CHAPTER 3

Synthesis of 3-[1,2,4]triazolo [1,5-a]pyridine derivatives
3.1. Introduction

The synthesis of nitrogen containing heterocyclic systems has been attracting interest over the past decade because of their utility in various applications, such as propellants, explosives, pyrotechnics and especially chemotherapy. In recent years, the chemistry of triazoles and their fused heterocyclic derivatives has received considerable attention owing to their synthetic and effective biological importance. There are two possible isomers of triazole depending on the position of nitrogen atom in the ring and are numbered as shown below (1, 2).

\[ \text{1H-1,2,3-triazole} \]

\[ \text{1H-1,2,4-triazole} \]

Triazoles are an important class of bridgehead nitrogen heterocycles and specifically the 1, 2, 4-triazole nucleus has been found to be an integral part of therapeutically interesting compounds that display significant biological activity. Out of the two triazoles, 1, 2, 4-triazole (2) has drawn great attention to medicinal chemists. Due to its wide variety of activity [1], 1, 2, 4-triazole derivatives are readily soluble in polar solvents and only slightly soluble in nonpolar solvents, however, the solubility in non-polar solvents can be increased by substitution on the nitrogen atom.
Heterocyclic compounds, which are of considerable interest due to their uses as active ingredients in antihypertensive triazolopyridines represent an important class of heterocyclic compounds having a wide range of pharmaceutical and biological activities including herbicidal, antifungal, anticonvulsant, and anxiolytic activities[2]. 1,2,4-Triazolo[1,5-a]pyridines constituted an important class of bronchodilatory, antiinflammatory, analgesic and positive inotropic agents[3-5]. The triazolo pyridine family composed of three [1,2,3] triazoles (3,6,7) and two [1,2,4]triazoles (4,5).

The synthesis of triazolo pyridines requires several steps. Some of the synthetic routes start with the construction of triazole ring [6-7]. Some procedures starting from the pyridine ring are known [8-10]. These compounds have also been prepared by ring transformation of isomeric triazolo [3, 4-a] pyridines [11] and from 2-thioxopyrone [12].

Methods for the synthesis of [1,2,4]triazolo[1,5-a]pyridines;

(a) By the reaction of 1, 2-diaminopyridine derivatives with compounds such as carboxylic acids and esters [13], 1, 3-diketones [14] and acetylene derivatives [15]

(b) By cyclization of 2(N-substituted amino) pyridines [16]

(c) By the reaction of 1-aminopyridinium salts with nitriles [17]
(d) From 3-cyanomethyl [1, 2,4] triazolo derivatives by reaction with ketomethylene compounds [18]

(e) By ring transformation of triazolo [4, 3-a] pyridines and 2-thioxopyrones [19]

(f) By the reaction of N-amino-a-pyridones with amides [20]

One step intramolecular synthesis of the title compounds are unusual and most of these consist in intermolecular multistep processes in low overall yield [21].

Maribel et al [22] synthesized 5-oxo-1,2,4-triazolo[1,5-a]pyridines (8) from N'-[bis(methylthio)-methylene]cyanoacetohydrazide and ketene -S, S-acetal by refluxing sodium ethoxide in ethanol in a single step.

\[
\text{MeS} \quad \text{N} \quad \text{O} \quad \text{CN} \\
\text{X} = \text{COOMe, COOEt, CN}
\]

Suresh M et al [23] synthesized the triazolopyridines by the Wittig reaction of substituted 1,6 diamino pyridine, to form iminophosphorane which upon cyclization with carbon disulphide in toluene furnished 5-oxo-7-phenyl-2-thiol-3,5-dihydro[1,2,4]-triazolo[1,5-a]pyridine-6,8-dicarbonitrile(9). These compounds show antifungal activity against Aspergillus flavus, Aspergillus fumigatus, Candida albicans, Penicillium marneffe.
W. R. Abdel-Monem et al. [24] synthesized triazolo pyridine derivatives by the reaction of cyanoacetyl hydrazide with aryldenemalononitrile to form diamino compound which cyclizes with formic acid to form triazole (10). Some of the synthesized derivatives show antifungal and antibacterial activities.

Recently, Nagasawa and Ueda [26] reported a convenient Cu(I) catalyzed condensation between 2-aminopyridines and aromatic nitriles to furnish triazolopyridines (12).

E. Huntsman et al [27] synthesized substituted 1, 2, 4-triazolo [1, 5-a] pyridine (13) from 2-aminopyridines in good yield by cyclization of N-(pyrid-2-yl) formamidoximes under mild reaction conditions and cyclising with trifluoroacetic anhydride (TFAA) in tetrahydrofuran.

Ramadan Ahmed Mekheimer et al [28] synthesized 7-amino-2-ethylthio-1,5-dihydro-5-oxo-1-phenyl-1,2,4-triazolo[1,5-a]-pyridine-6,8-dicarbonitrile (14) which found to possess an anti-oxidative activity. In addition, this compound was found to extend the life span of nematode Caenorhabditis Elegans.
Xiao-Meng Wang [29] reported the synthesis and anticancer activity of a series of [1,2,4]triazolo[1,5-a]pyridinylpyridines (15, 16) in vitro and in vivo which shows potential anti-tumor activities. This was an attempt to develop novel anticancer agents, by combining 2-amino-[1,2,4]triazolo[1,5-a]pyridine with N-pyridin-3-yl-phenyl sulfonamide.

Yuya Oguro et al [30] synthesized derivatives of [1,2,4]triazolo[1,5-a]pyridines (17) which shows potential anti-tumor activities. The intermediate was prepared by the reaction of Boc-protected phenol with 5-bromo-2-nitropyridine in cesium carbonate and DMF followed by hydrogenation. Further, after cyclisation the amine was reacted with cyclopropyl carbonyl chloride followed by Boc removal using TFA to form, which was then acylated with acyl halide.
Tao Liu and Yongzhou Hu [31] synthesized the triazolopyridine derivatives (18) by N-amination of pyridine with O-mesitylenesulfonyl hydroxylamine (MSH) which afforded N-amine-2-methylpyridinium mesitylene sulphonate salt, which upon further condensation with substituted benzonitriles gave the desired compound. Research indicates that the triazole ring is essential for the pregnancy-terminating activity through structural analysis and 2-phenyl ring can improve the activity. They also found that compounds having alkoxy group like methoxy and ethoxy have more potent activity than those of other groups. The compound (18) was shown to have potent pregnancy terminating agent.

Oscar Mammoliti et al [32] synthesized triazolopyridines (19) directly by the reaction of thiaiazole 2-amine with 2-chloro, 3-nitropyridines in presence of diisopropyl amine and NMP in one pot synthesis.
Stephen et al [33] synthesized triazolopyridines (20) which shows anti-bacterial activity. The intermediate was synthesized by Suzuki reaction using 2-amino-4-chloropyridine and 3-pyridyl boronic acid.

Maddeboina Krishnaiah et al [34] synthesized 2-benzylamino-4(5)-(6-methylpyridin-2-yl)-5(4)-([1,2,4]triazolo[1,5-a]pyridin-6-yl)thiazoles (21, 22) which shows a high therapeutic potential for cancer metastasis and fibrosis.
Cheng Hua Jin et al [35] synthesized substituted [1,2,4]triazolo[1,5-a]pyridine pyrazole derivatives (23, 24) and evaluated their biological activities as transforming growth factor which shows beta type-1 receptor kinase inhibitors.

![Chemical structures](23.png)

Kathryn Bell [36] synthesized series of triazolopyridines (25) which are potent and selective Phosphoinositide 3-kinase inhibitors for the treatment of inflammatory and autoimmune disorders. They hypothesized that the exocyclic NH along with one of the nitrogen atoms in the triazolopyridine core could form the classical bi-dentate hydrogen bond donor-acceptor interaction with the hinge region of the kinase. The pendant phenyl ring was identified as a suitable region for initial modification of the molecule. Analogues at this position were readily accessible by means of a Suzuki reaction on the acetylated 6-bromo-[1,2,4]triazolo[1,5-a]pyrid-2-ylamine core. This could be prepared from 2-amino-5-bromopyridine and allowed rapid access to analogues enabling exploration of the SAR around the aryl ring.

The 6-aryl triazolopyridines (25a) and (25b) have been shown to be potent inhibitors of PI3Kc with good invivo PK profile and have demonstrated efficacy in a chronic model of inflammation.
Jun-ichi Kuroyanagi et al [37] synthesized triazolopyridines derivatives (26) which are potent antifungal agents. The substituent at the 2-position of compound (52) strongly affected their antifungal activities. Among 2-substituted analogs of (26), 2-tert-butyl derivative was proved to exhibit the most potent inhibitory activity against Candida species. The methyl and n-butyl derivatives showed weak antifungal activity against C. glabrata. No activity was observed for 2-phenyl derivative.

Considering the above very interesting pharmacological properties of triazoles and as a part of our studies on the design of new routes for the synthesis of novel heterocyclic ring systems containing the 1,2,4-triazole skeleton, in this chapter we designed and synthesized some novel functionalized 1,2,4-triazolo[1,5-a]pyridines.
3.2. Present work

In this chapter we are describing the synthesis of [1,2,4]triazolo[1,5-a]pyridine derivatives \((31)\) by the reaction of amino pyridines with dimethyl formamide dimethyl acetal and hydroxyl amine hydrochloride followed by cyclization using trifluoroacetic anhydride and Suzuki coupling.

The synthetic strategy involves the following steps:

1) Synthesis of \(N-(5\text{-bromopyridine-2-yl})-N\text{-hydroxyimidoformamide (28)}\)
2) Synthesis of 6-bromo[1,2,4]triazolo[1,5-a]pyridine (29)
3) Suzuki coupling reaction of 6-bromo[1,2,4]triazolo[1,5-a]pyridine with different boronic acids (30)

Schematic representation for the synthesis triazole derivatives is given in the following scheme-3.
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3-[1,2,4]triazolo[1,5-a]pyridine derivatives

Scheme-3

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3.2.1. Synthesis of 2-N-(5-bromopyrid-2-yl)formamidoxime (28)

\[
\begin{align*}
\text{Br} & \quad \text{DMF/DMA} \\
\text{N} & \quad \text{NH}_2 \text{OH} \text{ HCl} \\
\text{28} & \quad \text{Br} \\
\end{align*}
\]

The mixture of 2-amino,5-bromopyridine (0.01 mol) and dimethylformamide dimethyl acetal (0.02 mol) in isopropanol was refluxed at 80°C for 5 hr. The reaction mixture was cooled to 50°C and hydroxyl amine hydrochloride was added. The reaction was stirred for 12 h at 45-50°C. After completion of the reaction (checked by TLC) the reaction mass was cooled to 25-30°C and diluted with water. The aqueous layer was extracted with ethyl acetate and evaporated the solvent under vacuum to get the product. White solid, Yield-85%, m.p; 177-178°C. Further, the compound was confirmed from spectral data. The \textsuperscript{1}H NMR (DMSO-\textsuperscript{d6}, \delta ppm): 10.18 (s, 1 H), 9.53 (d, J = 10, 1H), 8.21 (d, J = 2.40, 1H), 7.81-7.74 (m, 2 H), 7.03 (dd, J = 8.8, 0.8, 1 H). \textsuperscript{13}C NMR (DMSO-\textsuperscript{d6}, \delta ppm): 151.9, 148.1, 140.8, 135.6, 112.7, 110.7; MS (LCMS): m/z = 216 [M + 1],

3.2.2. Synthesis of 6-bromo[1,2,4]triazolo[1,5-a]pyridine (31)

\[
\begin{align*}
\text{Br} & \quad \text{TFAA} \\
\text{28} & \quad \text{Br} \quad \text{N} \quad \text{N-OH} \\
\text{31} & \quad \text{N} \\
\end{align*}
\]

The solution of N-(5-bromopyrid-2-yl) formamidoxime in THF was cooled to 20-25°C. To the reaction mixture, trifluoroacetic anhydride was added slowly so that the
the temperature of the reaction does not exceed above 40 °C. The reaction was aged for 30 min at 35-40 °C. The reaction mixture was quenched into cold water and extracted with methyl t-butyl ether. The organic layer washed with saturated aqueous NaHCO₃ solution, followed by water wash and dried over anhydrous sodium sulphate. The solvent was evaporated under vacuum to get off white solid.

White solid, Yield- 67%, m.p; 115-117 °C; ¹H NMR (DMSO-d₆, δ ppm) 9.37 (s, 1 H), 8.52 (s, 1 H), 7.84-7.78 (m, 2 H). ¹³C NMR (DMSO-d₆, δ, ppm) 154.5, 149.1, 133.8, 130.0, 117.3, 108.2: MS (LCMS): m/z = 198 [M]: Mol. Formula: C₆H₄BrN₃.

3.2.3. Synthesis of 6-(3, 4-dimethylphenyl) [1, 2, 4] triazolo[1, 5-a] pyridine (31c)

![Reaction Scheme]

The mixture of 6-bromo [1,2,4]triazolo[1,5-a]pyridine (29) 1.98 g (1mol) and 3,4-dimethylphenyl boronic acid (30c) (1.2mol), in 20 ml of 1,2-dimethoxyethane and water mixture (8:2 v/v) was stirred at 25-30 °C for 1hr. Then the reaction was heated at 90-95 °C for 12-14h. After completion of the reaction (checked by TLC), the reaction mixture was cooled to room temperature and the product was extracted using ethyl acetate. The organic layer was washed with water followed by brine solution. The solvent was evaporated using rotary evaporator to get the solid. The product (31c) was purified by column chromatography using ethyl acetate and hexane.
The structure of the 6-(3,4-dimethylphenyl)[1,2,4]triazolo[1,5-a]pyridine (31c) was characterized by $^1$HNMR, $^{13}$C NMR and mass spectral studies. The $^1$HNMR of the compound (31c) shows singlet at $\delta$ 9.26 corresponds to proton on pyridine ring, a singlet at 8.53 for the triazole ring proton and another singlet on the dimethylphenyl ring. The two singlets at 2.27 and 2.31 correspond to two methyl protons. The $^{13}$C NMR shows a signal at 154.6 corresponds to triazole ring carbon. The signals at 19.5 and 19.9 correspond to two methyl carbons. Further, the structure of the compound was confirmed by the LCMS which shows mass [M+] 224.

Off white solid, Yield- 70 \%, $^1$HNMR (400 MHz, DMSO-$d_6$, $\delta$ ppm): $\delta$ 9.26(s, 1H), 8.53(s,1H), 8.03-8.00(m, 4H, Ar-H), 7.62 (s,1H), 2.31-2.27(d, 6H(2CH$_3$)), $^{13}$C NMR (400 MHz, DMSO-$d_6$, $\delta$ ppm): 19.5(CH$_3$),19.9(CH$_3$), 116.4, 124.6, 126.1, 127.9, 128.4,130.3, 130.6, 133.3, 136.9, 137.5, 149.5,154.6; MS (LCMS), m/z = 224.2 [M+]: Mol. formula -C$_{14}$H$_{13}$N$_3$
$^{1}$HNMR spectrum of compound (31c)
$^{13}$CNMR spectrum of compound (31c)
Mass spectrum of compound (56c)
3.3. Experimental

3.3.1. Synthesis of 3-[[1,2,4]triazolo [1,5-a]pyridine-6-yl]benzaldehyde (31a-m).

General procedure:

The mixture of 6-bromo [1,2,4]triazolo[1,5-a]pyridine (29) 1.98 g (0.01 mol) and different substituted phenyl boronic acids (1.2eq), in a 20 mL of 1,2 dimethoxyethane and water mixture (8:2 v/v) was stirred at 25-30 °C. Then the reaction was heated at 90-95 °C for 12-14h. After completion of the reaction (checked by TLC), the reaction mixture was cooled to room temperature and the product was extracted using ethyl acetate. The organic layer was washed with water followed by brine solution. The solvent was evaporated using rotary evaporator to get the solid. The product was purified by column chromatography using ethyl acetate and hexane.

3-([1, 2, 4] Triazolo [1, 5-a] pyridin-6-yl) benzaldehyde (31a)
White solid, Yield- 55 %, m.p 166-168°C; \(^1\)HNMR (400MHz, DMSO-\(d_6\), ppm): 10.11 (s, 1H), 9.46 (s, 1H), 8.58 (s, 1H), 8.37 (s, 1H), 8.19-7.73; \(^13\)CNMR(400MHz, \(d_6\), δ ppm); 190.2, 154.5, 149.4, 136.3, 135.7, 134.6, 132.2, 131.0, 130.4, 129.4, 128.3, 127.2, 126.8, MS(LCMS) m/z: 224[M+1]: Mol.Formula;C\(_{13}\)H\(_9\)N\(_3\)O,

6-(4-tert-Butylphenyl)[1,2,4]triazolo[1,5-a]pyridine (31b)
Off white solid, Yield- 62 %, m.p 68-70°C; \(^1\)HNMR (400 MHz, DMSO-\(d_6\), δ ppm): 9.28 (s, 1H), 8.53 (s, 1H), 8.02-7.31(m, 6H, Ar-H), 1.44(m, 9H); \(^13\)C NMR (400 MHz, DMSO-\(d_6\), δ ppm): 154.7, 149.5, 143.0, 116.4, 126.28, 127.3, 127.8, 129.5, 130.4, 133.3, 34.7, 31.3; MS (LCMS) m/z: [M+]252.2,[M+2]253.2: Mol. Formula:C\(_{16}\)H\(_{17}\)N\(_3\).
6-(3,4-Dimethylphenyl) [1,2,4]triazolo[1,5-a]pyridine (31c)

Off white solid, Yield: 65%, m.p 136-139°C; \(^1\)HNMR (400 MHz, DMSO-\(d_6\), δ ppm): δ 8.9 (s, 1H), 8.53 (s, 1H), 8.03-8.00 (m, 4H, Ar-H), 7.62 (s, 1H), 2.31-2.27 (d, 6H-2CH\(_3\)); \(^{13}\)C NMR (400 MHz, DMSO-\(d_6\), δ ppm): 154.6, 149.5, 137.5, 136.9, 133.3, 130.6, 130.3, 128.4, 127.9, 126.1, 124.6, 116.4, 19.5, 19.9; MS (LCMS), m/z: 224.2; Mol formula: C\(_{14}\)H\(_{13}\)N\(_3\).

6-(3-Methoxyphenyl) [1,2,4]triazolo[1,5-a]pyridine (31d)

White solid, Yield: 59%, m.p 129-132°C; \(^1\)HNMR (400 MHz, DMSO-\(d_6\), δ ppm): 9.04-9.03 (s, 1H), 8.53 (s, 1H), 7.80-7.11 (m, 6H, Ar-H), 3.89 (s, 3H, OCH\(_3\)); \(^{13}\)C NMR (400 MHz, DMSO-\(d_6\), δ ppm): 156.3, 154.1, 149.5, 133, 131.8, 130.6, 128.4, 125.1, 125, 121.7, 115, 112, 56.13; MS (LCMS) m/z: 226.1 (M+1). Mol formula: C\(_{13}\)H\(_{11}\)N\(_3\)O.

6-(3-Chloro-4-fluorophenyl) [1,2,4]triazolo[1,5-a]pyridine (31e)

Off white solid, Yield: 60%, m.p 202-205°C; \(^1\)HNMR (400 MHz, DMSO-\(d_6\), δ ppm): δ 9.41 (s, 1H), 8.56 (s, 1H), 8.12-7.54 (m, 5H, Ar-H); \(^{13}\)C NMR (400 MHz, DMSO-\(d_6\), δ ppm): 158.9, 156.4, 154.8, 149.7, 130.3, 129.6, 128.3, 127.2, 125.6, 120.6, 117.8, 116.5; MS (LCMS) m/z: [M+2] 248.2/249.2. Mol formula: C\(_{12}\)H\(_7\)ClF\(_3\)N\(_3\).

6-(4-Nitrophenyl) [1,2,4]triazolo[1,5-a]pyridine (31f)

Yellowish solid, Yield: 57%, m.p 232-235°C; \(^1\)HNMR (400 MHz, DMSO-\(d_6\), δ ppm): δ 9.55 (s, 1H), 8.64 (s, 1H), 8.60-7.80 (m, 6H, Ar-H); \(^{13}\)C NMR (400 MHz, DMSO-\(d_6\), δ ppm):
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155.6, 149.2, 145.6, 133.2, 130.6, 129.6, 127.6, 125.4, 120.4, 118.1; MS (LCMS) m/z: 241 [M+1]

Mol. Formula: C_{12}H_{8}N_{4}O_{2}.

6-(3,4-Dichlorophenyl) [1, 2, 4] triazolo[1, 5-a]pyridine (31g)

White solid, Yield - 64 %; m.p.: 116-117°C; \(^1\)H NMR - (400 MHz, DMSO-\(d_6\), δ ppm): 9.45 (s, 1H), 8.57 (s, 1H), 8.16 (s, 1H), 8.09-7.76 (m, 4H, Ar-H), \(^1^3\)C NMR (400 MHz, DMSO-\(d_6\), δ ppm): 152.2, 150.6, 148.3, 130.1, 129.2, 128.9, 127.3, 127.2, 118.8, 116.6; MS (LCMS) m/z: [M+2] 266, [M+3] 267; Mol. Formula: C_{12}H_{7}Cl_{2}N_{3}.

\(N, N\)-Dimethyl-4-([1, 2, 4] triazolo[1, 5-a]pyridine-6-yl) aniline (31h)

Off white solid, Yield - 56 %; m.p.: 130-139°C; \(^1\)H NMR - (400 MHz, DMSO-\(d_6\), δ ppm): 9.67 (s, 1H), 8.49 (s, 1H), 8.00-6.82 (m, 6H, Ar-H), 2.96 (s, 6H, N-(CH_{3})_{2}), \(^1^3\)C NMR (400 MHz, DMSO-\(d_6\), δ ppm): 154.1, 150.9, 149.3, 130.1, 128.1, 127.2, 124.7, 123.5, 116.2, 113.1; MS (LCMS) m/z: [M+1] 239.2; Mol. Formula: C_{14}H_{14}N_{4}.

6-(4-Methoxyphenyl) [1, 2, 4] triazolo [1,5-a] pyridine (31i)

Off white solid, Yield - 67 %; m.p.: 94-96°C; \(^1\)H NMR - (400 MHz, DMSO-\(d_6\), δ ppm): 9.36 (s, 1H), 8.35 (s, 1H), 8.07-6.99 (m, 6H, Ar-H), 3.86 (s, 3H, OCH_{3}), \(^1^3\)C NMR (400 MHz, DMSO-\(d_6\), δ ppm): 160.3, 154.3, 149.1, 137.6, 130.8, 127.5, 126.7, 119.3, 116.1, 114.4, 112.2, 55.7; MS (LCMS) m/z: 226.1 [M+1], Mol. Formula: C_{13}H_{11}N_{3}O.

6-(2,5-Dimethylphenyl) [1, 2, 4] triazolo [1,5-a] pyridine (31j)

Off white solid, Yield - 65%; m.p.: 103-106°C; \(^1\)H NMR - (400 MHz, DMSO-\(d_6\), δ ppm): 8.94 (s, 1H), 8.53 (s, 1H), 7.89-7.13 (m, 5H, Ar-H ), 2.30 (s, 3H, CH_{3}), 2.23 (s, 3H, CH_{3}); \(^1^3\)C
3-[1,2,4]triazolo [1,5-a]pyridine derivatives

NMR (400 MHz, DMSO-d$_6$, δ ppm): 154.8, 149.7, 136.5, 135.4, 132.1, 130.2, 129.5, 125.3, 124.6, 121.4, 119.7, 115.2, 20.86 (CH$_3$), 19.94 (CH$_3$); MS (LCMS) m/z: [M]224.2; Mol. Formula: C$_{14}$H$_{13}$N$_3$.

6-(Pyridini-3-yl) [1, 2, 4] triazolo [1, 5-a]pyridine (31k)

White solid, Yield: 56%, m.p 144-147°C
^1H NMR (400 MHz, DMSO-d$_6$, δ ppm): δ 9.86 (s, 1H), 8.46 (s, 1H), 9.05-8.63 (m, 5H), 8.57 (s, 1H), ^13C NMR (400 MHz, DMSO-d$_6$, δ ppm): 155.6, 149.2, 145.6, 133.2, 130.6, 129.6, 127.6, 125.4, 120.4, 118.1; MS (LCMS) m/z: 197.1[M], 198.1[M+2], Mol. Formula: C$_{11}$H$_8$N$_4$.

6-(4-Ethynylphenyl) [1, 2, 4]triazolo [1, 5-a] pyridine (31l)

White solid, yield: 62%, m.p 140-142°C
^1H NMR (400 MHz, DMSO-d$_6$, δ ppm): 9.13 (s, 1H), 8.51 (s, 1H), 8.12-8.09 (m, 11H, Ar-H), ^13C NMR (400 MHz, DMSO-d$_6$, δ ppm): 154.7, 149.7, 137.1, 133.2, 130.6, 129.8, 129.2, 128.5, 127.4, 126.7, 125.5, 124.1; MS (LCMS): m/z 223.1[M], Mol. formula: C$_{14}$H$_{13}$N$_3$.

6-(1H-Indol-2-yl) [1, 2, 4] triazolo [1, 5-a]pyridine (31m)

Off white solid, yield: 66 %, m.p 150-153°C
^1H NMR (400 MHz, DMSO-d$_6$, δ ppm): 9.2 (s, 1H), 8.57 (s, 1H), 7.28 (m, 6H, Ar-H), 6.93 (s, 1H), 6.29 (s, 1H), ^13C NMR (400 MHz, DMSO-d$_6$, δ ppm): 156.2, 148.8, 140.3, 138.8, 137.1, 133.14, 130.6, 129.8, 129.2, 128.5, 128.1, 126.7, 125.4, 124.2; MS (LCMS) m/z: [M+1] 335.2, [M+2] 336.2. Mol. Formula: C$_{14}$H$_{10}$N$_4$. 

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References


Chapter 3

3-[1,2,4]triazolo [1,5-a]pyridine derivatives


