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Novel Synthesis of (R)-Imidazolo[1,2c][1,2,3]triazolo[4,5e]pyrimidines

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Commercially available cyanoacetamide (**1**) was reacted with isopropylazide (**2**) in the presence of sodium ethoxide in ethanol at 80 °C for 36 h yielding 4-amino-3-isopropyl-3H-[1,2,3]triazolo-5-carboxamide (**3**) which on treatment with carbon disulphide and potassium hydroxide in ethanol-water under refluxing conditions at 80 °C for 48 h gave 3-isopropyl-5-mercapto-3H-[1,2,3] triazolo[4,5-d]pyrimidine-7-ol (**4**). The latter on treatment with methyl iodide in aqueous sodium hydroxide at 0 °C for 2 h resulted in 3-isopropyl-5-methanesulfanyl-3H-[1,2,3]triazolo[4,5-d]pyrimidine-7-ol (**5**). This was reacted with *meta*-chloroperbenzoic acid (*m*-CPBA) in dichloromethane at 0 °C for 6 h yielding 3-isopropyl-5-methanesulfonyl-3H-[1,2,3]triazolo[4,5-d]pyrimidine-7-ol (**6**). Compound **6** was reacted with $SOCl_2$ in the presence of triethylamine at 75 °C for 6 h to obtain 7-chloro-3-isopropyl-5-methanesulfonyl-3H-[1,2,3] triazolo[4,5-d]pyrimidine (**7**) which on condensation with D-prolinol (**8**) in ethanol at room temperature for 2 h resulted in (R)-[1-(5-methanesulfonyl-3-isopropyl-3H-[1,2,3]triazolo[4,5-d]pyrimidine-7-yl) pyrrolidine-2-yl-methanol (**9**). Compound **9** on treatment with anilines (**10a-10g**) in microwave oven at 130 °C just for 60 s gave (R)-[1-(5-arylamino-3-isopropyl-3H-[1,2,3]triazolo[4,5-d]pyrimidine-7-yl)pyrrolidine-2yl-methanol (**11a-g**). The latter, on treatment with polyphosphoric acid at 125 °C for 0.5 h, afforded a series of novel, chiral (R)-N-(3-isopropyl-7a,8,9,10[1'2':3,4]imidazolo [1,2c] [1,2,3]triazolo-[4,5-e]-pyrimidine-5-(7H)ylidine) aniline derivatives (**12a-g**).

Keywords: Cyanoacetamide, Isopropylazide, *meta*-Chloroperbenzoic acid, D-Prolinol, Triazole, Triazolopyrimidine.

INTRODUCTION

Heterocyclic compounds are broadly distributed in nature, in the form of amino acids, triazoles, pyrimidines and purines. Simple substituted triazoles have biological activities such as antifungal[3,4], antiinflammatory andanalgesic[4], antiviral[5], antimalarial[6], *etc*. Triazoles are also widely used in industrial applications such as dyes, photostabillizers, photographic materials and agrochemicals[7]. Likewise, pyrimidine derivatives also exhibit biological activities such as anticancer[8], antibacterial[9], antiviral[10], antifungal[8], antiinflammatory[11], *etc*.

Among the fused heterocyclics, triazolo-pyrimidines represent a pharmaceutically important class of compounds because of their different biological activities, such as antiviral[12], antifungal[13], anticancer[14], antitumer[13,15,16], antituberculosis[17], anti-HIV[18,19], cytotoxicity[20]. In addition, they have been found to be present in DNA-interactive agents.

Herein we wish to report the synthesis of some fused triazolopyrimidine derivatives having one chiral center which may potentially be biologically active and also as new chemical entities.

EXPERIMENTAL

Unless stated otherwise, reactions were performed under nitrogen atmosphere. Reactions were monitored by thin layer chromatography (TLC) on silica gel plates (60 F254), visualizing with ultraviolet light or iodine spray. Flash chromatography was performed on silica gel, 100-200 and 230-400 mesh using hexane, ethyl acetate, dichloromethane. ^{1}H NMR and ^{13}C NMR spectra were determined in $CDCl_3$ and DMSO-d_6 solution by using Bruker AC-300 & 400 MHz spectrometers. Proton chemical shifts (δ) are relative to tetramethylsilane (TMS, δ = 0.00) as internal standard and expressed in ppm. Coupling constant (j) are given in Hertz. Infrared spectra were recorded on a Perkin-Elmer 1720 FT-IR spectrometer as KBr Pellets. Melting points were determined in a polmon melting point apparatus and are uncorrected. Mass spectra were recorded on Agilent 6120 LCMS instrument giving M^+ values either on $M^+ + 1$ or $M^+ - 1$ modes.

Preparation of 4-amino-3-isopropyl-3H-[1,2,3]triazolo-5-carboxamide (3): Cyanoacetamide (96 g, 0.96 mol) and isopropylazide (163.2 g, 1.92 mol) were added to a solution of sodium ethoxide (195.84 g, 2.88 mol) in absolute ethanol (2L). The mixture was stirred for 1 h at room temperature. The temperature was slowly raised to reflux and maintained in that condition for 36 h, while the reaction was monitored by TLC. Ethanol was then distilled out under reduced pressure and the residue was cooled to room temperature. Water (100

mL) was added to the residue and the mixture cooled to 10 °C. The pH was adjusted to 7- 7.5 using 6 N HCl and filtered. The separated solid was washed with cold water (50 mL) and dried. Yield: 110.32 g, (68 %); m.p.: 211-216 °C; (lit[1]. m.p.: 209-215 °C).

Preparation of 3-isopropyl-5-mercapto-3H[1,2,3]triazolo-[4,5-d]pyrimidine-7-ol (4): To a solution of potassium hydroxide (27 g, 0.483 mol) in ethanol (260 mL), carbon disulphide (36.77 g, 0.483 mol) was added in one portion and the mixture stirred for 0.5 h. A solution of compound **3** (50 g, 0.322 mol) in ethanol (500 mL) and water (50 mL) mixture was added to the above reaction mixture at room temperature. The temperature was slowly raised to reflux and stirred for 48 h in this condition, while the reaction was monitored by TLC. The reaction mixture was cooled to room temperature and diluted with water (1 L). The mixture was cooled to 0 °C and the pH adjusted to 2 to 2.5 using concentrated HCl. After stirring for 1 h, the separated solid was filtered, washed with cold ethanol (100 mL) and dried to get an off-white solid. Yield: 41 g, (64 %); m.p.: 254-256 °C; ^{1}H NMR (400 MHz, DMSO-d_6) δ: 13.5 (1H, bs), 12.5 (1H, S), 5 (1H, septet), 1.5 (6H, d, 2 × CH_3); LC-MS: *m/z* = 212 [M^+ + 1].

Preparation of 3-isopropyl-5-methanesulfanyl-3H-[1,2,3]triazolo[4,5-d]pyrimidine-7-ol (5): To a solution of sodium hydroxide (9.84 g, 0.246 mol) in water (600 mL), compound **4** (40 g, 0.189 mol) was added portion-wise at room temperature and stirred for 0.5 h. Then, the reaction mixture was cooled to 0 °C, dimethyl sulphate (26.19 g, 0.207 mol) was added drop-wise over a period of 2 h. After completion of addition, the reaction mixture was slowly allowed to rise to room temperature and stirred for 5 h, while the reaction was monitored by TLC. Once again, the reaction mixture was cooled to 0 °C and adjusted the pH to 2-2.5 using with 6 N HCl. The separated solid was filtered, washed with cold water (100 mL) and dried. The resulting solid was recrystallized from ethanol, to get pure compound **5**. Yield: 35.65 g, (83.58 %); m.p.: 242-245 °C; ^{1}H NMR (400 MHz, DMSO-d_6) δ: 12.9 (1H, bs), 5 (1H, septet), 2.6 (3H, -CH_3), 1.5 (6H, d, 2 × CH_3); LC-MS: *m/z* = 226 [M^+ + 1].

Preparation of 3-isopropyl-5-methanesulfonyl-3H-[1,2,3]triazolo[4,5-d]pyrimidine-7-ol (6): A solution of compound **5** (30 g, 133 mmol) in dichloromethane (1 L) was cooled to 10 °C and *m*-chloroperbenzoic acid (41.27 g, 239 mmol) was added portion-wise at 10 °C. Afterwards, the reaction mixture was stirred at room temperature for 2 h while the reaction was monitored by TLC. Dichloromethane was then distilled out under reduced pressure and the crude residue was stirred with cold methanol (50 mL). The separated solid was filtered and washed with cold methanol (30 mL). The resulting solid was dried. Yield: 28.5 g, (83.18 %); m.p.: 209-212 °C; ^{1}H NMR (400 MHz, DMSO-d_6) δ: 12.9 (1H, bs), 4.9 (1H, septet), 3.1 (3H, -CH_3), 1.5 (6H, d, 2 × CH_3); LC-MS: *m/z* = 258 [M^+ + 1].

Preparation of 7-chloro-3-isopropyl-5-methanesulfonyl-3H-[1,2,3]triazolo[4,5-d]pyrimidine (7): A mixture of 6 (25 g, 97 mmol) and thionyl chloride (200 mL) was cooled to 5 °C and triethyl amine (11.78 g, 116 mmol) was added drop-wise to this mixture. Afterwards the temperature was slowly raised to reflux and stirred at this temperature for 6 h, while the reaction was monitored by TLC. Thionyl chloride was then distilled out under reduced pressure, the residue cooled to room temperature and poured into crushed ice (125 g). The mixture was stirred at room temperature for 2 h. The separated solid was filtered, washed with water (100 mL) and dried. Yield: 20.7 g, (77.38 %); m.p.: 168-173 °C; ^{1}H NMR (400 MHz, DMSO-d_6) δ: 4.7 (1H, septet), 3.3 (3H, s, SO_2-CH_3), 1.5 (6H, d, 2 × CH_3); LC-MS: *m/z* = 276 [M^+ + 1].

Preparation of (R)-[1-(5-methanesulfonyl-3-isopropyl-3H-[1,2,3]triazolo[4,5-d]pyramidine-7-yl)pyrrolidine -2-yl-methanol (9): To a solution of compound **7** (20 g, 72 mmol) in ethanol (150 mL) was added a solution of D-prolinol (**8**) (14.69 g,145 mmol) in ethanol (50 mL) in a drop-wise fashion at room temperature over a period of 0.5 h. The mixture was then stirred for 2 h at room temperature, while the reaction was monitored by TLC. The mixture was then distilled to remove ethanol from the reaction mixture. The resulting crude residue was dissolved in dichloromethane (300 mL). The organic layer was washed with water (2 × 100 mL) followed by 2N HCl (100 mL). The organic layer was then dried over anhydrous Na_2SO_4, filtered and the filtrate concentrated under reduced presser to obtain a crude solid that was recrystallized from MTBE to obtain a pale brown colored solid. Yield: 23.5 g, (95.14 %); m.p.: 86-88 °C; ^{1}H NMR (400 MHz, DMSO-d_6) δ: 5-4.85 (2H, m), 4.1(1H, m), 3.67-3.61(3H, m), 3.4 (3H, s), 2-61.98 (3H, m), 1.58-1.56 (6H, d); LC-MS: *m/z* = 341 [M^+ + 1]; optical rotation $[\alpha]^{25}_D$ (+) 103.98 (C= 0.25 % w/v in methanol).

Preparation of (R)-(1-(3-isopropyl-5-(arylamino)-3H-[1,2,3]triazolo-[4,5-d]pyrimidine-7-yl)pyrrolidine-2-yl)-methanol (11a-g): A mixture of compound **9** (2.93 mmol) and appropriate aniline **10a-g** (5.86 mmol) was heated to 130 °C in a microwave oven just for 60 s, while the reaction was monitored by TLC. After this, the reaction mixture was cooled to room temperature and diluted with ethyl acetate, washed with 3 N HCl followed by water. Then, the organic layer was dried over anhydrous Na_2SO_4, filtered and the filtrate was concentrated under reduced pressure to obtain a crude residue. This was stirred with hexane and filtered, to obtain compound **11**.

Compound 11a: Light brown solid; Yield: 0.77 g, (75 %); m.p.: 139-142 °C; ^{1}H NMR (400 MHz, DMSO-d_6) δ: 7.81-7.79 (2H, d), 7.34-7.28 (2H, m), 6.99-6.96 (1H, m), 4.98-4.97 (2H, dd), 4.14 (1H, m), 3.83-3.58 (3H, m), 2.19-2.01 (4H, m), 1.6 (6H, d); ^{13}C NMR (100 MHz: $CDCl_3$) δ: 156.9, 150.6, 140.6, 129.1, 121.8, 121.4, 118.6, 115.9, 67.1, 65.1, 61.8, 60.9, 50.9, 47.8, 28.8, 28.2, 24.5, 21.9, 21.6; LC-MS *m/z*: 353 [M^+ + 1].

Compound 11b: Ash solid; Yield: 0.87 g (80 %); m.p.: 122-127 °C; IR (KBr, ν_{max}, cm^{-1}): 3400 (-OH, str), 3300 (N-H, str), 1596 (N=N, str), 1324 (C-N, str); ^{1}H NMR (300 MHz, DMSO-d_6) δ: 8.95 (1H, s), 7.87-7.85 (1H, m), 7.44-7.41(1H, s), 7.22-7.19 (1H, t), 6.62 (1H, t), 4.99 (2H, m), 4.22 (1H, m), 3.80-3.2 (4H, m), 2.5-2 (5H, m), 1.9-1.6 (6H, d); ^{13}C NMR (100 MHz: $CDCl_3$) δ: 129.2, 114, 108.1, 106.1, 105.8, 66.05, 61.3, 60.5, 50.2, 27.7, 24, 21.3; LC-MS: *m/z*: 372 [M^+ + 1].

Compound 11c: Ash solid; Yield: 0.76 g, (96 %); m.p.: 142-146 °C; ^{1}H NMR (300 MHz, DMSO-d_6) δ: 9.4 (1H, bs), 7.7 (1H, d), 7.5 (1H, dd), 7.15 (1H, d), 6.75 (1H, d), 5 (1H,

m), 4.2 (1H, m), 3.5 (3H, m), 2.2 (3H, s), 2.1(5H, m), 1.6 (6H, d); its LC-MS: *m/z* = 368 [M$^+$ + 1].

Compound 11d: Off-white solid; Yield: 0.95 g, (74 %); m.p.: 136-140 °C; IR (KBr, ν_{max}, cm^{-1}): 3400 (-OH, str), 2999 (N-H, str), 1598 (N=N, str), 1325 (C-N, str); ^{1}H NMR (300 MHz, DMSO-d_6) δ: 8.6 (1H, dd), 8.4 (1H, s), 7.8-7.7 (1H, dd), 7.5 (1H, d), 7.4 (1H, m), 5 (1H, m), 4.8 (1H, s), 4.2 (2H, m), 3.7-3.8 (3H, m), 2.1-2.4 (4H, m), 1.6 (6H, d); ^{13}C NMR (100 MHz: $CDCl_3$) δ: 156.9, 150.6, 140.6, 129.1, 121.8, 121.4, 118.6, 115.9, 67.1, 65.1, 61.8, 60.9, 50.9, 47.8, 28.8, 28.2, 24.5, 21.9, 21.6; LC-MS: *m/z* = 422 [M$^+$ + 1].

Compound 11e: Pale yellow solid; Yield: 0.81 g, (70 %); m.p.: 139-145 °C; IR (KBr, ν_{max}, cm^{-1}): 3392 (-OH, str), 3310 (N-H str), 1601(N=N, str), 1335 (C-N, str); ^{1}H NMR (300 MHz, DMSO-d_6) δ: 9.6 (1H, bs), 9.1 (1H, dd), 7.9 (1H, dd), 7.7 (1H, m), 7.4 (1H, m), 5.1(2H, m), 4.2 (1H, m), 3.7-3.8 (4H, m), 2.0-2.2 (4H, m), 1.6 (6H, d); LC-MS: *m/z* = 399 [M$^+$ + 1].

Compound 11f: Ash solid; Yield: 0.84 g, (78 %); m.p.: 161-165 °C; ^{1}H NMR (300 MHz, DMSO-d_6) δ: 9.4 (1H, bs), 7.6 (1H, m), 7.2 (2H, m), 7.05 (1H, d), 6.75 (1H, d), 5 (1H, m), 4.2 (1H, m), 3.5 (3H, m), 2.2 (3H, s), 2.1 (5H, m), 1.6 (6H, d); LC-MS: *m/z* = 368 [M$^+$ + 1].

Compound 11g: Off-white solid; Yield: 0.97 g, (76 %); m.p.: 164-169 °C; ^{1}H NMR (300 MHz, DMSO-d_6) δ: 8.8 (1H, bS), 7.8 (2H, dd), 7.2 (2H, dd), 5.1 (2H, m), 4.2 (1H, m), 3.7- 3.8 (4H, m), 2-2.2 (4H, m), 1.6 (6H, d); Its LC-MS: *m/z* = 438 [M$^+$ + 1].

Preparation of (R)-N-(3-isopropyl-7a,8,9,10[1'2':3,4]-imidazolo[1,2c][1,2,3]triazolo[4,5e]pyrimidine-5(7H)-ylidine)aniline hydrochloride (12a-g): A suspension of compound **11** (1.41 mmol), in polyphosphoric acid (5 volumes) was heated to 125 °C with stirring for 1.5 h, while the reaction was monitored by TLC. Then, the reaction mixture was cooled to room temperature and poured into crushed ice (15 volumes). The mixture was extracted with chloroform and the organic layer washed with water, saturated solution of $NaHCO_3$ followed by brine. Then the organic layer was dried over anhydrous Na_2SO_4 and concentrated under reduced pressure to obtain a crude residue. The crude solid was recrystallized from MTBE, to obtain pure compound **12**.

Compound 12a: Ash solid; Yield: 340 mg, (72 %); m.p.: 131-133 °C; ^{1}H NMR (300 MHz, DMSO-d_6) δ: 7.74-7.72 (2H, d), 7.42-7.40 (2H, m), 7.39-7.23 (1H, m), 5 (2H, m), 4.85 (1H, m), 4.5 (1H, m), 4.2 (1H, m), 4.05 (1H, m), 2.48 (3H, m), 2 (1H, m), 1.6 (6H, d); LC-MS: *m/z* = 336 [M$^+$ + 1].

Compound 12b: Off-white solid; Yield: 361 mg, (76 %); m.p.: 158-161 °C; IR (KBr, ν_{max}, cm^{-1}): 1702 (C=N, str), 1545, 1057; ^{1}H NMR (300 MHz, DMSO-d_6) δ: 7.3-6.9 (3H, m), 7 (1H, m), 4.97-4.95 (1H, septet), 4.85 (2H, m), 4.5 (1H, m), 4.1 (1H, m), 3.95 (1H, m), 2.21 (3H, m), 1.95 (1H, m), 1.56 (6H, d); ^{13}C (100 MHz, $CDCl_3$) δ: 150.8, 148.6, 138.4, 129.4, 118.9, 118.2, 111.8, 111.6, 110.4, 110.1, 64.2, 54.2, 51.3, 41.2, 30.5, 25.7, 21.5; LC-MS: *m/z* = 354 [M$^+$ + 1].

Compound 12c: Pale brown solid; Yield: 356 mg, (74 %; m.p.: 141-144 °C; ^{1}H NMR (300 MHz, DMSO-d_6) δ: 7.5 (2H, m), 7.2 (1H, dd), 7.0 (1H, dd), 5 (1H, septet), 4.9-4.6 (2H, m), 4.2 (2H, m), 4 (1H, m), 2.4 (6H, m), 1.95 (1H, m), 1.6 (6H, d); ^{13}C (100 MHz, $CDCl_3$) δ: 151, 149, 138.1, 136.5, 128, 126, 124, 120, 118.1, 64.1, 54, 51.2, 47.3, 30.5, 25.7, 21.4, 21.3; LC-MS: *m/z* = 350 [M$^+$ + 1].

Compound 12d: Off-white solid; Yield: 335 mg, (70 %); m.p.: 148-151 °C; ^{1}H NMR (400 MHz, DMSO-d_6) δ: 8.2 (1H, m), 8 (1H, m), 7.47 (2H, m), 5 (1H, septet), 4.9-4.6 (2H, m), 4.2 (2H, m), 4 (1H, m), 2.3 (3H, m), 1.8 (1H, m), 1.6 (6H, d); ^{13}C (100 MHz: $CDCl_3$) δ: 151.8,150.6, 148. 5, 137.3, 129.2, 126.8, 121.6, 120.2, 118.6, 64.5, 51.8, 47.4, 47, 30.7, 21.3, 21.2; LC-MS: *m/z* = 404 [M$^+$ + 1].

Compound 12e: Pale yellow solid; Yield:353 mg, (74 %); m.p.: 185-188 °C; IR (KBr, ν_{max}, cm^{-1}): 1689 (C=N, str), 1529, 1012; ^{1}H NMR (400 MHz, DMSO-d_6) δ: 8.8 (1H, s), 8 (2H, m), 7.8 (1H, dd), 5 (1H, septet), 4.9-4.6 (2H, m), 4.2 (2H, m), 4 (1H, m), 2.2 (3H, m), 1.9 (1H, m), 1.6 (6H, d); LC-MS: *m/z* = 381 [M$^+$ + 1].

Compound 12f: Pale brown solid; Yield: 337 mg, (71 %); m.p.: 140-142 °C; ^{1}H NMR (300 MHz, DMSO-d_6) δ: 7.3-7.2 (4H, m), 4.9 (1H, septet), 4.7 (2H, m), 4.5 (1H, m), 4.1-3.9 (2H, m), 2.2 (3H, m), 1.9 (1H, m), 1.4(6H, d); LC-MS: *m/z* = 350 [M$^+$ + 1].

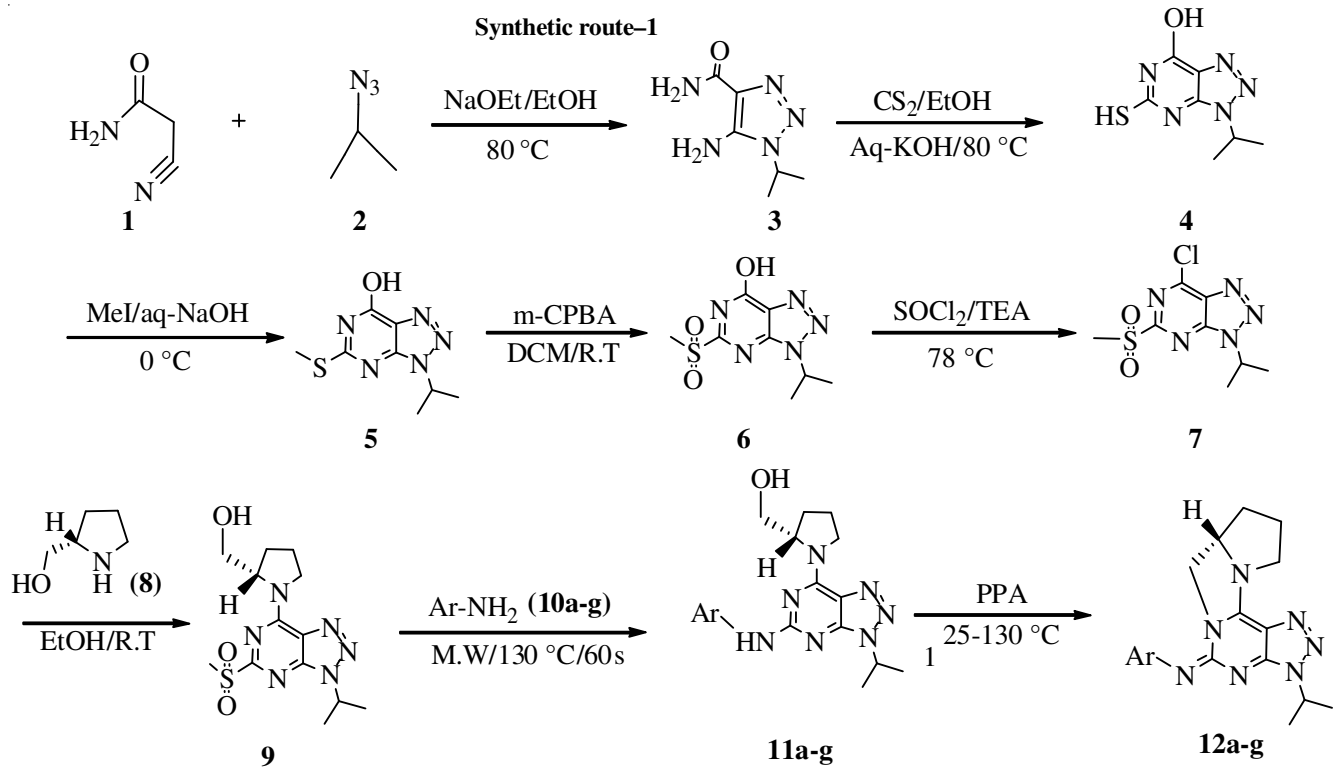
Compound 12g: Off-white solid; Yield: 383 mg, (80 %); m.p.: 153-155 °C; IR (KBr, ν_{max}, cm^{-1}): 1694 (C=N, str), 1587, 1013; ^{1}H NMR (300 MHz: DMSO-d_6) δ: 7.9 (2H, dd), 7.5 (2H, dd), 4.97 (2H, m), 4.8 (1H, m), 4.1 (1H, m) 3.9 (2H, m), 2.2 (3H, m), 1.9 (1H, m), 1.6 (6H, d); ^{13}C (100 MHz: $CDCl_3$) δ: 150.9, 148.8, 146.6, 135.3, 125.1, 120.9, 118.4, 64.3, 53.5, 51.3, 47.4, 30.6, 25.7, 21.5; LC-MS: *m/z* = 420 [M$^+$ + 1].

RESULTS AND DISCUSSION

The reaction sequences leading to the formation of title compounds is outlined in **Scheme-I**.

Cyanoacetamide (**1**) was reacted with isopropylazide (**2**) in the presence of sodium ethoxide in ethanol at 80 °C yielding a product, 4-amino-3-isopropyl-1H-[1,2,3]triazolo-5-carboxamide (**3**) which is known in literature[1]. Treatment of compound **3** with carbon disulfide in ethanol in the presence of aq-KOH at 80 °C gave a product 3-isopropyl-5-mercapto-3H-[1,2,3]-triazolo-[4,5-d]pyrimidine-7-ol (**4**) which is also known in literature[2]. Compound **4** was reacted with methyl iodide in the presence of aq-NaOH in water at 0 °C to obtain 3-isopropyl-5-methylsulfanyl-3H-[1,2,3]triazolo-[4,5-d] pyrimidine-7-ol (**5**) which is also known in literature[2]. Compound **5** was reacted with *m*-chloroperbenzoic acid (*m*-CPBA) in dichloromethane at room temperature yielding 3-isopropyl-5-methanesulfonyl-3H-[1,2,3]triazolo-[4,5-d]pyrimidine-7-ol (**6**). Compound **6** on treatment with $SOCl_2$ in the presence of triethyl amine at 78 °C gave 7-chloro-3-ispropyl-5-methanesulfonyl-3H-[1,2,3]triazolo-[4,5-d]pyrimidine (**7**).

Reaction of compound **7** with D-prolinol (**8**) in ethanol at room temperature, yielded (R)-[1-(5-methanesulfonyl-3-isopropyl-3H-[1,2,3]triazolo-[4,5-d]pyrimidine-7-yl)pyrrolidine -2-yl-methanol (**9**) which has been characterized on the basis of its spectral data. Thus, its ^{1}H NMR (DMSO-d_6/TMS) spectrum showed signals at δ 5.1 (septate, 1H, isopropyl-H), 5 (m, 2H, -CH_2-OH), 4.4 (bs, 1H, -OH, D_2O exchangeable), 4.1 (m, 1H), 3.9 (s, 3H, SO_2-CH_3) 3.7 (m, 3H, -CH_2-N-CH-), 2.2 (m, 4H, 2 × CH_2), 1.6 (d, 2 × CH_3). Its LC-mass showed the molecular ion peak (M$^+$ + 1) at *m/z*: 355 corresponding to a molecular mass of 354. Optical rotation value $[\alpha]_D^{25}$ was found to be (+) 103.98 (C= 0.25% w/v in methanol).



$ArNH_2$ = H_2N-C_6H_5 (a) ; H_2N-C_6H_4-F(3) (b); H_2N-C_6H_4-CH3 (3) (c);H_2N-C_6H_4-CF_3(3) (d); H_2N-C_6H_4-NO_2 (3) (e); H_2N-C_6H_4-CH_3 (2) (f); H_2N-C_6H_4-OCF_3(4) (g).

Scheme-I

Treatment of compound **9** with aniline (**10a**) as neat reactants at 130 °C in microwave oven just for 60 s gave (R)-(1-(3-isopropyl-5-(phenyl amino)-3H-[1,2,3]triazolo-[4,5-d]pyrimidine-7-ly)pyrrolidine-2yl)methanol (**11a**). Similarly compounds **9** with **10a-g** gave compound **11a-g**, which have been characterized on the basis of their IR, ^{1}H NMR, spectral data.

Further, treatment of compound **11a-g** with polyphosphoric acid at 130 °C resulted in the formation of (R)-N-(3-isopropyl-7a,8,9,10[1'2':3,4]imidazolo[1,2c][1,2,3]triazolo [4,5e]pyrimidine-5(7H)-ylidine)aniline (**12a-g**) which have been characterized on the basis of their spectral data.

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