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Research Article

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A one-pot microwave irradiation synthesis of 1,2,4-triazolo[1,5-a]pyrimidines

Mahendra Borisagar*[1], Haresh Ram[2], Kaushik Joshi[3], Kartik Vyas[4] and Kiran Nimavat[5]

[1]JJT University, Rajasthan, India
[2]Navin Fluorine International Ltd Surat
[3]M.V.M. Science & Home Science College, Rajkot
[4]Sheth L.H. Science College, Mansa
[5]Govt. Science College, Gandhinagar

ABSTRACT

*Synthesis of a series of triazolopyrimidines **(4a-j)** was achieved from different acetoacetamides, thiophene-2-carbaldehyde and 5-amino-1,2,4-triazole using microwave irradiation within 20-30 minutes with high yield. The structures of the products were supported by FTIR, PMR and mass spectral data.*

Keywords: Triazolo[1,5-a]pyrimidines; Acetoacetamides; 5-Amino-1,2,4-triazole, microwave irradiation 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. Among these isomeric families of compounds, 1,2,4-triazolo[1,5-*a*]pyrimidine derivatives are thermodynamically more stable and, thus, the most studied ones [1]. 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. Pharmacological activities, such as antitumor potency [5,6] inhibition of KDR kinase[7], antifungal effect[8,9] and macrophage activation[10]. Anticancer acticity[11], Acetohydroxyacid synthase inhibitor[12], CDK-2 inhibitors[13], Anti-inflammatory[14,15], fungicidal activities[16], antimycobacterial agents[17], A2A adenosine receptor antagonists[18], latent leishmanicidal activity[19],

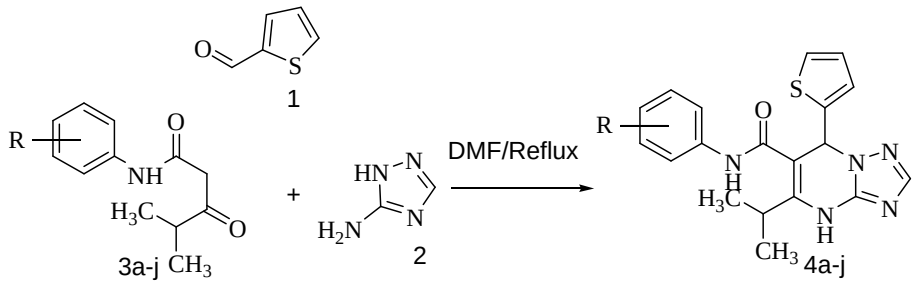
We have developed a new one-pot multi component synthesis of novel triazolo[1,5-a]pyridmidines **(4a-j)** with the advantages of short reaction time, high yield and environmental friendliness **(Scheme-1)**.

EXPERIMENTAL SECTION

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 SHIMADZU. Thin Layer Chromatography (TLC) was performed on silica gel-G using hexane: ethylacetate solvent system.

Typical exaperimental procedure for the synthesis of 1,2,4 triazolopyrimidines.

A mixture of the 5-amino-1,2,4-triazole (2 mmol), acetoacetaminde (1 mmol) and thiophene-2-carbaldehyde (1 mmol) in 0.4 ml of DMF was refluxed under microwave irradiation for 20-30 min. After cooling, methanol (~10 ml) was added. The reaction mixture was allowed to stand overnight and then filtered to give the solid triazolopyrimidine products **(4a-j)**, which were crystallized from ethanol and subsequently dried in air.



Scheme-1

4,7-dihydro-N-(4-methoxyphenyl)-5-isopropyl-7-(thiophen-2-yl)-[1,2,4]triazolo[1,5-a]pyrimidine-6-carboxamide (4a)

M. p. 219 ºC; white crystals; ^{1}H NMR (DMSO-d_6) δ ppm: (δ 1.71) (s, 3H, H_a), (δ 3.37) (s, 3H, H_b), (δ 5.66) (s, 1H, H_c), (δ 6.60-6.72) (d, 2H, $H_{dd'}$,), (δ 6.75) (t, 2H, $H_{ee'}$), (δ 6.91) (d, 1H, H_f,), (δ 7.53) (t, 2H, $H_{gg'}$), (δ 8.10) (s, 1H, H_h), (δ 8.43) (s, 1H, H_i), (δ 9.78) (s, 1H, H_j). FT IR (cm^{-1}): 3150 (N-H stretching of secondary amine), 3002 (C-H stretching of aromatic ring), 2913 (C-H asymmetrical stretching of CH_3 group), 2856 (C-H asymmetrical stretching of CH_3 group), 1660 (C=O stretching of amide), 1600 (C=N stretching of triazole ring), 1545 (N-H deformation of pyrimidine ring), 1511 and 1465 (C=C stretching of aromatic ring), 1445 (C-H asymmetrical deformation of CH_3 group), 1406 (C-H symmetrical deformation of CH_3 group), 1353(C=S stretching), 1323 (C-N stretching), 1242 (C-O-C stretching), 1021 (C-H in plane deformation of aromatic ring), 823 (C-H out of plane bending of 1,4-disubstituion), Mass: *m/z* 367; Anal. Calcd. for $C_{18}H_{17}N_5O_2S$: C, 58.84; H, 4.66; N, 19.06; O, 8.71; S, 8.73. Found: C, 58.61; H, 4.34; N, 19.00; O, 8.42; S, 8.53 %.

N-(4-chlorophenyl)-4,7-dihydro-5-isopropyl-7-(thiophen-2-yl)-[1,2,4]triazolo[1,5-a]pyrimidines-6-carboxamide (4b)

M. p. 179 ºC; white crystals; 1H NMR (DMSO-d6) δ ppm: (δ 1.77) (s, 3H, H_a), (δ 5.06) (s, 1H, H_b), (δ 6.61-6.77) (d, 2H, $H_{cc'}$,), (δ 6.79) (t, 2H, $H_{dd'}$), (δ 6.93) (d, 1H, H_e,), (δ 7.59) (t, 2H, $H_{ff'}$), (δ 8.15) (s, 1H, H_g), (δ 8.49) (s, 1H, H_h), (δ 9.78) (s, 1H, H_i). FT IR (cm^{-1}): 3133 (N-H stretching of secondary amine), 3010 (C-H stretching of aromatic ring), 2921 (C-H asymmetrical stretching of CH_3 group), 2853 (C-H asymmetrical stretching of CH_3 group), 1659 (C=O stretching of amide), 1610(C=N stretching of triazole ring), 1535 (N-H deformation of pyrimidine ring), 1510 and 1460 (C=C stretching of aromatic ring), 1440 (C-H asymmetrical deformation of CH_3 group), 1401 (C-H symmetrical deformation of CH_3 group), 1358 (C=S stretching), 1333 (C-N stretching), 1023 (C-H in plane deformation of aromatic ring), 832 (C-H out of plane bending of 1,4-disubstituion), 736 (C-Cl stretching). Mass: *m/z* 371; Anal. Calcd. for $C_{17}H_{14}ClN_5OS$: C, 54.91; H, 3.79; Cl, 9.53; N, 18.83; O, 4.30; S, 8.62. Found: C, 54.51; H, 3.53; Cl, 9.23; N, 18.45; O, 4.22; S, 8.55%.

4,7-dihydro-5-isopropyl-7-(thiophen-2-yl)-N-p-tolyl-[1,2,4]triazolo[1,5-a]pyrimidine-6-carboxamide (4c)

M. p. 257 ^{o}C; white crystals; ^{1}H NMR (DMSO-d_6) δ ppm: (δ 1.63) (s, 3H, H_a), (δ 2.07) (s, 3H, H_b), (δ 5.45) (s, 1H, H_c), (δ 6.54-6.70) (d, 2H, $H_{dd'}$,), (δ 6.73) (t, 2H, $H_{ee'}$), (δ 6.95) (d, 1H, H_f,), (δ 7.54) (t, 2H, $H_{gg'}$), (δ 8.23) (s, 1H, H_h), (δ 8.89) (s, 1H, H_i), (δ 9.70) (s, 1H, H_j). FT IR (cm^{-1}): 3144 (N-H stretching of secondary amine), 3020 (C-H stretching of aromatic ring), 2953 (C-H asymmetrical stretching of CH_3 group), 2850 (C-H asymmetrical stretching of CH_3 group), 1656 (C=O stretching of amide), 1601 (C=N stretching of triazole ring), 1553 (N-H deformation of pyrimidine ring), 1515 and 1443 (C=C stretching of aromatic ring), 1421 (C-H asymmetrical deformation of CH_3 group), 1400 (C-H symmetrical deformation of CH_3 group), 1350(C=S stretching), 1311 (C-N stretching), 1020 (C-H in plane deformation of aromatic ring), 833 (C-H out of plane bending of 1,4-disubstituion), Mass: *m/z* 367; Anal. Calcd. for $C_{18}H_{17}N_5OS$: C, 61.52; H, 4.88; N, 19.93; O, 4.55; S, 9.12. Found: C, 61.21; H, 4.23; N, 19.54; O, 4.42; S, 9.10 %.

N-(4-fluorophenyl)-4,7-dihydro-5-isopropyl-7-(thiophen-2-yl)-[1,2,4]triazolo[1,5-a]-pyrimidine-6-carboxamide (4d)

M. p. 179 ^{o}C; white crystals; 1H NMR (DMSO-d6) δ ppm: (δ 1.83) (s, 3H, H_a), (δ 5.53) (s, 1H, H_b), (δ 6.64-6.74) (d, 2H, $H_{cc'}$,), (δ 6.79) (t, 2H, $H_{dd'}$), (δ 6.90) (d, 1H, H_e,), (δ 7.61) (t, 2H, $H_{ff'}$), (δ 8.13) (s, 1H, H_g), (δ 8.76) (s, 1H, H_h), (δ 9.88) (s, 1H, H_i). FT IR (cm^{-1}): 3150 (N-H stretching of secondary amine), 3021 (C-H stretching of aromatic ring), 2924 (C-H asymmetrical stretching of CH_3 group), 2851 (C-H asymmetrical stretching of CH_3 group), 1656 (C=O stretching of amide), 1609 (C=N stretching of triazole ring), 1531 (N-H deformation of pyrimidine ring), 1510 and 1453 (C=C stretching of aromatic ring), 1453 (C-H asymmetrical deformation of CH_3 group), 1424 (C-H symmetrical deformation of CH_3 group), 1353 (C=S stretching), 1323 (C-N stretching), 1032 (C-H in plane deformation of aromatic ring), 823 (C-H out of plane bending of 1,4-disubstituion), 736 (C-F stretching). Mass: *m/z* 355; Anal. Calcd. for $C_{17}H_{14}FN_5OS$: C, 57.45; H, 3.97; F, 5.35; N, 19.71; O, 4.50; S, 9.02. Found: C, 57.35; H, 3.82; F, 5.12; N, 19.65; O, 4.21; S, 8.89%.

N-(4-bromophenyl)-4,7-dihydro-5-isopropyl-7-(thiophen-2-yl)-[1,2,4]triazolo[1,5-a]-pyrimidine-6-carboxamide (4e)

M. p. 199 ^{o}C; white crystals; 1H NMR (DMSO-d6) δ ppm: (δ 1.56) (s, 3H, H_a), (δ 5.65) (s, 1H, H_b), (δ 6.54-6.72) (d, 2H, $H_{cc'}$,), (δ 6.78) (t, 2H, $H_{dd'}$), (δ 6.90) (d, 1H, H_e,), (δ 7.54) (t, 2H, $H_{ff'}$), (δ 8.10) (s, 1H, H_g), (δ 8.75) (s, 1H, H_h), (δ 9.75) (s, 1H, H_i). FT IR (cm^{-1}): 3124 (N-H stretching of secondary amine), 3011 (C-H stretching of aromatic ring), 2922 (C-H asymmetrical stretching of CH_3 group), 2853 (C-H asymmetrical stretching of CH_3 group), 1653 (C=O stretching of amide), 1603 (C=N stretching of triazole ring), 1535 (N-H deformation of pyrimidine ring), 1514 and 1456 (C=C stretching of aromatic ring), 1451 (C-H asymmetrical deformation of CH_3 group), 1421 (C-H symmetrical deformation of CH_3 group), 1352 (C=S stretching), 1328 (C-N stretching), 1045 (C-H in plane deformation of aromatic ring), 823 (C-H out of plane bending of 1,4-disubstituion), 751 (C-Br stretching). Mass: *m/z* 416; Anal. Calcd. for $C_{17}H_{14}BrN_5OS$: C, 49.05; H, 3.39; Br, 19.19; N, 16.82; O, 3.84; S, 7.70. Found: C, 49.00; H, 3.24; Br, 19.12; N, 16.68; O, 3.64; S, 7.65%

N-(3-chloro-4-fluorophenyl)-4,7-dihydro-5-isopropyl-7-(thiophen-2-yl)-[1,2,4]triazolo[1,5-a]-pyrimidine-6-carboxamide (4f)

M. p. 222 ºC); white crystals; 1H NMR (DMSO-d6) δ ppm: (δ 1.74) (s, 3H, H_a), (δ 5.64) (s, 1H, H_b), (δ 6.54-6.72) (d, 2H, $H_{cc'}$,), (δ 6.89) (t, 1H, H_d), (δ 6.95) (d, 1H, H_e,), (δ 7.54-7.59) (t, 2H, $H_{ff'}$), (δ 8.21) (s, 1H, H_g), (δ 8.79) (s, 1H, H_h), (δ 9.81) (s, 1H, H_i). FT IR (cm^{-1}): 3164 (N-H stretching of secondary amine), 3068 (C-H stretching of aromatic ring), 2964 (C-H asymmetrical stretching of CH_3 group), 2861 (C-H asymmetrical stretching of CH_3 group), 1660 (C=O stretching of amide), 1608 (C=N stretching of triazole ring), 1553 (N-H deformation of pyrimidine ring), 1514 and 1454 (C=C stretching of aromatic ring), 1445 (C-H asymmetrical deformation of CH_3 group), 1428 (C-H symmetrical deformation of CH_3 group), 1354 (C=S stretching), 1328 (C-N stretching), 1042 (C-H in plane deformation of aromatic ring), 832 (C-H out of plane bending of 1,4-disubstituion), 751 (C-Cl stretching), 659 (C-F stretching). Mass: *m/z* 390; Anal. Calcd. for $C_{17}H_{13}ClFN_5OS$: C, 52.38; H, 3.36; Cl, 9.09; F, 4.87; N, 17.96; O, 4.10; S, 8.23. Found: C, 52.12; H, 3.24; Cl, 9.01; F, 4.56; N, 17.84; O, 4.01; S, 8.12%.

N-(3,4-dichlorophenyl)-4,7-dihydro-5-isopropyl-7-(thiophen-2-yl)-[1,2,4]triazolo[1,5-a]-pyrimidine-6-carboxamide (4g)

M. p. 227 ^{o}C; white crystals; 1H NMR (DMSO-d6) δ ppm: (δ 1.64) (s, 3H, H_a), (δ 5.64) (s, 1H, H_b), (δ 6.60-6.72) (d, 2H, $H_{cc'}$,), (δ 6.89) (t, 1H, H_d), (δ 6.92) (d, 1H, H_e,), (δ 7.56-7.60) (t, 2H, $H_{ff'}$), (δ 8.24) (s, 1H, H_g), (δ 8.82) (s, 1H, H_h), (δ 9.86) (s, 1H, H_i). FT IR (cm^{-1}): 3156 (N-H stretching of secondary amine), 3065 (C-H stretching of aromatic ring), 2966 (C-H asymmetrical stretching of CH_3 group), 2856 (C-H asymmetrical stretching of CH_3 group), 1656 (C=O stretching of amide), 1645 (C=N stretching of triazole ring), 1565 (N-H deformation of pyrimidine ring), 1512 and 1456 (C=C stretching of aromatic ring), 1456 (C-H asymmetrical deformation of CH_3 group), 1421 (C-H symmetrical deformation of CH_3 group), 1353 (C=S stretching), 1328 (C-N stretching), 1042 (C-H in plane deformation of aromatic ring), 833 (C-H out of plane bending of 1,4-disubstituion), 751 (C-Cl stretching). Mass: *m/z* 406; Anal. Calcd. for $C_{17}H_{13}C_{l2}N_5OS$: C, 50.26; H, 3.23; Cl, 17.45; N, 17.24; O, 3.94; S, 7.89. Found: C, 50.11; H, 3.12; Cl, 17.42; N, 17.13; O, 3.64; S, 7.43%.

N-(3-chlorophenyl)-4,7-dihydro-5-isopropyl-7-(thiophen-2-yl)-[1,2,4]triazolo[1,5-a]-pyrimidine-6-carboxamide (4h)

M. p. 199 ^{o}C; white crystals; 1H NMR (DMSO-d6) δ ppm: (δ 1.45) (s, 3H, H_a), (δ 5.58) (s, 1H, H_b), (δ 6.56-6.70) (d, 2H, $H_{cc'}$,), (δ 6.80) (t, 1H, H_d), (δ 6.92-7.08) (d, 2H, H_{ef},), (δ 7.52) (d, 1H, $H_{g'}$), (δ 7.52) (d, 1H, $H_{h'}$), (δ 8.33) (s,

1H, H_i), (δ 8.86) (s, 1H, H_j), (δ 9.78) (s, 1H, H_k). FT IR (cm^{-1}): 3165 (N-H stretching of secondary amine), 3055 (C-H stretching of aromatic ring), 2975 (C-H asymmetrical stretching of CH_3 group), 2853 (C-H asymmetrical stretching of CH_3 group), 1642 (C=O stretching of amide), 1644 (C=N stretching of triazole ring), 1561 (N-H deformation of pyrimidine ring), 1508 and 1451 (C=C stretching of aromatic ring), 1445 (C-H asymmetrical deformation of CH_3 group), 1412 (C-H symmetrical deformation of CH_3 group), 1356 (C=S stretching), 1324 (C-N stretching), 1041 (C-H in plane deformation of aromatic ring), 843 (C-H out of plane bending of 1,4-disubstituion), 752 (C-Cl stretching). Mass: *m/z* 388; Anal. Calcd. for $C_{18}H_{18}ClN_5OS$: C, 55.74; H, 4.68; Cl, 9.14; N, 18.06; O, 4.12; S, 8.27. Found: C, 55.65; H, 4.46; Cl, 9.08; N, 18.00; O, 4.04; S, 8.11%.

N-(3-bromophenyl)-4,7-dihydro-5-isopropyl-7-(thiophen-2-yl)-[1,2,4]triazolo[1,5-a]-pyrimidine-6-carboxamidede (4i)

M. p. 189 ºC; white crystals; 1H NMR (DMSO-d6) δ ppm: (δ 1.24) (s, 3H, H_a), (δ 5.49) (s, 1H, H_b), (δ 6.43-6.64) (d, 2H, $H_{cc'}$,), (δ 6.72) (t, 1H, H_d), (δ 6.86-7.00) (d, 2H, H_{ef},), (δ 7.59) (d, 1H, $H_{g'}$), (δ 7.65) (d, 1H, $H_{h'}$), (δ 8.21) (s, 1H, H_i), (δ 8.98) (s, 1H, H_j), (δ 9.89) (s, 1H, H_k). FT IR (cm^{-1}): 3213 (N-H stretching of secondary amine), 3023 (C-H stretching of aromatic ring), 2959 (C-H asymmetrical stretching of CH_3 group), 2835 (C-H asymmetrical stretching of CH_3 group), 1624 (C=O stretching of amide), 1635 (C=N stretching of triazole ring), 1556 (N-H deformation of pyrimidine ring), 1511 and 1449 (C=C stretching of aromatic ring), 1442 (C-H asymmetrical deformation of CH_3 group), 1419 (C-H symmetrical deformation of CH_3 group), 1346 (C=S stretching), 1314 (C-N stretching), 1029 (C-H in plane deformation of aromatic ring), 846 (C-H out of plane bending of 1,4-disubstituion), 689 (C-Br stretching). Mass: *m/z* 432; Anal. Calcd. for $C_{18}H_{18}BrN_5OS$: C, 50.01; H, 4.20; Br, 18.48; N, 16.20; O, 3.70; S, 7.42. Found: C, 49.46; H, 4.04; Br, 18.34; N, 16.10; O, 3.63; S, 7.33%.

N-(3-methoxyphenyl)-4,7-dihydro-5-isopropyl-7-(thiophen-2-yl)-[1,2,4]triazolo[1,5-a]-pyrimidine-6-carboxamide (4j)

M. p. 168 °C; white crystals; 1H NMR (DMSO-d6) δ ppm: (δ 1.17) (s, 6H, $H_{aa'}$), (δ 2.24) (m, 1H, H_b), (δ 5.24) (s, 1H, H_c), (δ 6.41-6.66) (d, 2H, $H_{dd'}$,), (δ 6.78) (t, 1H, H_e), (δ 6.87-7.12) (d, 2H, H_{fg},), (δ 7.64) (d, 1H, $H_{h'}$), (δ 7.87) (d, 1H, $H_{i'}$), (δ 8.33) (s, 1H, H_j), (δ 8.43) (s, 1H, H_k), (δ 9.46) (s, 1H, H_l). FT IR (cm^{-1}): 3245 (N-H stretching of secondary amine), 3022(C-H stretching of aromatic ring), 2954 (C-H asymmetrical stretching of CH_3 group), 2831 (C-H asymmetrical stretching of CH_3 group), 1626 (C=O stretching of amide), 1612 (C=N stretching of triazole ring), 1564 (N-H deformation of pyrimidine ring), 1524 and 1487 (C=C stretching of aromatic ring), 1453 (C-H asymmetrical deformation of CH_3 group), 1413 (C-H symmetrical deformation of CH_3 group), 1335 (C=S stretching), 1313 (C-N stretching), 1023 (C-H in plane deformation of aromatic ring), 846 (C-H out of plane bending of 1,4-disubstituion), 689 (C-Br stretching). Mass: *m/z* 383; Anal. Calcd. for $C_{19}H_{21}N_5O_2S$: C, 59.51; H, 5.52; N, 18.26; O, 8.34; S, 8.36. Found: C, 59.23; H, 5.13; N, 18.15; O, 8.23; S, 8.31%.

Antimicrobial activity

The in vitro antibacterial activity was performed against Gram-positive bacteria including *Staphylococcus aureus*(**MTCC 96**), *Streptococcus pyogenes* (**MTCC 442**) and Gram negative bacteria including *Escherichia coli* (**MTCC 443**), *Pseudomonas aeruginosa* (**MTCC 424**). Yeast including *Candida albicans* (**MTCC 227**) and fungi *Aspergillus clavatus* (**MTCC 1323**) were used to test antifungal activity. Known antibiotics like **Amplicilline** and**Chloramphenicol** (the reference anti bacterial drugs) and **Fluconazole** (the reference antifungal drug) were used for comparison. The anmicrobial activities are summarized in Table A.

RESULTS AND DISCUSSION

The different 4,7-dihydro-N-(substitutedphenyl)-5-isopropyl-7-(thiophen-2-yl)-[1,2,4]triazolo [1,5-a]pyrimidine-6-carboxamide were synthesised by the cyclocondensation of 5-amino-1,2,4-triazole (2 mmol), substituted acetoacetaminde (1 mmol) and thiophene-2-carbaldehyde (1 mmol) in 0.4 ml of DMF was refluxed under microwave irradiation. The M.P. of the synthesized compounds was checked by the given literatures The purity of compounds was analyzed by TLC. The structures of the synthesized compounds 3a-j were confirmed on the basis of spectral and elemental analysis. The IR spectrum of these compounds exhibited bands due to 3245 (N-H stretching of secondary amine), 3022(C-H stretching of aromatic ring), 2954 (C-H asymmetrical stretching of CH_3 group), 2831 (C-H asymmetrical stretching of CH_3 group), 1626 (C=O stretching of amide), 1612 (C=N stretching of triazole ring), 1564 (N-H deformation of pyrimidine ring), 1524 and 1487 (C=C stretching of aromatic ring), 1453 (C-H asymmetrical deformation of CH_3 group), 1413 (C-H symmetrical deformation of CH_3 group), 1335 (C=S stretching), 1313 (C-N stretching), 1023 (C-H in plane deformation of aromatic ring). Further in their 1H NMR

(DMSO-d6) δ ppm: (δ 1.17) (s, 6H, 2CH3), (δ 2.24) (m, 1H, isopropyl proton), (δ 5.24) (s, 1H, -CH), (δ 6.41-6.90) (d, 3H, thiol ring ,), (δ 6.91-8.33) (m, 4H, Haloginated Aromatic ring), (δ 8.42) (s, 1H, triazol ring), (δ 8.56) (s, 1H, Amide), (δ 9.46) (s, 1H, pyrimidine ring) peaks confirms the formation of title compounds.

Table-.1: Antimicrobial activity of compounds 3a-j

Compound	Antibacterial activity				Antifungal activity	
	Gram +ve		Gram -ve			
	S. aureus	***S. pyrogenes***	***E-Cali***	***P. aeruginosa***	***C. albicans***	***A. clavatus***
3a	13	15	18	15	21	**23**
3b	12	16	17	16	20	19
3c	15	15	13	17	**23**	20
3d	16	**19**	18	14	19	22
3e	17	14	17	17	18	18
3f	14	12	18	15	19	20
3g	17	18	2	16	20	19
3h	12	17	13	17	16	20
3i	16	13	15	14	18	**23**
3j	**18**	16	16	17	20	22
Amplicilline	18	19	20	20	-	-
Chloramphenicol	21	20	23	21	-	-
Fluconazole					24	24

CONCLUSION

The newly synthesized compounds 4,7-dihydro-N-(substitutedphenyl)-5-isopropyl-7-(thiophen-2-yl)-[1,2,4]triazolo [1,5-a]pyrimidine-6-carboxamide, in the study of antibacterial activity compound 3d, 3j were found to be active. In the study of antifungal activity compounds 3a, 3c, 3i, were active. It can be concluded that this class of compounds certainly holds great promise towards the pursuit to discover novel classes of antimicrobial agents.

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