Heterocyclic Letters
Vol. 8| No.1|91-93|Nov-Jan |2018
ISSN : (print) 2231–3087 / (online) 2230-9632
CODEN: HLEEAI
http://heteroletters.org

MICROWAVE ASSISTED SYNTHESIS OF 2-((3,5-DIMETHYL-1*H*-PYRROL-2-YL)DIAZENYL)-3H-IMIDAZO[4,5-B]PYRIDINE

Rajeshwari M

Telangana University Dichpally, Nizamabad, Telangana 503322
Email: rajithamadipelly@yahoo.com

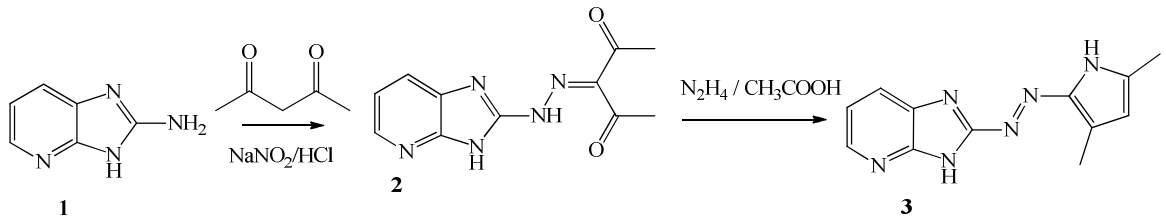
Abstract
A simple and clear approach was developed for the synthesis of 2-((3,5-dimethyl-1H-pyrrol-2-yl)diazenyl)-3H-imidazo[4,5-b]pyridine. The compounds were characterized by IR, NMR and Mass spectral analyses.

Introduction

Imidazo[4,5-b]pyridine can be considered as 1-deazapurine or 4(7)-azabenzimidazole. Such an analogy induces interest in the biological activity of this system's derivatives. To date some of them have been applied in pharmacotherapy.

The enormous number of biologically active compounds comprises with a diazepine ring. Synthesis of the pure aromatic moiety and/or heteroaromatic systems, including various N-heterocycles to the dissimilar sides of the diazepine heptatomic ring modifies and widens its biological activity. The tricyclic pyridobenzodiazepinone drug, pirenzepine, shows assessable inhibitory effects exclusively in the direction of the muscarinic receptor system[i]. It is also accepted to care for peptic ulcer[ii])and to influence scleral metabolic changes in myopia[iii]. Nevirapine is the most evident example of dipyridodiazepinones, which is a strong and discriminatory non-nucleoside inhibitor of HIV-1 reverse transcriptase and it was approved for use in the treatment of the HIV infection in humans[iv-vii]. In recent times, both diazepine derivatives and hydrazones have also been extensively studied due to their potent antitumor activities. However, it is pretty frequent that anticancer drugs are associated with various adverse effects. Therefore, there is a need to search for new modified diazepines that can selectively inhibit cancer cell proliferation and exhibit biochemical stability. In view of the importance of Imidazo[4,5-b]pyridines, I undertook synthesis of title compounds.

Scheme 1



Experimental Section

All the chemicals and solvents used were purchased either from Fluka or Merck. Reagents used were of analytical grade. Thin-layer chromatography (TLC) was performed on E.Merck AL silica gel 60 F254 plates and visualized under UV light. IR spectra were recorded as KBr pellet with a perkin-elmer spectrum gx FTIR instrument and only intense peaks are reported. ^{1}H NMR spectra were recorded in DMSO- d_6 with a Varian Mercury plus 400 MHz instrument. TMS is used as an internal standard. All the chemical shifts were reported in δ (ppm). The ^{1}H NMR chemical shifts and coupling constants were determined assuming first-order behavior. Multiplicity is indicated by one or more of the following: s (singlet), d (doublet), t (triplet), q (quartet), m (multiplet), br (broad); the list of coupling constants (*J*) corresponds to the order of multiplicity assignment. Mass spectra were recorded with a PE Sciex model API 3000 instrument. All the reactions were carried out under argon atmosphere.

3-(2-(3*H*-imidazo[4,5-b]pyridin-2-yl)hydrazono)pentane-2,4-dione (2)

A cold mixture of acetyl acetone (0.01mole) and sodium acetate (0.01mole) made as paste with 3-4 drops of EtOH and 3H-imidazo[4,5-b]pyridin-2-amine **(1)** and irradiated with microwaves for 2-3 min. The reaction mixture was left about 2hrs. at room temp., red solid product then collected.

Yield: 78 %; m.p. 208-210 ^{o}C; IR: 3333 cm^{-1}(N-H), 2979 cm^{-1}(C-H aromatic), 1715 cm^{-1}(C=O), 1514 cm^{-1}(C=N).

^{1}H NMR (DMSO-d_6) : δ=2.21 (s, 6H), 7.35 (t, 1H), 7.85(d, 1H), 8.25 (d, 1H), 10.52 (brs, 1H), 13.01 (brs, 1H).

Mass: m/z 245 (M+H).

2-((3,5-dimethyl-1*H*-pyrrol-2-yl)diazenyl)-3H-imidazo[4,5-b]pyridine (3)

A mixture of compound **(2)** (0.01mole) and hydrazine hydrate (0.02mole) was irradiated under MW for 3-4min, cooled and poured onto crushed ice and the solid product was obtained was filtered off.

Yield: 81 %; m.p. 210-212 ^{o}C; IR: 3333 cm^{-1}(N-H), 2985 cm^{-1}(C-H aromatic), 1766 cm^{-1}(C=O), 1514 cm^{-1}(C=N).

^{1}H NMR (DMSO-d_6) : δ=2.21 (s, 3H), 2.41 (s, 3H), 6.14 (brs, 1H), 6.98 (t, 1H), 7.21 (t, 2H), 7.63 (dd, 1H), 7.81 (d, 1H), 7.94 (d, 2H), 8.12 (d, 1H), 13.02 (brs, 1H).

Mass: m/z 240 (M+H).

Results and Discussions

3H-imidazo[4,5-b]pyridin-2-amine **(1)** reacts with acetyl acetone in presence of $NaNO_2$ to offer 3-(2-(3H-imidazo[4,5-b]pyridin-2-yl)hydrazono)pentane-2,4-dione **(2)** which on reaction with

hydrazine hydrate cyclized to give title compound. The compounds synthesized were characterized by spectral analysis.

References

I. Novelli F., Sparatore A., Tasso B., Sparatore F.: Bioorg. Med. Chem. Lett. 9, 3031 (1999).
II. Carmine A.A., Broaden R.N.: Drugs 30, 85 (1985).
III. Truong H.-T., Cottriall C.L., Gentle A., McBrien N.A.: Exp. Eye Res. 74, 103 (2002).
IV. Merluzzi V.J., Hargrave K.D., Labadia M.J., Grozinger K.G., Skoog M.T., et al.: Science 250, 1411 (1990).
V. Riska P., Lamson M., MacGregor T., Sabo J., Hattox S., Pav J., Keirns J.: Drug Metab. Dispos. 27, 895 (1999).
VI. Grozinger K.G., Byrne D.P., Nummy L.J., Ridges M.D., Salvagno A.: J. Heterocycl. Chem. 37, 229 (2000).
VII. Milinkovic A., Martinez E.: Expert Rev. Anti Infect. Ther. 2, 367 (2004).

Received on November 27, 2017.