International Journal for Pharmaceutical Research Scholars (IJPRS)
ISSN No: 2277-7873
RESEARCH ARTICLE
V-1, I-3, 2012

An Efficient Multi Component Synthesis: Novel Triazolopyrimidines

Fadadu PD[1*], Fadadu PP[1], Kiran S. Nimavat KS[2], Vyas KB[3]

[1]*Research Scholar, JJT University, Jhunjhunu, Rajasthan, India.*

[2]*Government Science College, Gandhinagar, Gujarat, India.*

[3]*Sheth L. H. Science College, Mansa, Gujarat, India.*

Manuscript No: IJPRS/V1/I3/00137, Received On: 17/07/2012, Accepted On: 20/07/2012

ABSTRACT

Synthesis and biological activity of new derivatives of triazolopyrimidines **(4a-j)** was achieved from different acetoacetamides, new aldehyde and triazole using heating within 30 min with high yield. The triazolopyrimidines of the products were supported by FTIR, PMR and mass spectral data.

KEYWORDS

Pyrimidines, acetoacetamides, triazole condensation synthesis.

INTRODUCTION

The condensation of a ring of 1,2,4-triazole and another one of pyrimidine gives rise to the formation of bicyclic heterocycles known as 1,2,4-triazolopyrimidines. Four different possibilities exist for the relative orientation of both rings, so four different isomeric families of compounds are defined (see Fig. 1). Among these, 1,2,4-triazolo[1,5-a]pyrimidine derivatives are thermodynamically more stable and, thus, the most studied ones [1], a few of them being commercially available. Revisions surveying the synthesis, reactivity, spectroscopic characterization and crystallographic studies of 1,2,4-triazolo[1,5-c]pyrimidines[2] 1,2,4-triazolo[4,3-a]pyrimidines[3] and 1,2,4-triazolo[4,3-c]pyrimidines[4] have also been published.

The studies about the coordination chemistry of triazolopyrimidines have been exclusively focused till now in the 1,5-a series. These compounds, which are structurally similar and may be regarded as mimic of isomeric purines, have displayed a rich coordination chemistry, a considerable number of new compounds with interesting structural features having been characterized[5], including simple mononuclear compounds with monodentately coordinated ligands[6,7] and di or polynuclear compounds in which either the triazolopyrimidine ligand[8] or other auxiliary ligands[9] bridge the metalatoms.

From the standpoint of biological activity, fused heteroaromatic systems are often of much greater interest than the constituent monocyclic compounds. Recently, 1,2,4-triazolo[1,5-a]pyrimidines have aroused increasing attention from the chemical and biological view points, due to their diverse pharmacological activities, such as antitumor potency, inhibition of KDR kinase, antifungal effect and macrophage activation. They have proved to be promising anticancer agents with dual mechanisms of tubulin polymerization promotion as well as cyclin dependent kinases 2 inhibition. Some examples of published derivatives of 1,2,4-triazolo[1,5-a]pyrimidine with their biological activities.

Several synthetic strategies have been reported for the preparation of triazolopyrimidine derivatives.[10,11-15] Most of these are based on modification of the classical one-pot Biginelli reaction[10,11-14] and in some cases on more

***Address for Correspondence:**
Piyush Fadadu,
Department of Chemistry,
JJT University, Jhunjhunu
Rajasthan, India.
E-Mail Id: Piyush.fadadu@yahoo.co.in

complex multi-step processes involving harsh reaction conditions and long reaction times.[16-17] One major drawback of the classical Biginelli protocol is the low yield that is frequently encountered when using sterically more demanding aldehydes.

To circumvent these problems, we have developed a new microwave assisted protocol for the synthesis of novel pyridmidines **(4a-j)** with the advantage of short reaction time, high yield and environmentally friendliness **(Scheme-a)**.

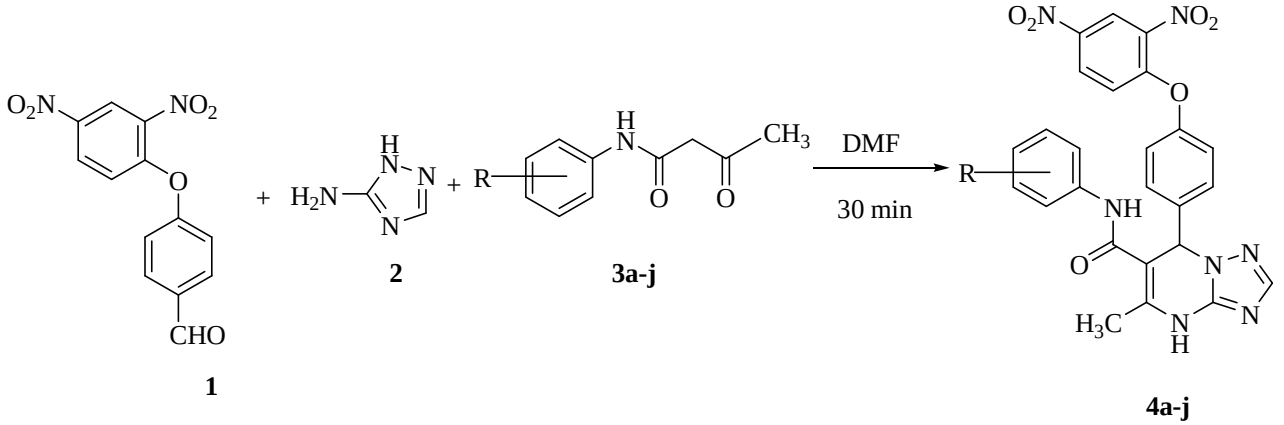

Fig.:-1

Scheme-a

EXPERIMENTAL

Melting points were measured in open capillaries and are uncorrected. ^{1}HNMR spectra were recorded on Brukur spectrophotometer (400MHz). Chemical shifts are expressed in units relative to TMS signal as internal reference. IR spectra were recorded on FT-IR Shimadzu-FT-IR 8400 spectrophotometer on KBr pallets. Mass spectra were recorded on GCMS QP2010 Gas Chromatograph. Thin Layer Chromatography was performed on silica gel-G using hexane: ethylacetate solvent system.

Typical exaperimental procedure for the synthesis of triazolopyrimidines.

A mixture of the 5-amino-1,2,4-triazole (2 mmol), an appropriate acetoacetaminde (1 mmol) and 4-(2,4-dinitrophenoxy)benzaldehyde (1 mmol) was refluxed in 0.5 ml of DMF for 30 min. After cooling, methanol (~15 ml) was added. The reaction mixture was allowed to stand overnight and then filtered to give the solid triazolopyrimidine products, which were crystallized from ethanol.

7-(4-(2,4-dinitrophenoxy)phenyl)-N-(3-chlorophenyl)-4,7-dihydro-5-methyl-[1,2,4]triazolo[1,5-a]pyrimidine-6-carboxamide 4a. m.p. 202ºC; white crystals; ^{1}H NMR (DMSO-d_6) δ ppm: (δ 2.13) (s, 3H, H_a), (δ 6.46) (s, 1H, H_b), (δ 6.73-6.75) (d, 2H, $H_{cc'}$,), (δ 6.86-6.88) (d, 1H, $H_{d,}$), (δ 7.04-7.08) (t, 2H, $H_{ee'}$), (δ 7.17-7.21) (t, 1H, H_f), (δ 7.27-7.35) (m, 3H, H_{g-i}), (δ 7.48-7.52) (dd, 2H, H_{jk}), (δ 7.61) (s, 1H, H_l), (δ 9.78) (s, 1H, H_m),(δ 10.19) (s, 1H, H_n). FT IR (cm^{-1}): 3259 (N-H stretching of secondary amine), 3032 (C-H stretching of aromatic ring), 2920 (C-H asymmetrical stretching of CH_3 group), 2875 (C-H asymmetrical stretching of CH_3 group), 1668 (C=O stretching of amide), 1606 (C=N stretching of triazole ring), 1550 (N-H deformation of pyrimidine ring), 1514 and 1480 (C=C stretching of aromatic ring), 1440 (C-H asymmetrical deformation of CH_3 group), 1410 (C-H symmetrical deformation of CH_3 group), 1330 (C-N stretching), 1274 (C-NO2 symmetrical deformation of NO2 group), 1247 (C-O-C stretching), 1028 (C-H in plane deformation of aromatic ring), 821 (C-H out of plane bending of 1,4-disubstituion), 736 (C-Cl stretching), Mass: m/z 548; Anal. Calcd. for

$C_{25}H_{18}ClN_7O_6$: C, 54.80; H, 3.31; Cl, 6.47; N, 17.89; O, 17.52; Found: C, 54.75; H, 3.25; Cl, 6.24; N, 17.75; O, 17.23%.

7-(4-(2,4-dinitrophenoxy)phenyl)-N-(4-fluorophenyl)-4,7-dihydro-5-methyl-[1,2,4]triazolo[1,5-a]pyrimidine-6-carboxamide 4b. m.p. 201 ºC; white crystals; ^{1}H NMR (DMSO-d_6) δ ppm: (δ 2.24) (s, 3H, H_a), (δ 6.41) (s, 1H, H_b), (δ 6.67-6.76) (d, 2H, $H_{cc'}$,), (δ 6.82-6.89) (d, 1H, $H_{d,}$), (δ 7.03-7.09) (t, 2H, $H_{ee'}$), (δ 7.17-7.37) (dd'dd', 4H, $H_{ff'-gg'}$), (δ 7.49-7.54) (dd, 2H, H_{hi}), (δ 7.63) (s, 1H, H_j), (δ 9.67) (s, 1H, H_k),(δ 10.13) (s, 1H, H_l). FT IR (cm^{-1}): 3249 (N-H stretching of secondary amine), 3022 (C-H stretching of aromatic ring), 2911 (C-H asymmetrical stretching of CH_3 group), 2863 (C-H asymmetrical stretching of CH_3 group), 1657 (C=O stretching of amide), 1608 (C=N stretching of triazole ring), 1545 (N-H deformation of pyrimidine ring), 1512 and 1474 (C=C stretching of aromatic ring), 1454 (C-H asymmetrical deformation of CH_3 group), 1408 (C-H symmetrical deformation of CH_3 group), 1324 (C-N stretching), 1278 (C-NO2 symmetrical deformation of NO2 group), 1249 (C-O-C stretching), 1029 (C-H in plane deformation of aromatic ring), 826 (C-H out of plane bending of 1,4-disubstituion), 738 (C-Cl stretching), Mass: m/z 531; Anal. Calcd. for $C_{25}H_{18}FN_7O_6$: C, 56.50; H, 3.41; F, 3.57; N, 18.45; O, 18.06; Found: C, 56.24; H, 3.31; F, 3.51; N, 18.40; O, 18.00%.

7-(4-(2,4-dinitrophenoxy)phenyl)-N-(4-chlorophenyl)-4,7-dihydro-5-methyl-[1,2,4]triazolo[1,5-a]pyrimidine-6-carboxamide 4c. m.p. 211 ºC; white crystals; ^{1}H NMR (DMSO-d_6) δ ppm: (δ 2.15) (s, 3H, H_a), (δ 6.34) (s, 1H, H_b), (δ 6.57-6.68) (d, 2H, $H_{cc'}$,), (δ 6.78-6.84) (d, 1H, $H_{d,}$), (δ 7.05-7.12) (t, 2H, $H_{ee'}$), (δ 7.20-7.41) (dd'dd', 4H, $H_{ff'-gg'}$), (δ 7.45-7.50) (dd, 2H, H_{hi}), (δ 7.69) (s, 1H, H_j), (δ 9.64) (s, 1H, H_k),(δ 10.05) (s, 1H, H_l). FT IR (cm^{-1}): 3189 (N-H stretching of secondary amine), 3002 (C-H stretching of aromatic ring), 2901 (C-H asymmetrical stretching of CH_3 group), 2803 (C-H asymmetrical stretching of CH_3 group), 1607 (C=O stretching of amide), 1602 (C=N stretching of triazole ring), 1525 (N-H deformation of pyrimidine ring), 1502 and 1464 (C=C stretching of aromatic ring), 1444 (C-H asymmetrical deformation of CH_3 group), 1401 (C-H symmetrical deformation of CH_3 group), 1334 (C-N stretching), 1268 (C-NO2 symmetrical deformation of NO2 group), 1239 (C-O-C stretching), 1019 (C-H in plane deformation of aromatic ring), 834 (C-H out of plane bending of 1,4-disubstituion), 729 (C-Cl stretching), Mass: m/z 548; Anal. Calcd. for $C_{25}H_{18}ClN_7O_6$: C, 54.80; H, 3.31; Cl, 6.47; N, 17.89; O, 17.52; Found: C, 54.68; H, 3.23; Cl, 6.25; N, 17.71; O, 17.12%.

7-(4-(2,4-dinitrophenoxy)phenyl)-N-(4-nitrophenyl)-4,7-dihydro-5-methyl-[1,2,4]triazolo[1,5-a]pyrimidine-6-carboxamide 4d. m.p. 223 ºC; white crystals; ^{1}H NMR (DMSO-d_6) δ ppm: (δ 2.10) (s, 3H, H_a), (δ 6.30) (s, 1H, H_b), (δ 6.50-6.60) (d, 2H, $H_{cc'}$,), (δ 6.71-6.79) (d, 1H, $H_{d,}$), (δ 7.02-7.08) (t, 2H, $H_{ee'}$), (δ 7.15-7.34) (dd'dd', 4H, $H_{ff'-gg'}$), (δ 7.41-7.46) (dd, 2H, H_{hi}), (δ 7.56) (s, 1H, H_j), (δ 9.58) (s, 1H, H_k),(δ 10.02) (s, 1H, H_l). FT IR (cm^{-1}): 3230 (N-H stretching of secondary amine), 3022 (C-H stretching of aromatic ring), 2926 (C-H asymmetrical stretching of CH_3 group), 2853 (C-H asymmetrical stretching of CH_3 group), 1656 (C=O stretching of amide), 1623 (C=N stretching of triazole ring), 1555 (N-H deformation of pyrimidine ring), 1516 and 1453 (C=C stretching of aromatic ring), 1423 (C-H asymmetrical deformation of CH_3 group), 1409 (C-H symmetrical deformation of CH_3 group), 1345 (C-N stretching), 1253 (C-NO2 symmetrical deformation of NO2 group), 1229 (C-O-C stretching), 1028 (C-H in plane deformation of aromatic ring), 843 (C-H out of plane bending of 1,4-disubstituion), 738 (C-Cl stretching), Mass: m/z 558; Anal. Calcd. for $C_{25}H_{18}N_8O_8$: C, 53.77; H, 3.25; N, 20.06; O, 22.92; Found: C, 53.58; H, 3.12; N, 20.00; O, 22.86%.

7-(4-(2,4-dinitrophenoxy)phenyl)-N-(3-nitrophenyl)-4,7-dihydro-5-methyl-[1,2,4]triazolo[1,5-a]pyrimidine-6-carboxamide 4e. m.p. 189ºC; white crystals; ^{1}H

NMR (DMSO-d_6) δ ppm: (δ 2.11) (s, 3H, H_a), (δ 6.43) (s, 1H, H_b), (δ 6.71-6.73) (d, 2H, $H_{cc'}$,), (δ 6.82-6.84) (d, 1H, $H_{d,}$), (δ 7.02-7.06) (t, 2H, $H_{ee'}$), (δ 7.12-7.16) (t, 1H, H_f), (δ 7.23-7.31) (m, 3H, H_{g-i}), (δ 7.42-7.46) (dd, 2H, H_{jk}), (δ 7.63) (s, 1H, H_l), (δ 9.65) (s, 1H, H_m),(δ 10.23) (s, 1H, H_n).FT IR (cm^{-1}): 3267 (N-H stretching of secondary amine), 3025 (C-H stretching of aromatic ring), 2922(C-H asymmetrical stretching of CH_3 group), 2845 (C-H asymmetrical stretching of CH_3 group), 1665 (C=O stretching of amide), 1615 (C=N stretching of triazole ring), 1524 (N-H deformation of pyrimidine ring), 1516 and 1452 (C=C stretching of aromatic ring), 1413 (C-H asymmetrical deformation of CH_3 group), 1411 (C-H symmetrical deformation of CH_3 group), 1363 (C-N stretching), 1251 (C-NO2 symmetrical deformation of NO2 group), 1213 (C-O-C stretching), 1032 (C-H in plane deformation of aromatic ring), 823 (C-H out of plane bending of 1,4-disubstituion), 738 (C-Cl stretching), Mass: m/z 558; Anal. Calcd. for $C_{25}H_{18}N_8O_8$: C, 53.77; H, 3.25; N, 20.06; O, 22.92; Found: C, 53.60; H, 3.13; N, 19.89; O, 22.82%.

7-(4-(2,4-dinitrophenoxy)phenyl)-N-(4-hydroxyphenyl)-4,7-dihydro-5-methyl-[1,2,4]triazolo[1,5-a]pyrimidine-6-carboxamide 4f. m.p. 198 ºC; white crystals; ^{1}H NMR (DMSO-d_6) δ ppm: (δ 2.14) (s, 3H, H_a), (δ 4.42) (s, 1H, H_b), (δ 6.32) (s, 1H, H_c), (δ 6.48-6.58) (d, 2H, $H_{dd'}$,), (δ 6.64-6.74) (d, 1H, $H_{e,}$), (δ 7.05-7.11) (t, 2H, $H_{ff'}$), (δ 7.16-7.29) (dd'dd', 4H, $H_{gg'-hh'}$), (δ 7.42-7.48) (dd, 2H, H_{ij}), (δ 7.62) (s, 1H, H_k), (δ 9.52) (s, 1H, H_l),(δ 10.11) (s, 1H, H_m). FT IR (cm^{-1}): 3256 (N-H stretching of secondary amine), 3054 (C-H stretching of aromatic ring), 2958 (C-H asymmetrical stretching of CH_3 group), 2868 (C-H asymmetrical stretching of CH_3 group), 1652 (C=O stretching of amide), 1641 (C=N stretching of triazole ring), 1525 (N-H deformation of pyrimidine ring), 1509 and 1452 (C=C stretching of aromatic ring), 1413 (C-H asymmetrical deformation of CH_3 group), 1401 (C-H symmetrical deformation of CH_3 group), 1354 (C-N stretching), 1235 (C-NO2 symmetrical deformation of NO2 group), 1234 (C-O-C stretching), 1021 (C-H in plane deformation of aromatic ring), 834 (C-H out of plane bending of 1,4-disubstituion), 728 (C-Cl stretching), Mass: m/z 529; Anal. Calcd. for $C_{25}H_{19}N_7O_7$: C, 56.71; H, 3.62; N, 18.52; O, 21.15; Found: C, 56.54; H, 3.51; N, 18.23; O, 21.01%.

7-(4-(2,4-dinitrophenoxy)phenyl)-N-(2-chlorophenyl)-4,7-dihydro-5-methyl-[1,2,4]triazolo[1,5-a]pyrimidine-6-carboxamide 4g. m.p. 194ºC; white crystals; ^{1}H NMR (DMSO-d_6) δ ppm: (δ 2.23) (s, 3H, H_a), ((δ 6.25) (s, 1H, H_b), (δ 6.71-6.73) (d, 2H, $H_{cc'}$,), (δ 6.78-6.80) (d, 1H, $H_{d,}$), (δ 7.00-7.04) (t, 2H, $H_{ee'}$), (δ 7.10-7.15) (t, 1H, H_f), (δ 7.20-7.24) (m, 5H, H_{g-k}), (δ 7.41-7.51) (dd, 2H, H_{lm}), (δ 7.52) (s, 1H, H_n), (δ 9.52) (s, 1H, H_o),(δ 10.02) (s, 1H, H_p). FT IR (cm^{-1}): 3245 (N-H stretching of secondary amine), 3023 (C-H stretching of aromatic ring), 2917 (C-H asymmetrical stretching of CH_3 group), 2864 (C-H asymmetrical stretching of CH_3 group), 1651 (C=O stretching of amide), 1612 (C=N stretching of triazole ring), 1524 (N-H deformation of pyrimidine ring), 1502 and 1484 (C=C stretching of aromatic ring), 1424 (C-H asymmetrical deformation of CH_3 group), 1405 (C-H symmetrical deformation of CH_3 group), 1356 (C-N stretching), 1254 (C-NO2 symmetrical deformation of NO2 group), 1256 (C-O-C stretching), 1012 (C-H in plane deformation of aromatic ring), 831 (C-H out of plane bending of 1,4-disubstituion), 732 (C-Cl stretching), Mass: m/z 548; Anal. Calcd. for $C_{25}H_{18}ClN_7O_6$: C, 54.80; H, 3.31; Cl, 6.47; N, 17.89; O, 17.52; Found: C, 54.72; H, 3.21; Cl, 6.20; N, 17.70; O, 17.20%.

7-(4-(2,4-dinitrophenoxy)phenyl)-N-(4-methoxyphenyl)-4,7-dihydro-5-methyl-[1,2,4]triazolo[1,5-a]pyrimidine-6-carboxamide 4h. m.p. 202ºC; white crystals; ^{1}H NMR (DMSO-d_6) δ ppm: (δ 2.23) (s, 3H, H_a), (δ 3.23) (s, 3H, H_b), (δ 3.46) (s, 2H, H_c), (δ 6.25) (s, 1H, H_d), (δ 6.71-6.73) (d, 2H, $H_{ee'}$,), (δ 6.78-6.80) (d, 1H, $H_{f,}$), (δ 7.00-7.04) (t, 2H, $H_{g'}$), (δ 7.10-7.15) (t, 1H, H_h), (δ 7.20-7.24) (m,

5H, H_{i-k}), (δ 7.41-7.51) (dd, 2H, H_{lm}), (δ 7.52) (s, 1H, H_n), (δ 9.52) (s, 1H, H_o),(δ 10.02) (s, 1H, H_p). FT IR (cm^{-1}): 3240 (N-H stretching of secondary amine), 3020 (C-H stretching of aromatic ring), 2913 (C-H asymmetrical stretching of CH_3 group), 2860 (C-H asymmetrical stretching of CH_3 group), 1650 (C=O stretching of amide), 1610 (C=N stretching of triazole ring), 1521 (N-H deformation of pyrimidine ring), 1500 and 1480 (C=C stretching of aromatic ring), 1411 (C-H asymmetrical deformation of CH_3 group), 1401 (C-H symmetrical deformation of CH_3 group), 1323 (C-N stretching), 1251 (C-NO2 symmetrical deformation of NO2 group), 1250 (C-O-C stretching), 1011 (C-H in plane deformation of aromatic ring), 821 (C-H out of plane bending of 1,4-disubstituion), 723 (C-Cl stretching), Mass: m/z 543; Anal. Calcd. for $C_{26}H_{21}N_7O_7$: C, 57.46; H, 3.89; N, 18.04; O, 20.61; Found: C, 57.34; H, 3.54; N, 18.00; O, 20.53%.

7-(4-(2,4-dinitrophenoxy)phenyl)-N-(4-bromophenyl)-4,7-dihydro-5-methyl-[1,2,4]triazolo[1,5-a]pyrimidine-6-carboxamide 4i. m.p. 210 ºC; white crystals; ^1H NMR (DMSO-d_6) δ ppm: (δ 2.02) (s, 3H, H_a), (δ 6.13) (s, 1H, H_b), (δ 6.54-6.66) (d, 2H, $H_{cc'}$,), (δ 6.76-6.82) (d, 1H, $H_{d,}$), (δ 7.04-7.10) (t, 2H, $H_{ee'}$), (δ 7.16-7.36) (dd'dd', 4H, $H_{ff'-gg'}$), (δ 7.48-7.52) (dd, 2H, H_{hi}), (δ 7.80) (s, 1H, H_j), (δ 9.54) (s, 1H, H_k),(δ 10.13) (s, 1H, H_l). FT IR (cm^{-1}): 3289 (N-H stretching of secondary amine), 3022 (C-H stretching of aromatic ring), 2923 (C-H asymmetrical stretching of CH_3 group), 2832 (C-H asymmetrical stretching of CH_3 group), 1612 (C=O stretching of amide), 1600(C=N stretching of triazole ring), 1554 (N-H deformation of pyrimidine ring), 1511 and 1431 (C=C stretching of aromatic ring), 1421 (C-H asymmetrical deformation of CH_3 group), 1400 (C-H symmetrical deformation of CH_3 group), 1344 (C-N stretching), 1223 (C-NO2 symmetrical deformation of NO2 group), 1201 (C-O-C stretching), 1054 (C-H in plane deformation of aromatic ring), 832 (C-H out of plane bending of 1,4-disubstituion), 730 (C-Br stretching), Mass: m/z 591; Anal. Calcd. for $C_{25}H_{18}BrN_7O_6$: C, 50.69; H, 3.06; Br, 13.49; N, 16.55; O, 16.21; Found: C, 50.62; H, 3.00; Br, 13.32; N, 16.23; O, 16.02%.

7-(4-(2,4-dinitrophenoxy)phenyl)-N-(3-bromophenyl)-4,7-dihydro-5-methyl-[1,2,4]triazolo[1,5-a]pyrimidine-6-carboxamide 4j. m.p. 191 ºC; white crystals; ^1H NMR (DMSO-d_6) δ ppm: (δ 2.12) (s, 3H, H_a), (δ 6.21) (s, 1H, H_b), (δ 6.52-6.64) (d, 2H, $H_{cc'}$,), (δ 6.74-6.80) (d, 1H, $H_{d,}$), (δ 7.00-7.08) (t, 2H, $H_{ee'}$), (δ 7.12-7.30) (dd'dd', 4H, $H_{ff'-gg'}$), (δ 7.40-7.42) (dd, 2H, H_{hi}), (δ 7.64) (s, 1H, H_j), (δ 9.67) (s, 1H, H_k),(δ 10.54) (s, 1H, H_l). FT IR (cm^{-1}): 3223 (N-H stretching of secondary amine), 3001 (C-H stretching of aromatic ring), 2954 (C-H asymmetrical stretching of CH_3 group), 2856 (C-H asymmetrical stretching of CH_3 group), 1602 (C=O stretching of amide), 1598(C=N stretching of triazole ring), 1525 (N-H deformation of pyrimidine ring), 1500 and 1456 (C=C stretching of aromatic ring), 1409 (C-H asymmetrical deformation of CH_3 group), 1397 (C-H symmetrical deformation of CH_3 group), 1357 (C-N stretching), 1228 (C-NO2 symmetrical deformation of NO2 group), 1211 (C-O-C stretching), 1042 (C-H in plane deformation of aromatic ring), 838 (C-H out of plane bending of 1,4-disubstituion), 729 (C-Br stretching), Mass: m/z 591; Anal. Calcd. for $C_{25}H_{18}BrN_7O_6$: C, 50.69; H, 3.06; Br, 13.49; N, 16.55; O, 16.21; Found: C, 50.54; H, 3.00; Br, 13.27; N, 16.20; O, 16.00%.

REFERENCES

1. Fischer G, "1,2,4-triazolo[1,5-a]pyrimidine derivatives are thermodynamically more stable", Adv. Heterocycl. Chem. 1993, 57, 81.
2. Shaban MAE, Morgan AEA, "Studies of 1,2,4-triazolo[1,5-c]pyrimidines", Adv. Heterocycl. Chem., 2000, 77, 345.
3. Shaban MAE, Morgan AEA, "Studies of 1,2,4-triazolo[4,3-a]pyrimidines", Adv. Heterocycl. Chem., 1999, 73, 131.
4. Shaban MAE, Morgan AEA, "Studies of 1,2,4-triazolo[4,3-c]pyrimidines", Adv. Heterocycl. Chem., 2000, 75, 243.

5. Salas JM, Romero MA, Sanchez MP, Quiros M, "New platinum and palladium-Hmtpo compounds 5,7-dihydro -7 -oxo-5-methyl [1,2,4] triazolopyrimidine", Coord. Chem. Rev., 1999, 193, 1119.
6. Szlyk E, Łakomska I, Surdykowski A, Głowiak T, Pazderski L, Sitkowski J, Kozerski L, "Platinum(II) complexes with triazolopyrimidines", Inorg. Chim. Acta, 2002, 333, 93.
7. Abul Haj M, Quiros M, Salas JM, "Monodentately coordinated ligands", Polyhedron, 2004, 23, 743.
8. Abul Haj M, Quiros M, Salas JM, Dobado JA, Molina J., Basallote MG, Manez MA "Polynuclear compounds in which either the triazolopyrimidine ligand", Eur. J. Inorg. Chem., 2002, 811.
9. Biagini-Cingi M, Manotti-Lanfredi AM, Tiripicchio A, Haasnoot JG, Reedijk J, Triazolopyrimidine auxiliary ligands", Inorg. Chim. Acta, 1985, 101, 49.
10. Kappe CO, Fabian WMF, Semones MA, "Biginelli dihydropyrimidine synthesis: The steric proximity", Tetrahedron, 1997, 53, 2803.
11. Kidwai M, Mishra AD, "Preparation of triazolopyrimidine derivatives", Bull. Korean Chem. Soc., 2003, 24, 1038.
12. Biginelli PR, "Formation of 2-oxo-1,2,3,4-tetrahydropyrimidines", Gazz Chim. Ital., 1893, 23, 360.
13. Kappe CO, Rochge PJ, "An one-pot multi component synthesis of novel 1,2,4-triazolo[1,5-a]pyrimidines", Heterocycl. Chem. 1989, 26, 55.
14. Foroughifar N, Mobinikhaledi A, Fathinejad Jirandehi H, "Synthesis of some biginelli compounds in solvent medium using a photochemistry method. Phosphorus, Sulfur and Silicon and the Related Elements", 2003, 178, 495-500
15. Sharaf MAF, Abdel FA, Fattah AM, Khalil AMR, "Some C-Heterocycle-Substituted Phenoxazines", J. Chem. Research (S), 1996, 354.
16. O'Reilly BC, Atwal KS, "Preparation of triazolopyrimidine derivatives", Heterocycles, 1987, 26, 1158.
17. Shutalev AD, Kishko EA, Sivova N, Kuzentsov AY, "Design characterization and antitubercular activity of 2-heterocycle-substituted phenothiazines", Molecules, 1989, 3, 100.

