared by treating compound (**II**) with five different aldehydes in alcohol under reflux. The synthesised compounds were characterized by IR, mass, ^{1}H NMR spectroscopy.

Key Words: Aryl thiazole, azomethines, Heterocyclic compounds.

INTRODUCTION

Thiazoles are an important class of natural and synthetic compounds[1]. Thiazole derivatives display a wide range of biological activities such as antifungal[2], antimicrobial[3], anti-tubercular[2], antineoplastic[4], antiinflammatory[5] activity. Moreover, azomethines are also known to possess antimicrobial, antifungal and antineoplastic activity. Modifications of thiazole moiety have proved highly effective in designing new pharmacophore with improved potency and lesser toxicity[6,7]. In the light of above evidences, some new Schiff bases containing thiazole moiety were synthesized.

EXPERIMENTAL

Melting points were taken in open capillary tube and are presented uncorrected. IR spectra were recorded in Perkin-Elmer spectrum one FTIR spectrometer using KBr disc method. The ^{1}H NMR were recorded in Bruker Avance III500 MHZ NMR spectrometer, chemical shifts values are reported as values in ppm relative to TMS ($\delta = 0$) as internal standard. The mass spectra were recorded on Jeol GC mateII mass spectrometer.

Synthesis of 2-chloro-N-(2-methylphenyl)acetamide[1] (I): About (0.01 M) *o*-toludine was taken in a beaker to which 2.8 % of sodium hydroxide solution was added with continuous stirring and kept in ice bath for 10 min. To the cooled mixture chloroacetyl chloride (0.02 M) was added as one portion with continuous stirring under cold condition. The product obtained was recrystallized from methanol.

Synthesis of N^4-phenyl-1,3-thiazole-2,4-diamine (II): Equimolar mixture of compound (**II**) and thiourea was dissolved in alcohol and subjected to microwave irradiation for 20 min with stirring. The alcohol evaporated was replaced at an interval of every 3 min to avoid charring. The mixture was kept in an ice cold condition.

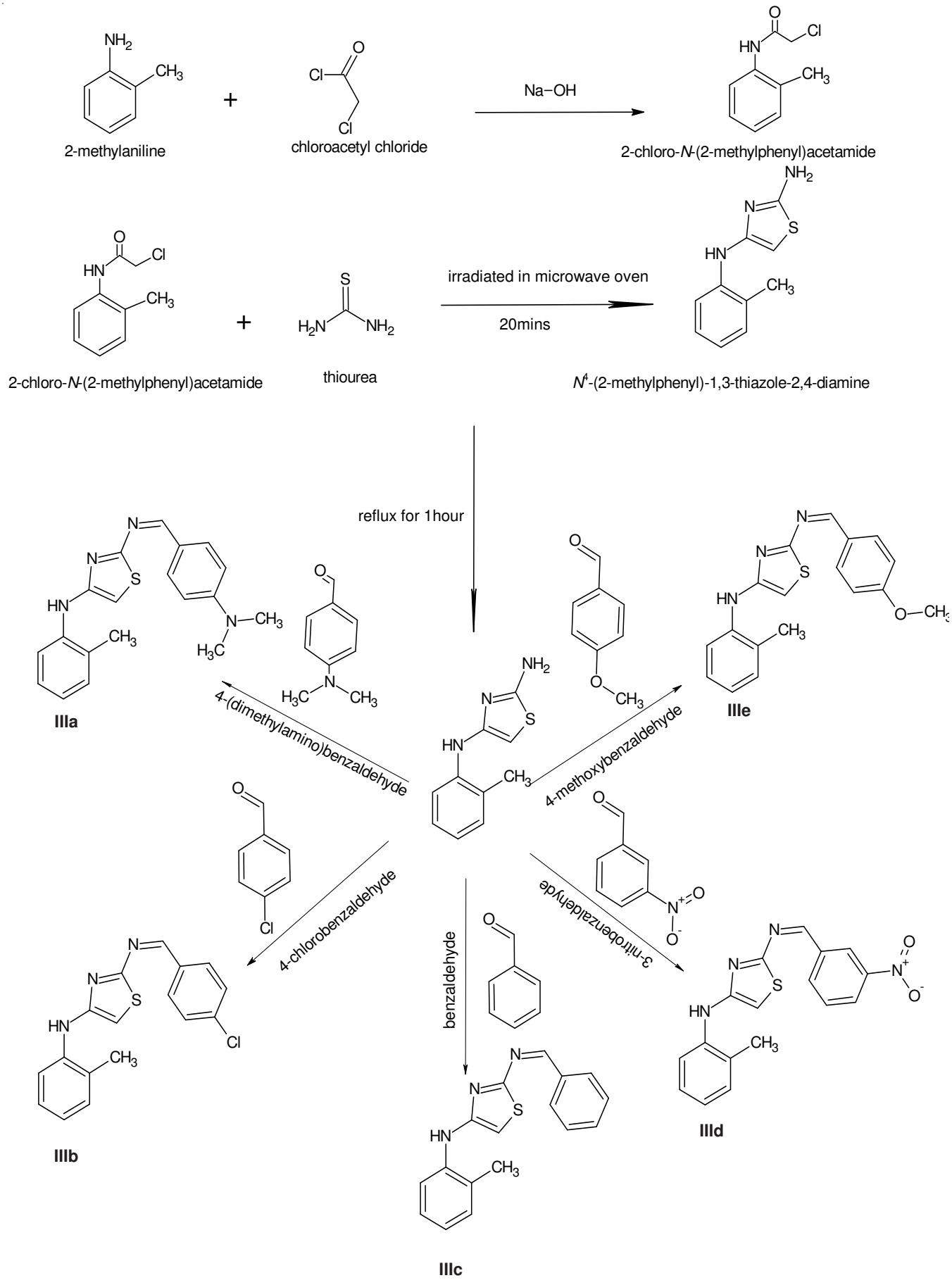
Synthesis of azomethines (III): An equimolar mixture of compound (**II**) and appropriate aromatic aldehydes was dissolved in absolute alcohol and pH of the solution was adjusted to 4.5-5.0 with glacial acetic acid. The above mixture was refluxed for an hour. The product formed was cooled and poured into crushed ice, the separated solid was collected, dried and recrystallized in dimethylformamide. The physical characteristics of the synthesized compounds were shown in Table-1.

TABLE-1
PHYSICAL DATA FOR COMPOUND **IIIa-e**

Compd.	Colour	m.p. (ºC)	Yield (%)	m.f.	m.w.
IIIa	Red	285	64.55	$C_{19}H_2ON_4S$	336.45
IIIb	Pale white	310	63.12	$C_{17}H_{14}ClN_3S$	327.76
IIIc	Pale Green	265	63.81	$C_{17}H_{15}N_3S$	293.38
IIId	PaleYellow	280	55.94	$C_{17}H_{14}N_4OS$	338.38
IIIe	Greenish brown	270	46.63	$C_{19}H_{17}N_3OS$	323.41

Spectral data of synthesized compound IIIa-c[8,9]

IIIa: IR (KBr, ν_{max}, cm^{-1}): 3349 (NH str.); 2974 (Ar-H str.); 1661 (thiazoles, Schiff' base); 2887 (CH. str.); 666 (C-S). ^{1}H NMR δ ppm: 7.1 (m, 4H of Ar-H); 7.9 (m, 5H of benzylideneimino); 7.7 (s, 1H of thiazole); 4.3 (s, 1H of NH); 2.95 (s, 3H of *o*-toludine); 3.11 (s, 6H of N-dimethyl). M/S (m/z (%): M^+ - 336.46.



Synthetic **Scheme-I**

IIIb: IR (KBr, ν_{max}, cm^{-1}): 3479 (NH str.); 3072 (Ar-H str.); 1670 (thiazoles, Schiff' base); 2866 (CH. str.); 660 (C-S); 865 (C-Cl). ^1H NMR δ ppm: 7.2 (m, 4H of Ar-H); 7.7 (m, 5H of benzylidene imino); 7.6 (s, 1H of thiazole); 4.02(s, 1H of NH); 2.39 (s, 3H of CH_3). M/S m/z (%): M^+ - 327.7639.

IIIc: IR (KBr, ν_{max}, cm^{-1}): 3349 (NH str); 2974 (Ar-H str.); 1654 (thiazoles, Schiff' base); 2889 (CH. str.); 669 (C-S.). ^1H NMR δ ppm: 7.3 (m, 4H of Ar-H); 7.8 (m, 5H of benzylidene imino); 7.5 (s, 1H of thiazole); 4.33 (s, 1H of NH); 2.22 (s, 3H of CH_3). M/S m/z (%): M^+-293.33.

IIId: IR (KBr, ν_{max}, cm^{-1}): 3495 (NH str.); 3071 (Ar-H str.); 1671 (thiazoles, Schiff bases.); 2863 (CH. str.); 660 (C-S); 1504 (NO_2). ^1H NMR δ ppm: 7.47-7.53 (m, 4H of Ar-H); 7.9 (m, 5H of benzylidene imino); 7.5 (s, 1H of thiazole); 4.03 (s, 1H of NH); 2.20 (s, 3H of CH_3); M/S m/z (%): M^+-338.231.

IIIe: IR (KBr, ν_{max}, cm^{-1}): 3495 (NH str.); 2944 (Ar-H str.); 1663 (thiazoles, Schiff bases); 2832 (CH. str.); 666 (C-S); 1256(C-O-C). ^1H NMR δ ppm: 7.45 (m, 4H of Ar-H); 7.8 (m, 5H of (benzylidene imino); 7.64 (s, 1H of thiazole); 4.5 (s, 1H of NH); 2.22 (s, 3H of CH_3); 3.3 (s, 3H of OCH_3). M/S m/z (%): M + 1-324.627.

RESULTS AND DISCUSSION

The new Schiff bases of thiazoles were synthesized, identified by TLC and characterized by IR, ^1H NMR and mass spectroscopy. Purification of the synthesized compounds was done by recrystallisation. The ^1H NMR spectra of the compounds (**IIIa-e**) showed signals at 7.3-7.5 δ (m, Ar-H); 7.5-7.7 δ (s, thiazole CH-proton); 4.0-4.5 δ (s, NH proton); 7.7-7.9 δ (s, benzylidene-imino); 2.2-2.95 δ (s, CH_3); 3.3 δ (OCH_3, **IIIe**), 3.11 δ (s, N-$(CH_3)_2$, (**IIIa**)). IR spectra of all the synthesized compounds showed the presence of aromatic C-H str vibration between 2944-3072 cm^{-1}, NH str between 3495-3349 cm^{-1}, C-S str. between 669-660 cm^{-1}, (thiazoles, Schiff bases) str between 1654-1671 cm^{-1}, C-Cl str at 865 cm^{-1} (**IIIb**); NO_2 str at 1504 cm^{-1} (**IIId**); C-O-C str at 1256 cm^{-1} (**IIIe**) and CH_3 str between 2944 cm^{-1}. All the synthesized compounds exhibited (M^+) and (M^+ + 1) molecular ion peak of varying intensities ascertaining the molecular weights of the synthesised compounds.

Conclusion

In summary, we have developed a simple, convenient and effective method for easy synthesis of thiazole derivatives by the condensation of phenyl-1, 3-thiazole-2, 4-diamine and aldehydes under solvent free conditions. Present methodology offers very attractive features such as reduced reaction times, good yields and environmentally benign condition. The simple procedure combined with ease of work-up and entirely solvent-free conditions make this method economic, benign and a waste-free chemical process for the synthesis of thiazole derivatives of biological importance. The further scope of the study includes exploration of various biological activities, the said compounds are expected to possess.

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