Available online www.jocpr.com

Journal of Chemical and Pharmaceutical Research, 2016, 8(12):19-21

Research Article

ISSN : 0975-7384
CODEN(USA) : JCPRC5

Microwave Assisted Improved Method for the Synthesis, Characterization of N- Aroyl -3,5-disubstituted Pyrazoles

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ABSTRACT

The present research has systematic approach to synthesized a series of 1- phenyl-4-yl-methanone-3,5-disubstituted Pyrazoles (3a-d) and 1- pyridine-4-yl-methanone-3,5-disubstituted pyrazoles (5a-c) derivatives by the action of substituted 1,3-disubstituted propane-1,3-diones with phenyl hydrazide and isoniazide respectively. The compounds were synthesized by green chemistry technique. Structures of all the synthesized compounds were confirmed by their IR, ^{1}H-NMR.

Keywords: Pyrazoles; Propane-1,3-diones; Phenyl hydrazide; Isoniazide; WI

INTRODUCTION

Literature survey reveals that the work on pyrazoles derivatives has been extensively documented because of their broad spectrum biological activities. The pharmaceutical importance of these compounds lies in the fact that pyrazoles are well documented to posses biological activities[1] such as antihypertensive, anti-inflammatory[2], antitumor, insecticidal[3] and analgesic activity[4], antibacterial [5], particularly 1,5- diaryl pyrazoles have received immense attention in drug research [6-9]so it was thought interesting to incorporate these biologically active heterocycles into pyrazoles and to study their enhanced biological activities. Microwave [10-12] is widely recognized as electromagnetic waves with wavelengths ranging from 1 mm to 1m, and has been applied in science research as an assistant technique or a method to chemical synthesis. It may be considered as a green chemistry technique which focuses on more efficient and faster reaction than conventional method. Because of structural and packing effects, reaction products may be obtained in solid state. The microwave based approaches have been introduced gradually and played an important role in the process of preparation. Compared to the traditional heating methods, the microwave treatment provides intensive, homogeneous and efficient energy, and thus it can achieve the elevated temperature and initiate the reaction in an extremely short time.

In the present study, an attempt has been made to synthesize compounds by green chemistry technique i.e. microwave synthesis which is more convenient than conventional method [13]. The structures of synthesized compounds were confirmed by spectral analysis.

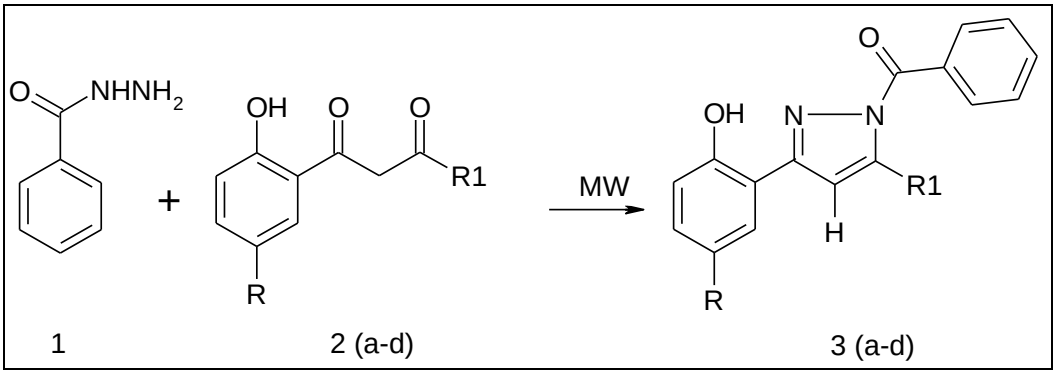
EXPERIMENTAL SECTION

General Conditions: Melting points are uncorrected and were determined in open capillary tubes in. TLC was performed on silica gel-G and spotting was done using iodine. IR spectra were recorded on Nicolet 5ZDXFT-IR spectrometer in KBr phase and ^{1}HNMR on Brucker WP 200 and 500 SY.

General procedure for the preparation of 1- phenyl-4-yl-Methanone-3,5-disubstituted Pyrazoles 3(a-d) under Microwave Irradiation method

A mixture of 1,3-disubstituted- propane-1,3-diones 2 (a-d) (0.01 mol) and phenyl hydrazide (0.01 mol) under solventless condition was subjected to microwave irradiation in microwave oven at 450W level for 5-10 minutes.The completion of reaction was monitored by TLC . The crude product obtained on usual work up was crystallized from ethanol to obtain pure product.

3a: IR (KBr):3760 cm^{-1} (-OH), 1635 cm^{-1} (C=O); ^{1}HNMR:δ δ 2.37(s,3H, CH_3), 6.80 (1H,H_1 proton of pyrazole),7.15-7.61 (m, 12H, Ar-H), 8.20 (bs ,1H, OH, exchangeable with D_2O)

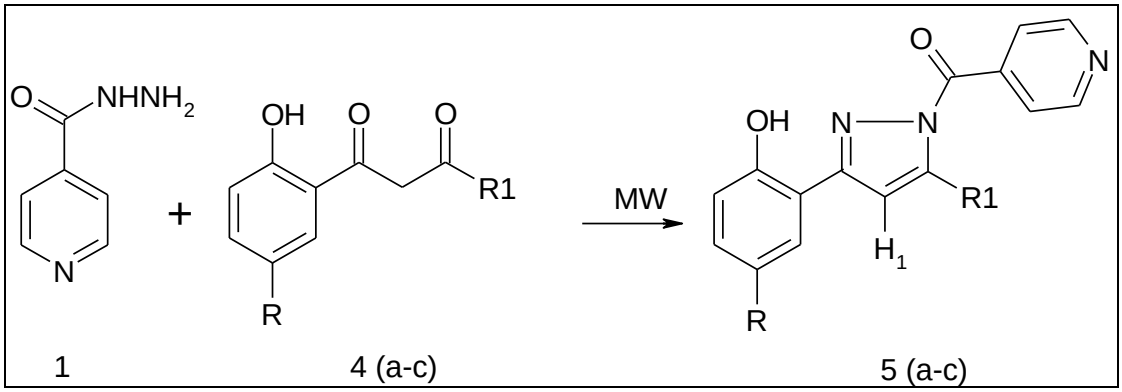


Scheme 1: Synthesis of 1- phenyl-4-yl-Methanone-3,5-disubstituted Pyrazoles

General procedure for the preparation of 1- pyridine-4-yl-Methanone-3,5-disubstituted Pyrazoles 5(a-c) under Microwave Irradiation method

A mixture of 1,3- disubstituted propanedione 4 (a-c) (0.0025 mol) and isoniazide (0.0025 mol) was subjected to microwave irradiation in microwave oven at 450W level for 6 minutes. The completion of reaction was monitored by TLC . The reaction mixture was cooled and transferred to ice-cold water. The crude product obtained was recrystallized from ethanol to get pure compound.

5a: IR (KBr):3779 cm^{-1} (-OH), 1612 cm^{-1} (C=O); ^{1}HNMR:δ 2.4 (s,3H, CH_3), 6.83 (1H,H_1 proton of pyrazole),6.92-7.95 (m, 12H, Ar-H), 8.03 (bs , OH, exchangeable with D_2O)



Scheme-2: Synthesis of 1- pyridine-4-yl-Methanone-3,5-disubstituted Pyrazoles

Table 1: Physical data of synthesized compounds

S. No	Entry R R1	M P (ºC)	Yield (%)	Time of Irradiation
1	3a -CH_3 Ph	145	90	6
2	3b -CH_3 - $PhOCH_3$	150	92	8
3	3c -CH_3 -CH_3	200	91	7
4	3d -H -CH_3	215	90	5
5	5a -CH_3 Ph	94-96	90	6
6	5b -CH_3 - $PhOCH_3$	150-153	91	5
7	5c- H - Ph	160	89	7

RESULTS AND DISCUSSION

Reaction of of 1- phenyl-4-yl-methanone-3,5-disubstituted Pyrazoles (3a-d) and 1- pyridine-4-yl-methanone-3,5-disubstituted pyrazoles (5a-c) derivatives by the action of substituted 1,3-disubstituted propane-1,3-diones with phenyl hydrazide and isoniazide respectively . The structures of synthesized compounds were characterized on the basis of its spectral data. Thus, its IR spectrum in KBr,showed a strong peak at 1635 cm^{-1} due to C=O

group, 3760 cm^{-1} due to –OH group in pyrazole (3a) and peak at 1612 cm^{-1} due to C=O group, 3779 cm^{-1} due to –OH group in pyrazole 5(a). ^{1}HNMR spectrum showed characteristic singlet at δ 6.80 (H1) proton of pyrazole 3(a) and characteristic singlet at δ 6.83 (H1) proton of pyrazole 5(a). This green chemistry technique is more efficient and faster with better yields than conventional method.

ACKNOWLEDGMENT

The authors would like to thanks authorities of Shri Shivaji Science College, Amravati University, Amravati for providing necessary facilities. Words of gratitude are also expressed for SAIF/RSIC Chandigarh for IR and NMR spectral data.

REFERENCES

1. [1] G P Gunwaradana; SKohmoto; SP Gunasekera; OJ McConhell; FE Koehn. *J Am Chem Soc*, **1988**, 110(5): 4855-56.
2. [2] JPP Donald; JO Michael; W Shuaige; MF John ; LQ Mimi; A Eugene. *J Med Chem*, **200**1,44,566-78.
3. [3] P Franscisco; A Domitila; S Jesus delos. *Tetrahedron let*, **1994**, 50, 12727-12742.
4. [4] S Zhihua; J Guan; FP Michal; M Kathy; WP Michael; M William; S Monica; RM Dave. *Bio-org Med. Chem. Lett*,.**2000**, 10, 601-603.
5. [5] SA Wadhal, *Indo American J of Pharmaceutical Res*, **2014**, 4(11),1462-1466.
6. [6] BP Nandeshwarappa, DB Aruna Kumar, H S Bhojya Naik, V P Vaidya and K M Mahadevan, *Indian J Chem*, 44, **2005**, 2155-2157.
7. [7] S Ailwadi YM Jyoti; D Pathak, D. *Der. Pharma. Chemica*. **2011**, 3, 215-222.
8. [8] J S M Pasin , Ferreria, A. P. O., Saraiva, A. L. L.,V. Ratzlaff, R. Andrighetto, Machado, P., Marchesam, S., Zanette, R. A., Martins, M. A. P. Braz J Med Biol Res. **2010**, 43, 1193-1202.
9. [9] A Singh; AC Rana. *J. Chem. Pharm. Res*.**2010,** 2, 505-511.
10. [10] RS Talegaonkar; AS Burghate; SA Wadhal. *Indian J. Heterocyclic Chem*. **2011** 20**:** 413-414.
11. [11] W Ankush ; B Archana; W Shrikant. *Indo American J Pharmaceutical Res***2014**, 10: 5010-5016.
12. [12] A Loupy; A Petit; B Tesier; P Jacquate; D Mathe. *Synthesis*, **1998**, 9,1213.
13. [13] SA Wadhal, KN Wadodkar, PS Pande, *Indian J Heter. Chem*, **2005** 15: 11-14.