



SYNTHESIS AND BIOLOGICAL ACTIVITY OF 1-THIOCARBOXAMIDO-3-METHYL-4-(4-ARYLHYDRAZONO) -5-(5-BROMOPYRIDIN-2-YL) IMINO-4,5-DIHYDRO PYRAZOLE DERIVATIVES

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ABSTRACT

1-Thiocarboxamido-3-methyl-4-(4-arylhydrazono)-5-(5-bromopyridin-2-yl) imino-4,5-dihydro pyrazole derivatives have been synthesized using conventional method and microwave irradiation. The structure of the synthesized compounds have been confirmed by IR and NMR Spectroscopy. These compounds were evaluated for their biological efficacy.

Key words: 1-Thiocarboxamido-3-methyl-4-(4-arylhydrazono)-5-(5-bromopyridin-2-yl) imino-4,5-dihydro pyrazole derivatives, Microwave irradiation, Biological activity.

INTRODUCTION

Pyrazole exhibits pharmacological properties such as anticancer¹, analgesic², antiinflammatory³ and antimicrobial⁴ activities. Further pyridine derivatives are found to exhibit fungicidal⁵, insecticidal⁶ activities. Synthesis of 1-Thiocarboxamido-3-methyl-4-(arylhydrazono)-2-pyrazolin-5-ones (3) has been reported⁷.

In continuation of our work on synthesis of new heterocycles⁸, we are hereby reporting heterocycles having pyrazole and pyridine moiety. We treated compounds 3(a-h) with 5-Bromo-2-aminopyridine to get 1-thiocarboxamido-3-methyl-4-(4-arylhydrazono)-5-(5-bromopyridin-2-yl) imino-4,5-dihydro pyrazole derivatives 4(a-h).

The synthesis of 4(a-h) has been carried out using conventional method as well as by using microwave irradiation.

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EXPERIMENTAL

Melting points were determined in open capillaries and are uncorrected.

IR spectra were recorded in KBr on Shimadzu Corporation, IR Affinity-I and PMR on a Agilent Technology 400/54 premium shielded using TMS as internal standard (chemical shift in δ ppm).

The reactions were monitored on TLC.

1-Thiocarboxamido-3-methyl-4-(4-nitrophenylhydrazono)-5-(5-bromopyridin-2-yl) imino-4, 5-dihydro pyrazole (4 g)

Conventional method

Compound 3 g (0.015 mol) and 5-bromo-2-aminopyridine (0.015 mol) were refluxed in 15 mL of DMF for 2 hrs. After completion of reaction, the reaction mixture was cooled and poured in to crushed ice with stirring. The solid obtained was filtered, washed with water and then recrystallized from ethanol.

Microwave assisted synthesis

Compound 3 g (0.002 mol) and 5-Bromo-2-aminopyridine (0.002 mol) were refluxed in 10 mL of DMF for 12 min. After completion of reaction, the reaction mixture was cooled and poured in to crushed ice with stirring. The solid obtained was filtered, washed with water and then recrystallized from ethanol.

Other compounds were obtained by the same method.

Compound 4g: IR (KBr): 1104 cm^{-1} (C=S str.), 1332 cm^{-1} (NO_2), 1520 cm^{-1} (C=N), 1560 cm^{-1} (NH-N=C).

NMR (CDCl_3): 2.28 (s, 3H, - CH_3), 7.2-7.45 (m, Ar-H, 6H), 8.92 (s, 1H, pyridine H of C6), 13.4 (m, 3H, -NH & - NH_2),

RESULTS AND DISCUSSION

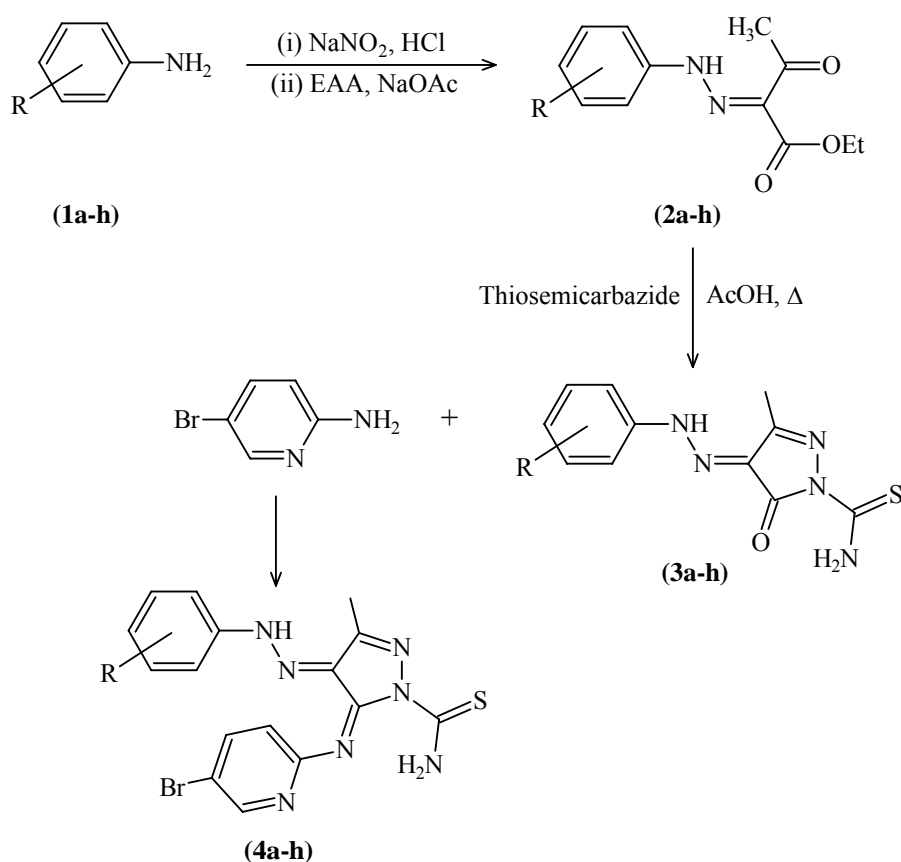
Synthesis of 1-thiocarboxamido-3-methyl-4-(4-arylhydrazono)-5-(5-bromopyridin-2-yl) imino-4,5-dihydro pyrazole derivatives has been carried out using conventional method as well as by using microwave irradiation.

The reaction rate is enhanced tremendously under microwave irradiation as compared to the conventional method with improved yields.

The IR spectrum of compound 3 shows peak at 1676 cm^{-1} indicating the presence of carbonyl group whereas the IR spectrum of compound 4 does not shows peak in this region indicating the absence of carbonyl group.

Biological activities

All the newly synthesized compounds i.e. 4a to 4h were screened for their antibacterial activity against *E.coli*, *S.aureus*, *P.aeruginosa* and *S. typhi* using Ciprofloxacin as a standard. The zone of inhibition was measured in mm. DMF was used as diluent control. However Compounds 4a to 4h did not show promising activities.



R = (a) H, (b) 2-OCH₃, (c) 4-OCH₃, (d) 4-Br, (e) 4-Cl, (f) 4-CH₃, (g) 4-NO₂, (h) 3-NO₂

Scheme 1

Table 1: Characterization data of 4(a-h)

S. No.	R	M.P. (Comp. No. 4)	Conventional method (Comp. No. 4)		Microwave irradiation (Comp. No. 4)	
			Time (hrs)	% Yield	Time (mins)	% Yield
1	H	198	2	49	9	61
2	2-OCH ₃	230	2	50	9	64
3	4-OCH ₃	196	2	44	9	58
4	4-Br	219	2	57	6	66
5	4-Cl	212	2	45	6	60
6	4-CH ₃	188	2	43	6	54
7	4-NO ₂	256	2	44	12	60
8	3-NO ₂	262	3	39	12	50

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