Supporting Information

An $FeCl_3$-Catalyzed Three-Component Reaction for the Synthesis *β*-(1,2,3-Triazolyl) Ketones by Using DMF as One Carbon Source

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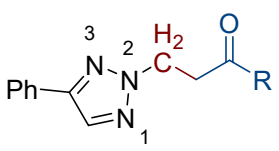
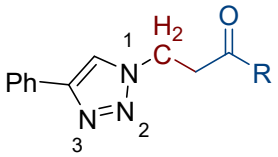
1. General information

All reactions are basically carried out under air atmosphere. Unless otherwise noted, all commercial reagents and solvents were obtained from the commercial provider and used without further purification. Column chromatography was generally performed on silica gel (300~400 mesh), and reactions were monitored by thin layer chromatography (TLC) using UV light to visualize the course of the reactions. The ^{1}H NMR (400 MHz) and ^{13}C NMR (100 MHz) data were recorded on 400 M spectrometers using $CDCl_3$ as solvent at room temperature. The chemical shifts (δ) are reported in ppm and coupling constants (J) in Hz. ^{1}H NMR spectra were recorded with $CDCl_3$ (δ = 7.26 ppm) as internal reference, and ^{13}C NMR spectra were recorded with $CDCl_3$ (δ = 77.00 ppm) as internal reference.

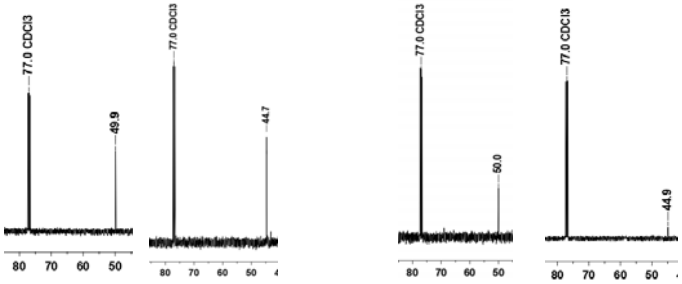
2. The confirmation of N^1 and N^2 isomers of 3 and 3'



N^2-isomer



N^1-isomer



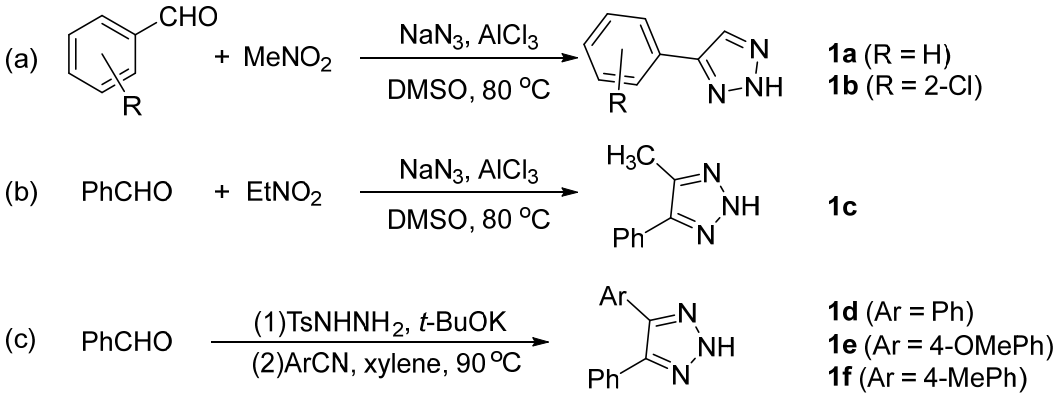
3a **3'a** **3b** **3'b**

In general, the N^2-substituted products exhibited less polar than other isomers. The ^{13}C NMR spectra of **3a** and **3'a** show significant differences between the CH_2 groups attached to the 1,2,3-triazole moiety of the N^1 (**3a**) and N^2 (**3'a**) isomers. Specifically, the CH_2 group in the N^2-isomer (**3a**) exhibited a chemical shift of 49.9 ppm, whereas the N^1-isomer's(**3'a**) CH_2 group had a chemical shift of 44.7 ppm, indicating that it was located at a higher field than the N^2-isomer. This result was also observed in other products, such as **3b** and **3'b**.

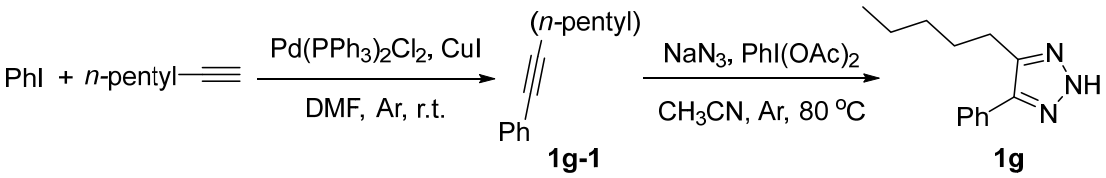
3. Experimental Details

3.1. Synthesis of *NH*-1,2,3-triazoles 1a~1g inTable 1.

The *NH*-1,2,3-triazoles **1a**~**1f** were known compounds and prepared by literature.[1] For **1a**, **1b**, and **1c**, prepared from corresponding aldehydes and nitromethane or Nitroethane;[1a] For componds **1d~1f**, prepared from the aldehydes and aromatic nitrile.[1b]



4-pentyl-5-phenyl-2H-1,2,3-triazole (1g) was prepared in two-step as shown blow:



4-pentyl-5-phenyl-2H-1,2,3-triazole (1g).

1g was prepared from the sonagashira product hept-1-yn-1-ylbenzene (**1g-1**) and NaN_3 under the oxidizing conditions, reported by Zhao's group, yields was not optimized.[2] White solid. **^{1}H NMR** (400 MHz, DMSO-d_6) δ 14.71 (s, 1H), 7.66 (d, J = 7.6 Hz, 2H), 7.49 – 7.30 (m, 3H), 2.81 (t, J = 7.8 Hz, 2H), 1.62 (p, J = 7.2 Hz, 2H), 1.35 – 1.13 (m, 4H), 0.91 – 0.69 (m, 3H). **MS (ASAP)** *m/z*: calcd for $C_{13}H_{17}N_3$ $[M+H]^+$: 216.15, found, 216.08.

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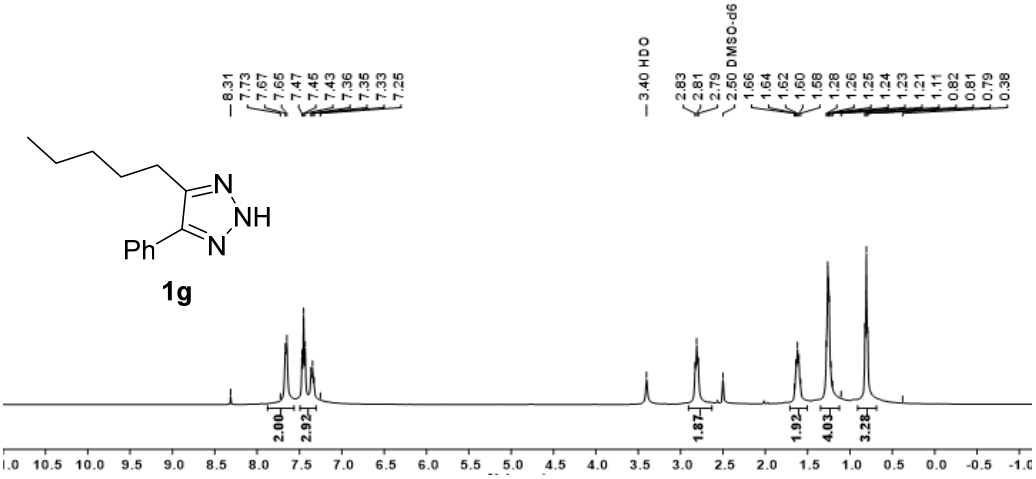
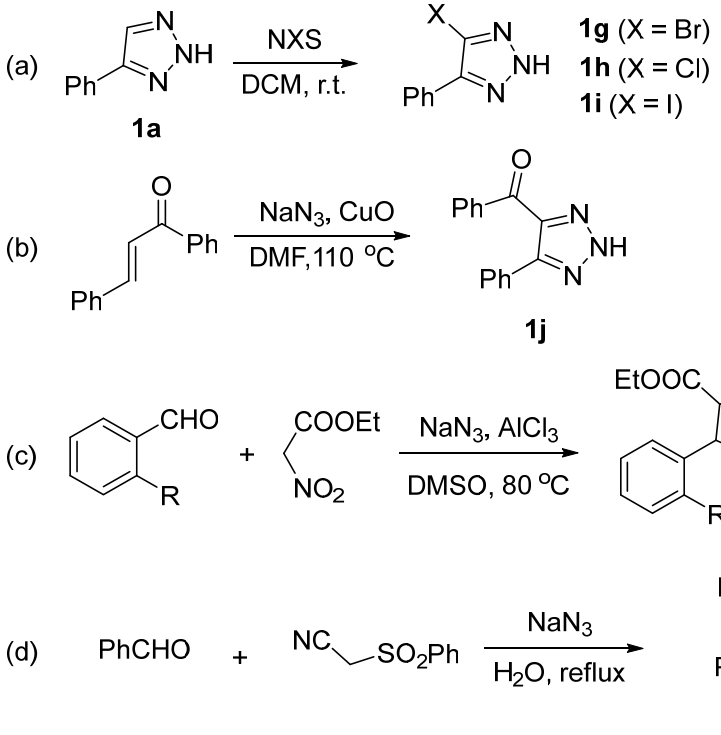
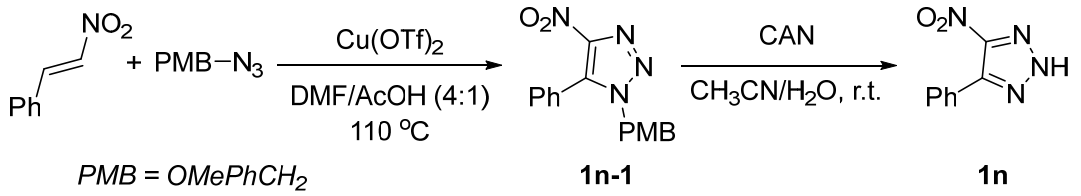


3.2. Synthesis of C-3 EWG substituted *NH*-1,2,3-triazoles inTable 2.

1g~**1m** were known compounds and prepared by literature.[1a, 3] For C-3 posotion halogen (Br, Cl, and I) substituted *NH*-1,2,3-triazoles **1g**~**1i**, prepared from **1a** and NXS (NBS, NCS, and NIS) in DCM.[3a, 3b] For C-3 posotion benzoyl compound **1j**, prepared from the chalcone and NaN_3.[3c] For ethyl ester **1k** and **1l**, prepared from aldehyde, ethyl nitroacetate and NaN_3.[1a] For C-3 posotion CN substituted *NH*-1,2,3-triazoles **1m**, prepared from aldehyde, 2-(phenylsulfonyl)acetonitrile and NaN_3.[3d]

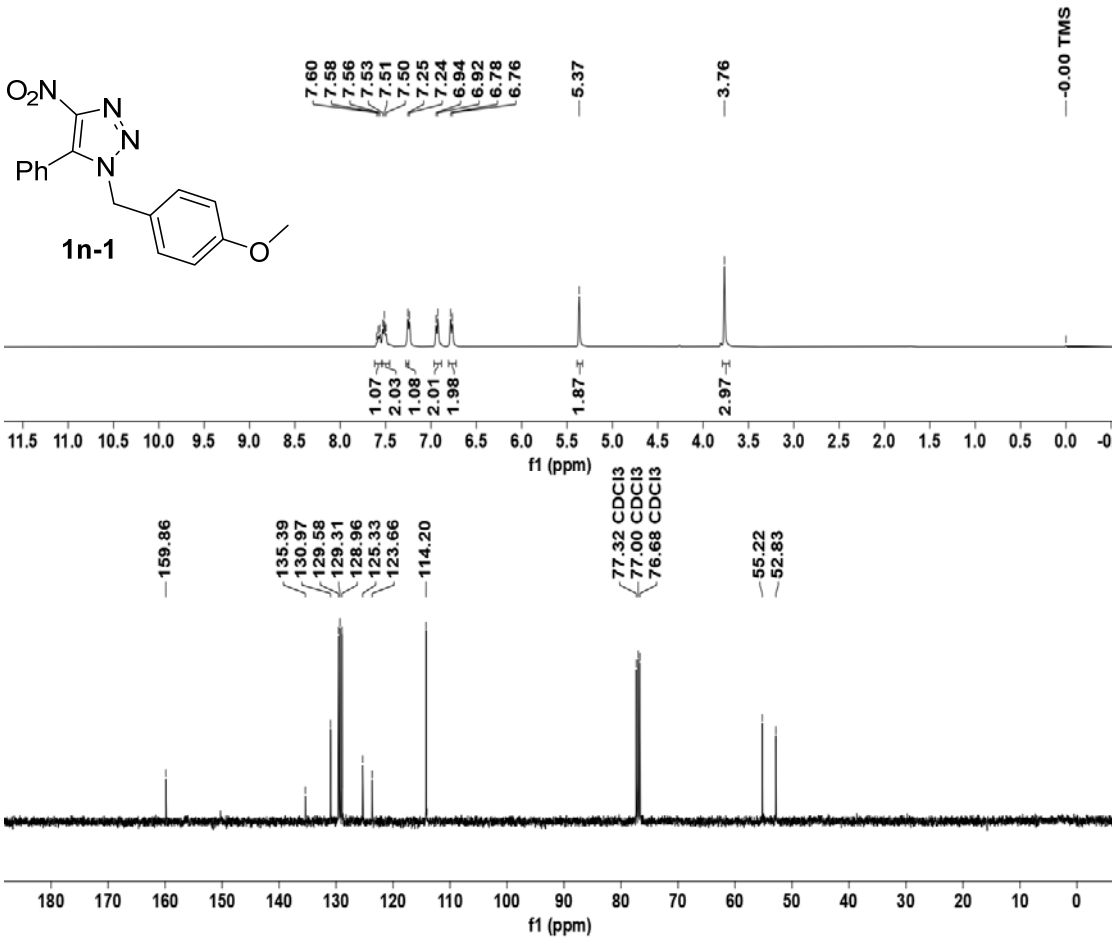


4-nitro-5-phenyl-2H-1,2,3-triazole (1n) was prepared in two-step as shown blow:



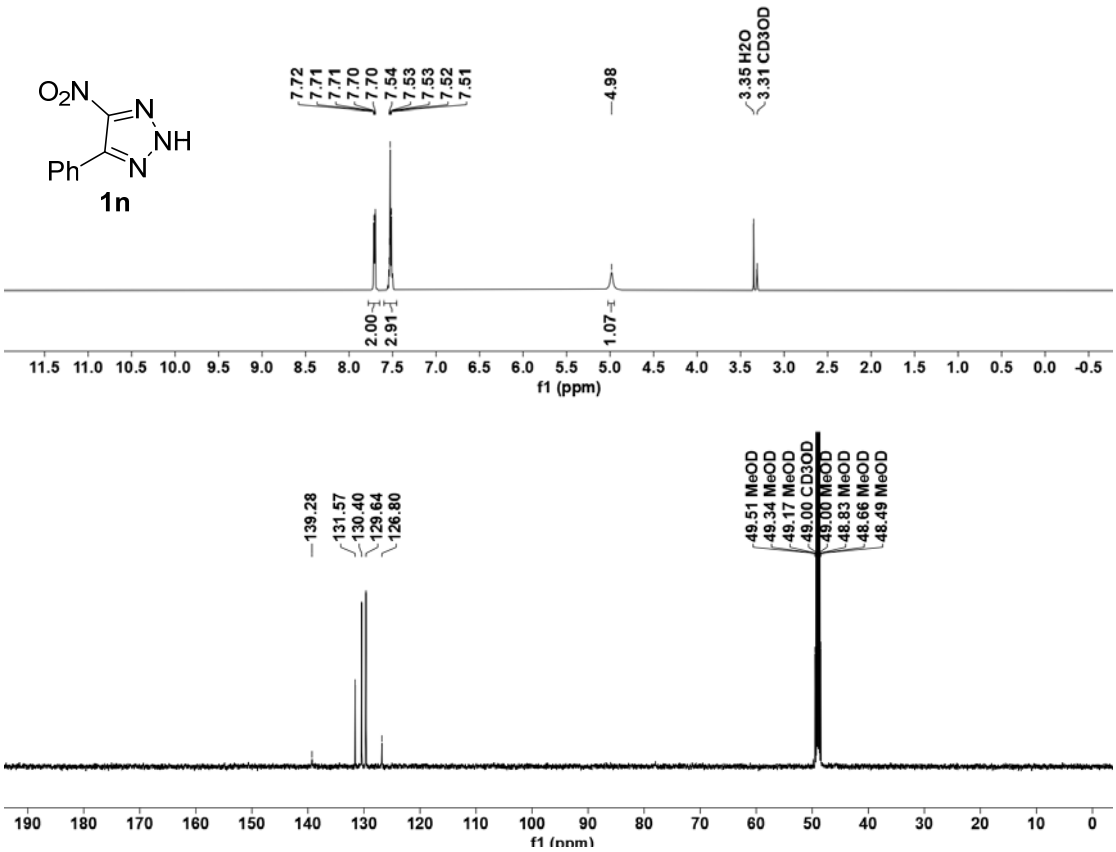
1-(4-methoxybenzyl)-4-nitro-5-phenyl-1H-1,2,3-triazole (1n-1).

The intermediate **1n-1** was prepared from copper-catalyzed [3+2] cycloaddition/oxidation reaction of nitro-olefins and organic azides as reported by Chen's group and yields was not optimized.[4] White solid. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.62 – 7.54 (m, 1H), 7.51 (t, J = 7.2 Hz, 2H), 7.25 (s, 1H), 6.93 (d, J = 7.8 Hz, 2H), 6.77 (d, J = 7.6 Hz, 2H), 5.37 (s, 2H), 3.76 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 159.86, 135.39, 130.97, 129.58, 129.31, 128.96, 125.33, 123.66, 114.20, 55.22, 52.83. **MS (ASAP)** *m/z*: calcd for $C_{16}H_{14}N_4O_3$ $[M+H]^+$: 311.11, found, 310.92.

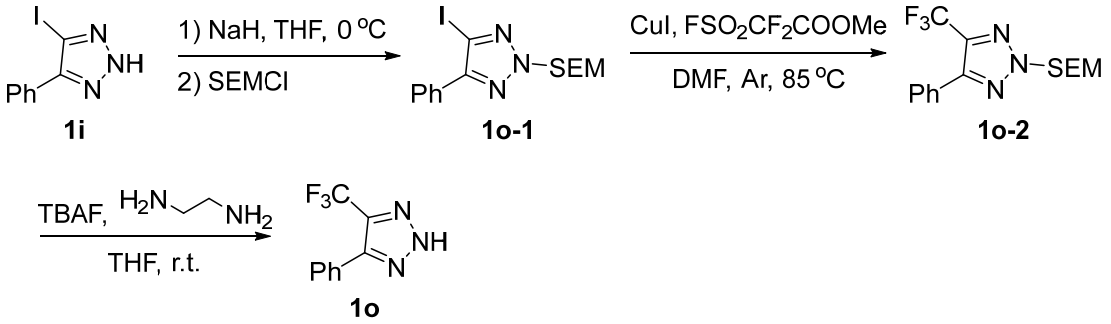


4-nitro-5-phenyl-2H-1,2,3-triazole (1n).

1n was prepared from deprotection of the N^1-PMB group of **1n-1**. Similar method was reported by Chen's group.[5] Yellow solid. **^{1}H NMR** (500 MHz, MeOD) δ 7.78 – 7.65 (m, 2H), 7.60 – 7.45 (m, 3H), 4.98 (s, 1H). **^{13}C NMR** (126 MHz, MeOD) δ 139.28, 131.6, 130.4, 129.6, 126.8. **MS (ASAP)** *m/z*: calcd for $C_8H_6N_4O_2$ $[M+H]^+$: 191.06, found, 191.03.

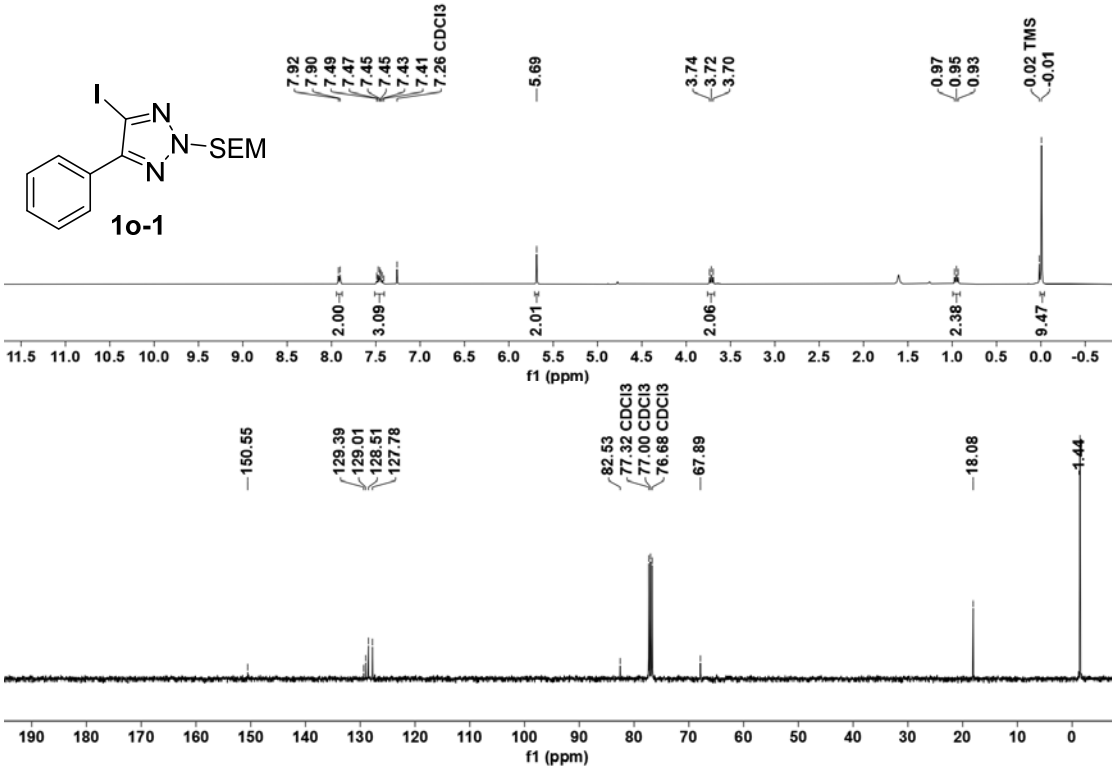


The 4-phenyl-5-(trifluoromethyl)-2H-1,2,3-triazole (1o) was prepared from 1i in three-step as shown blow:



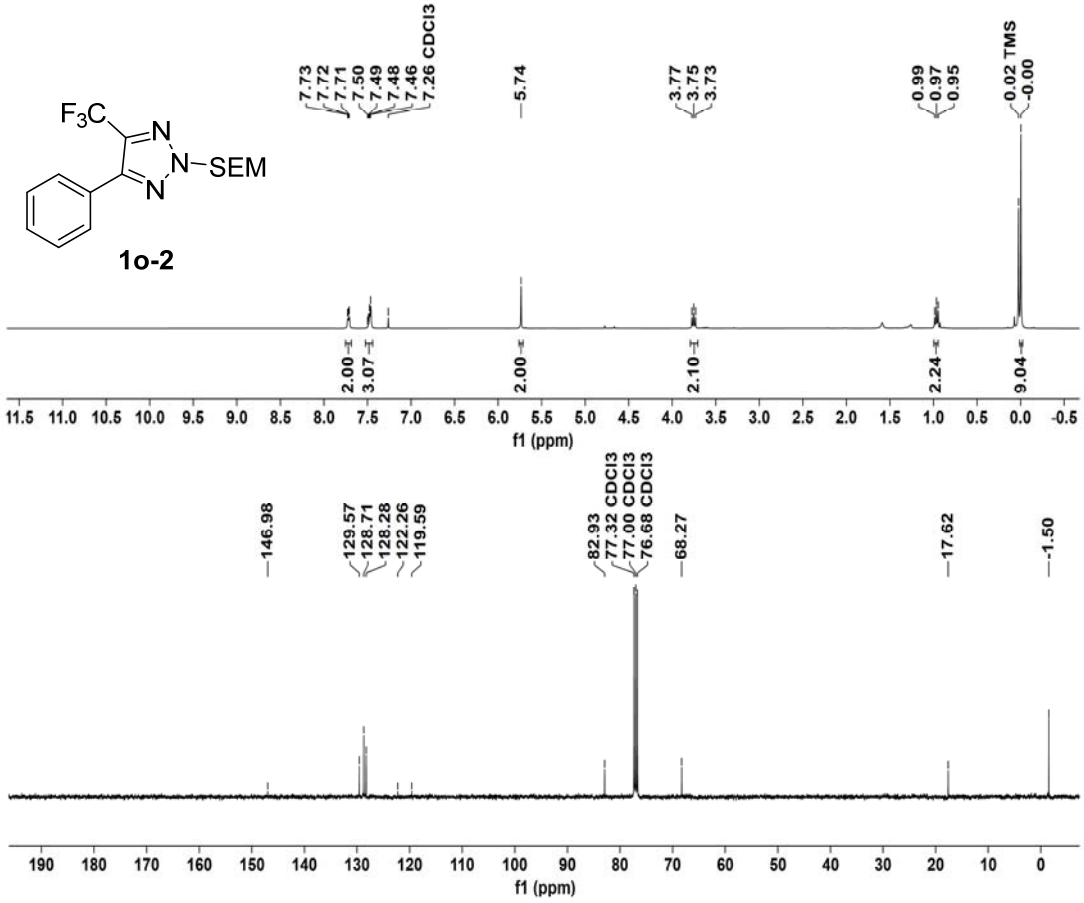
4-iodo-5-phenyl-2-((2-(trimethylsilyl)ethoxy)methyl)-2H-1,2,3-triazole (1o-1).

To a solution of 4-iodo-5-phenyl-2H-1,2,3-triazole **1i** (542 mg, 2.0 mmol) in THF (5 mL) was added NaH (60% w/w in mineral oil, 96 mg, 2.4 mmol) at 0 °C. The mixture was stirred for 1 h and then a solution of SEMCl (500 mg, 3.0 mmol) in THF (0.5 mL) was added dropwise. The mixture was stirred for 24 h at room temperature. After the reaction was completed, the reaction mixture was quenched with water and extracted with EA. The organic phase was washed with brine, dried over anhydrous Na_2SO_4, and concentrated to give a crude product. The residue was purified by flash chromatography on silica gel (EA/hexane = 1/20) to afford the desired product as colourless oil (45%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.91 (d, J = 7.4 Hz, 2H), 7.51 – 7.41 (m, 3H), 5.69 (s, 2H), 3.72 (t, J = 8.0 Hz, 2H), 0.95 (t, J = 8.0 Hz, 2H), -0.01 (s, 9H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 150.55, 129.39, 129.01, 128.51, 127.78, 82.53, 67.89, 18.08, -1.44. **MS (ASAP)** *m/z*: calcd for $C_{14}H_{20}IN_3OSi$ $[M+H]^+$: 402.05, found, 402.05.



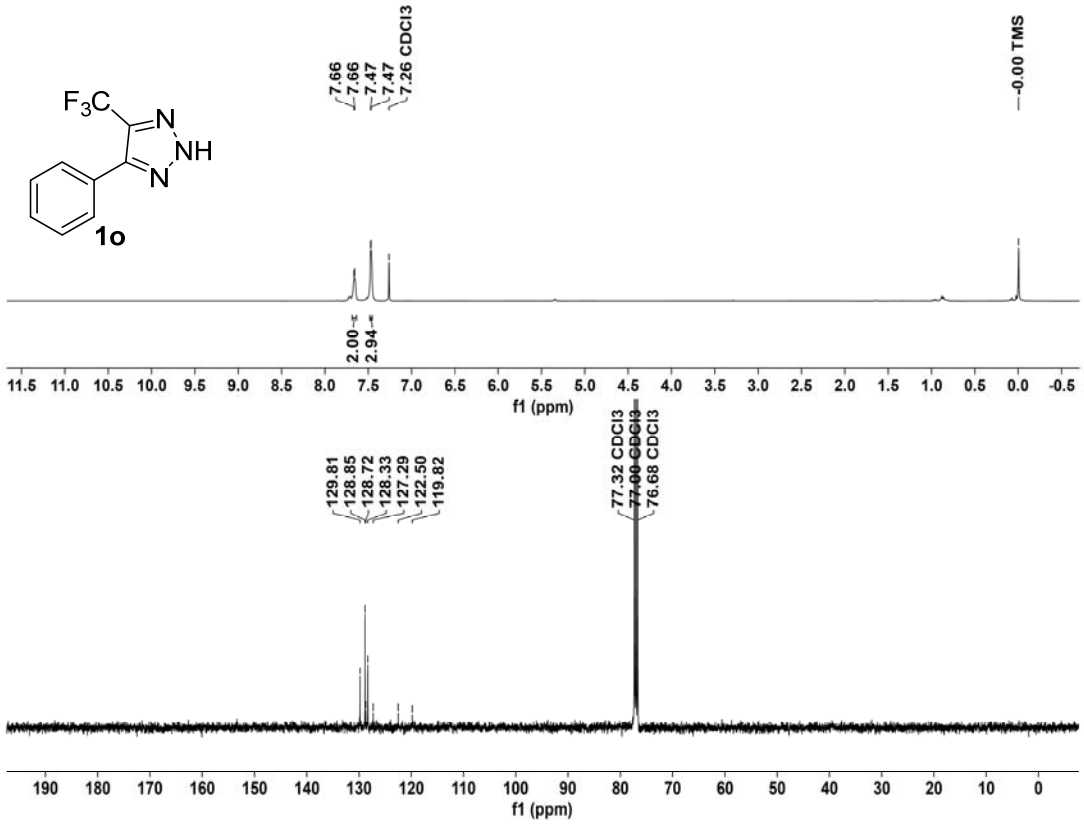
4-phenyl-5-(trifluoromethyl)-2-((2-(trimethylsilyl)ethoxy)methyl)-2H-1,2,3-triazole (1o-2).

To a solution of **1o-1** (1.0 mmol) and CuI (1.0 mmol) in DMF (4.0 mL) was added FSO_2CF_2COOMe (1.5 mmol) under N_2 atmosphere. The mixture was stirred at 80 °C for 2 h. After stirring at 80 °C for 2 h, the reaction mixture was quenched with water and extracted with EA (3 × 2.5 mL). The organic phase was washed with brine, dried, and concentrated. The residue was purified by silica gel column chromatography eluted with EA/hexane (v/v = 1/5) to afford **1o-2** as a yellow oil (75%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.75 – 7.69 (m, 2H), 7.52 – 7.44 (m, 3H), 5.74 (s, 2H), 3.75 (t, J = 8.0 Hz, 2H), 0.96 (t, J = 8.2 Hz, 2H), 0.00 (s, 9H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 146.98, 129.57, 128.71, 128.28, 120.92 (d. J = 267.0 Hz), 82.93, 68.27, 17.62, -1.50. **MS (ASAP)** *m/z*: calcd for $C_{15}H_{20}F_3N_3OSi$ $[M+H]^+$: 344.14, found, 344.01.

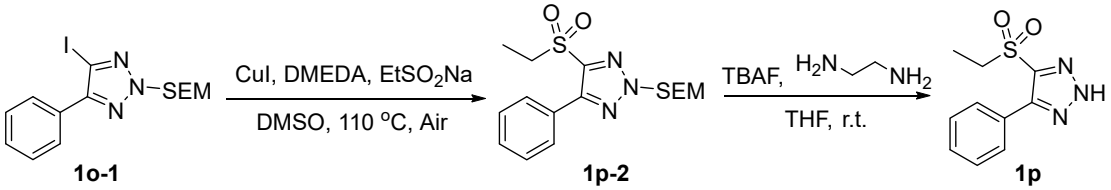


4-phenyl-5-(trifluoromethyl)-2H-1,2,3-triazole (1o)

To a solution of **1o-2** (1.0 mmol) in THF (4.0 mL) was added TBAF (2.0 mmol). The mixture was stirred at 65 °C for 2 h. Then, a solution of ethane-1,2-diamine in THF (4.0 M, 0.25 mL) was added. After stirring at room temperature for 24 h, the reaction mixture was quenched with water and extracted with EA (3 × 4 mL). The organic phase was washed with brine, dried over anhydrous Na_2SO_4, and concentrated in vacuo. The residue was purified by silica gel column chromatography eluted with EA/hexane (v/v = 1/5) to afford **1o** as a white solid (95% yield). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.69 – 7.63 (m, 2H), 7.48 – 7.45 (m, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 129.81, 128.85, 128.72, 128.33, 127.29, 121.16 (d, J = 269.4 Hz). **MS (ASAP)** *m/z*: calcd for $C_9H_6F_3N_3$ $[M+H]^+$: 214.06, found, 214.01. Spectral data match those previously reported in the literature.[6]

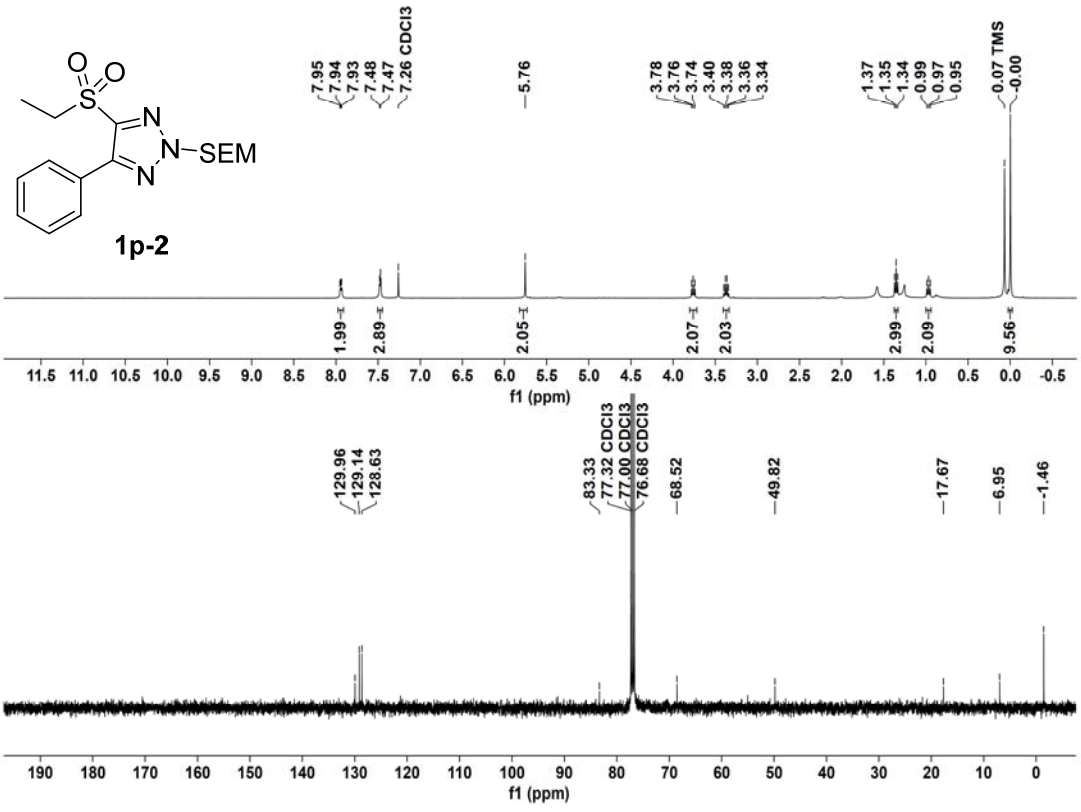


The 4-(ethylsulfonyl)-5-phenyl-2H-1,2,3-triazole (1p) was prepared in two-step from 1o-1 as shown blow:



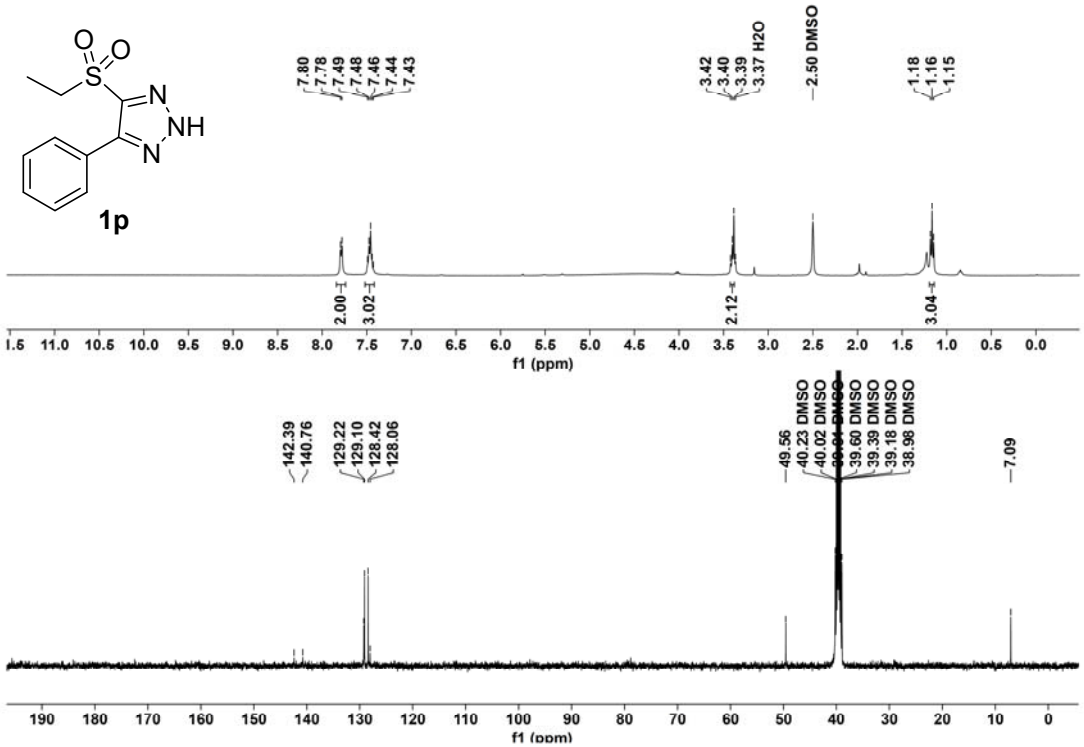
4-(ethylsulfonyl)-5-phenyl-2-((2-(trimethylsilyl)ethoxy)methyl)-2H-1,2,3-triazole (1p-2).

The synthesis of **1p-2** was prepared from **1o-1** and $EtSO_2Na$ following a modified literature procedure.[7] To a solution of **1o-1** (201 mg, 0.5 mmol), CuI (9.5 mg, 50 μmol) and $EtSO_2Na$ (116 mg, 1 mmol) in DMSO (2.5 mL) was added EMEDA (6.6 mg, 75 μmol). The mixture was stirred at 110 °C under air conditions for 24 h. The reaction mixture was quenched with water and extracted with EA (3 × 4 mL). The organic phase was washed with brine, dried over anhydrous Na_2SO_4, and concentrated in vacuo. The residue was purified by silica gel column chromatography eluted with EA/hexane (v/v = 1/2) to afford **1p-2** as a white solid (65% yield). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.97 – 7.91 (m, 2H), 7.48 (d, J = 3.9 Hz, 3H), 5.76 (s, 2H), 3.76 (t, J = 8.0 Hz, 2H), 3.37 (q, J = 7.4 Hz, 2H), 1.35 (t, J = 7.4 Hz, 3H), 0.97 (t, J = 7.4 Hz, 2H), 0.00 (s, 9H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 129.96, 129.14, 128.63, 83.33, 68.52, 49.82, 17.67, 6.95, -1.46. **MS (ASAP)** *m/z*: calcd for $C_{16}H_{25}N_3O_3SSi$ $[M+H]^+$: 368.15, found, 368.09.

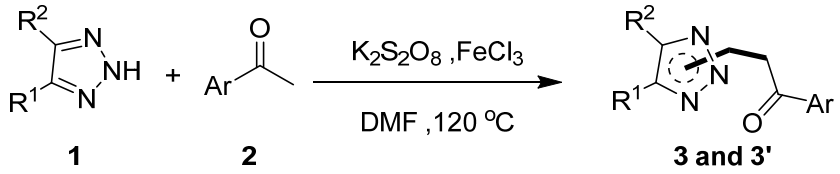


4-(ethylsulfonyl)-5-phenyl-2H-1,2,3-triazole (1p)

1p was prepared from N^2-SEM deprotection of **1p-2** in a similar manner as described for **1o**. White solid. **^{1}H NMR** (400 MHz, DMSO-d_6) δ 7.79 (d, J = 6.9 Hz, 2H), 7.47 (q, J = 6.6 Hz, 3H), 3.39 (t, J = 7.2 Hz, 2H), 1.16 (t, J = 7.2 Hz, 3H). **^{13}C NMR** (100 MHz, DMSO-d_6) δ 142.39, 140.76, 129.22, 129.10, 128.42, 128.06, 49.56, 7.09. **MS (ASAP)** *m/z*: calcd for $C_{10}H_{11}N_3O_2S$ $[M+H]^+$: 238.06, found, 238.03.



3.3 General procedure for the synthesis of *β*-(1,2,3-Triazolyl) Ketones



1 **2** **3 and 3'**

To a solution of *NH*-1,2,3-triazole **1** (1.0 mmol), **2** (1.2 mmol) and $FeCl_3$ (0.1 mmol) in 5.0 mL DMF was added potassium persulfate (2.0 mmol). The mixture was stirred at 120 ºC under air for 7 hours. After the reaction was completed, the mixture was poured into water, extracted with ethyl acetate, washed with saturated brine and dried over anhydrous Na_2SO_4. Remove the solvent in vacuum and purified by silica gel column chromatography (petroleum ether/ethyl acetate as eluent) to obtain the products **3** and **3'**.

4. Reference

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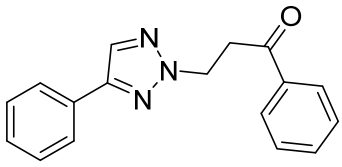
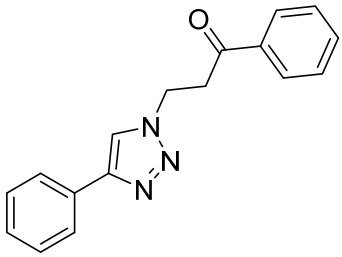
5. Characterization data of the *β*-(1,2,3-triazolyl) ketones

1-phenyl-3-(4-phenyl-2H-1,2,3-triazol-2-yl)propan-1-one (**3a**)



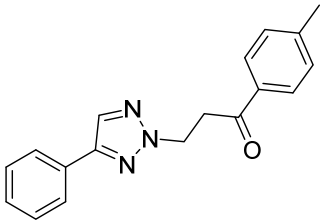
White solid (149.7 mg, 54%), m.p. 83-84 ºC, R_f = 0.6 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.05 – 7.92 (m, 2H), 7.83 (s, 1H), 7.80 – 7.72 (m, 2H), 7.61 – 7.55 (m, 1H), 7.47 (t, *J* = 7.7 Hz, 2H), 7.41 (t, *J* = 7.7 Hz, 2H), 7.37 – 7.30 (m, 1H), 4.93 (t, *J* = 7.2 Hz, 2H), 3.74 (t, *J* = 7.2 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 196.6, 147.8, 136.3, 133. 5, 130.9, 130.3, 128.8, 128.7, 128.3, 128.0, 125.8, 49.9, 37.9. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{17}H_{15}N_3O+H^+$: 278.1288, found: 278.1288.

1-phenyl-3-(4-phenyl-1H-1,2,3-triazol-1-yl)propan-1-one (**3'a**)



Yellow solid (91.5 mg, 33%), m.p. 112-113 ºC, R_f = 0.2 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.94 (s, 1H), 7.93 – 7.89 (m, 2H), 7.83 – 7.77 (m, 2H), 7.58 – 7.52 (m, 1H), 7.45 (m, 2H), 7.41 – 7.36 (m, 2H), 7.32 – 7.27 (m, 1H), 4.83 (t, *J* = 6.2 Hz, 2H), 3.66 (t, *J* = 6.2 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 196.5, 147.4, 135.8, 133.7, 130.5, 128.7, 128.6, 128.0, 127.9, 125.6, 121.0, 44.7, 38.6. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{17}H_{15}N_3O+H^+$: 278.1288, found: 278.1289.

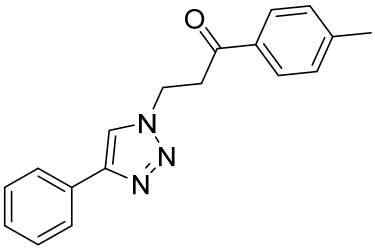
3-(4-phenyl-2H-1,2,3-triazol-2-yl)-1-(p-tolyl)propan-1-one (**3b**)



White solid (177.7 mg, 61%), m.p. 90-91 ºC, R_f = 0.6 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.93 – 7.85 (m, 2H), 7.83 (s, 1H), 7.80 – 7.72 (m, 2H), 7.46 – 7.37 (m, 2H), 7.37 – 7.31 (m, 1H), 7.29 – 7.22 (m, 2H), 4.92 (t, *J* = 7.3 Hz, 2H), 3.72 (t, *J* = 7.3 Hz, 2H), 2.41 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 195.9, 147.4,

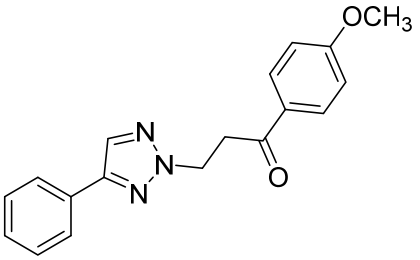
144.0, 133.5, 130.6, 130.0, 129.0, 128.5, 128.0, 127.8, 125.5, 49.7, 37.5, 21.3. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{18}H_{17}N_3O+H^+$: 292.1444, found: 292.1443.

3-(4-phenyl-1H-1,2,3-triazol-1-yl)-1-(p-tolyl)propan-1-one (**3'b**)



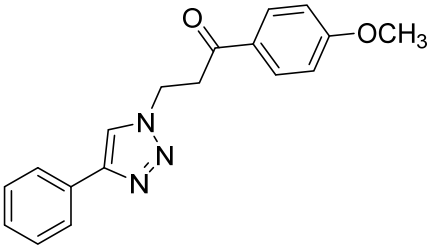
White solid (81.5 mg, 28%), m.p. 160-161 ºC, R_f = 0.2 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.94 (s, 1H), 7.86 – 7.78 (m,4H), 7.45 – 7.37 (m, 2H), 7.34 – 7.30 (m, 1H), 7.28 – 7.21 (m, 2H), 4.87 (t, J = 6.2 Hz, 2H), 3.67 (t, J = 6.2 Hz, 2H), 2.41 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 196.5, 145.1, 133.8, 130.9, 130.1, 129.8, 129.1, 128.5, 128.4, 126.0, 121.4, 45.2, 39.0, 22.0. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{18}H_{17}N_3O+H^+$: 292.1444, found: 292.1443.

1-(4-methoxyphenyl)-3-(4-phenyl-2H-1,2,3-triazol-2-yl)propan-1-one (**3c**)



White solid (172.1 mg, 58%), m.p. 95-97 ºC, R_f = 0.6 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.99 – 7.92 (m, 2H), 7.82 (s, 1H), 7.78 – 7.70 (m, 2H), 7.44 – 7.38 (m, 2H), 7.37 – 7.28 (m, 1H), 6.96 – 6.86 (m, 2H), 4.90 (t, J = 7.3 Hz, 2H), 3.85 (s, 3H), 3.68 (t, J = 7.3 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 195.1, 163.7, 147.7, 130.8, 130.3, 129.4, 128.8, 128.3, 125.8, 113.8, 55.4, 50.0, 37.5. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{18}H_{17}N_3O_2+H^+$: 308.1394, found: 308.1393.

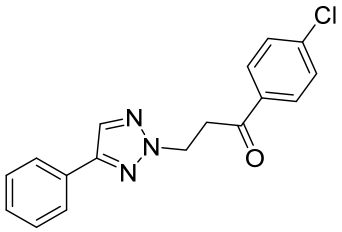
1-(4-methoxyphenyl)-3-(4-phenyl-1H-1,2,3-triazol-1-yl)propan-1-one (**3'c**)



White solid (114.6 mg, 36%), m.p. 130-131 ºC, R_f = 0.2 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.93 (s, 1H), 7.91 – 7.83 (m, 2H), 7.82 – 7.75 (m, 2H), 7.39 – 7.33 (m, 2H), 7.31 – 7.23 (m, 1H), 6.91 – 6.81 (m, 2H), 4.79 (t, J = 6.3 Hz,2H),

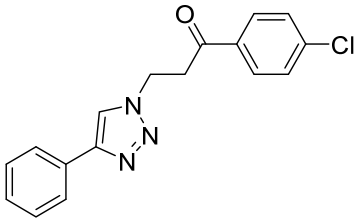
3.80 (s, 3H), 3.57 (t, J = 6.3 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 194.8, 163.8, 147.3, 130.5, 130.2, 129.0, 128.9, 128.6, 128.6, 127.8, 125.5, 121.0, 113.7, 113.7, 55.3, 44.8, 38.1 **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{18}H_{17}N_3O_2+H^+$: 308.1394, found: 308.1393.

1-(4-chlorophenyl)-3-(4-phenyl-2H-1,2,3-triazol-2-yl)propan-1-one (**3d**)



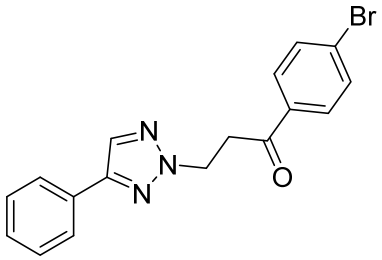
White solid (162.0 mg, 52%), m.p. 133-134 ºC, R_f = 0.6 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.96 – 7.88 (m, 2H), 7.82 (s, 1H), 7.79 – 7.71 (m, 2H), 7.47 – 7.39 (m, 4H), 7.37 – 7.29 (m, 1H), 4.92 (t, J = 7.1 Hz, 2H), 3.71 (t, J = 7.1 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 195.8, 148.2, 140.3, 134.9, 131.3, 130.6, 129.8, 129.3, 129.1, 128.7, 126.1, 50.1, 38.1. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{17}H_{14}ClN_3O+H^+$: 312.0898, found: 312.0898.

1-(4-chlorophenyl)-3-(4-phenyl-1H-1,2,3-triazol-1-yl)propan-1-one (**3'd**)



White solid (109.0 mg, 35%), m.p. 152-154 ºC, R_f = 0.2 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.93 (s, 1H), 7.91 – 7.85 (m, 2H), 7.83 – 7.79 (m, 2H), 7.49 – 7.36 (m, 4H), 7.36 – 7.27 (m, 1H), 4.86 (t, J = 6.2 Hz, 2H), 3.67 (t, J = 6.2 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 195.4, 147.6, 140.4, 134.2, 130.5, 129.5, 129.2, 128.8, 128.1, 125.7, 121.1, 44.7, 38.6. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{17}H_{14}ClN_3O+H^+$: 312.0898, found: 312.0898.

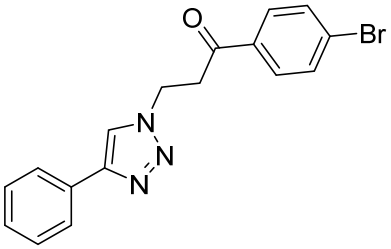
1-(4-bromophenyl)-3-(4-phenyl-2H-1,2,3-triazol-2-yl)propan-1-one (**3e**)



Yellow solid (188.8 mg, 53%), m.p. 143-144 ºC, R_f = 0.6 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.89 – 7.80 (m, 1H), 7.77 – 7.72 (m, 1H), 7.66 – 7.56 (m, 1H), 7.45 – 7.38 (m, 1H), 7.37 – 7.30 (m, 0H), 4.91 (t, J = 7.1 Hz, 1H), 3.70

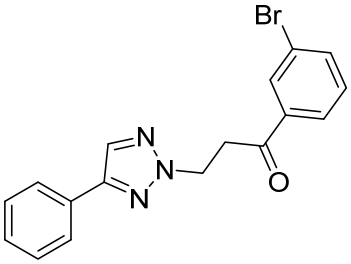
(t, J = 7.1 Hz, 1H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 196.0, 148.2, 135.3, 132.3, 132.0, 131.3, 130.5, 129.9, 129.1, 128.7, 126.1, 50.1, 38.1. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{17}H_{14}BrN_3O+H^+$: 356.0393, found: 356.0393.

1-(4-bromophenyl)-3-(4-phenyl-1H-1,2,3-triazol-1-yl)propan-1-one (**3'e**)



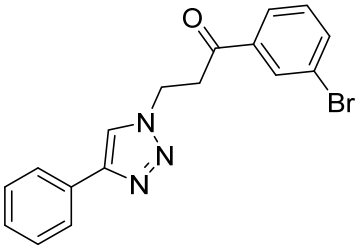
White solid (121.1 mg, 34%), m.p. 98-100 ºC, R_f = 0.2 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.92 (s, 0H), 7.86 – 7.76 (m, 2H), 7.61 (d, J = 8.6 Hz, 1H), 7.41 (t, J = 7.5 Hz, 1H), 7.32 (t, J = 7.4 Hz, 0H), 4.85 (t, J = 6.2 Hz, 1H), 3.66 (t, J = 6.2 Hz, 1H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 195.9, 147.9, 134.9, 132.5, 130.8, 129.8, 129.5, 129.1, 128.4, 126.0, 121.4, 45.0, 38.9. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{17}H_{14}BrN_3O+H^+$: 356.0393, found: 356.0393.

1-(3-bromophenyl)-3-(4-phenyl-2H-1,2,3-triazol-2-yl)propan-1-one (**3f**)



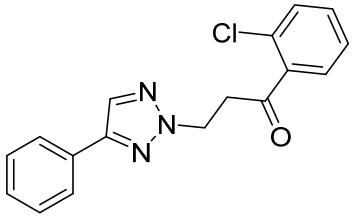
White solid (199.4 mg, 56%), m.p. 121-122 ºC, R_f = 0.6 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.09 (t, J = 1.8 Hz, 1H), 7.90 – 7.85 (m, 1H), 7.82 (s, 1H), 7.77 – 7.72 (m, 2H), 7.71 – 7.64 (m, 1H), 7.44 – 7.37 (m, 2H), 7.38 – 7.27 (m, 2H), 4.90 (t, J = 7.0 Hz, 2H), 3.69 (t, J = 7.0 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 195.6, 148.1, 138.2, 136.5, 131.4, 131.2, 130.5, 130.5, 129.1, 128.7, 126.8, 126.1, 123.3, 49.9, 38.1. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{17}H_{14}BrN_3O+H^+$: 356.0393, found: 356.0390.

1-(3-bromophenyl)-3-(4-phenyl-1H-1,2,3-triazol-1-yl)propan-1-one (**3'f**)



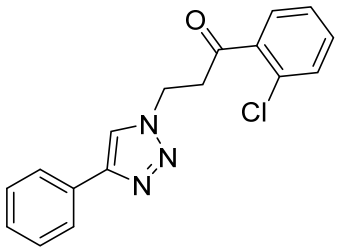
White solid (99.7 mg, 28%), m.p. 140-142 ºC, R_f = 0.2 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.07 (s, 1H), 7.93 (s, 1H), 7.86 (m, 1H), 7.83 – 7.78 (m, 2H), 7.71 (m, 1H), 7.41 (t, J = 7.5 Hz, 2H), 7.39 – 7.29 (m, 2H), 4.86 (t, J = 6.1 Hz, 2H), 3.67 (t, J = 6.1 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 195.6, 148.0, 137.9, 137.0, 131.4, 130.8, 130.7, 129.1, 128.4, 126.9, 126.0, 123.5, 121.4, 44.9, 39.1. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{17}H_{14}BrlN_3O+H^+$: 356.0393, found: 356.0391.

1-(2-chlorophenyl)-3-(4-phenyl-2H-1,2,3-triazol-2-yl)propan-1-one (**3g**)



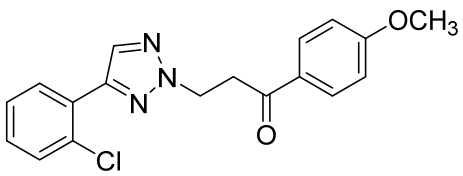
Yellow oil (158.9 mg, 51%), R_f = 0.6 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.95 – 7.86 (m, 2H), 7.82 (s, 1H), 7.78 – 7.70 (m, 2H), 7.45 – 7.38 (m, 2H), 7.36 – 7.30 (m, 1H), 4.91 (t, J = 7.1 Hz, 2H), 3.70 (t, J = 7.1 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 195.4, 147.8, 139.9, 134.6, 130.9, 130.2, 129.4, 129.0, 128.8, 128.4, 125.8, 49.7, 37.8. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{17}H_{14}ClN_3O+H^+$: 312.0898, found: 312.0898.

1-(2-chlorophenyl)-3-(4-phenyl-1H-1,2,3-triazol-1-yl)propan-1-one (**3'g**)



White solid (112.3mg, 36%), m.p. 99-100 ºC, R_f = 0.2 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.90 (s, 1H), 7.82 – 7.73 (m, 2H), 7.49 – 7.42 (m, 1H), 7.41 – 7.32 (m, 4H), 7.31 – 7.21 (m, 2H), 4.78 (t, J = 6.2 Hz, 2H), 3.62 (t, J = 6.2 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 199.0, 137.4, 132.4, 131.0, 130.6, 130.4, 129.2, 128.6, 127.9, 126.9, 125.4, 120.8, 44.7, 42.4. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{17}H_{14}ClN_3O+H^+$: 312.0898, found: 312.0898.

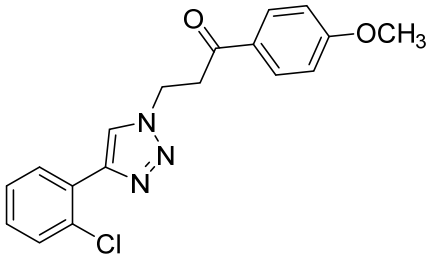
3-(4-(2-chlorophenyl)-2H-1,2,3-triazol-2-yl)-1-(4-methoxyphenyl)propan-1-one (**3h**)



White solid (143.4 mg, 42%), m.p. 160-161 ºC, R_f = 0.6 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.11 (s, 1H), 7.97 (d, J = 8.9 Hz, 2H), 7.85 – 7.80 (m,

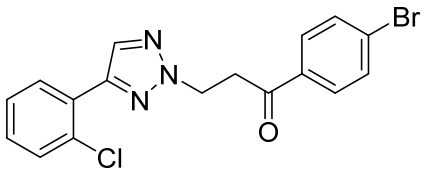
1H), 7.48 – 7.42 (m, 1H), 7.32 – 7.27 (m, 2H), 6.94 (d, *J* = 9.0 Hz, 2H), 4.94 (t, *J* = 7.3 Hz, 2H), 3.87 (s, 3H), 3.70 (t, *J* = 7.3 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 195.1, 163.8, 134.2, 132.1, 132.1, 130.4, 130.4, 130.3, 129.4, 129.3, 129.2, 127.0, 113.9, 55.5, 50.2, 37.6. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{18}H_{16}ClN_3O_2+H^+$: 342.1004, found: 342.1001.

3-(4-(2-chlorophenyl)-1H-1,2,3-triazol-1-yl)-1-(4-methoxyphenyl)propan-1-one (**3'h**)



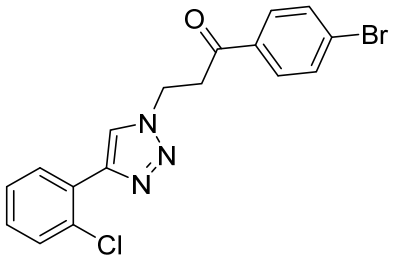
Yellow solid (140.0 mg, 41%), m.p. 138-139 ºC, R_f = 0.3 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.32 (s, 1H), 8.20 – 8.15 (m, 1H), 7.95 – 7.88 (m, 2H), 7.44 – 7.40 (m, 1H), 7.33 (d, *J* = 1.4 Hz, 1H), 7.27 – 7.20 (m, 1H), 6.93 – 6.88 (m, 2H), 4.87 (t, *J* = 6.4 Hz, 2H), 3.84 (s, 3H), 3.65 (t, *J* = 6.4 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 194.9, 163.9, 143.7, 131.2, 130.3, 130.1, 129.7, 129.3, 129.1, 128.9, 127.0, 124.5, 113.9, 55.5, 45.1, 38.3. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{18}H_{16}ClN_3O_2+H^+$: 342.1004, found: 342.1003.

1-(4-bromophenyl)-3-(4-(2-chlorophenyl)-2H-1,2,3-triazol-2-yl)propan-1-one (**3i**)



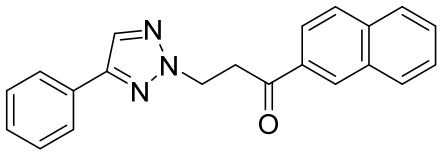
White solid (167.9 mg, 43%), m.p. 76-78 ºC, R_f = 0.6 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.10 (s, 1H), 7.87 – 7.76 (m, 3H), 7.61 (d, *J* = 8.6 Hz, 2H), 7.49 – 7.40 (m, 1H), 7.35 – 7.25 (m, 2H), 4.94 (t, *J* = 7.1 Hz, 2H), 3.71 (t, *J* = 7.1 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 195.6, 145.0, 135.0, 134.2, 132.0, 130.4, 130.2, 129.6, 129.4, 129.1, 128.8, 127.0, 49.8, 37.8. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{17}H_{13}BrClN_3O+H^+$: 390.0003, found: 390.0001.

1-(4-bromophenyl)-3-(4-(2-chlorophenyl)-1H-1,2,3-triazol-1-yl)propan-1-one (**3'i**)



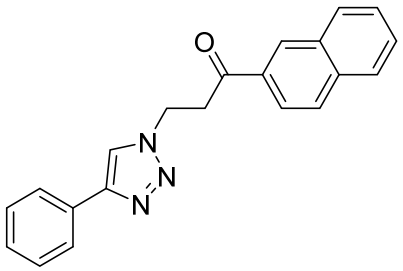
Yellow solid (156.2 mg, 40%), m.p. 146-147 ºC, R_f = 0.3 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.31 (s, 1H), 8.20 – 8.13 (m, 1H), 7.85 – 7.74 (m, 2H), 7.61 – 7.54 (m, 2H), 7.44 – 7.39 (m, 1H), 7.33 (d, J = 1.4 Hz, 1H), 7.27 – 7.21 (m, 1H), 4.86 (t, J = 6.4 Hz, 2H), 3.67 (t, J = 6.4 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 195.5, 143.8, 134.6, 132.0, 131.2, 130.1, 129.7, 129.5, 129.1, 129.0, 128.9, 127.1, 124.5, 44.8, 38.5. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{17}H_{13}BrClN_3O+H^+$: 390.0003, found: 390.0001.

1-(naphthalen-2-yl)-3-(4-phenyl-2H-1,2,3-triazol-2-yl)propan-1-one (**3j**)



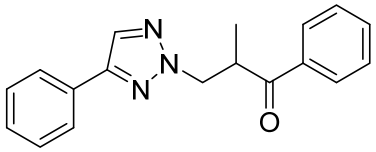
White solid (75.2 mg, 23%), m.p. 105-106 ºC, R_f = 0.6 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.69 (d, J = 8.5 Hz, 1H), 8.01 (d, J = 8.2 Hz, 1H), 7.95 (d, J = 7.2 Hz, 1H), 7.88 (d, J = 8.7 Hz, 1H), 7.84 (s, 1H), 7.74 (d, J = 6.9 Hz, 2H), 7.64 – 7.44 (m, 3H), 7.40 (t, J = 7.4 Hz, 2H), 7.34 (t, J = 7.3 Hz, 1H), 5.01 (t, J = 6.9 Hz, 2H), 3.82 (t, J = 6.9 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 200.3, 147.8, 134.8, 133.9, 133.2, 130.9, 130.3, 130.1, 128.8, 128.4, 128.3, 128.1, 128.1, 126.5, 125.8, 125.8, 124.3, 50.1, 40.8. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{21}H_{17}N_3O+H^+$: 328.1444, found: 328.1441.

1-(naphthalen-2-yl)-3-(4-phenyl-1H-1,2,3-triazol-1-yl)propan-1-one (**3'j**)



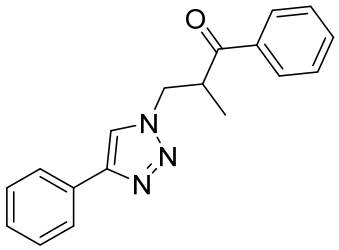
White solid (215.9 mg, 66%), m.p. 135-136 ºC, R_f = 0.3 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.67 (d, J = 8.6 Hz, 1H), 7.97 (d, J = 10.6 Hz, 2H), 7.88 – 7.79 (m, 4H), 7.59 (t, J = 7.7 Hz, 1H), 7.52 (t, J = 7.4 Hz, 1H), 7.42 (m, 3H), 7.31 (t, J = 7.4 Hz, 1H), 4.88 (t, J = 6.2 Hz, 2H), 3.73 (t, J = 6.2 Hz, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 200.0, 147.5, 133.9, 133.8, 133.6, 130.5, 130.0, 128.7, 128.5, 128.5, 128.3, 128.0, 126.5, 125.6, 125.4, 124.2, 121.0, 45.1, 41.3. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{21}H_{17}N_3O+H^+$: 328.1444, found: 328.1442.

2-methyl-1-phenyl-3-(4-phenyl-2H-1,2,3-triazol-2-yl)propan-1-one (**3k**)



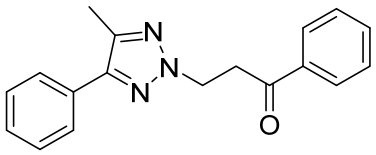
White solid (72.7 mg, 23%), m.p. 104-105 ºC, R_f = 0.6 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.03 – 7.93 (m, 2H), 7.79 (s, 1H), 7.77 – 7.69 (m, 2H), 7.57 (t, J = 7.4 Hz, 1H), 7.47 (m, 2H), 7.41 (m, 2H), 7.34 (m, 1H), 4.92 (m, 1H), 4.59 (m, 1H), 4.30 (m, 1H), 1.28 (d, J = 7.1 Hz, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 200.9, 147.4, 135.4, 133.0, 130.6, 130.0, 128.4, 128.4, 128.1, 128.0, 125.5, 56.5, 40.9, 15.6. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{18}H_{17}N_3O+H^+$: 292.1444, found: 292.1443.

2-methyl-1-phenyl-3-(4-phenyl-1H-1,2,3-triazol-1-yl)propan-1-one (**3'k**)



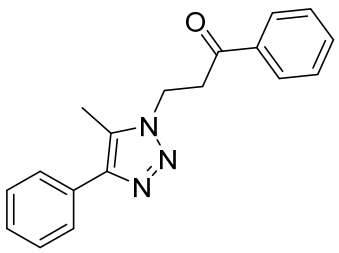
Yellow oil (151.3 mg, 50%), R_f = 0.1 (petroleum/ethyl acetate = 10:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.94 – 7.87 (m, 2H), 7.82 (s, 1H), 7.78 (d, J = 6.9 Hz, 2H), 7.54 (t, J = 7.4 Hz, 1H), 7.40 (m, 4H), 7.30 (d, J = 7.4 Hz, 1H), 4.83 (m, 1H), 4.53 (m, 1H), 4.24 (m, 1H), 1.29 (d, J = 7.2 Hz, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 201.2, 147.3, 135.2, 133.7, 130.4, 128.8, 128.7, 128.4, 128.0, 125.6, 121.1, 51.7, 42.0, 16.4. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{18}H_{17}N_3O+H^+$: 292.1444, found: 292.1441

3-(4-methyl-5-phenyl-2H-1,2,3-triazol-2-yl)-1-phenylpropan-1-one (**3l**)



White solid (163.1 mg, 56%), m.p. 78-79 ºC, R_f = 0.5 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.99 (d, J = 7.1 Hz, 2H), 7.66 (d, J = 8.2 Hz, 2H), 7.58 (t, J = 7.4 Hz, 1H), 7.51 – 7.39 (m, 4H), 7.34 (t, J = 7.3 Hz, 1H), 4.85 (t, J = 7.2 Hz, 2H), 3.72 (t, J = 7.2 Hz, 2H), 2.47 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 196.8, 144.9, 140.9, 136.3, 133.5, 131.2, 128.7, 128.6, 128.1, 127.8, 127.1, 49.6, 38.0, 11.7. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{18}H_{17}N_3O+H^+$: 292.1444, found: 292.1443.

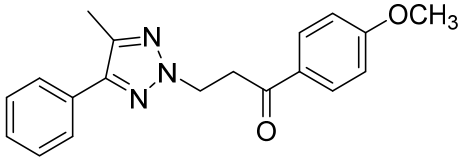
3-(5-methyl-4-phenyl-1H-1,2,3-triazol-1-yl)-1-phenylpropan-1-one (**3'l**)



White solid (93.2 mg, 32%), m.p. 119-120 ºC, R_f = 0.3 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.92 (d, J = 8.7 Hz, 2H), 7.66 (d, J = 7.0 Hz, 2H), 7.58

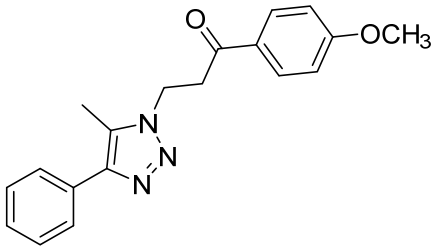
– 7.52 (m, 1H), 7.47 – 7.37 (m, 4H), 7.32 (t, *J* = 7.4 Hz, 1H), 4.64 (t, *J* = 6.7 Hz, 2H), 3.74 (t, *J* = 6.7 Hz, 2H), 2.51 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) *δ* 196.6, 144.2, 135.9, 133.6, 131.5, 129.5, 128.6, 128.5, 127.9, 127.4, 127.0, 42.3, 38.0, 9.0. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{18}H_{17}N_3O+H^+$: 292.1444, found: 328.1443.

1-(4-methoxyphenyl)-3-(4-methyl-5-phenyl-2H-1,2,3-triazol-2-yl)propan-1-one (**3m**)



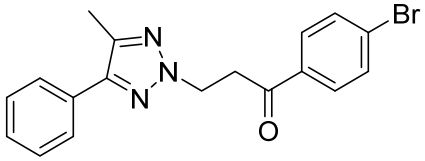
White solid (176.2 mg, 55%), m.p. 89-90 ºC, R_f = 0.6 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) *δ* 7.95 (d, *J* = 8.9 Hz, 2H), 7.66 (d, *J* = 6.9 Hz, 2H), 7.42 (t, *J* = 7.5 Hz, 2H), 7.34 (t, *J* = 7.4 Hz, 1H), 6.92 (d, *J* = 8.9 Hz, 2H), 4.83 (t, *J* = 7.3 Hz, 2H), 3.85 (s, 3H), 3.66 (t, *J* = 7.3 Hz, 2H), 2.46 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) *δ* 195.2, 163.7, 144.8, 140.8, 131.2, 130.3, 129.4, 128.6, 127.8, 127.0, 113.8, 55.4, 49.7, 37.7, 11.7. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{19}H_{19}N_3O_2+H^+$: 322.1550, found: 322.1548.

1-(4-methoxyphenyl)-3-(5-methyl-4-phenyl-1H-1,2,3-triazol-1-yl)propan-1-one (**3'm**)



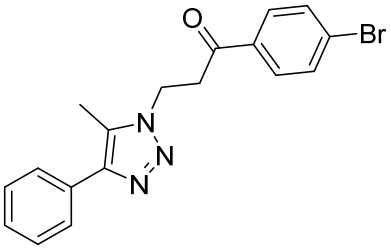
White solid (106 mg, 33%), m.p. 133-134 ºC, R_f = 0.2 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) *δ* 7.90 (d, *J* = 8.9 Hz, 2H), 7.65 (d, *J* = 6.9 Hz, 2H), 7.41 (t, *J* = 7.6 Hz, 2H), 7.32 (d, *J* = 7.3 Hz, 1H), 4.63 (t, *J* = 6.8 Hz, 2H), 3.82 (s, 3H), 3.67 (t, *J* = 6.8 Hz, 2H), 2.50 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) *δ* 195.1, 163.8, 144.2, 131.6, 130.3, 129.5, 129.1, 128.5, 127.4, 127.1, 113.8, 55.4, 42.5, 37.7, 9.0. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{19}H_{19}N_3O_2+H^+$: 322.1550, found: 322.1549.

1-(4-bromophenyl)-3-(4-methyl-5-phenyl-2H-1,2,3-triazol-2-yl)propan-1-one (**3n**)



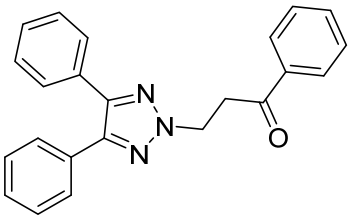
White solid (229 mg, 62%), m.p. 163-164 ºC, R_f = 0.5 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) *δ* 7.83 (d, *J* = 8.6 Hz, 2H), 7.67 – 7.58 (m, 4H), 7.42 (t, *J* = 7.4 Hz, 2H), 7.34 (t, *J* = 7.4 Hz, 1H), 4.83 (t, *J* = 7.2 Hz, 2H), 3.67 (t, *J* = 7.2 Hz, 2H), 2.46 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) *δ* 195.8, 144.9, 140.9, 135.0, 132.0, 131.1, 129.6, 128.7, 128.6, 127.8, 127.0, 49.4, 37.9, 11.7. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{18}H_{16}BrN_3O+H^+$: 370.0550, found: 370.0548.

1-(4-bromophenyl)-3-(5-methyl-4-phenyl-1H-1,2,3-triazol-1-yl)propan-1-one (**3'n**)



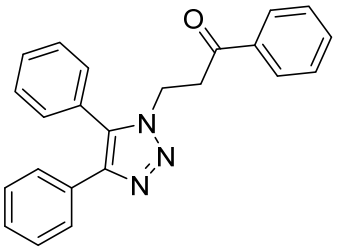
White solid (85 mg, 23%), m.p. 112-113 ºC, R_f = 0.3 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.79 (d, J = 8.6 Hz, 2H), 7.65 (d, J = 6.9 Hz, 2H), 7.58 (d, J = 8.6 Hz, 2H), 7.42 (t, J = 7.5 Hz, 2H), 7.32 (t, J = 7.4 Hz, 1H), 4.63 (t, J = 6.6 Hz, 2H), 3.72 (t, J = 6.6 Hz, 2H), 2.52 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 195.7, 144.4, 134.7, 132.0, 131.5, 129.5, 129.5, 128.9, 128.6, 127.5, 127.1, 42.2, 37.9, 9.0. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{18}H_{16}BrN_3O+H^+$: 370.0550, found: 370.0548.

3-(4,5-diphenyl-2H-1,2,3-triazol-2-yl)-1-phenylpropan-1-one (**3o**)



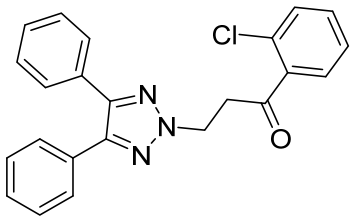
White solid (180.1 mg, 51%), m.p. 116-117 ºC, R_f = 0.6 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.04 – 7.96 (m, 2H), 7.62 – 7.51 (m, 5H), 7.48 (t, J = 7.6 Hz, 2H), 7.41 – 7.31 (m, 6H), 4.96 (t, J = 7.3 Hz, 2H), 3.81 (t, J = 7.3 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 196.7, 144.4, 136.3, 133.5, 130.9, 128.6, 128.5, 128.2, 128.2, 128.1, 50.0, 38.0. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{23}H_{19}N_3O+H^+$: 354.1601, found: 354.1594.

3-(4,5-diphenyl-1H-1,2,3-triazol-1-yl)-1-phenylpropan-1-one (**3'o**)



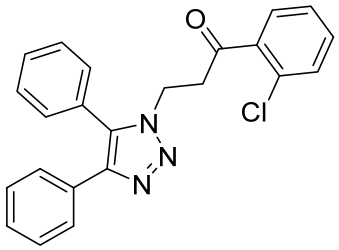
White solid (137.7 mg, 39%), m.p. 170-172 ºC, R_f = 0.2 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.95 – 7.88 (m, 2H), 7.62 – 7.49 (m, 6H), 7.48 – 7.36 (m, 4H), 7.31 – 7.19 (m, 3H), 4.60 (t, J = 7.2 Hz, 2H), 3.71 (t, J = 7.2 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 196.8, 144.6, 136.4, 134.4, 133.9, 131.2, 130.3, 130.1, 129.7, 129.0, 128.7, 128.3, 128.1, 127.9, 127.1, 43.6, 38.3. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{23}H_{19}N_3O+H^+$: 354.1601, found: 354.1594.

1-(2-chlorophenyl)-3-(4,5-diphenyl-2H-1,2,3-triazol-2-yl)propan-1-one (**3p**)



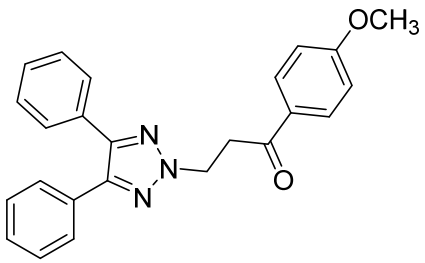
Yellow oil (193.8 mg, 50%), R_f = 0.6 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.61 – 7.55 (m, 1H), 7.55 – 7.51 (m, 3H), 7.43 – 7.39 (m, 2H), 7.38 – 7.31 (m, 8H), 4.94 (t, J = 7.0 Hz, 2H), 3.77 (t, J = 7.0 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 199.5, 144.4, 138.4, 132.1, 131.2, 131.1, 130.9, 130.6, 129.5, 128.5, 128.2, 128.2, 126.9, 49.8, 41.9. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{23}H_{18}ClN_3O+H^+$: 388.1211, found: 388.1209.

1-(2-chlorophenyl)-3-(4,5-diphenyl-1H-1,2,3-triazol-1-yl)propan-1-one (**3'p**)



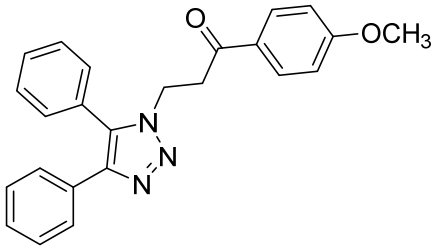
Yellow solid (158.9mg, 41%), m.p. 123-124 °C, R_f = 0.2 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.59 – 7.44 (m, 6H), 7.42 – 7.35 (m, 4H), 7.32 – 7.28 (m, 1H), 7.27 – 7.21 (m, 3H), 4.57 (t, J = 6.9 Hz, 2H), 3.66 (t, J = 6.9 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 199.0, 144.2, 137.9, 133.9, 132.2, 130.9, 130.7, 130.5, 129.8, 129.7, 129.4, 129.3, 128.3, 127.6, 126.9, 126.7, 43.1, 41.7. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{23}H_{18}ClN_3O+H^+$: 388.1211, found: 388.1209.

3-(4,5-diphenyl-2H-1,2,3-triazol-2-yl)-1-(4-methoxyphenyl)propan-1-one (**3q**)



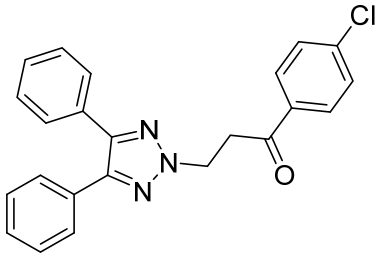
White solid (172.4 mg, 45%), m.p. 92-93 °C, R_f = 0.6 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.98 (d, J = 8.9 Hz, 2H), 7.60 – 7.50 (m, 4H), 7.40 – 7.29 (m, 6H), 6.93 (d, J = 8.9 Hz, 2H), 4.94 (t, J = 7.4 Hz, 2H), 3.85 (s, 3H), 3.75 (t, J = 7.3 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 195.1, 163.7, 144.3, 130.9, 130.3, 129.4, 128.4, 128.4, 128.3, 128.2, 128.2, 128.1, 113.7, 55.4, 50.1, 37.6. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{24}H_{21}N_3O_2+H^+$: 384.1707, found: 384.1703.

3-(4,5-diphenyl-1H-1,2,3-triazol-1-yl)-1-(4-methoxyphenyl)propan-1-one (**3'q**)



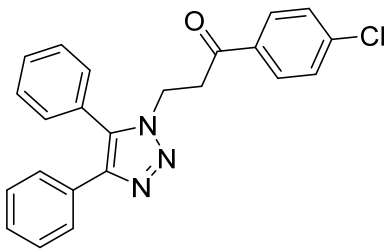
Yellow solid (145.6 mg, 38%), m.p. 79-80 °C, R_f = 0.2 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.86 (d, J = 8.9 Hz, 2H), 7.57 – 7.44 (m, 5H), 7.44 – 7.33 (m, 2H), 7.33 – 7.15 (m, 3H), 6.93 – 6.84 (m, 2H), 4.56 (t, J = 7.3 Hz, 2H), 3.82 (s, 3H), 3.62 (t, J = 7.3 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 194.9, 163.8, 134.0, 130.8, 130.3, 129.9, 129.7, 129.3, 129.1, 128.3, 127.7, 127.6, 126.7, 113.8, 55.4, 43.4, 37.6. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{24}H_{21}N_3O_2+H^+$: 384.1707, found: 384.1703.

1-(4-chlorophenyl)-3-(4,5-diphenyl-2H-1,2,3-triazol-2-yl)propan-1-one (**3r**)



White solid (174.4mg, 45%), m.p. 105-106 °C, R_f = 0.6 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.97 – 7.90 (m, 2H), 7.54 – 7.48 (m, 4H), 7.47 – 7.42 (m, 2H), 7.41 – 7.30 (m, 6H), 4.94 (t, J = 7.2 Hz, 2H), 3.76 (t, J = 7.2 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 195.5, 144.5, 140.0, 134.6, 130.9, 129.5, 129.0, 128.5, 128.3, 128.2, 49.9, 37.9. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{23}H_{18}ClN_3O+H^+$: 388.1211, found: 388.1214.

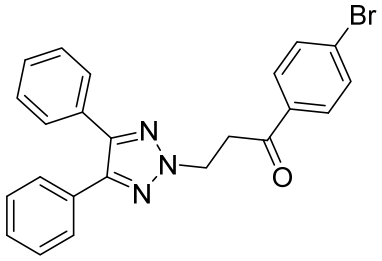
1-(4-chlorophenyl)-3-(4,5-diphenyl-1H-1,2,3-triazol-1-yl)propan-1-one (**3'r**)



White solid (166.7 mg, 43%), m.p. 162-163 °C, R_f = 0.2 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.85 (d, J = 8.6 Hz, 2H), 7.59 – 7.48 (m, 4H), 7.46 – 7.35 (m, 4H), 7.31 – 7.19 (m, 3H), 4.58 (t, J = 7.1 Hz, 2H), 3.68 (t, J = 7.1 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 195.3, 144.4, 140.1, 134.4, 134.1, 130.8, 130.0, 129.8,

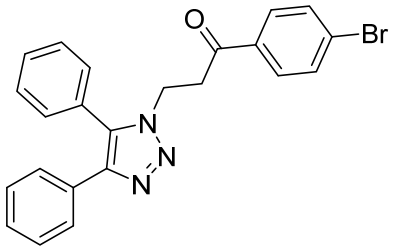
129.4, 129.0, 128.4, 127.7, 126.8, 43.1, 37.9. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{23}H_{18}ClN_3O+H^+$: 388.1211, found: 388.1208.

1-(4-bromophenyl)-3-(4,5-diphenyl-2H-1,2,3-triazol-2-yl)propan-1-one (**3s**)



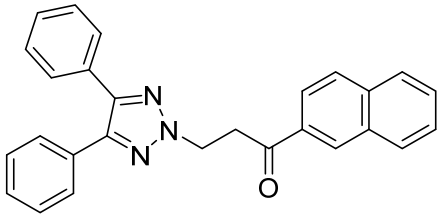
Yellow solid (190.1 mg, 44%), m.p. 136-137 ºC, R_f = 0.6 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.85 (d, J = 8.6 Hz, 2H), 7.61 (d, J = 8.6 Hz, 2H), 7.56 – 7.49 (m, 4H), 7.41 – 7.30 (m, 6H), 4.94 (t, J = 7.2 Hz, 2H), 3.75 (t, J = 7.2 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 195.7, 144.5, 135.0, 131.9, 130.9, 129.5, 128.7, 128.5, 128.3, 128.1, 49.8, 37.8. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{23}H_{18}BrN_3O+H^+$: 423.0706, found: 427.0703.

1-(4-bromophenyl)-3-(4,5-diphenyl-1H-1,2,3-triazol-1-yl)propan-1-one (**3's**)



White solid (172.8 mg, 40%), m.p. 175-176 ºC, R_f = 0.3 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.79 (d, J = 8.6 Hz, 2H), 7.60 (d, J = 8.5 Hz, 2H), 7.57 – 7.52 (m, 5H), 7.42 (m, 2H), 7.27 (d, J = 7.0 Hz, 3H), 4.59 (t, J = 7.0 Hz, 2H), 3.69 (t, J = 7.1 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 195.5, 144.3, 134.7, 134.0, 132.0, 130.8, 129.9, 129.8, 129.5, 129.4, 128.8, 128.4, 127.6, 126.7, 43.1, 37.8. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{23}H_{18}BrN_3O+H^+$: 423.0706, found: 427.0703.

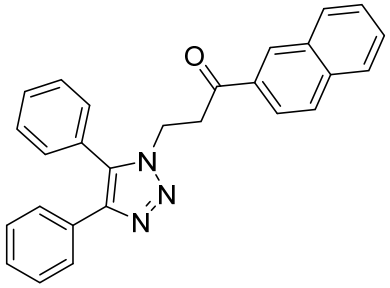
3-(4,5-diphenyl-2H-1,2,3-triazol-2-yl)-1-(naphthalen-2-yl)propan-1-one (**3t**)



White solid (242.0 mg, 60%), m.p. 140-142 ºC, R_f = 0.5 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.73 (d, J = 8.5 Hz, 1H), 8.04 – 7.92 (m, 2H), 7.91 – 7.85 (m, 1H), 7.62 – 7.51 (m, 6H), 7.51 – 7.45 (m, 1H), 7.37 – 7.33 (m, 6H), 5.05 (t, J = 6.9 Hz, 2H), 3.87 (t, J = 6.9 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 200.4, 144.4,

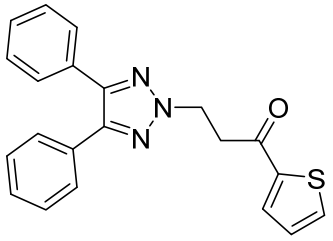
134.9, 133.9, 133.1, 130.9, 130.0, 128.4, 128.3, 128.2, 128.1, 128.1, 128.0, 126.5, 125.8, 124.2, 50.2, 40.8. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{27}H_{21}N_3O+H^+$: 404.1757, found: 404.1754.

3-(4,5-diphenyl-1H-1,2,3-triazol-1-yl)-1-(naphthalen-2-yl)propan-1-one (**3't**)



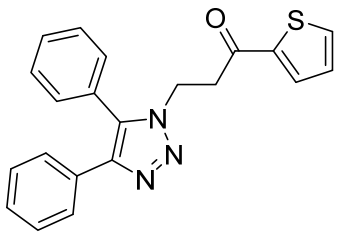
Yellow oil (92.7 mg, 23%), m.p. 112-113 ºC, R_f = 0.2 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.60 (d, J = 8.5 Hz, 1H), 7.99 (d, J = 8.2 Hz, 1H), 7.91 (d, J = 6.1 Hz, 1H), 7.86 (d, J = 6.3 Hz, 1H), 7.62 – 7.47 (m, 7H), 7.50 – 7.39 (m, 3H), 7.31 – 7.21 (m, 4H), 4.66 (t, J = 7.0 Hz, 2H), 3.80 (t, J = 7.0 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 200.0, 134.3, 133.8, 133.4, 130.8, 130.0, 129.7, 129.4, 128.4, 128.2, 127.7, 127.6, 126.8, 126.5, 125.6, 124.3, 43.5, 40.7. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{27}H_{21}N_3O+H^+$: 404.1757, found: 404.1752.

3-(4,5-diphenyl-2H-1,2,3-triazol-2-yl)-1-(thiophen-2-yl)propan-1-one (**3u**)



White solid (175.9 mg, 49%), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.72 (d, J = 3.9 Hz, 1H), 7.67 (d, J = 5.0 Hz, 1H), 7.60 – 7.51 (m, 5H), 7.45 – 7.38 (m, 2H), 7.33 – 7.23 (m, 3H), 7.14 (d, J = 4.4 Hz, 1H), 4.60 (t, J = 7.1 Hz, 2H), 3.68 (t, J = 7.1 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 189.2, 144.3, 143.2, 134.3, 134.1, 132.5, 130.8, 130.0, 129.8, 129.4, 128.4, 128.3, 127.7, 126.8, 43.1, 38.5. **HRMS** (ESI-MS) m/z $[M+Na]^+$ calcd for $C_{21}H_{17}N_3OS+Na^+$: 382.0985, found: 382.0988

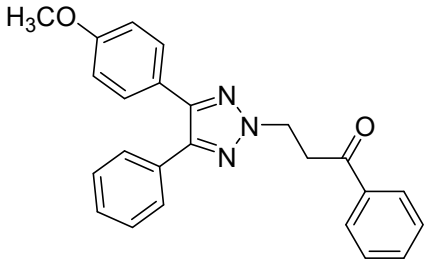
3-(4,5-diphenyl-1H-1,2,3-triazol-1-yl)-1-(thiophen-2-yl)propan-1-one (**3'u**)



White solid (136.4 mg, 38%), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.68 (m, 1.2 Hz, 1H), 7.63 (m 1.1 Hz, 1H), 7.57 – 7.46 (m, 5H), 7.38 (m, 3.6 Hz, 2H), 7.10 (m, 3.8 Hz, 1H), 4.56 (t, J = 7.1 Hz, 2H), 3.64 (t, J = 7.1 Hz, 2H). **^{13}C NMR** (100MHz, $CDCl_3$) δ 189.2,

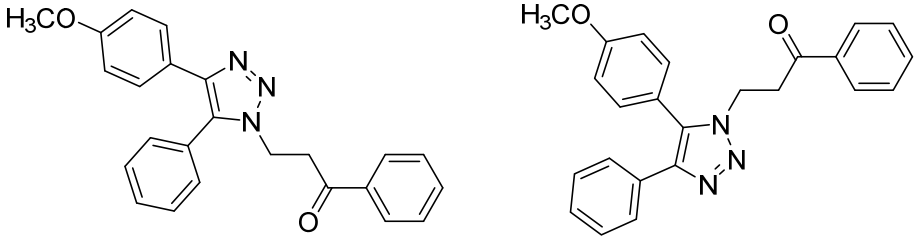
144.3, 143.2, 134.3, 132.5, 130.8, 130.0, 129.8, 129.4, 128.4, 128.2, 127.7, 126.8, 43.1, 38.5. **HRMS** (ESI-MS) m/z $[M+Na]^+$ calcd for $C_{21}H_{17}N_3OS+Na^+$: 359.1092, found: 382.0985, found: 382.0987

3-(4-(4-methoxyphenyl)-5-phenyl-2H-1,2,3-triazol-2-yl)-1-phenylpropan-1-one (**3v**)



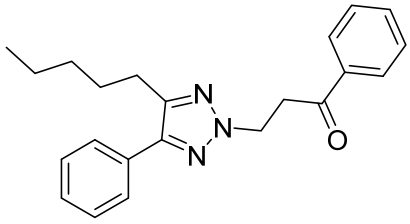
White solid (199.1 mg, 52%), ratio of N^1-producr/N^3product is about 0.63:0.37. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.06 – 7.99 (m, 2H), 7.64 – 7.55 (m, 3H), 7.53 – 7.47 (m, 2H), 7.38 (dd, J = 5.3, 1.9 Hz, 3H), 7.31 – 7.27 (m, 1H), 7.17 – 7.10 (m, 2H), 6.95 – 6.88 (m, 1H), 4.98 (t, J = 7.2 Hz, 2H), 3.83 (t, J = 7.3 Hz, 2H), 3.75 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 196.7, 159.6, 144.5, 144.3, 136.3, 133.5, 132.2, 130.9, 129.5, 128.6, 128.4, 128.3, 128.3, 128.0, 120.6, 114.5, 113.1, 55.1, 50.0, 38.0. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{24}H_{21}N_3O_2S+H^+$: 384.1707, found:384.1708

3-(4-(4-methoxyphenyl)-5-phenyl-1H-1,2,3-triazol-1-yl)-1-phenylpropan-1-one and 3-(5-(4-methoxyphenyl)-4-phenyl-1H-1,2,3-triazol-1-yl)-1-phenylpropan-1-one (**3'v**)



Yellow oil (137.8 mg, 38%), ratio of N^1-producr/N^3product is about 0.62:0.38. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.93 (d, J = 7.9 Hz, 3H), 7.80 (d, J = 7.9 Hz, 1H), 7.64 – 7.50 (m, 7H), 7.50 – 7.44 (m, 5H), 7.44 (s, 4H), 7.03 – 6.86 (m, 2H), 6.85 – 6.75 (m, 1H), 4.67 – 4.56 (m, 3H), 3.83 (s, 2H), 3.76 – 3.71 (m, 4H), 3.69 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 196.5, 159.5, 133.6, 130.5, 130.0, 129.8, 129.4, 128.7, 128.4, 128.0, 127.7, 126.7, 122.1, 119.1, 115.4, 114.1, 111.5, 55.3, 55.0, 43.3, 43.3, 38.0, 37.9.

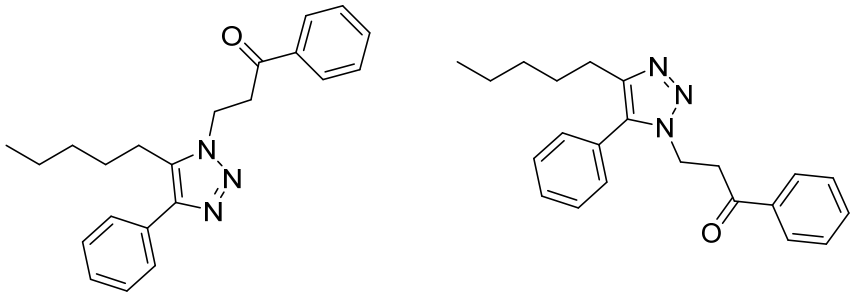
3-(4-pentyl-5-phenyl-2*H*-1,2,3-triazol-2-yl)-1-phenylpropan-1-one(3w)



Colorless oil (201.8 mg, 58%), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.00 – 7.94 (m, 2H), 7.66 – 7.61 (m, 2H), 7.58 – 7.52 (m, 1H), 7.49 – 7.38 (m, 4H), 7.37 – 7.30 (m, 1H),

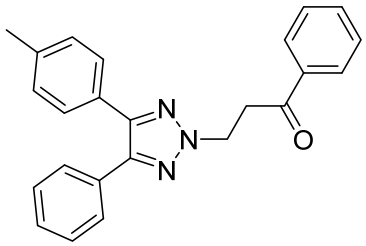
4.86 (t, *J* = 7.2 Hz, 2H), 3.71 (t, *J* = 7.2 Hz, 2H), 2.81 (t, *J* = 7.9 Hz, 2H), 1.70 (t, *J* = 7.7 Hz, 2H), 1.34 (h, *J* = 4.5, 3.5 Hz, 4H), 0.88 (t, *J* = 6.8 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 196.8, 145.4, 144.7, 136.4, 133.4, 131.4, 128.6, 128.6, 128.1, 127.8, 127.3, 49.7, 38.0, 31.7, 28.6, 25.8, 22.4, 14.0. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{22}H_{25}N_3O+H^+$: 384.2070, found:348.2071

3-(5-pentyl-4-phenyl-1*H*-1,2,3-triazol-1-yl)-1-phenylpropan-1-one and 3-(4-pentyl-5-phenyl-1*H*-1,2,3-triazol-1-yl)-1-phenylpropan-1-one (**3'w**)



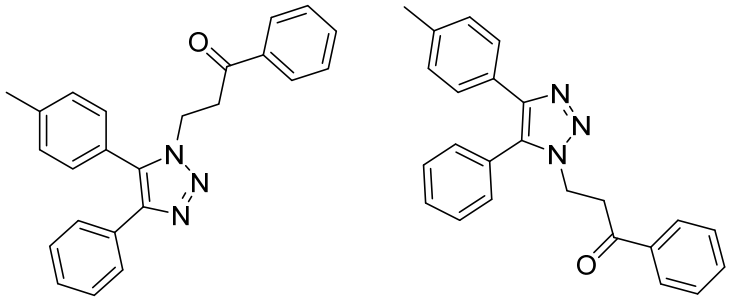
Colorless oil (80.6 mg, 20%), ratio of N^1-producr/N^3product is about 0.79:0.21. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.01 – 7.95 (m, 2H), 7.91 – 7.88 (m, 1H), 7.71 – 7.65 (m, 2H), 7.59 (q, *J* = 7.3 Hz, 1H), 7.52 – 7.41 (m, 6H), 7.35 – 7.32 (m, 1H), 4.69 (t, *J* = 6.9 Hz, 2H), 4.60 (t, *J* = 7.2 Hz, 1H), 3.82 (t, *J* = 6.9 Hz, 2H), 3.66 (t, *J* = 7.3 Hz, 1H), 2.95 – 2.90 (m, 2H), 2.64 – 2.59 (m, 1H), 1.79 (s, 1H), 1.64 (p, *J* = 7.6 Hz, 3H), 1.36 (tdd, *J* = 15.6, 7.7, 2.5 Hz, 5H), 1.26 (td, *J* = 7.2, 6.2, 3.3 Hz, 2H), 0.88 (t, *J* = 6.9 Hz, 4H), 0.84 (d, *J* = 6.7 Hz, 1H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 196.8, 144.2, 136.1, 134.0, 133.7, 131.8, 129.6, 129.3, 129.1, 128.8, 128.7, 128.7, 128.6, 128.6, 128.1, 128.0, 127.6, 127.5, 127.2, 109.1, 42.5, 38.2, 38.2, 31.6, 31.4, 29.3, 28.7, 23.0, 23.0, 22.3, 22.2, 16.0, 13.9, 13.9.

1-phenyl-3-(4-phenyl-5-(p-tolyl)-2H-1,2,3-triazol-2-yl)propan-1-one (**3x**)



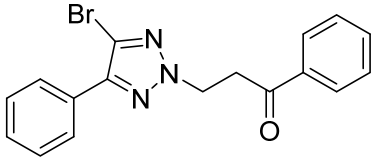
White solid ,(198mg, 54%), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.01 (d, *J* = 7.6 Hz, 2H), 7.63 – 7.52 (m, 3H), 7.51 – 7.40 (m, 4H), 7.39 – 7.31 (m, 3H), 7.17 (d, *J* = 7.8 Hz, 2H), 4.95 (t, *J* = 7.3 Hz, 2H), 3.80 (t, *J* = 7.3 Hz, 2H), 2.38 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 196.7, 144.5, 144.3, 138.1, 136.3, 133.4, 131.1, 129.2, 128.6, 128.4, 128.1, 128.1, 77.3, 77.0, 76.7, 50.0, 38.1, 21.3. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{24}H_{21}N_3O+H^+$: 368.1757, found: 368.1761

1-phenyl-3-(4-phenyl-5-(p-tolyl)-1H-1,2,3-triazol-1-yl)propan-1-one and 1-phenyl-3-(5-phenyl-4-(p-tolyl)-1H-1,2,3-triazol-1-yl)propan-1-one (**3'x**)



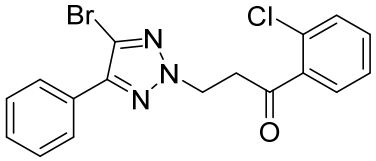
Yellow oil, (114mg, 31%), ratio of N^1-producr/N^3-product is about 0.53:0.47. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.84 (d, J = 7.7 Hz, 2H), 7.54 – 7.29 (m, 8H), 7.23 – 7.12 (m, 3H), 7.01 (d, J = 7.9 Hz, 1H), 4.52 (t, J = 7.2 Hz, 2H), 3.63 (q, J = 3.2 Hz, 2H), 2.37 (s, 1H), 2.24 (s, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 196.5, 193.5, 136.0, 136.0, 133.6, 130.1, 130.0, 129.8, 129.4, 129.1, 128.7, 128.4, 128.0, 127.6, 126.7, 126.7, 43.3, 43.2, 38.1, 38.1, 21.4, 21.2.

3-(4-bromo-5-phenyl-2*H*-1,2,3-triazol-2-yl)-1-phenylpropan-1-one (4a)



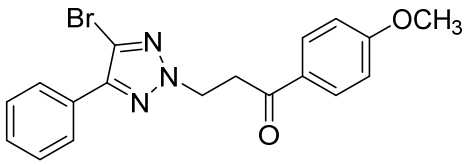
White solid (292 mg, 82%), m.p. 175-176 ºC, R_f = 0.6 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.98 (d, J = 7.0 Hz, 2H), 7.90 (d, J = 6.8 Hz, 2H), 7.59 (t, J = 7.4 Hz, 1H), 7.51 – 7.34 (m, 5H), 4.89 (t, J = 7.2 Hz, 2H), 3.74 (t, J = 7.2 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 196.2, 145.3, 136.1, 133.5, 129.0, 128.7, 128.7, 128.5, 128.0, 127.1, 119.5, 50.6, 37.6. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{17}H_{14}BrN_3O+H^+$: 356.0393, found: 356.0393.

3-(4-bromo-5-phenyl-2H-1,2,3-triazol-2-yl)-1-(2-chlorophenyl)propan-1-one (**4b**)



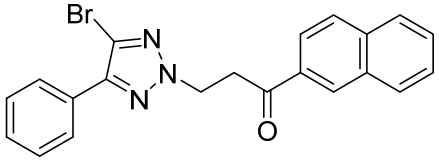
Yellow oil (316 mg, 81%), R_f = 0.6 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.91 – 7.86 (m, 2H), 7.58 – 7.53 (m, 1H), 7.46 – 7.39 (m, 5H), 7.36 – 7.30 (m, 1H), 4.88 (t, J = 6.9 Hz, 2H), 3.72 (t, J = 6.9 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 199.0, 145.4, 138.2, 132.3, 130.7, 129.5, 129.0, 128.8, 128.5, 127.2, 127.2, 127.0, 119.6, 50.5, 41.6. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{17}H_{13}BrClN_3O+H^+$: 390.0003, found: 390.0002.

3-(4-bromo-5-phenyl-2H-1,2,3-triazol-2-yl)-1-(4-methoxyphenyl)propan-1-one (**4c**)



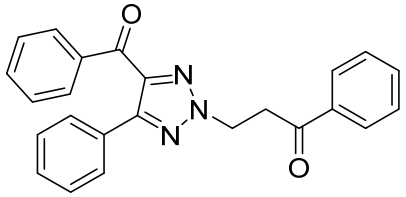
Yellow solid (328.1 mg, 85%), m.p. 131-132 °C, R_f = 0.6 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ8.00 – 7.85 (m, 4H), 7.47 – 7.36 (m, 3H), 6.93 (d, J = 8.9 Hz, 2H), 4.87 (t, J = 7.3 Hz, 2H), 3.85 (s, 3H), 3.68 (t, J = 7.2 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 194.7, 163.8, 145.2, 130.3, 129.2, 129.0, 128.7, 128.5, 127.1, 119.4, 113.8, 55.4, 50.8, 37.2. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{18}H_{16}BrN_3O_2+H^+$: 386.0499, found: 386.0497.

3-(4-bromo-5-phenyl-2H-1,2,3-triazol-2-yl)-1-(naphthalen-2-yl)propan-1-one (**4d**)



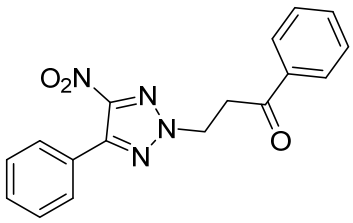
White solid (337.1 mg, 83%), m.p. 104-105 °C, R_f = 0.6 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.69 (d, J = 8.6 Hz, 1H), 8.04 – 7.98 (m, 1H), 7.97 – 7.92 (m, 1H), 7.91 – 7.86 (m, 3H), 7.63 – 7.47 (m, 3H), 7.46 – 7.36 (m, 3H), 4.97 (t, J = 6.9 Hz, 2H), 3.82 (t, J = 6.9 Hz, 2H), **^{13}C NMR** (100 MHz, $CDCl_3$) δ 199.9, 145.3, 134.6, 133.9, 133.4, 130.1, 129.0, 128.8, 128.5, 128.4, 128.2, 128.2, 127.2, 126.6, 125.8, 124.3, 119.5, 50.9, 40.4. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{21}H_{16}BrN_3O+H^+$: 406.0550, found: 406.0546.

3-(4-benzoyl-5-phenyl-2H-1,2,3-triazol-2-yl)-1-phenylpropan-1-one (**4e**)



White solid (328.7 mg, 84%), m.p. 98-99 °C, R_f = 0.6 (petroleum/ethyl acetate = 5:1), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.06 – 7.95 (m, 4H), 7.86 – 7.77 (m, 2H), 7.64 – 7.52 (m, 2H), 7.50 – 7.44 (m, 2H), 7.44 – 7.37 (m, 5H), 5.00 (t, J = 7.0 Hz, 2H), 3.79 (t, J = 7.0 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 196.2, 187.7, 149.7, 141.8, 137.2, 136.1, 133.6, 133.2, 130.3, 129.6, 129.0, 128.7, 128.6, 128.3, 128.2, 128.0, 50.4, 37.4. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{24}H_{19}N_3O_2+H^+$: 382.1550, found: 382.1542.

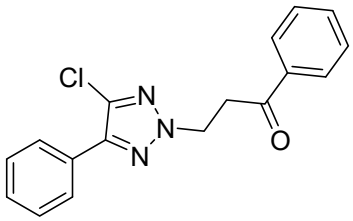
3-(4-nitro-5-phenyl-2H-1,2,3-triazol-2-yl)-1-phenylpropan-1-one (**4f**)



Yellow oil (268.1 mg, 83%), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.96 (dd, J = 7.4, 2.9 Hz, 2H), 7.71 (dd, J = 5.1, 2.6 Hz, 2H), 7.62 – 7.54 (m, 1H), 7.51 – 7.38 (m, 5H), 5.05 – 4.86 (m, 2H), 3.80 (t, J = 6.3 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 195.5, 149.0,

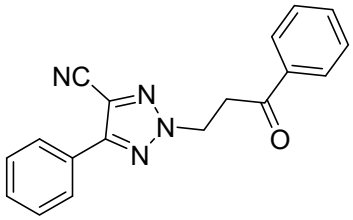
142.8, 135.7, 133.6, 129.9, 129.1, 128.6, 128.3, 127.9, 126.9, 51.3, 36.8. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{17}H_{14}N_4O_3+H^+$: 323.1139, found: 323.1139.

3-(4-chloro-5-phenyl-2H-1,2,3-triazol-2-yl)-1-phenylpropan-1-one (**4g**)



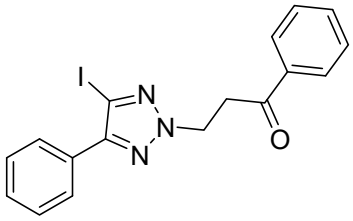
White solid (252.7 mg, 81%), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.12 – 7.82 (m, 4H), 7.67 – 7.52 (m, 1H), 7.52 – 7.30 (m, 5H), 4.87 (t, J = 6.7 Hz, 2H), 3.74 (t, J = 6.7 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 196.2, 142.8, 136.1, 133.6, 133.0, 128.7, 128.6, 128.0, 126.9, 50.6, 37.5. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{17}H_{14}ClN_3O+H^+$: 312.0898, found: 312.0900

2-(3-oxo-3-phenylpropyl)-5-phenyl-2H-1,2,3-triazole-4-carbonitrile (**4h**)



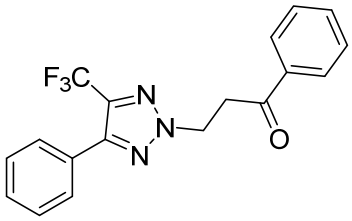
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.02 – 7.92 (m, 4H), 7.62 (t, J = 7.4 Hz, 1H), 7.48 (dt, J = 11.9, 6.4 Hz, 5H), 4.98 (t, J = 7.0 Hz, 2H), 3.80 (t, J = 7.0 Hz, 2H). **^{113}C NMR** (100 MHz, $CDCl_3$) δ 195.75, 151.08, 135.91, 133.82, 130.15, 129.11, 128.81, 128.07, 127.47, 126.66, 112.61, 51.03, 37.15. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{18}H_{14}N_4O+H^+$: 303.1240, found: 303.1243

3-(4-iodo-5-phenyl-2H-1,2,3-triazol-2-yl)-1-phenylpropan-1-one (**4i**)



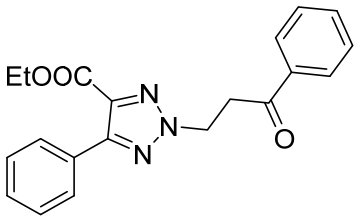
White solid (354.6 mg, 88%),**^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.17 – 7.74 (m, 4H), 7.59 (s, 1H), 7.53 – 7.32 (m, 5H), 4.93 (t, J = 6.4 Hz, 2H), 3.75 (t, J = 6.3 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 196.3, 136.1, 133.6, 129.6, 128.8, 128.7, 128.5, 128.1, 127.6, 88.6, 50.6, 37.8. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{17}H_{14}IN_3O+H^+$: 404.0254, found: 404.0259

1-phenyl-3-(4-phenyl-5-(trifluoromethyl)-2H-1,2,3-triazol-2-yl)propan-1-one (**4j**)



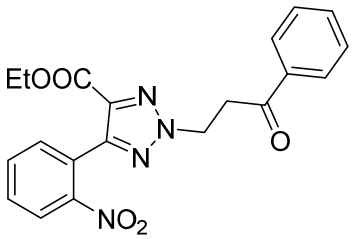
^{1}H NMR (400 MHz, $CDCl_3$) δ 7.99 (d, J = 7.7 Hz, 2H), 7.67 (d, J = 7.5 Hz, 2H), 7.51 – 7.44 (m, 5H), 4.97 (t, J = 7.2 Hz, 2H), 3.79 (t, J = 7.2 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 196.06, 146.26, 136.05, 133.71, 129.38, 128.77, 128.66, 128.43, 128.21, 128.20, 128.08, 120.99 (d, J = 268.6 Hz), 50.63, 37.53. **HRMS** (ESI-MS) m/z $[M+Na]^+$ calcd for $C_{18}H_{14}F_3N_3O+Na^+$: 368.0981, found: 368.0986

ethyl 2-(3-oxo-3-phenylpropyl)-5-phenyl-2H-1,2,3-triazole-4-carboxylate (**4k**)



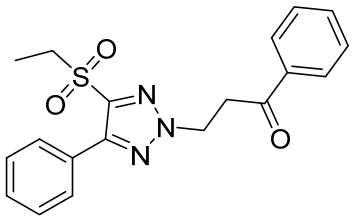
Yellow oil (280.1 mg, 80%), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.02 – 7.94 (m, 2H), 7.85 – 7.77 (m, 2H), 7.63 – 7.56 (m, 1H), 7.49 (t, J = 7.6 Hz, 2H), 7.42 (d, J = 7.8 Hz, 3H), 5.06 – 4.91 (m, 2H), 4.40 (t, J = 7.1 Hz, 2H), 3.81 (dd, J = 8.4, 5.7 Hz, 2H), 1.43 – 1.32 (m, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 196.1, 161.1, 149.9, 136.1, 135.8, 133.6, 129.4, 129.1, 129.1, 128.7, 128.0, 61.4, 50.7, 37.7, 14.1. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{20}H_{19}N_3O_3+H^+$: 350.1499, found: 350.1501.

ethyl 5-(2-nitrophenyl)-2-(3-oxo-3-phenylpropyl)-2H-1,2,3-triazole-4-carboxylate (**4l**)



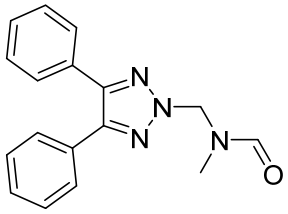
Yellow oil (327.8 mg, 83%), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.14 (d, J = 7.8 Hz, 1H), 8.03 – 7.90 (m, 2H), 7.71 – 7.63 (m, 1H), 7.58 (s, 2H), 7.55 – 7.42 (m, 3H), 5.00 (t, J = 7.0 Hz, 2H), 4.26 (d, J = 7.0 Hz, 2H), 3.81 (t, J = 7.0 Hz, 2H), 1.22 (t, J = 7.0 Hz, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 196.0, 160.3, 148.7, 136.0, 133.7, 132.9, 132.5, 130.1, 128.7, 128.1, 125.4, 124.5, 61.6, 50.9, 37.7, 13.9. **HRMS** (ESI-MS) m/z $[M+H]^+$ calcd for $C_{20}H_{18}N_4O_5+H^+$: 395.1350, found:395.1354

3-(4-(ethylsulfonyl)-5-phenyl-2H-1,2,3-triazol-2-yl)-1-phenylpropan-1-one (**4m**)



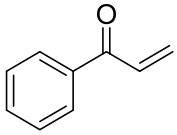
^{1}H NMR (400 MHz, $CDCl_3$) δ 7.99 (d, J = 7.8 Hz, 2H), 7.92 – 7.85 (m, 2H), 7.62 (t, J = 7.3 Hz, 1H), 7.52 – 7.44 (m, 5H), 4.99 (t, J = 7.2 Hz, 2H), 3.80 (t, J = 7.2 Hz, 2H), 3.28 (q, J = 7.2 Hz, 2H), 1.30 (t, J = 7.6 Hz, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 195.90, 147.53, 135.98, 133.82, 133.00, 129.81, 129.11, 128.83, 128.57, 128.08, 127.89, 50.99, 49.92, 37.33, 6.88. **HRMS** (ESI-MS) m/z $[M+Na]^+$ calcd for $C_{19}H_{20}N_3O_3S+Na^+$: 392.1039.1220, found: 392.1041

N-((4,5-diphenyl-2H-1,2,3-triazol-2-yl)methyl)-N-methylformamide (**5**)



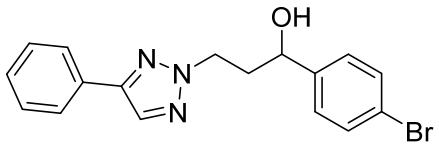
White solid (87%, 229 mg). Mp: 105−107 °C. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.52 (s, 1H), 7.55 – 7.52 (m, 4H), 7.38 – 7.35 (m, 6H), 5.86 (d, J = 121.5 Hz, 2H), 3.11 – 3.00 (m, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 186.9, 163.1, 162.9, 145.9, 145.5, 130.6, 130.5, 130.2, 128.7, 128.6, 128.6, 128.5, 128.5, 128.4, 128.4, 128.3, 128.3, 128.2, 128.2, 128.2, 67.1, 60.8, 33.8, 29.7.

1-phenylprop-2-en-1-one (**6**)



Yellow oil (112mg, 85%), R_f = 0.7 (petroleum/ethyl acetate = 20:1),**^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.93 (dd, J = 8.4, 1.4 Hz, 2H), 7.58 – 7.51 (m, 1H), 7.48 – 7.40 (m, 2H), 7.14 (dd, J = 17.1, 10.6 Hz, 1H), 6.42 (dd, J = 17.2, 1.7 Hz, 1H), 5.90 (dd, J = 10.6, 1.7 Hz, 1H).

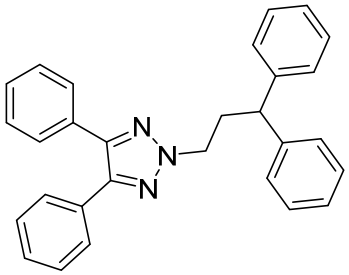
1-(4-bromophenyl)-3-(4-phenyl-2H-1,2,3-triazol-2-yl)propan-1-ol (**9**)



White solid (349 mg, 98%), **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.82 (s, 1H), 7.78 – 7.74 (m, 2H), 7.48 – 7.40 (m, 4H), 7.38 – 7.33 (m, 1H), 7.25 – 7.20 (m, 2H), 4.73 – 4.64 (m, 2H), 4.60 – 4.51 (m, 1H), 2.42 – 2.26 (m, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 147.8,

142.7, 131.6, 130.9, 130.1, 128.9, 128.5, 127.4, 125.8, 121.4, 70.6, 51.7, 38.6. **HRMS** (ESI-MS) m/z $[M+Na]^+$ calcd for $C_{17}H_{17}BrN_3O+ Na^+$: 380.0369, found: 380.0372.

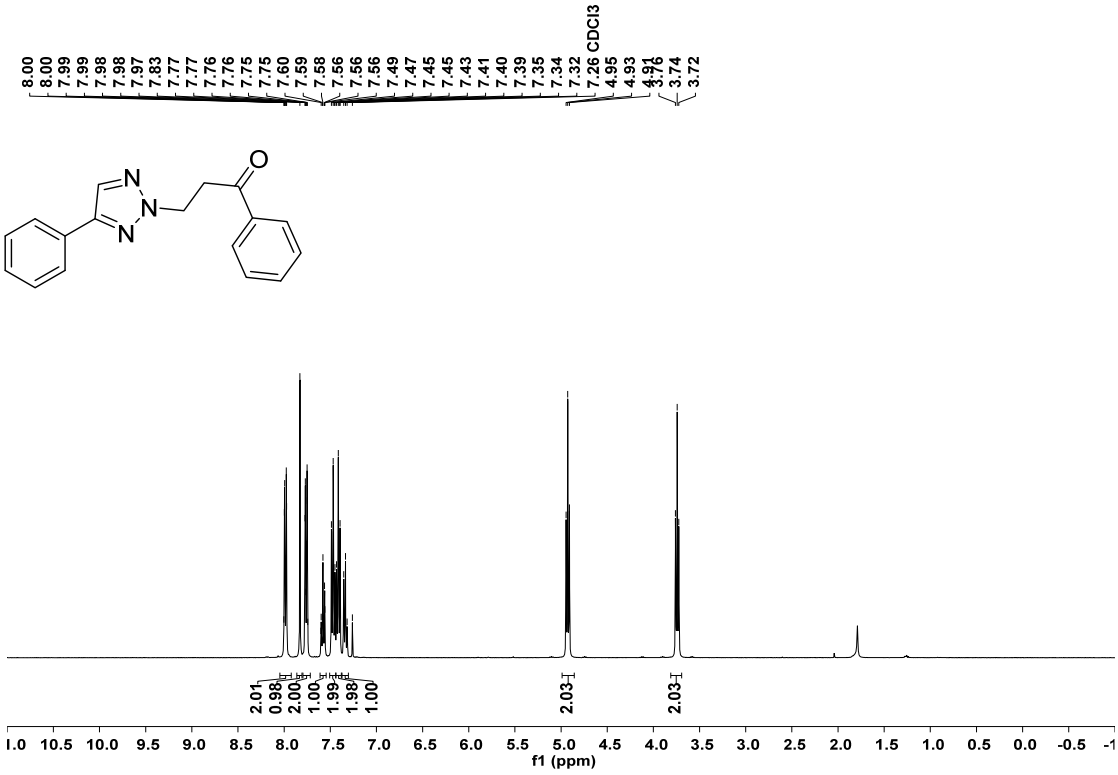
2-(3,3-diphenylpropyl)-4,5-diphenyl-2H-1,2,3-triazole (**10**)

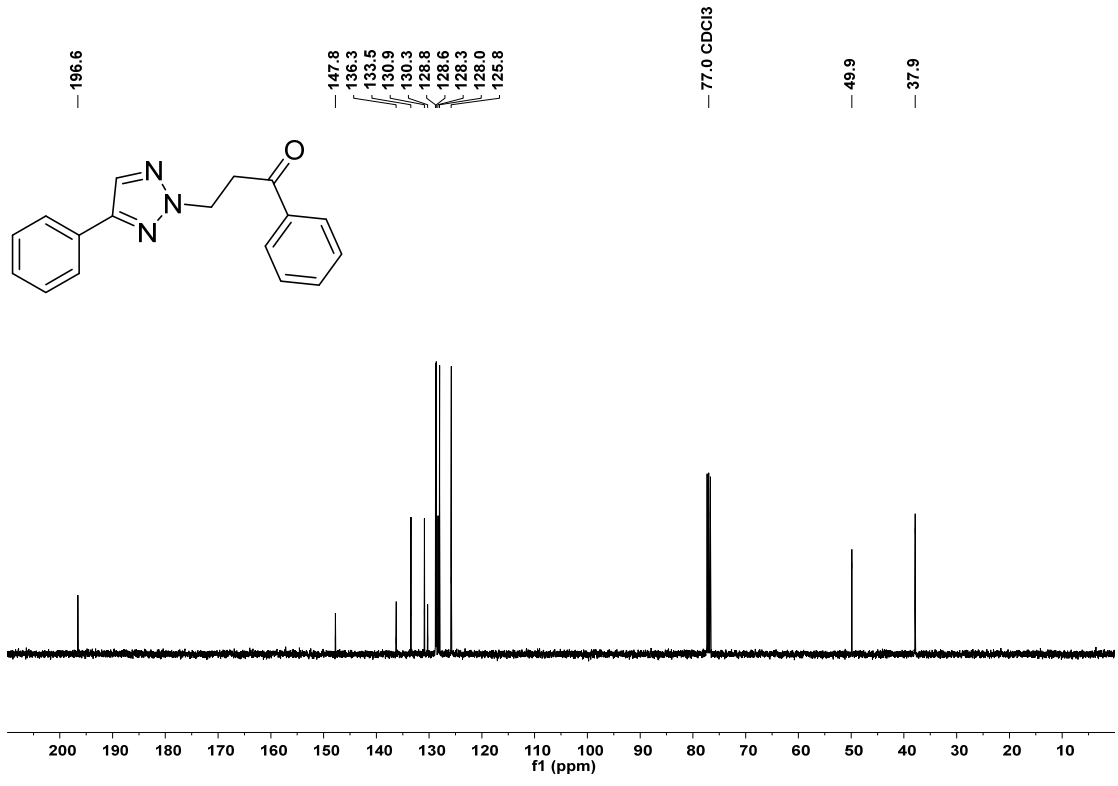


Colorless oil, **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.59 – 7.53 (m, 4H), 7.42 – 7.34 (m, 6H), 7.31 (d, *J* = 4.3 Hz, 8H), 7.21 (d, *J* = 4.4 Hz, 2H), 4.47 (t, *J* = 7.3 Hz, 2H), 4.12 (t, *J* = 7.8 Hz, 1H), 2.85 (q, *J* = 7.5 Hz, 2H). **^{13}C NMR** (126 MHz, $CDCl_3$) δ 144.2, 143.6, 131.1, 128.6, 128.5, 128.2, 128.2, 127.8, 126.5, 53.6, 48.5, 35.5. **HRMS (ESI-MS)** m/z $[M+H]^+$ calcd for $C_{29}H_{25}N_3+H^+$: 416.2121, found: 416.2128.

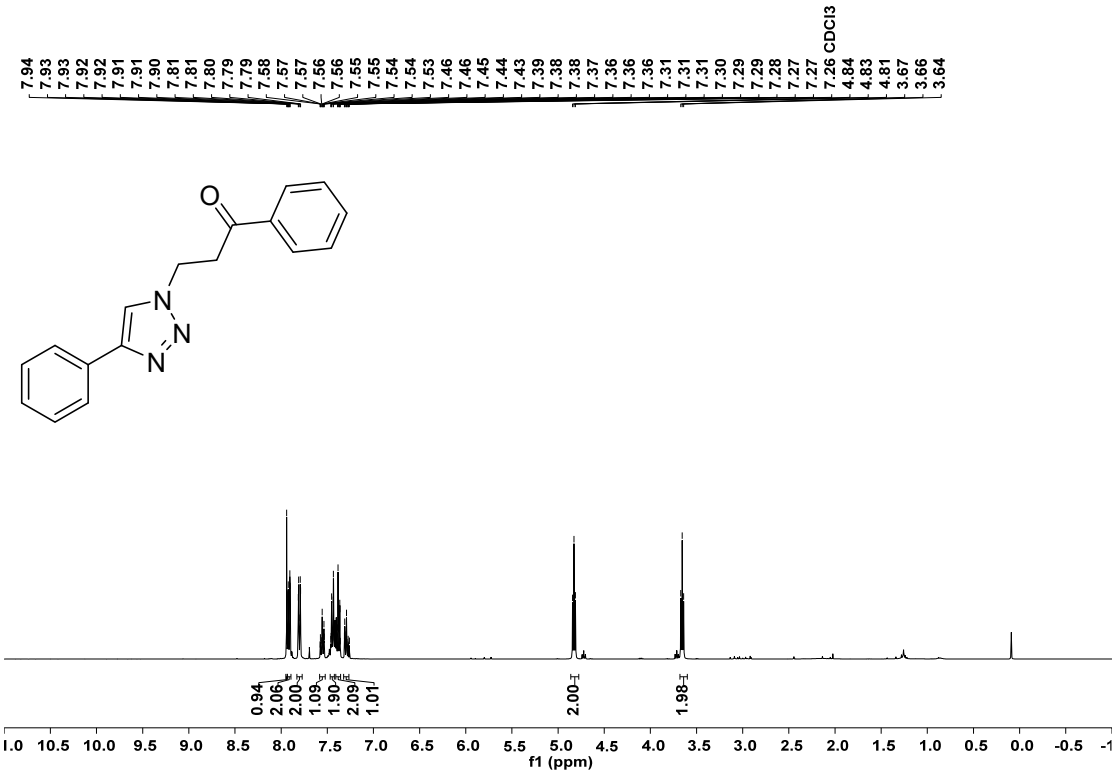
6. NMR spectra

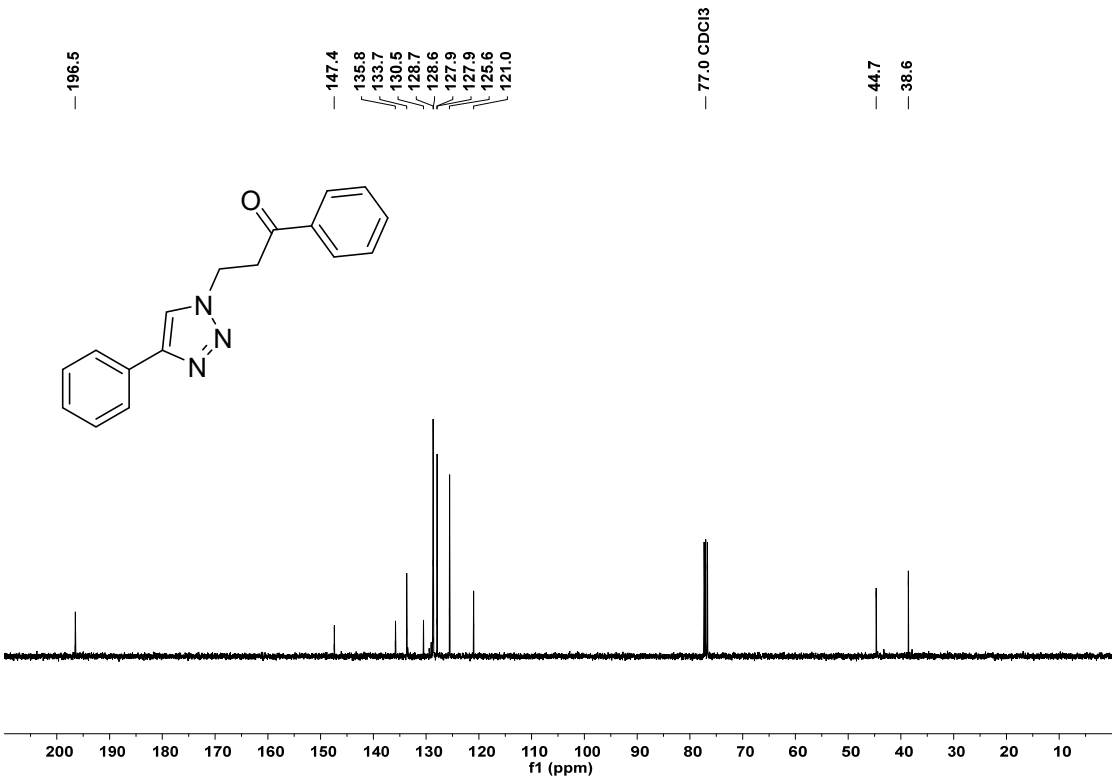
1-phenyl-3-(4-phenyl-2H-1,2,3-triazol-2-yl)propan-1-one (**3a**)



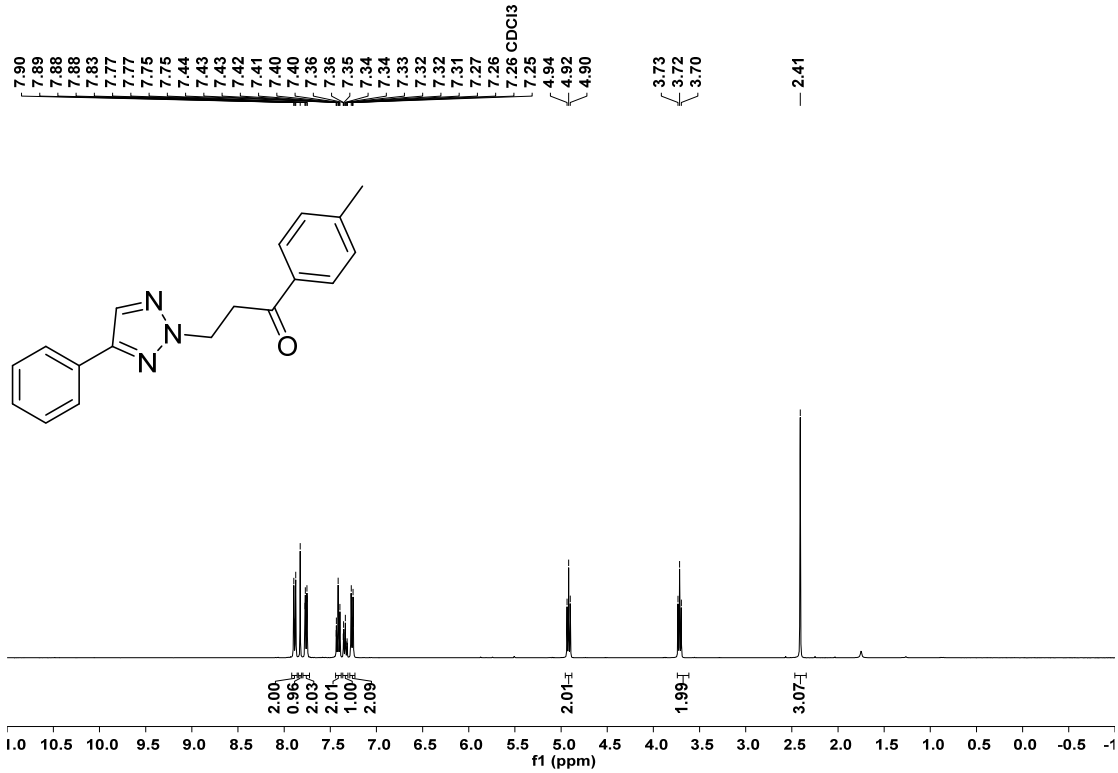


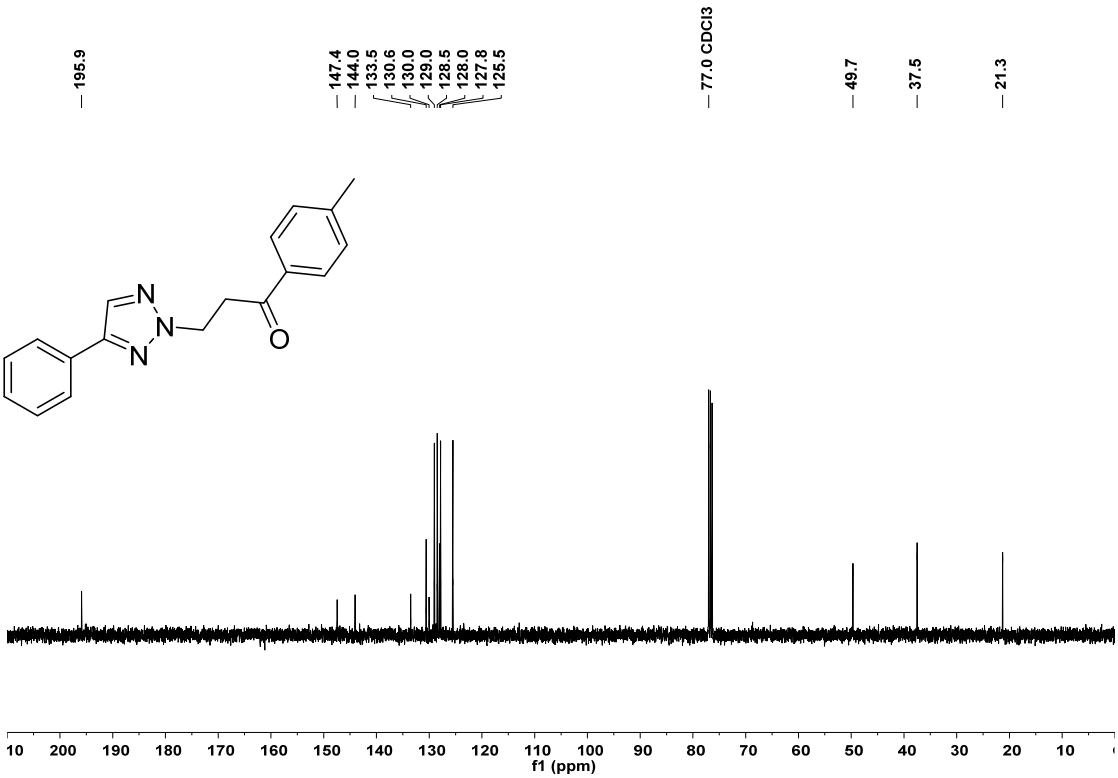
1-phenyl-3-(4-phenyl-1H-1,2,3-triazol-1-yl) propan-1-one (**3'a**)



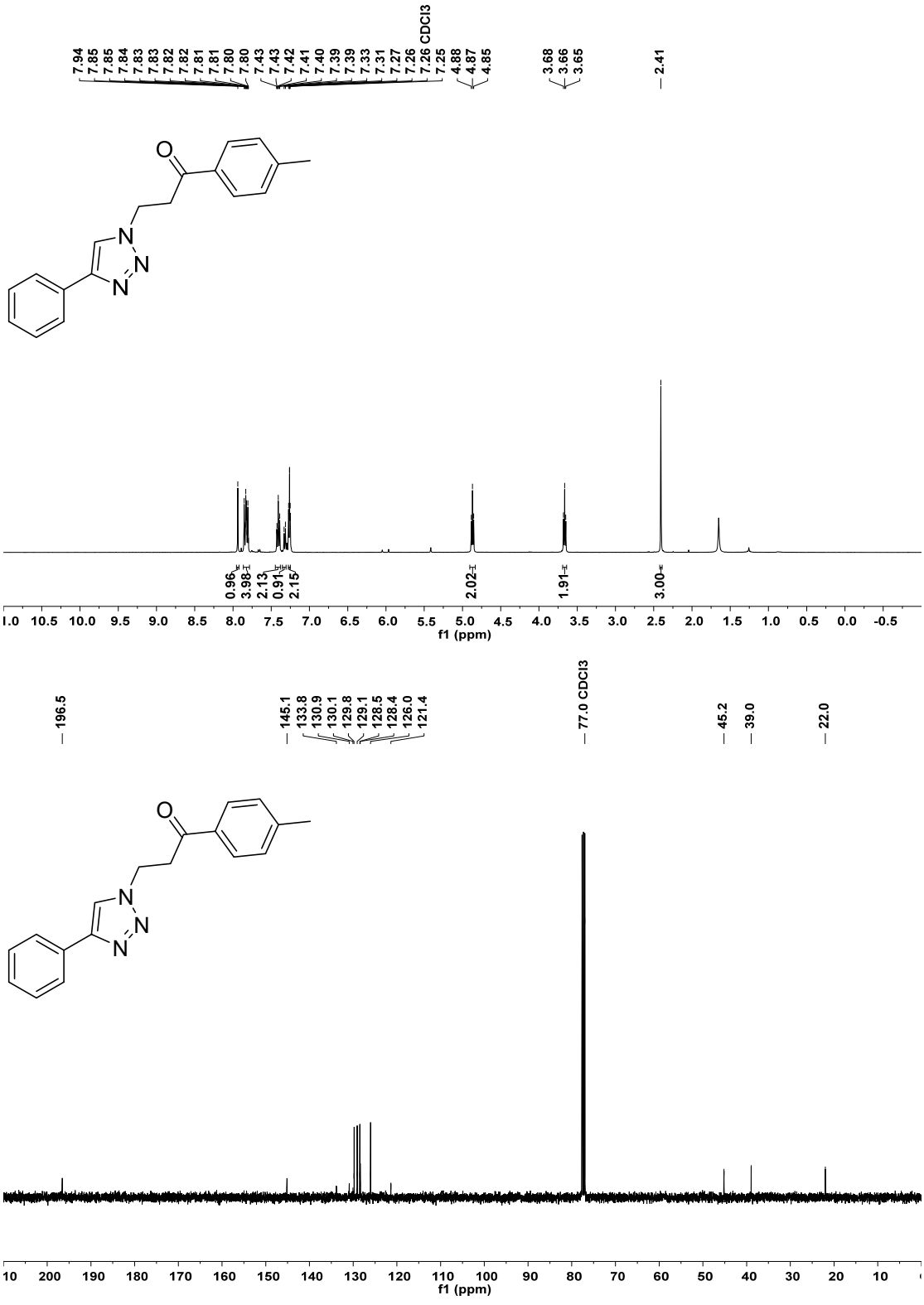


3-(4-phenyl-2H-1,2,3-triazol-2-yl)-1-(p-tolyl)propan-1-one (**3b**)

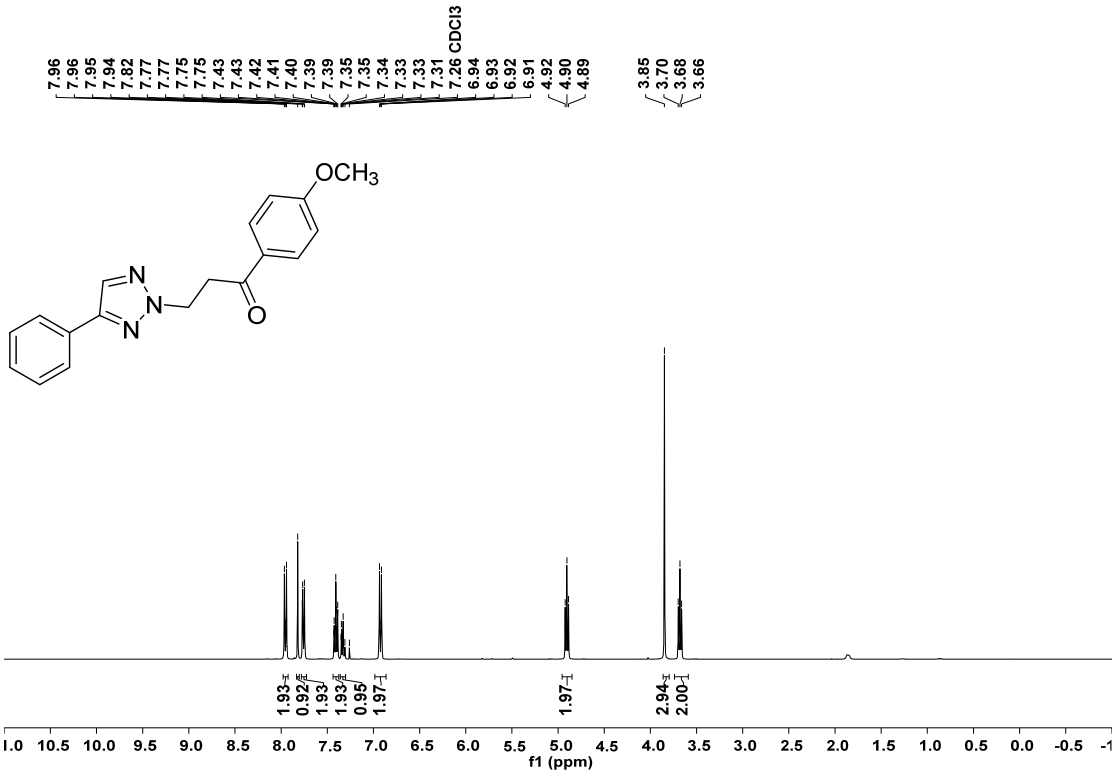


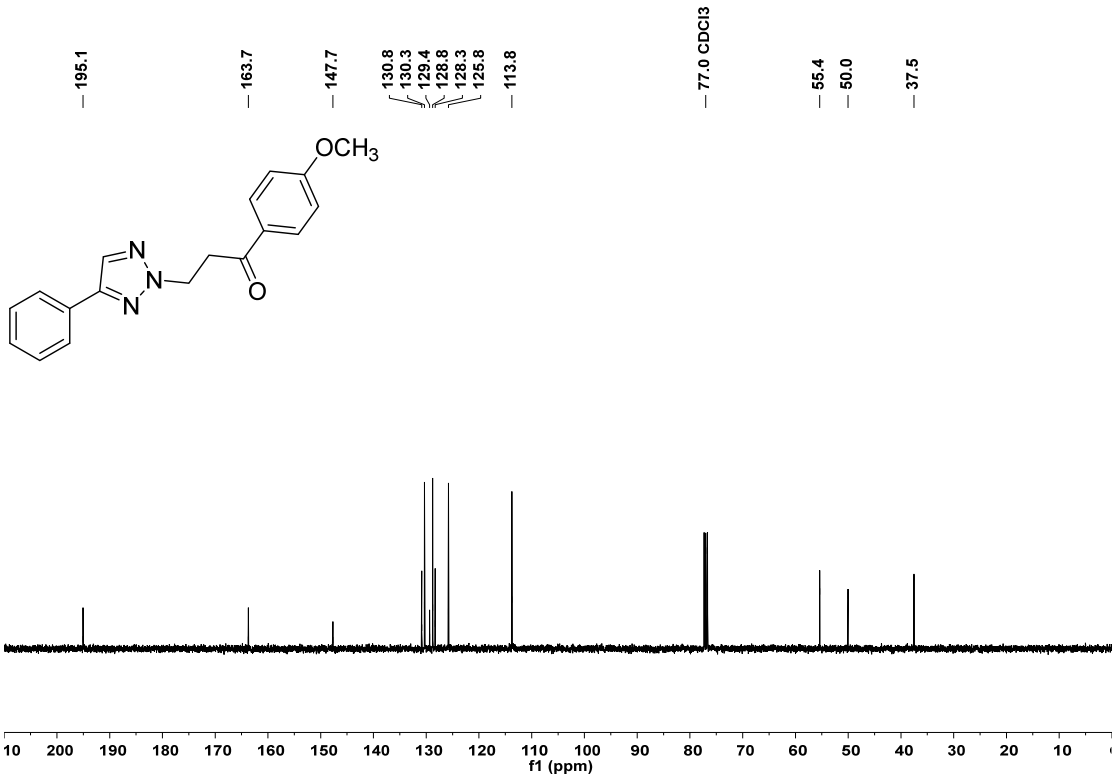


3-(4-phenyl-1H-1,2,3-triazol-1-yl)-1-(p-tolyl)propan-1-one (**3'b**)

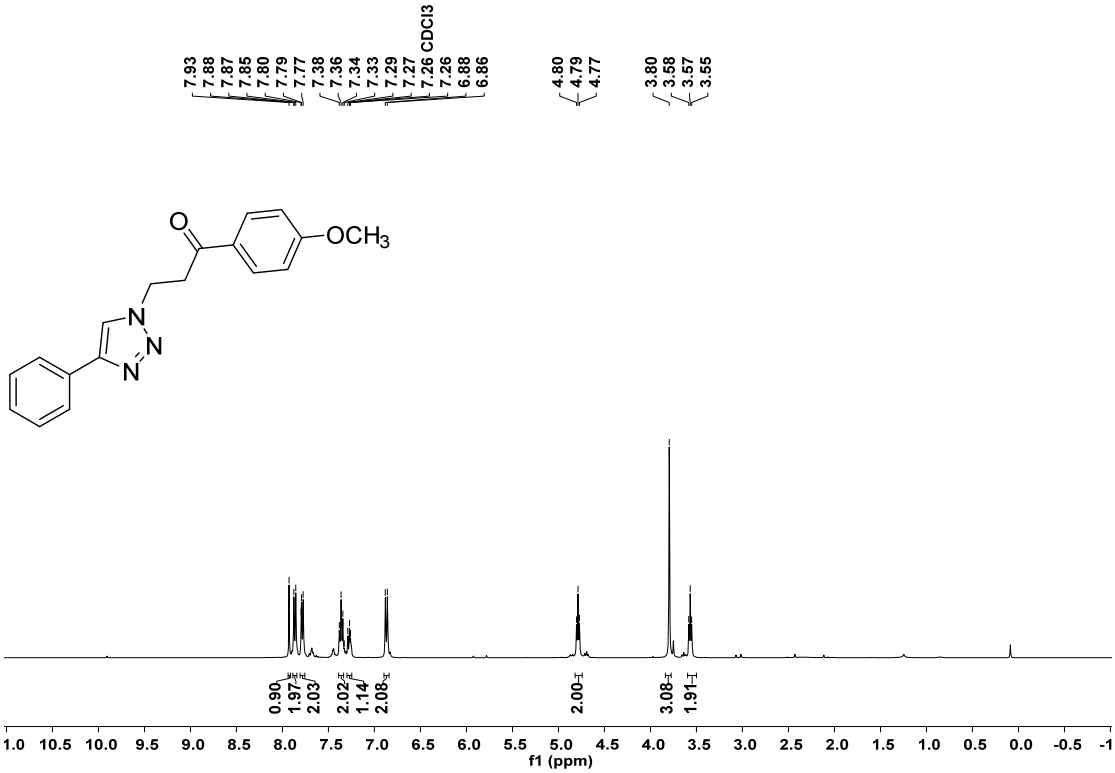


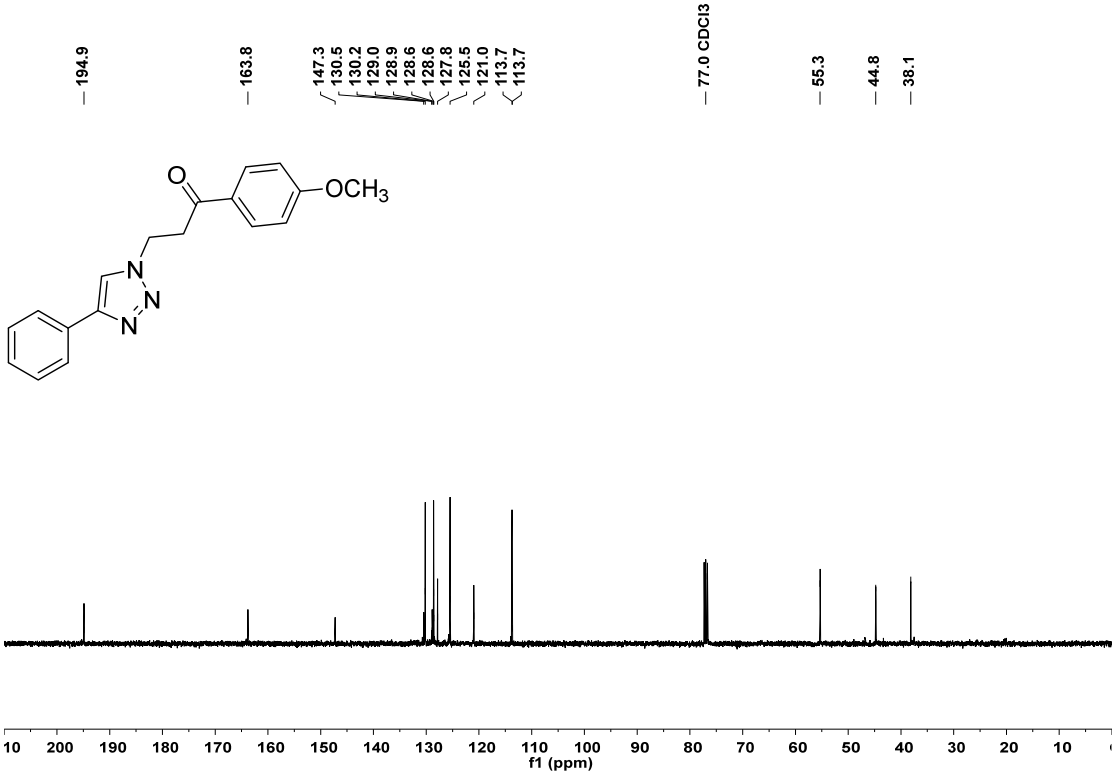
1-(4-methoxyphenyl)-3-(4-phenyl-2H-1,2,3-triazol-2-yl)propan-1-one (**3c**)



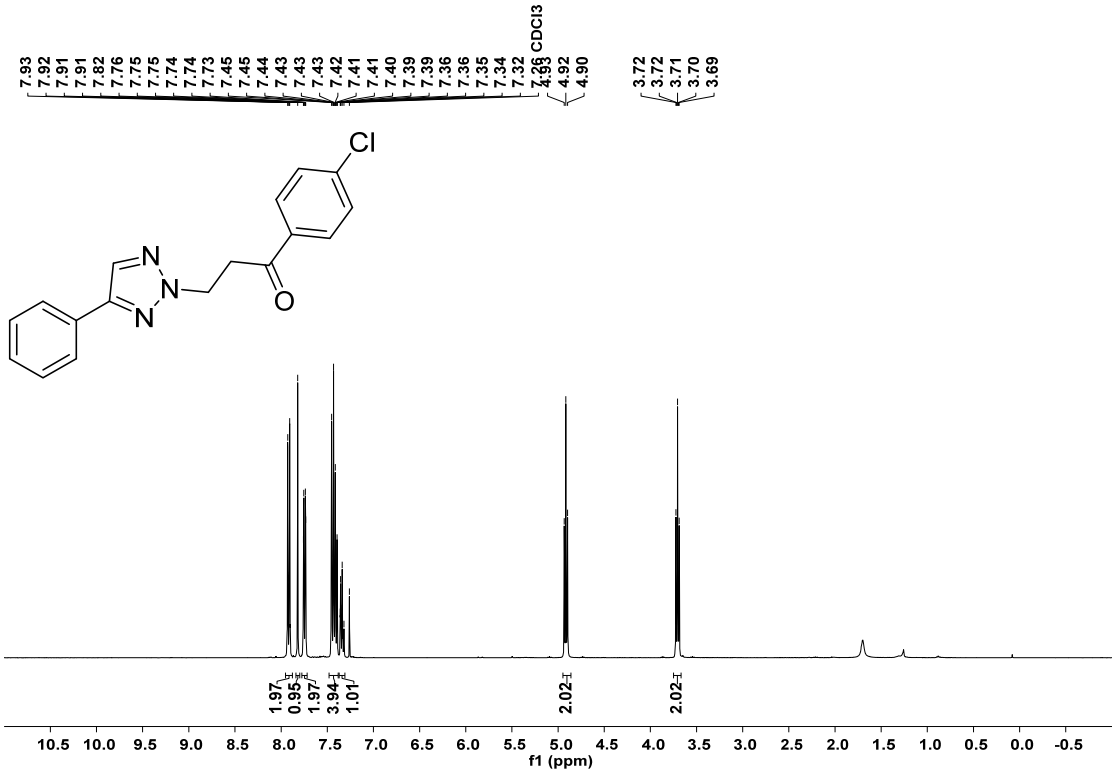


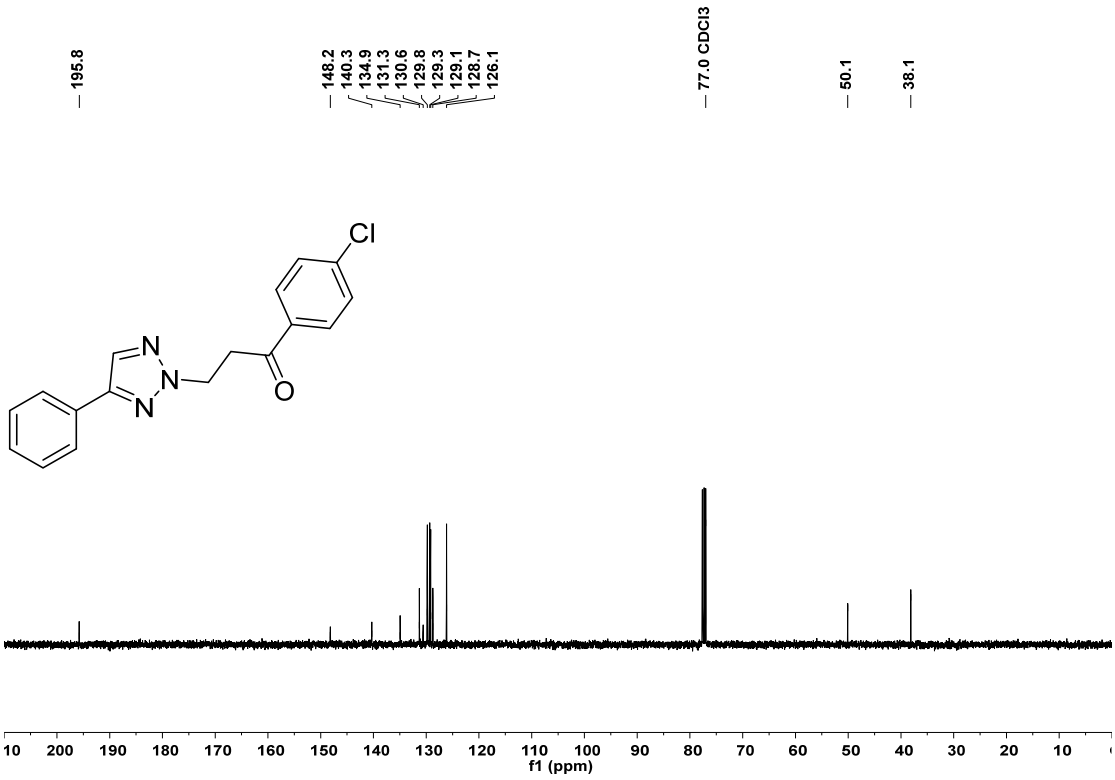
1-(4-methoxyphenyl)-3-(4-phenyl-1H-1,2,3-triazol-1-yl)propan-1-one (**3'c**)



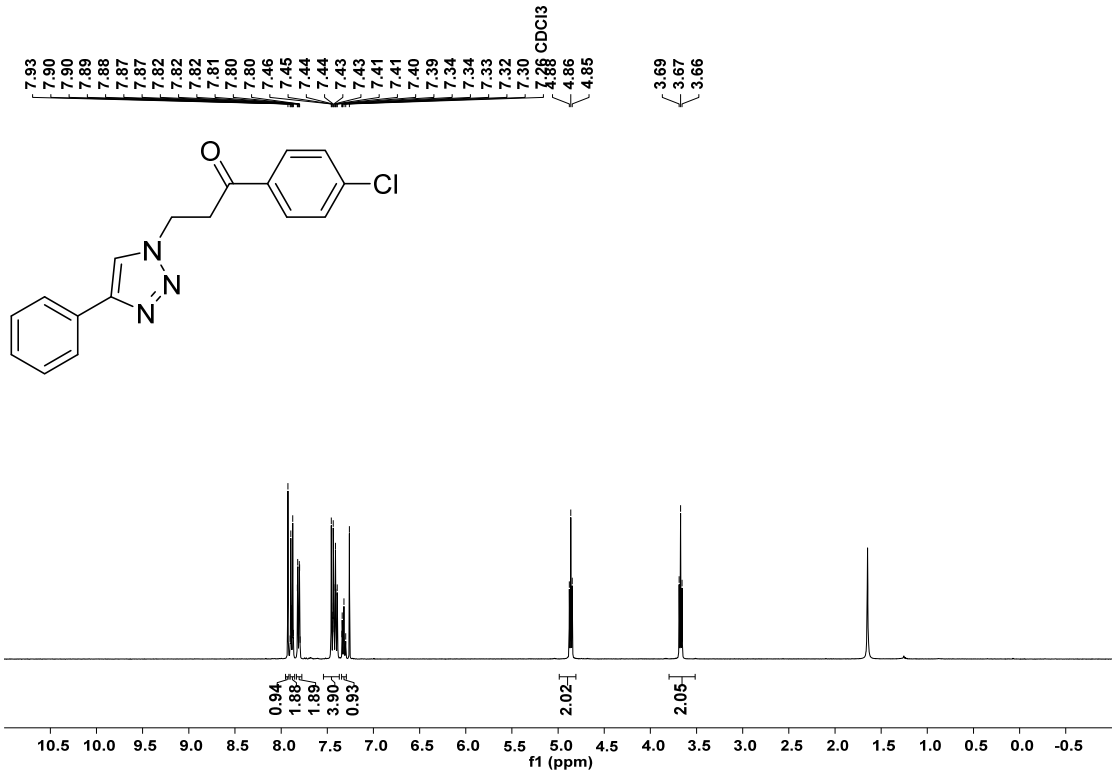


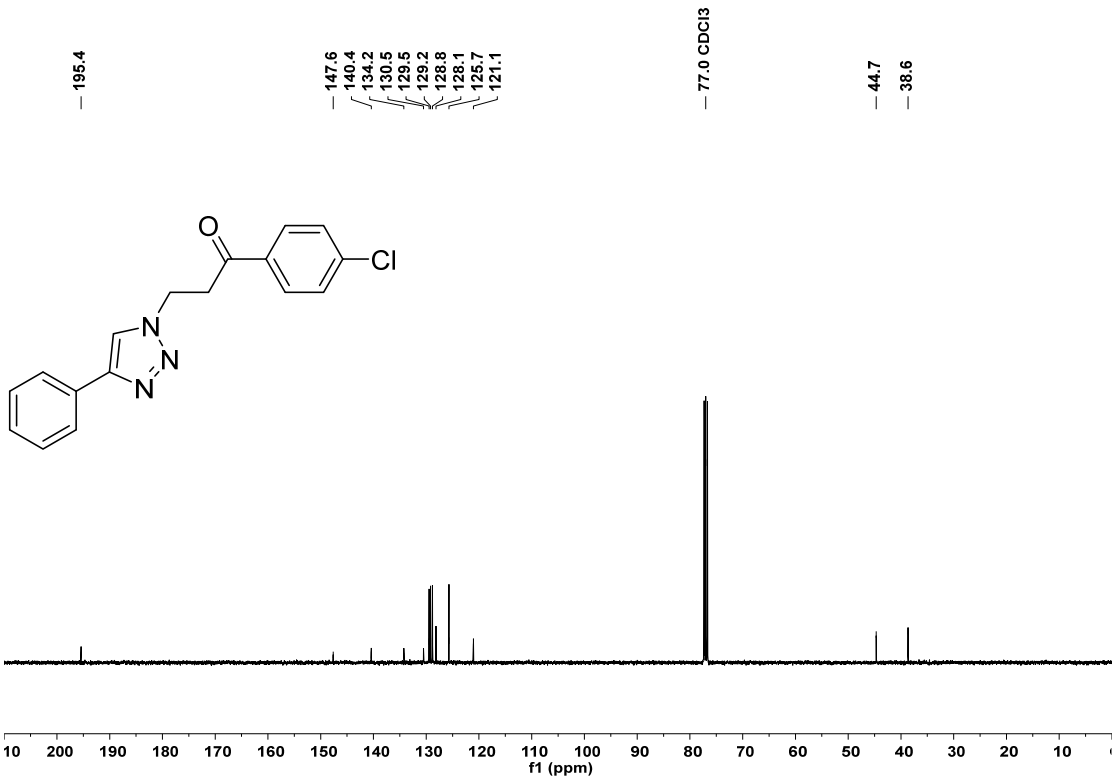
1-(4-chlorophenyl)-3-(4-phenyl-2H-1,2,3-triazol-2-yl)propan-1-one (**3d**)



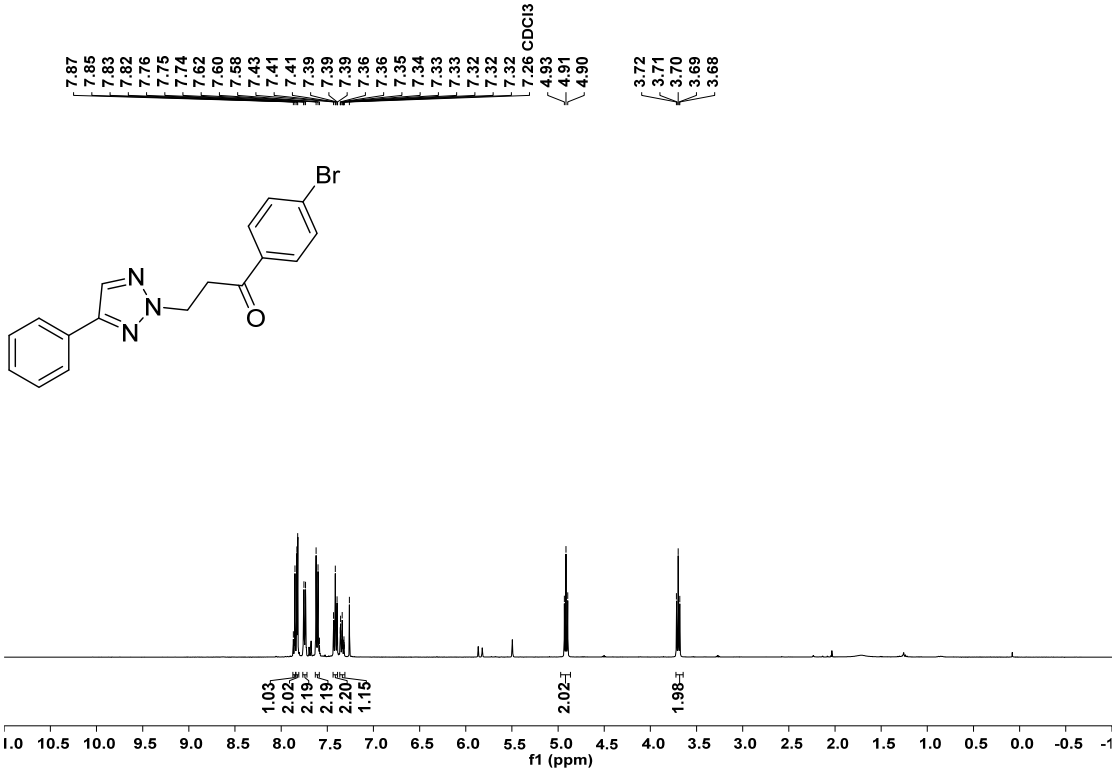


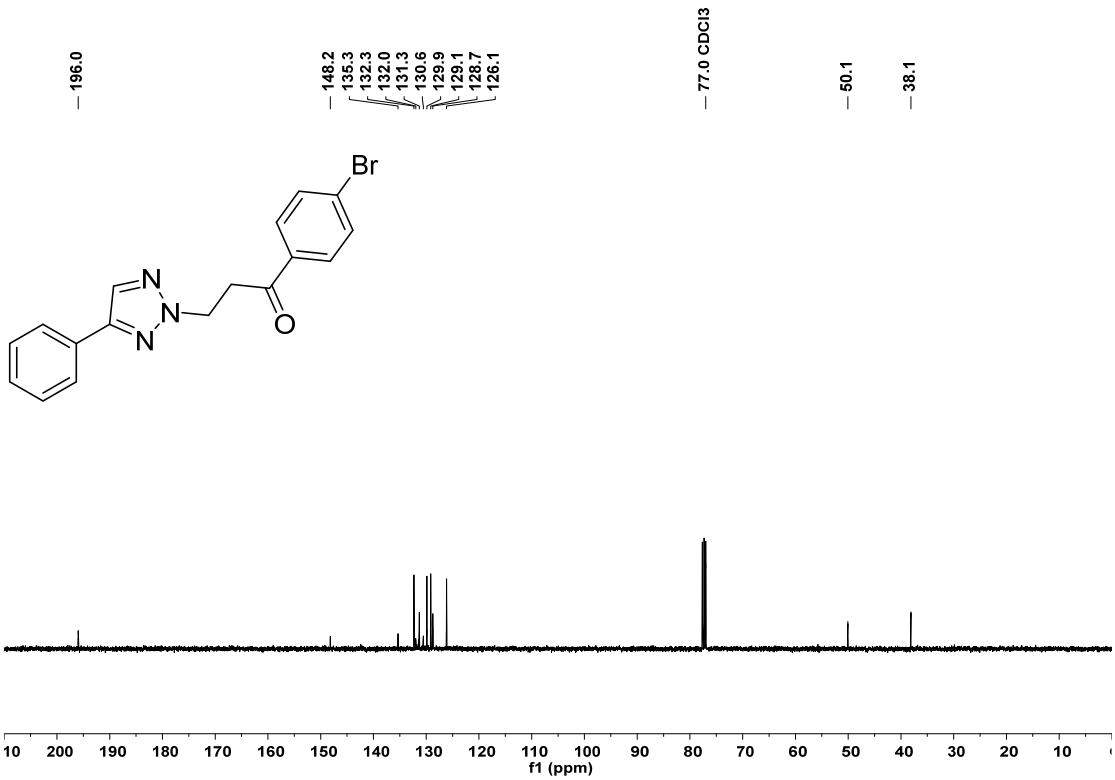
1-(4-chlorophenyl)-3-(4-phenyl-1H-1,2,3-triazol-1-yl)propan-1-one (**3'd**)



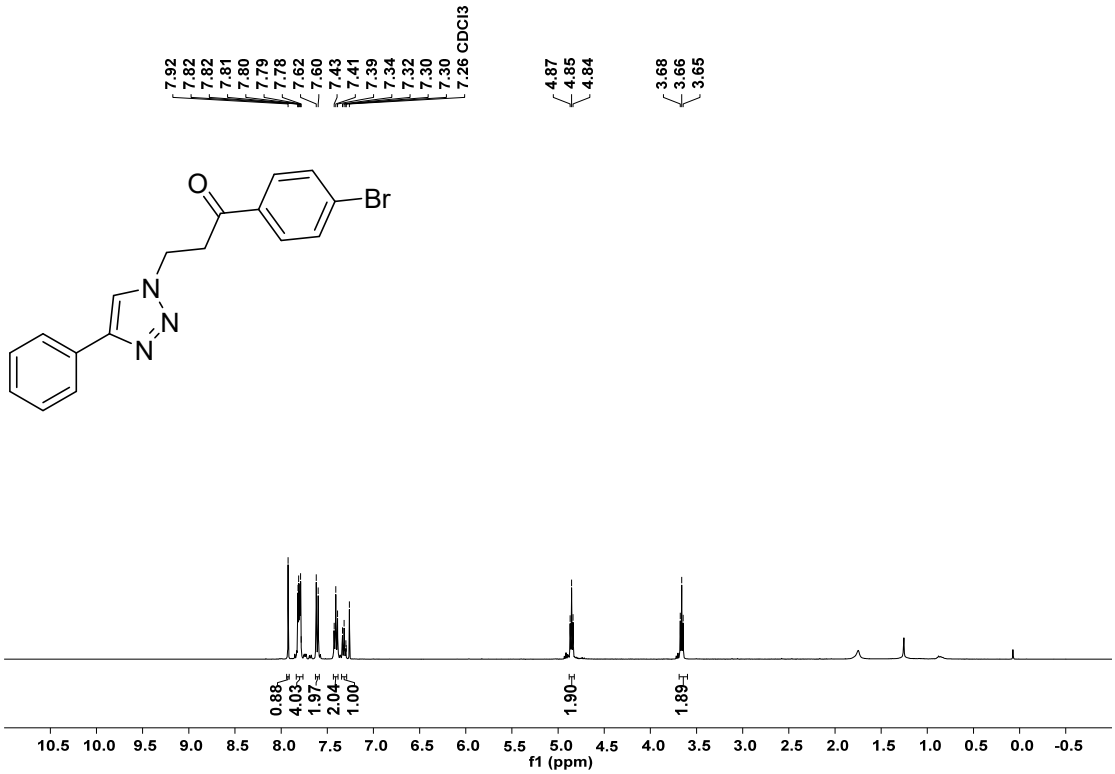


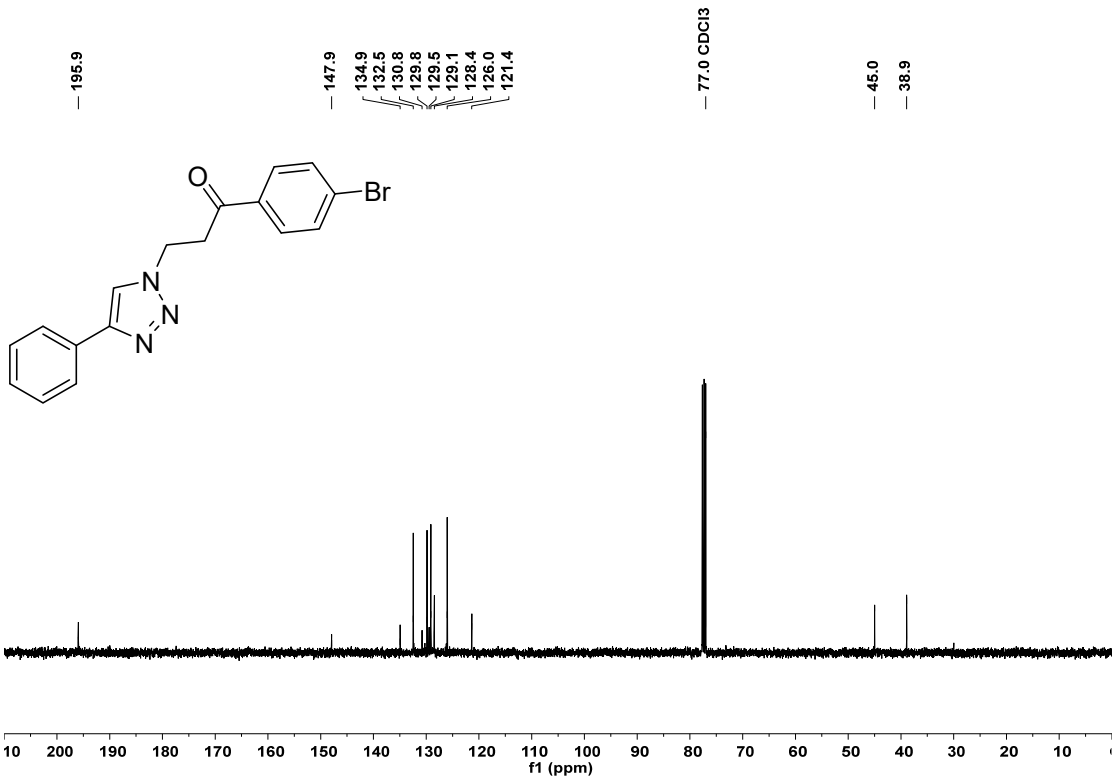
1-(4-bromophenyl)-3-(4-phenyl-2H-1,2,3-triazol-2-yl)propan-1-one (**3e**)



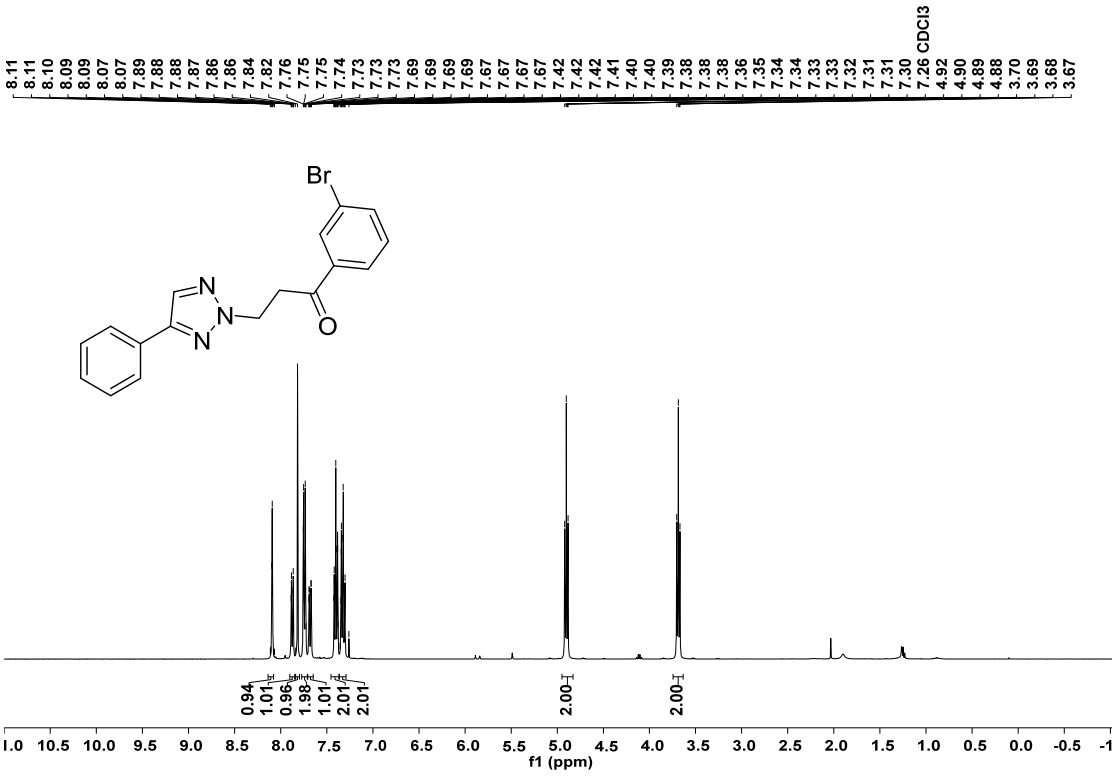


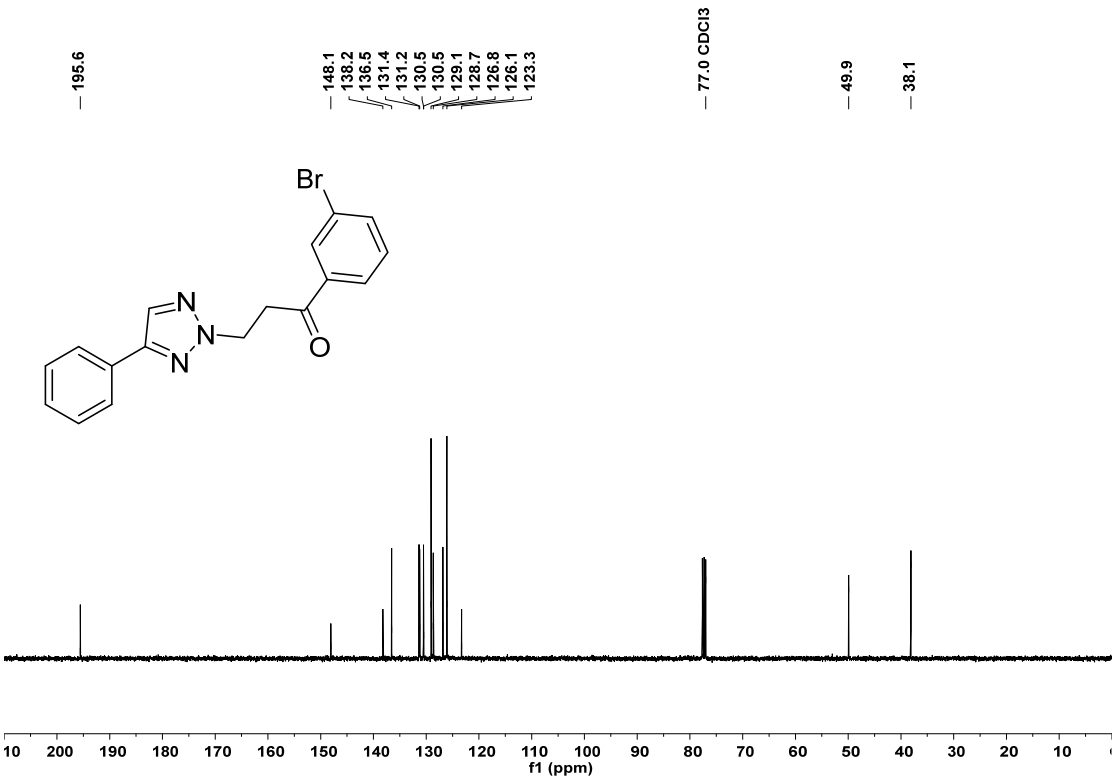
1-(4-bromophenyl)-3-(4-phenyl-1H-1,2,3-triazol-1-yl)propan-1- one (**3'e**)



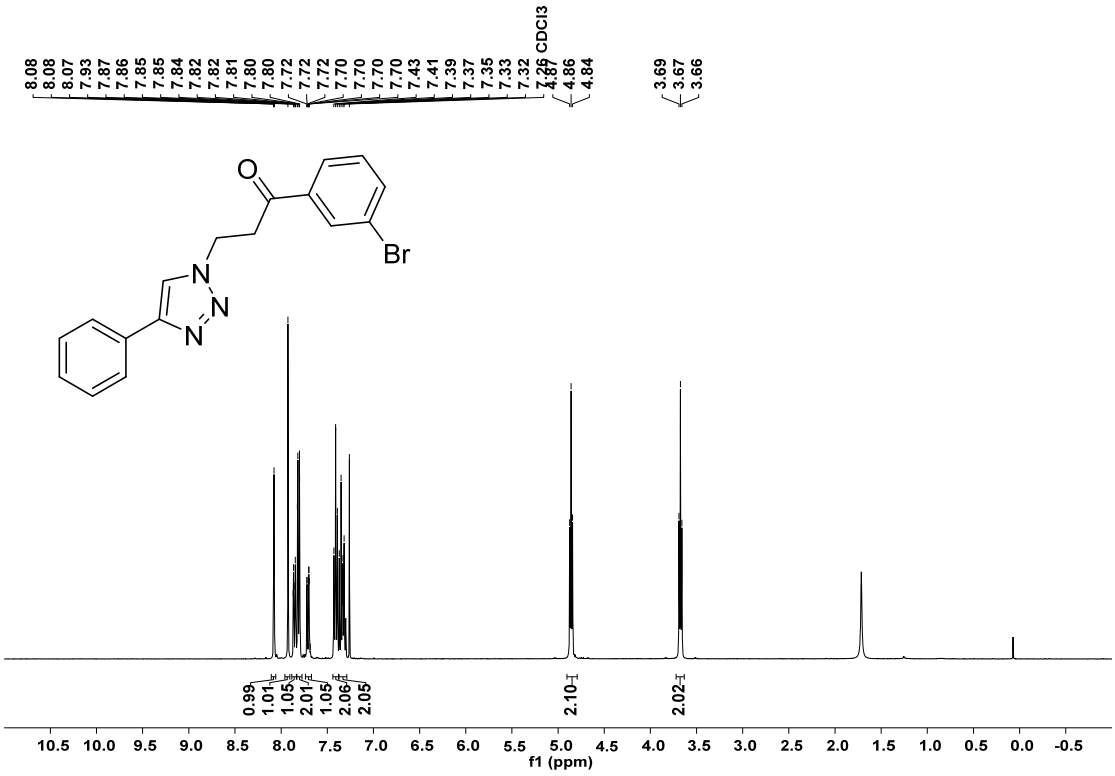


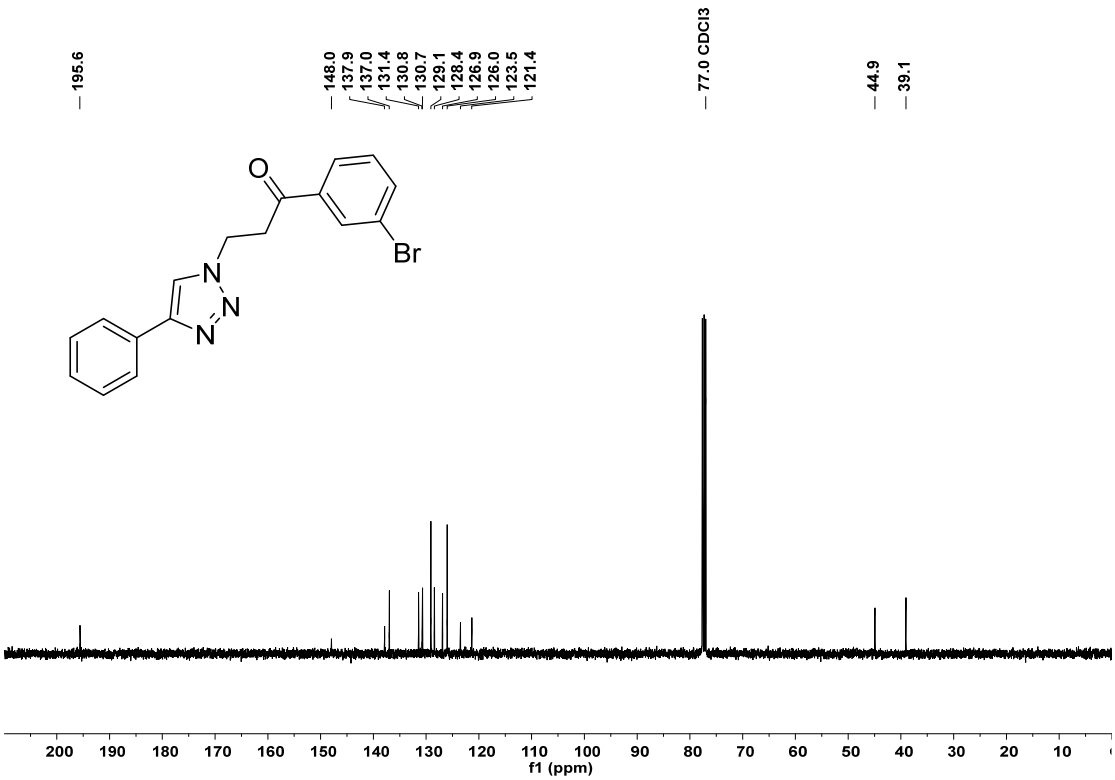
1-(3-bromophenyl)-3-(4-phenyl-2H-1,2,3-triazol-2-yl)propan-1- one (**3f**)



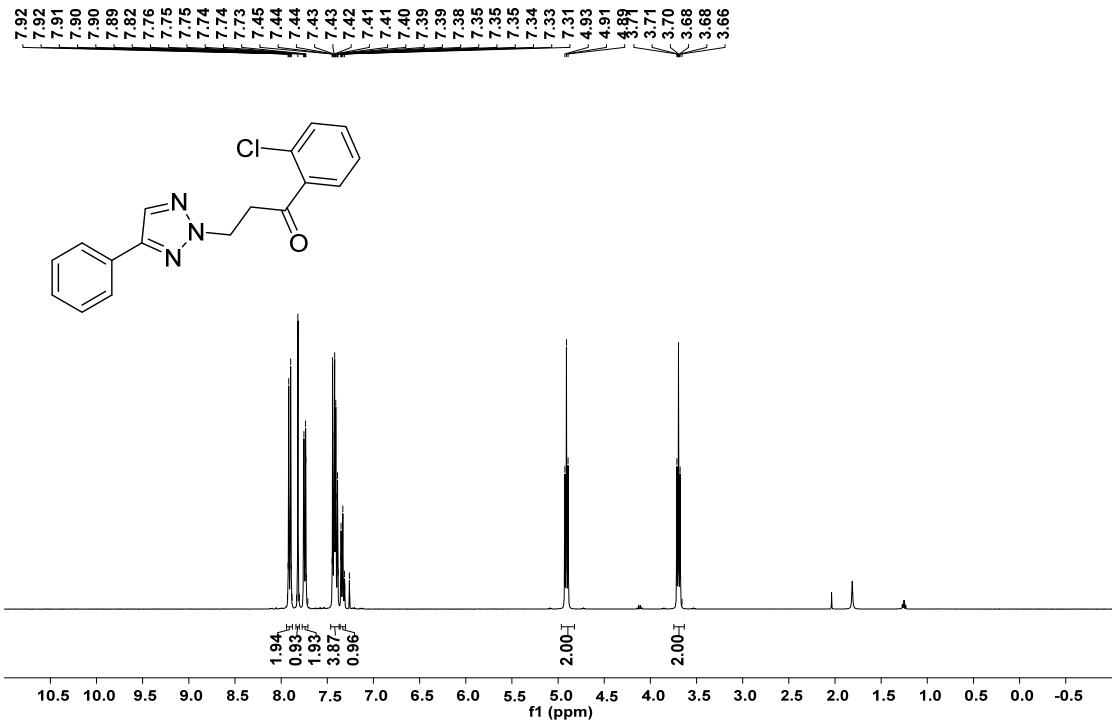


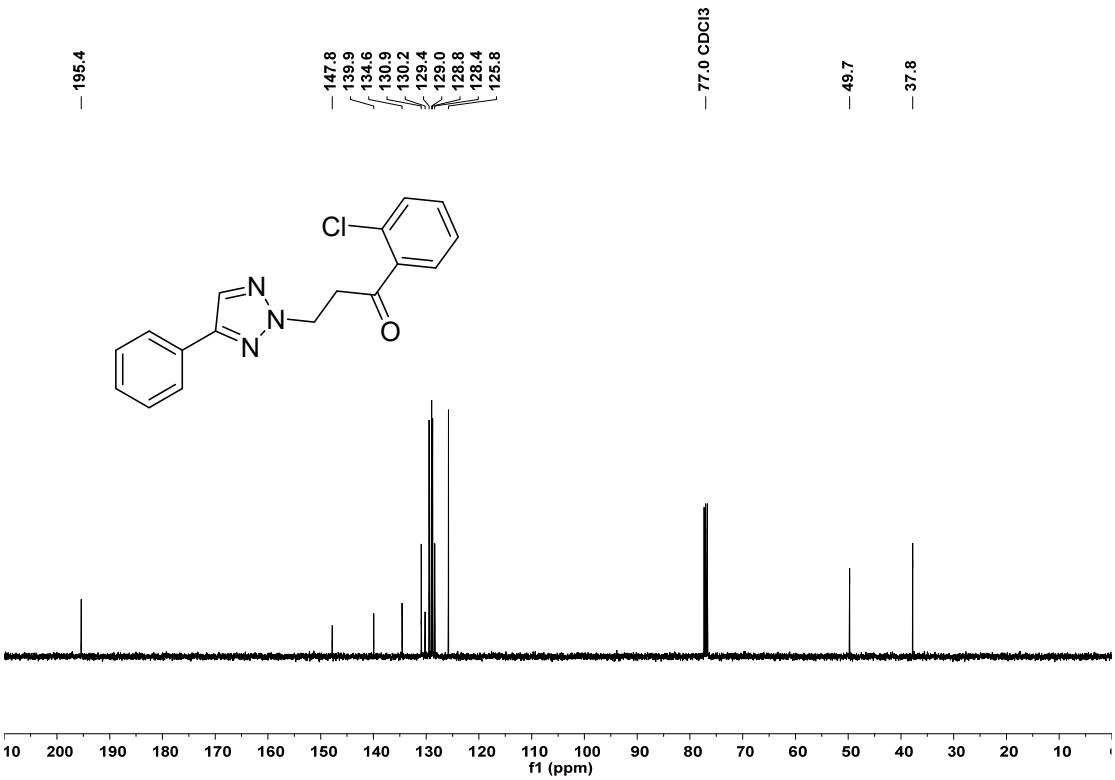
1-(3-bromophenyl)-3-(4-phenyl-1H-1,2,3-triazol-1-yl)propan-1- one (**3'f**)



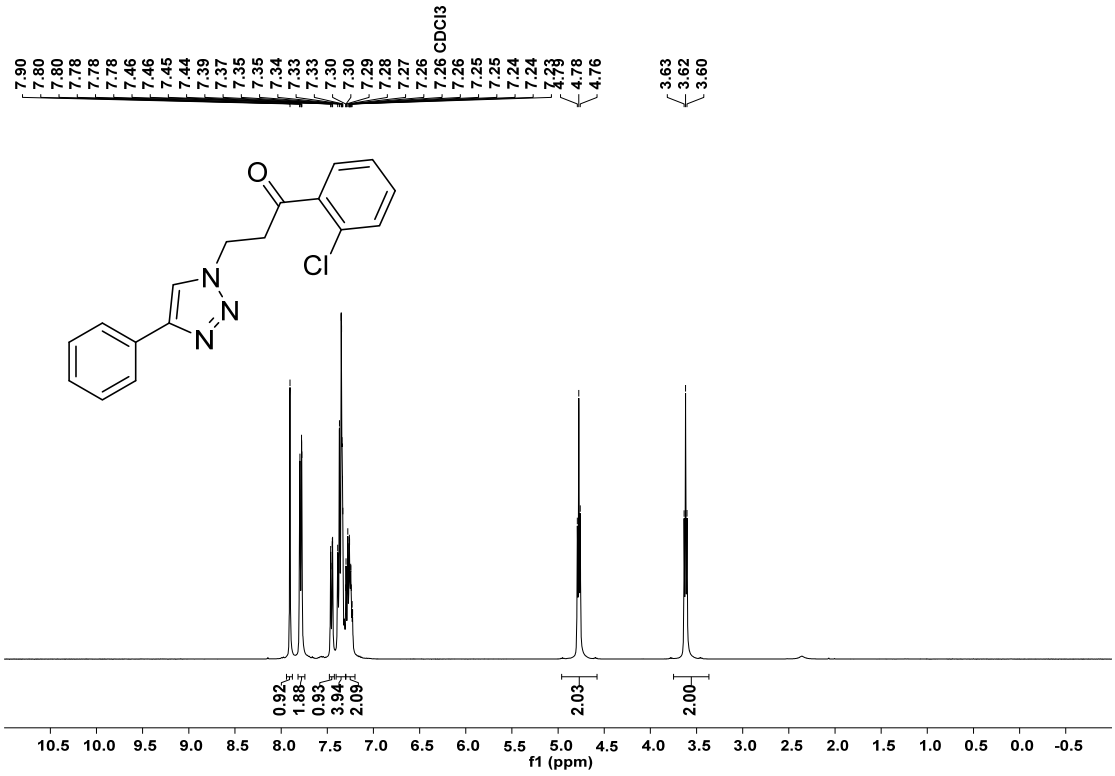


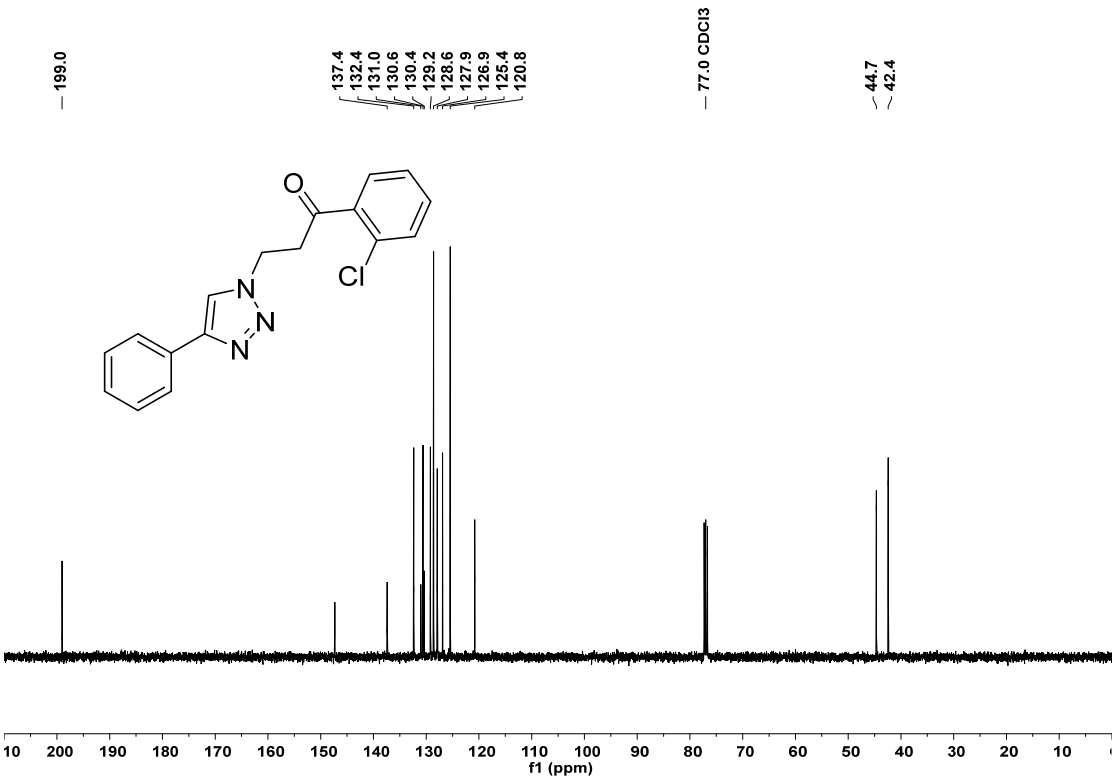
1-(2-chlorophenyl)-3-(4-phenyl-2H-1,2,3-triazol-2-yl)propan-1- one (**3g**)



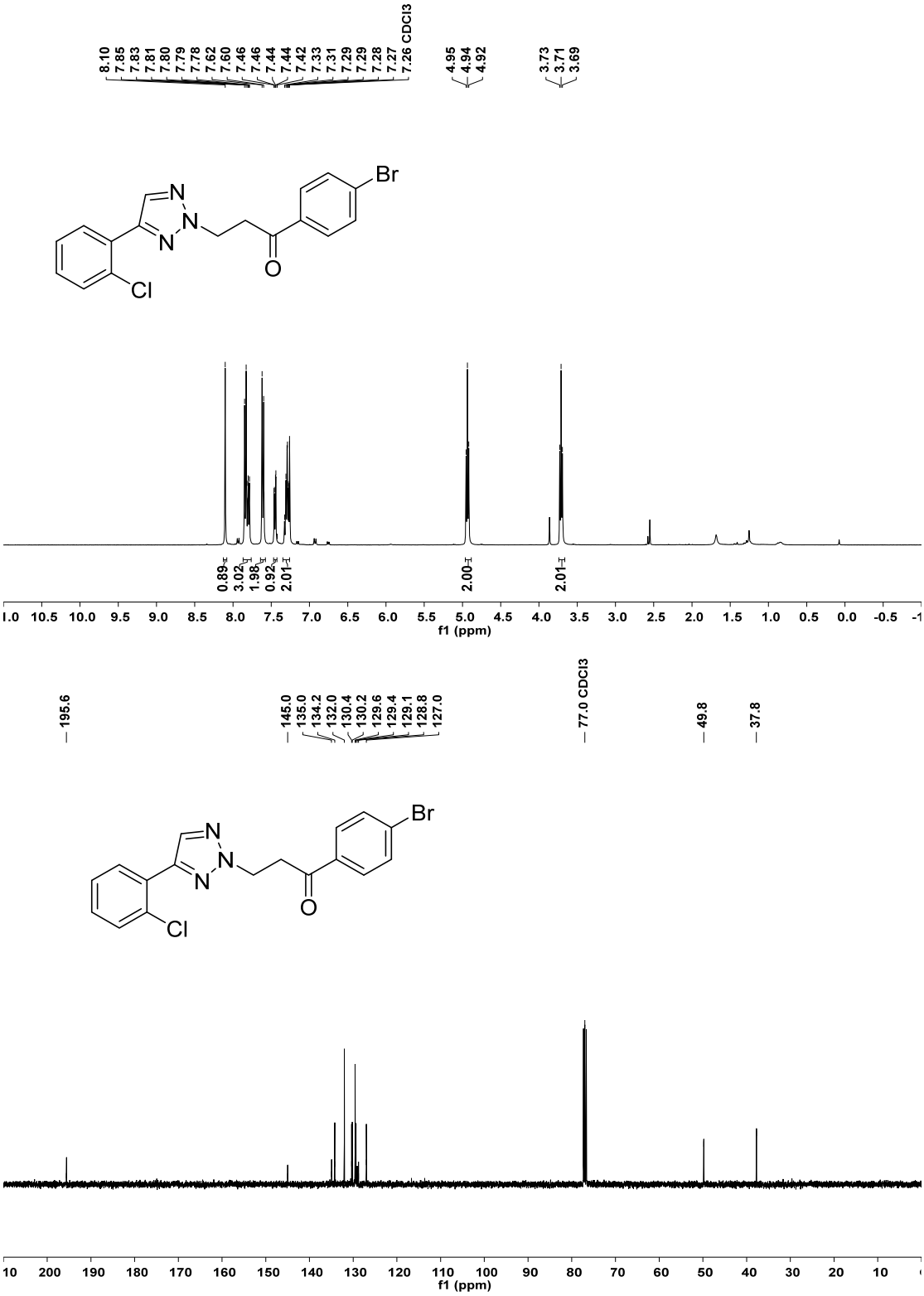


1-(2-chlorophenyl)-3-(4-phenyl-1H-1,2,3-triazol-1-yl)propan-1- one (**3'g**)

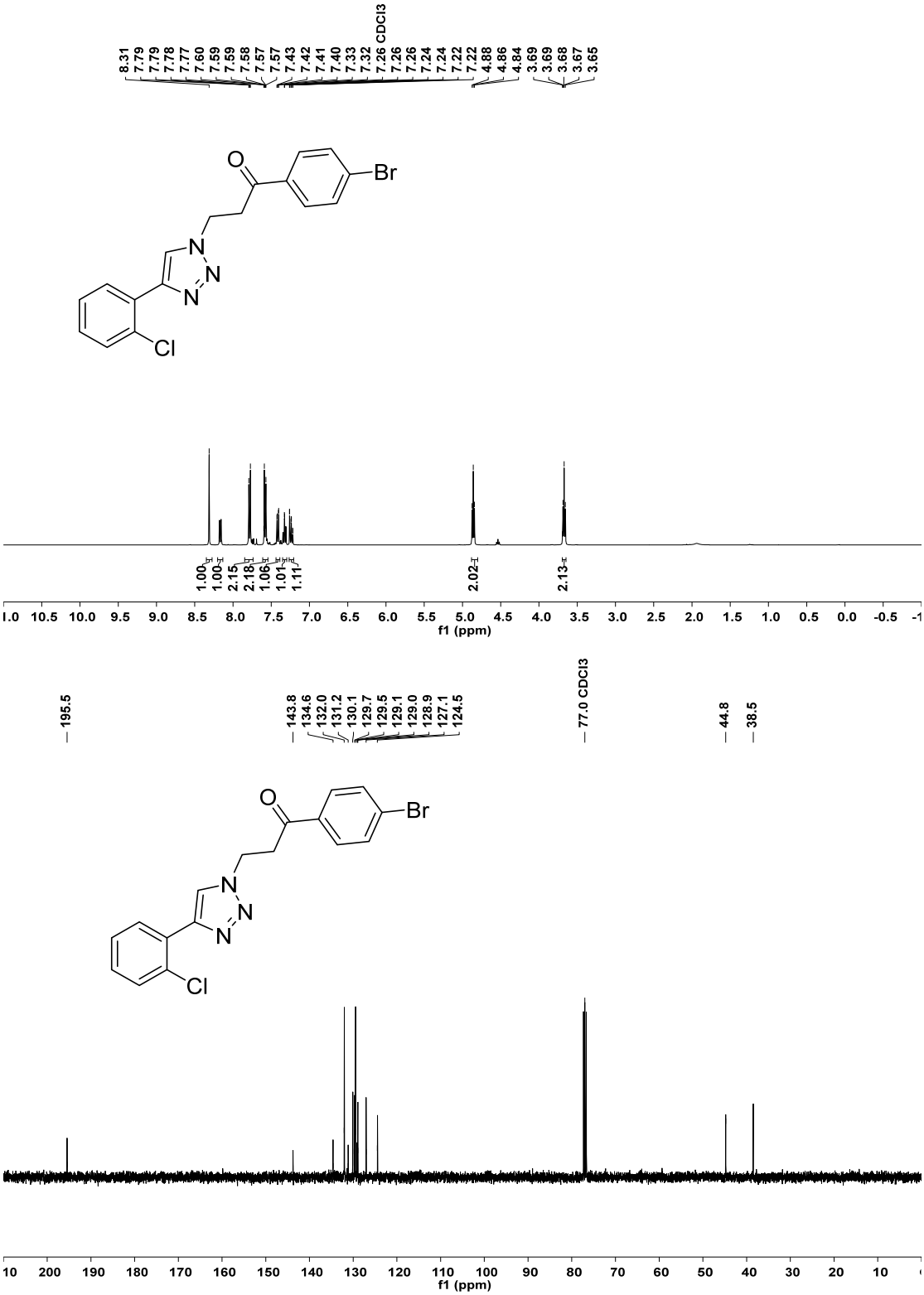




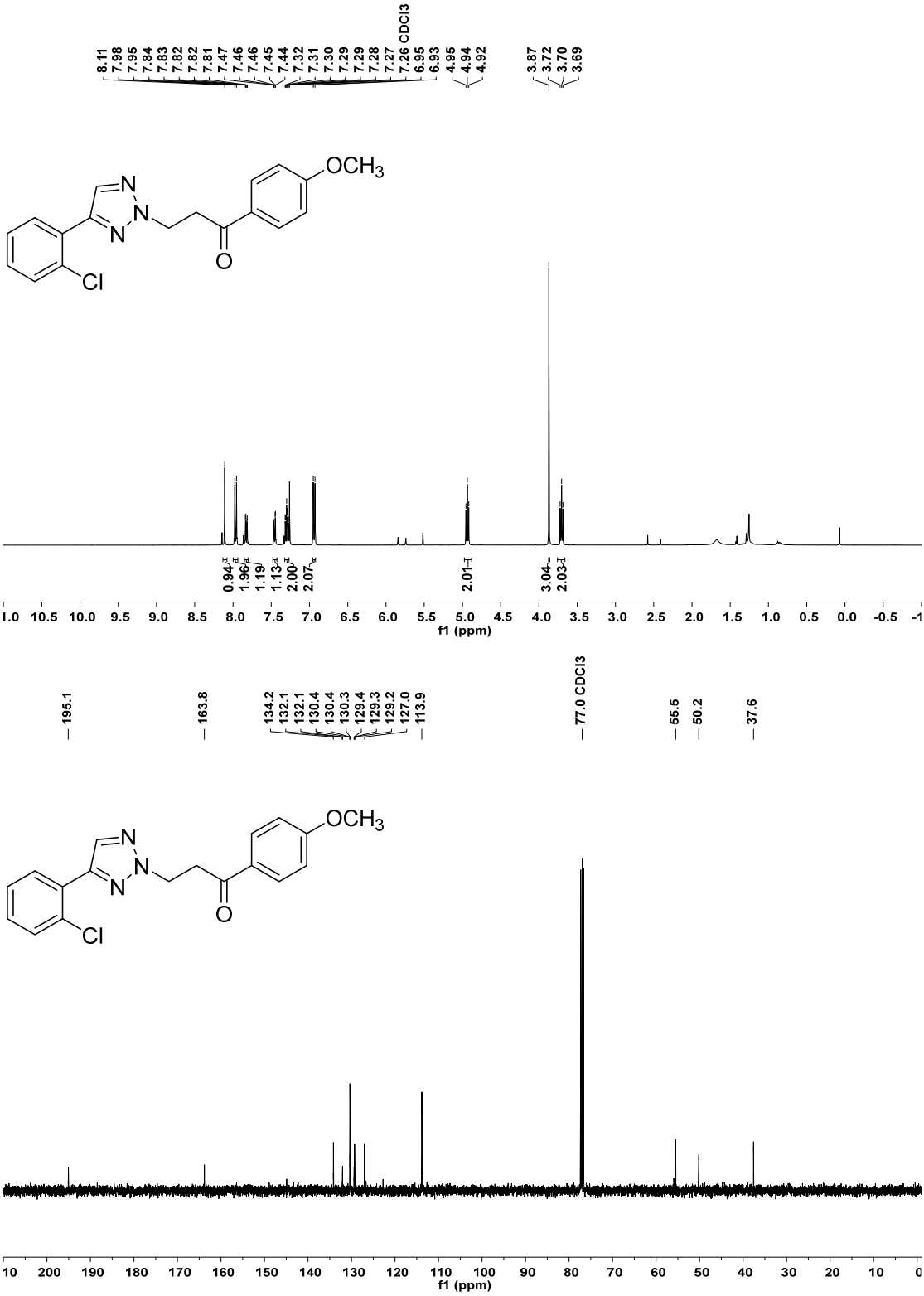
1-(4-bromophenyl)-3-(4-(2-chlorophenyl)-2H-1,2,3-triazol-2-yl)propan-1-one (**3h**)



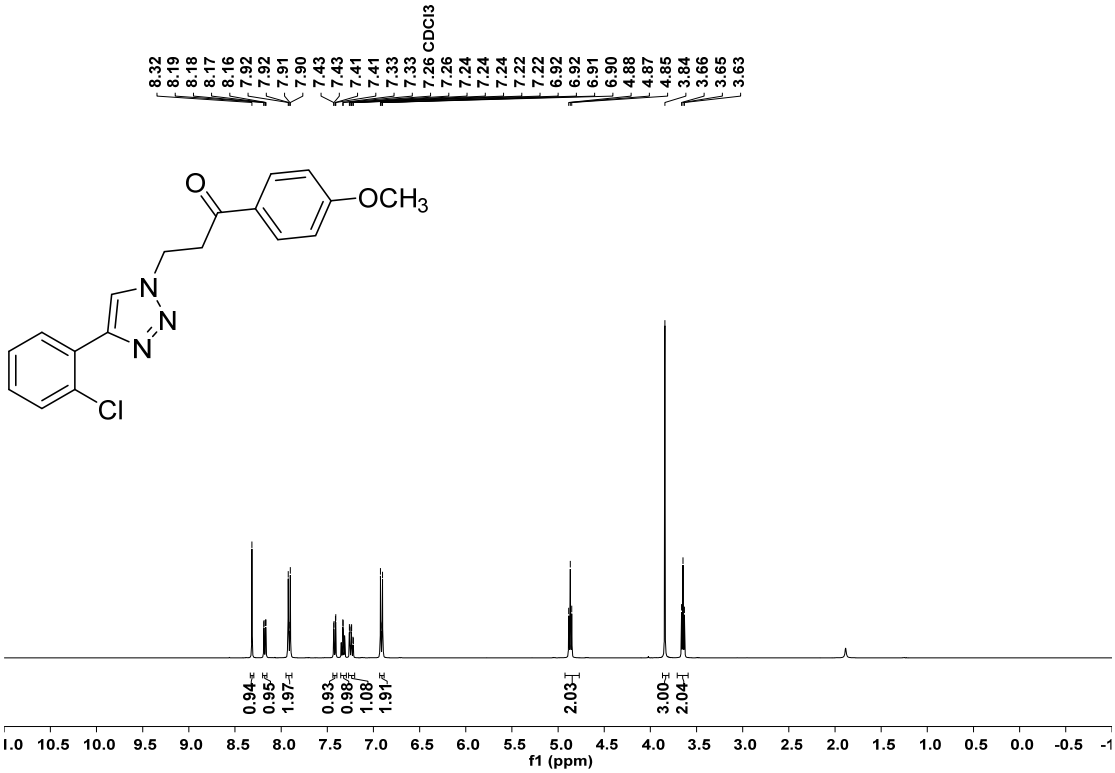
1-(4-bromophenyl)-3-(4-(2-chlorophenyl)-1H-1,2,3-triazol-1-yl)propan-1-one (**3'h**)

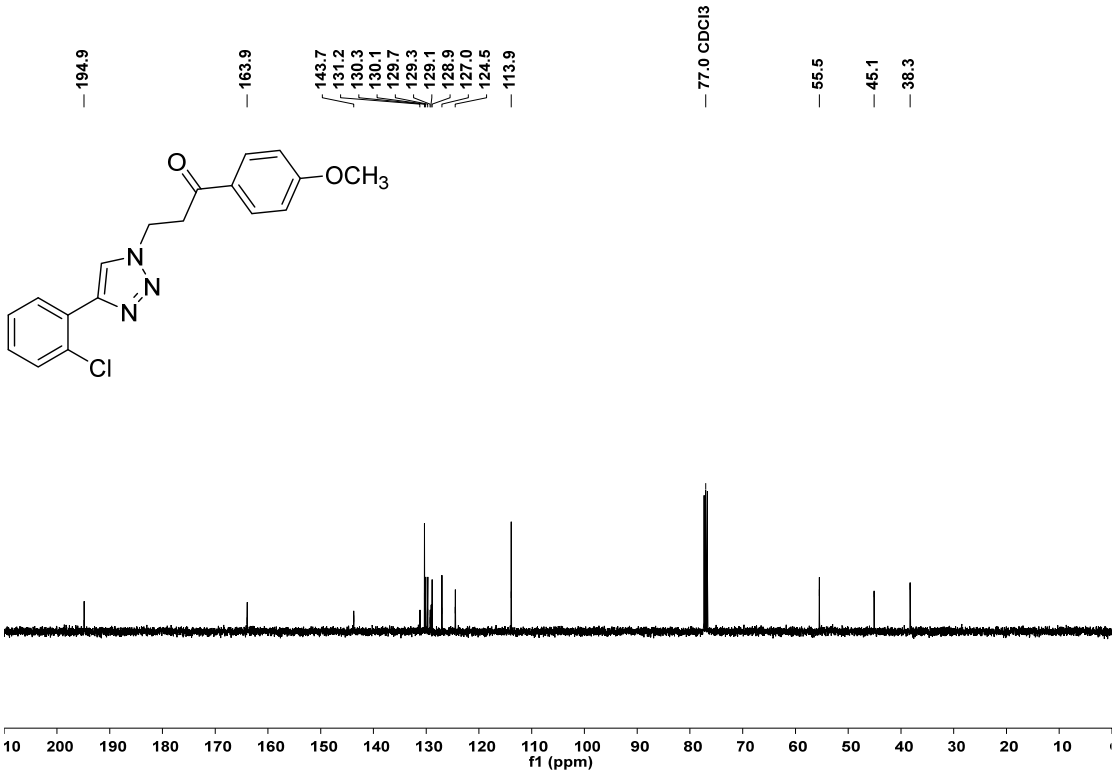


3-(4-(2-chlorophenyl)-2H-1,2,3-triazol-2-yl)-1-(4-methoxyphenyl)propan-1-one (**3i**)

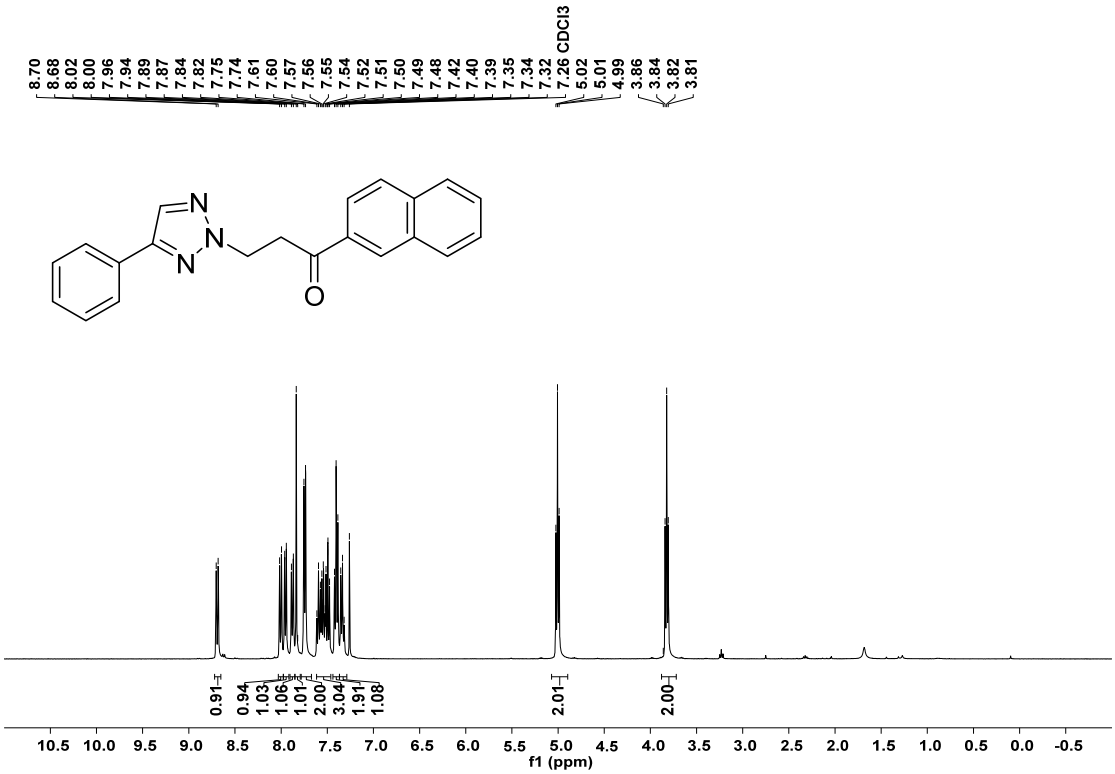


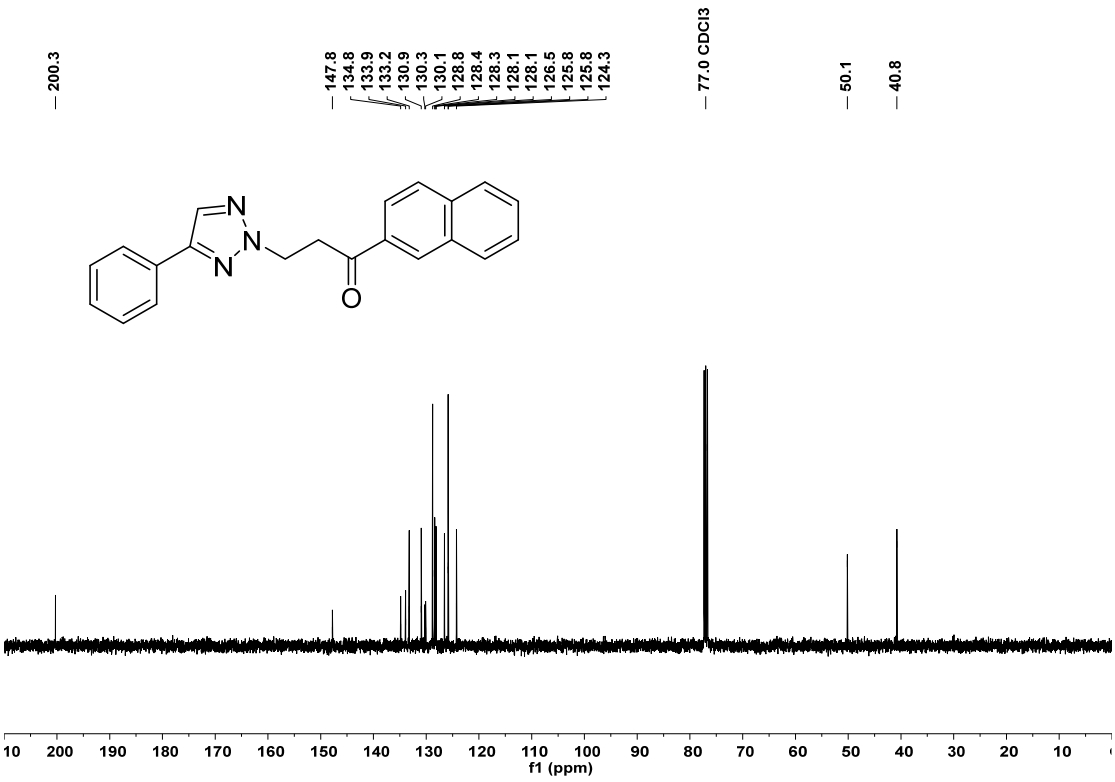
3-(4-(2-chlorophenyl)-1H-1,2,3-triazol-1-yl)-1-(4-methoxyphenyl)propan-1-one (**3'i**)



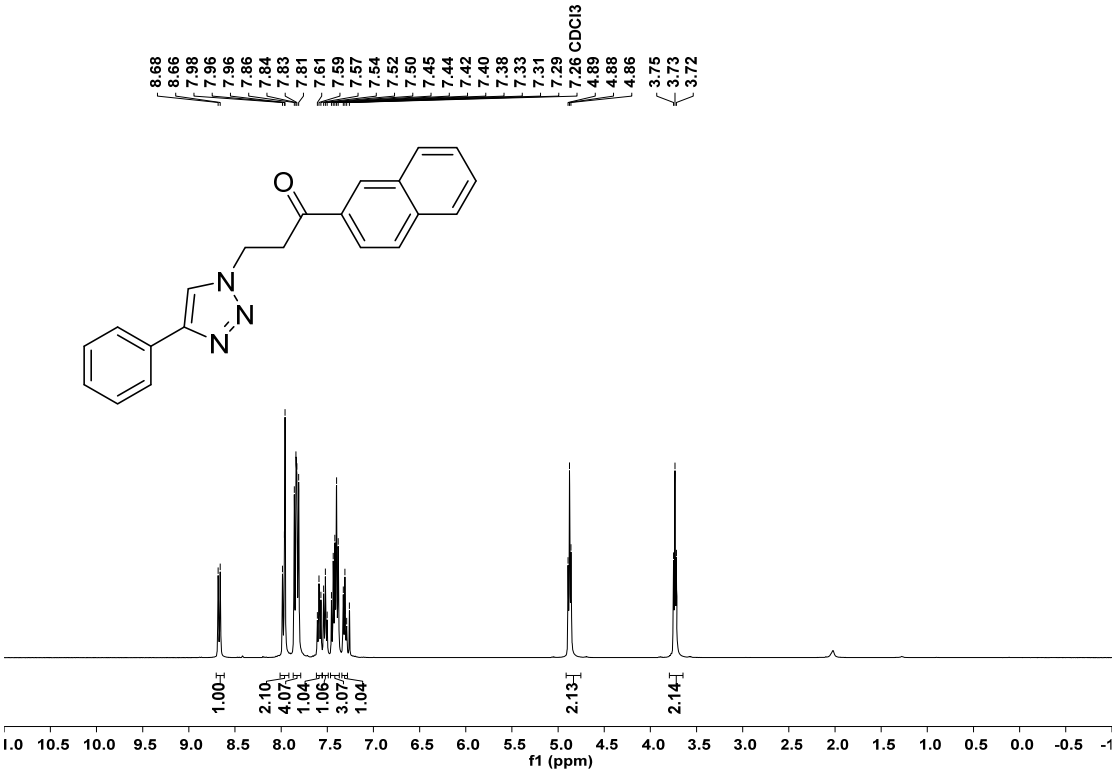


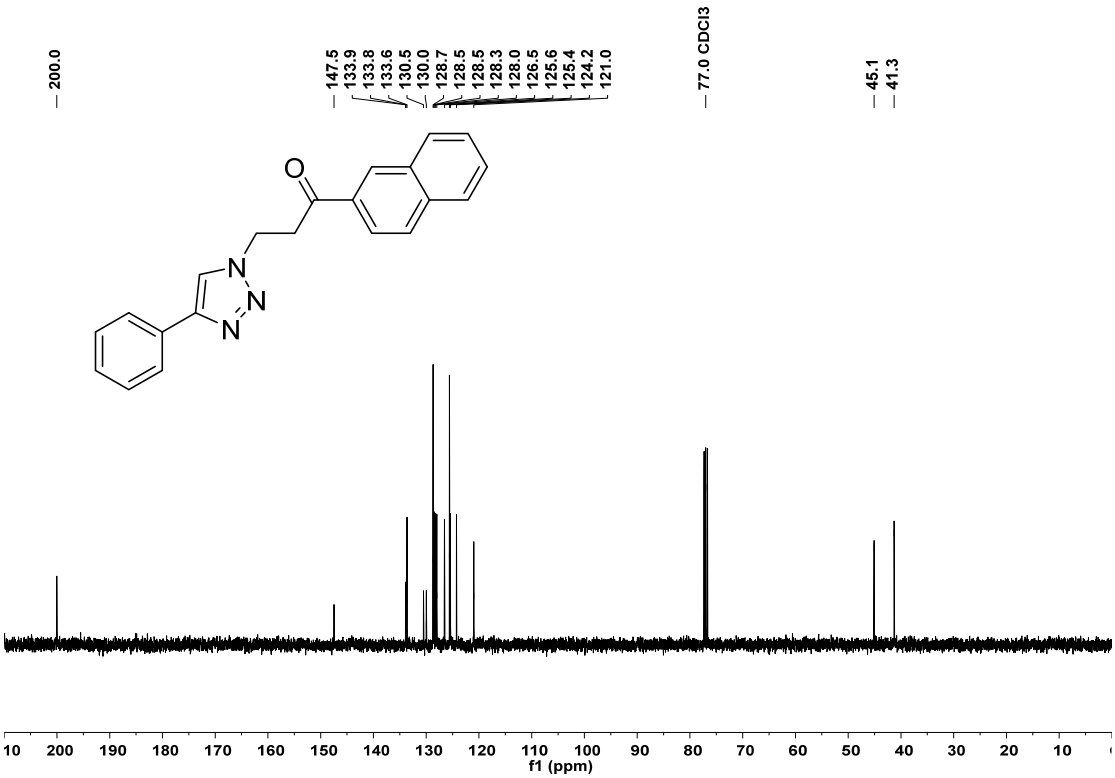
1-(naphthalen-2-yl)-3-(4-phenyl-2H-1,2,3-triazol-2-yl)propan-1-one (**3j**)



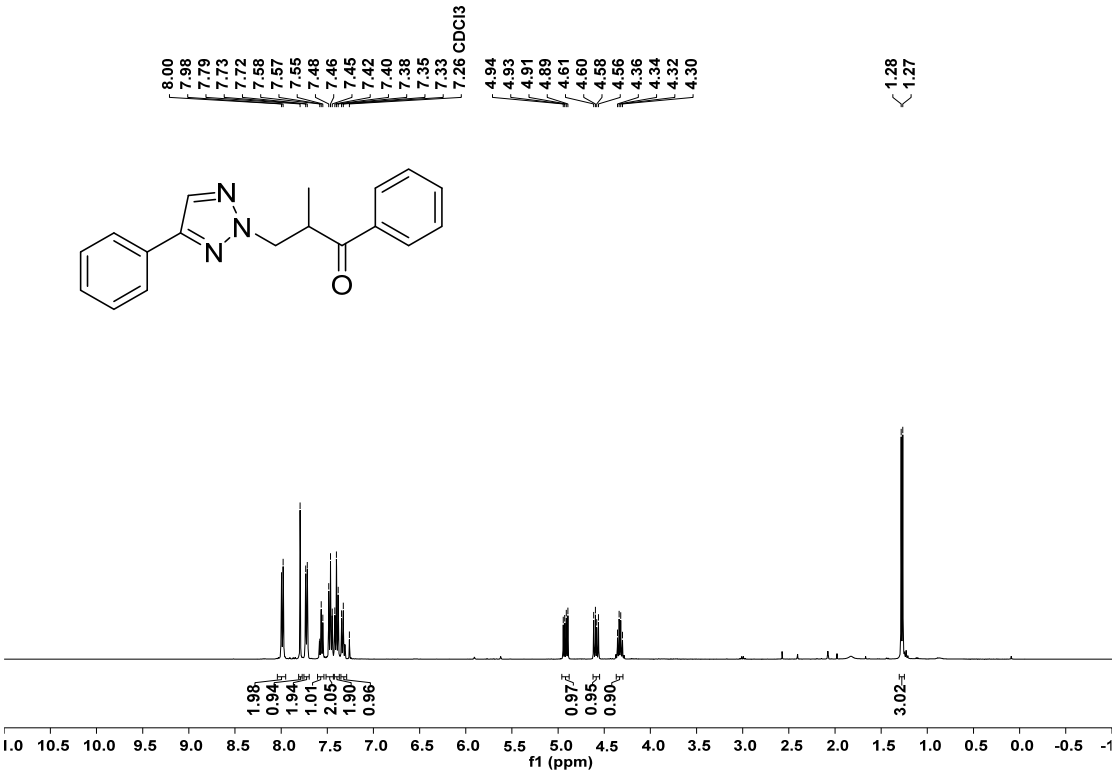


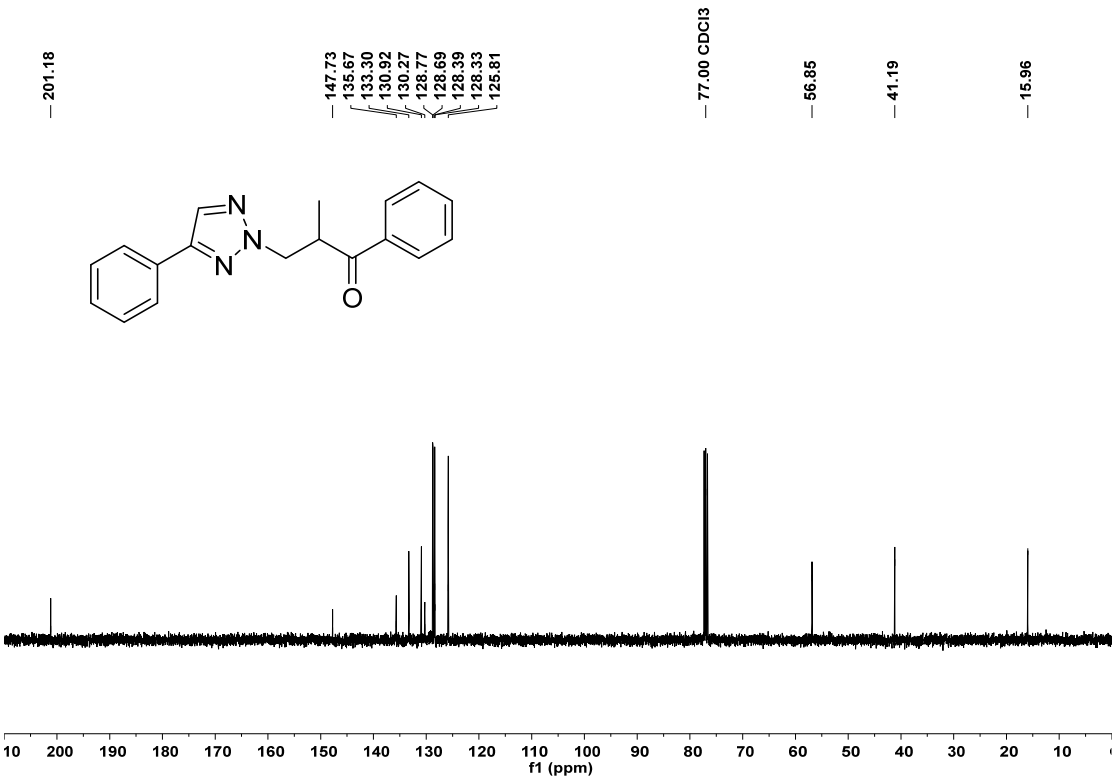
1-(naphthalen-2-yl)-3-(4-phenyl-1H-1,2,3-triazol-1-yl)propan-1-one (**3'j**)



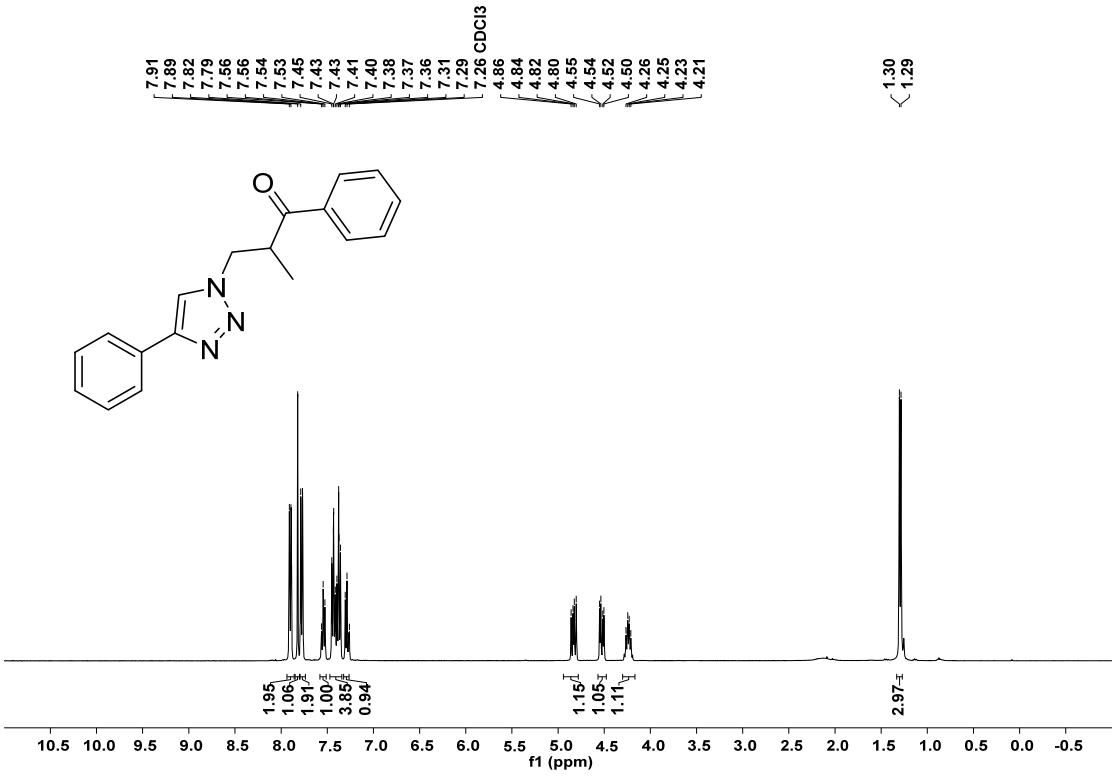


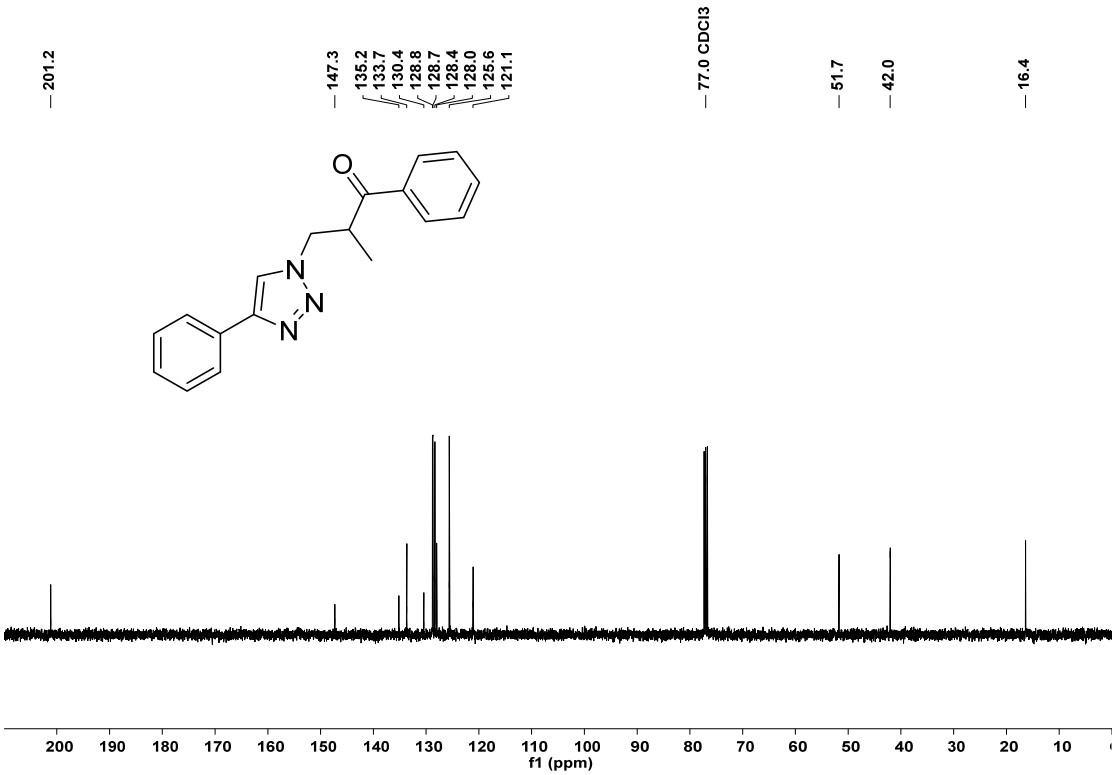
2-methyl-1-phenyl-3-(4-phenyl-2H-1,2,3-triazol-2-yl)propan-1-one (**3k**)



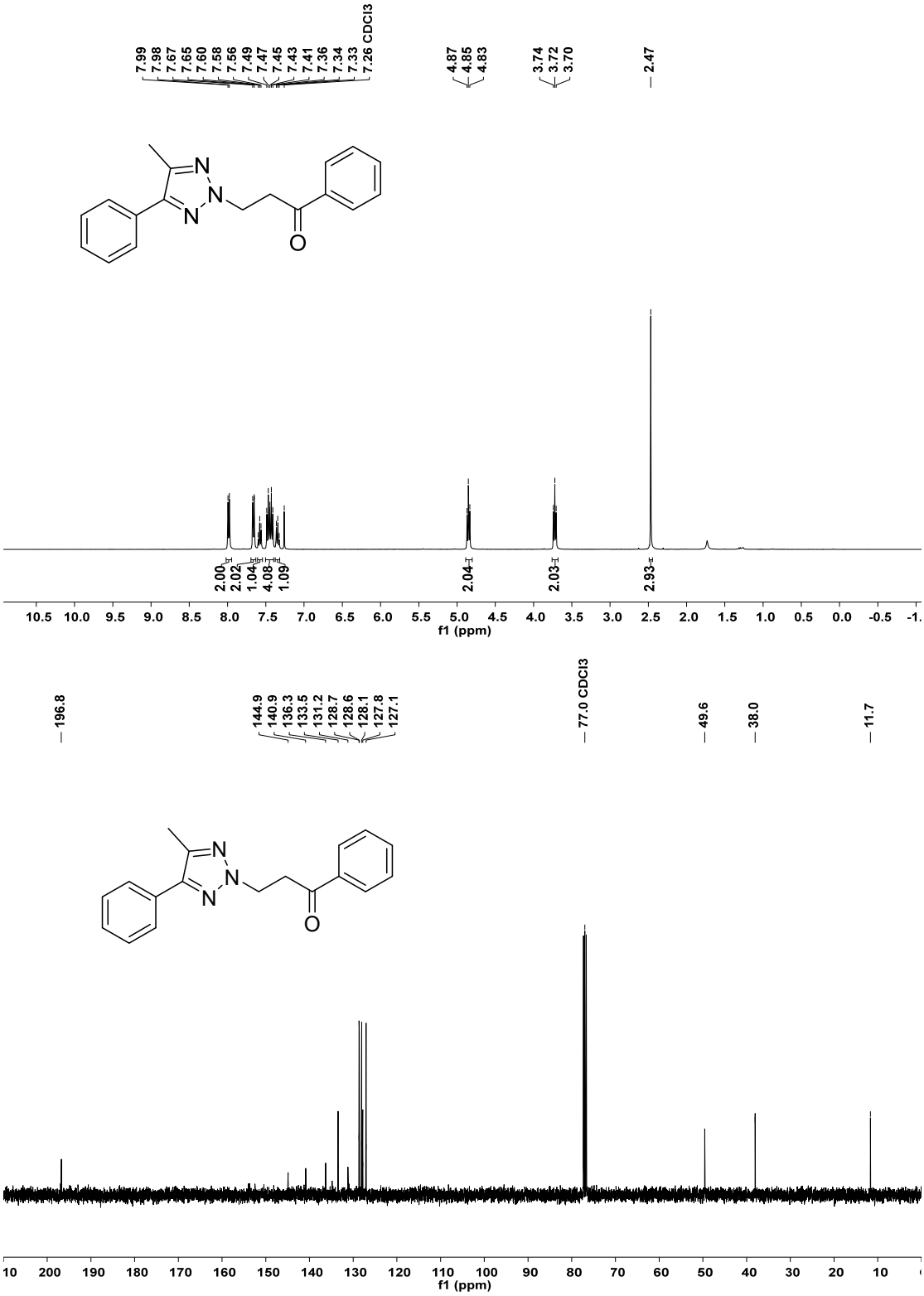


2-methyl-1-phenyl-3-(4-phenyl-1*H*-1,2,3-triazol-1-yl)propan-1-one (**3'k**)

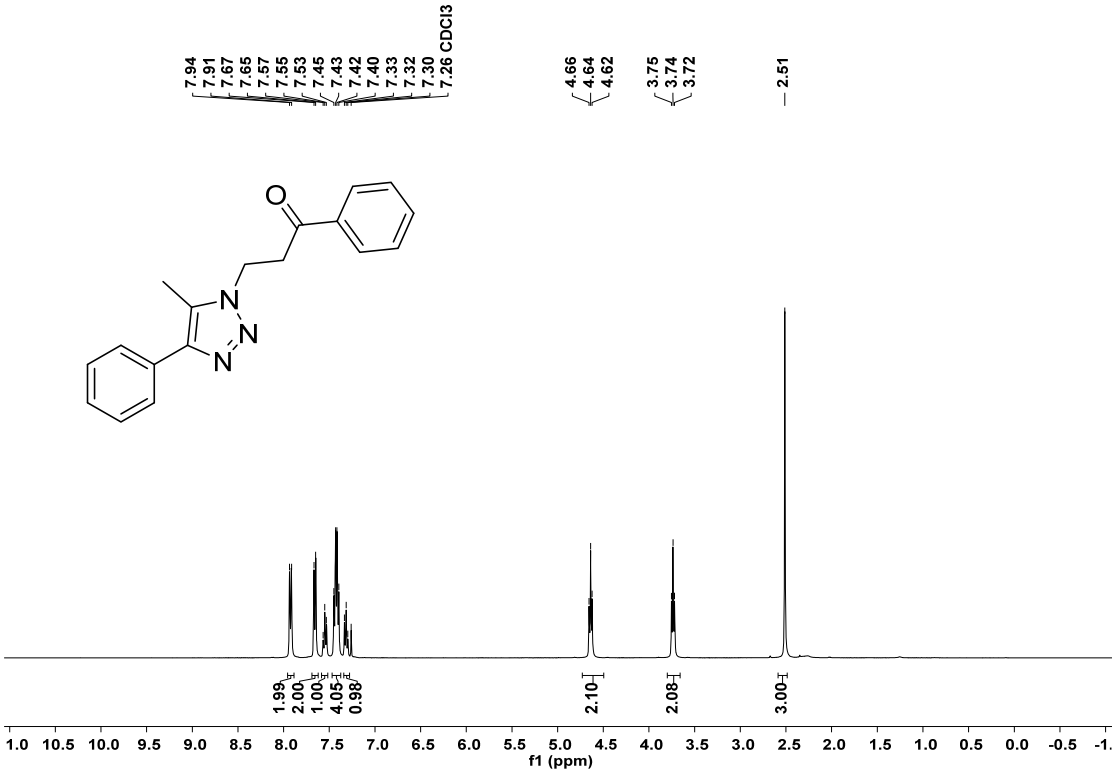


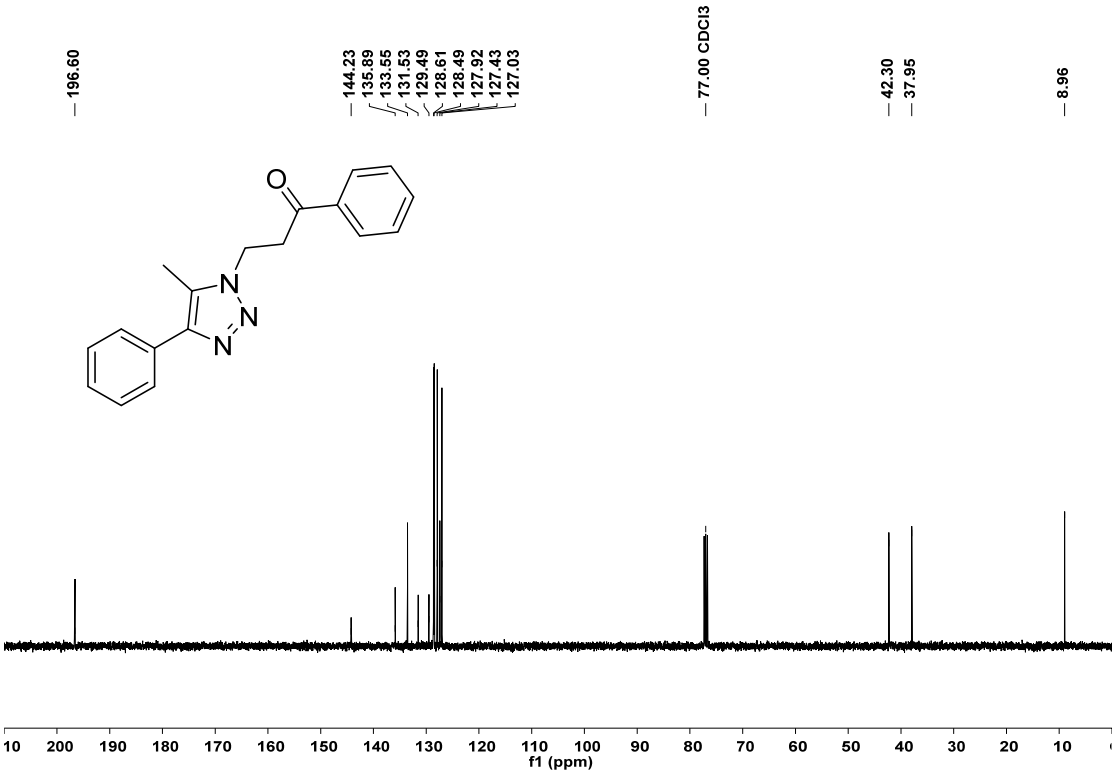


3-(4-methyl-5-phenyl-2H-1,2,3-triazol-2-yl)-1-phenylpropan-1-one (**3l**)

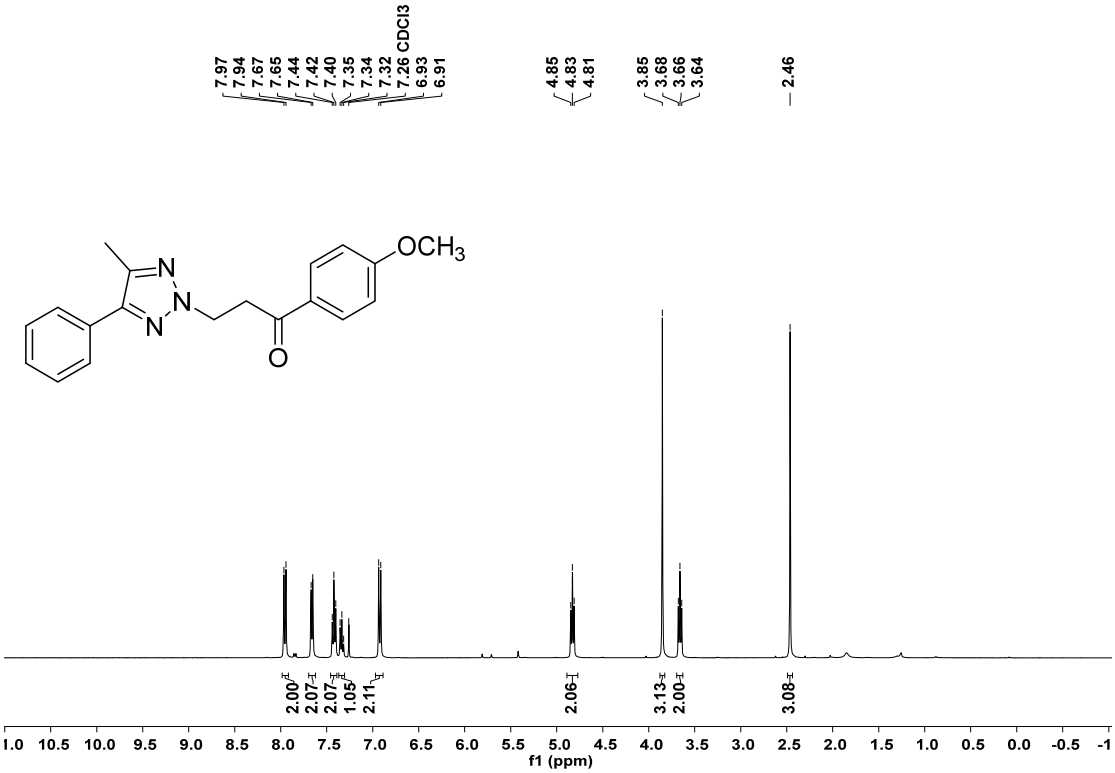


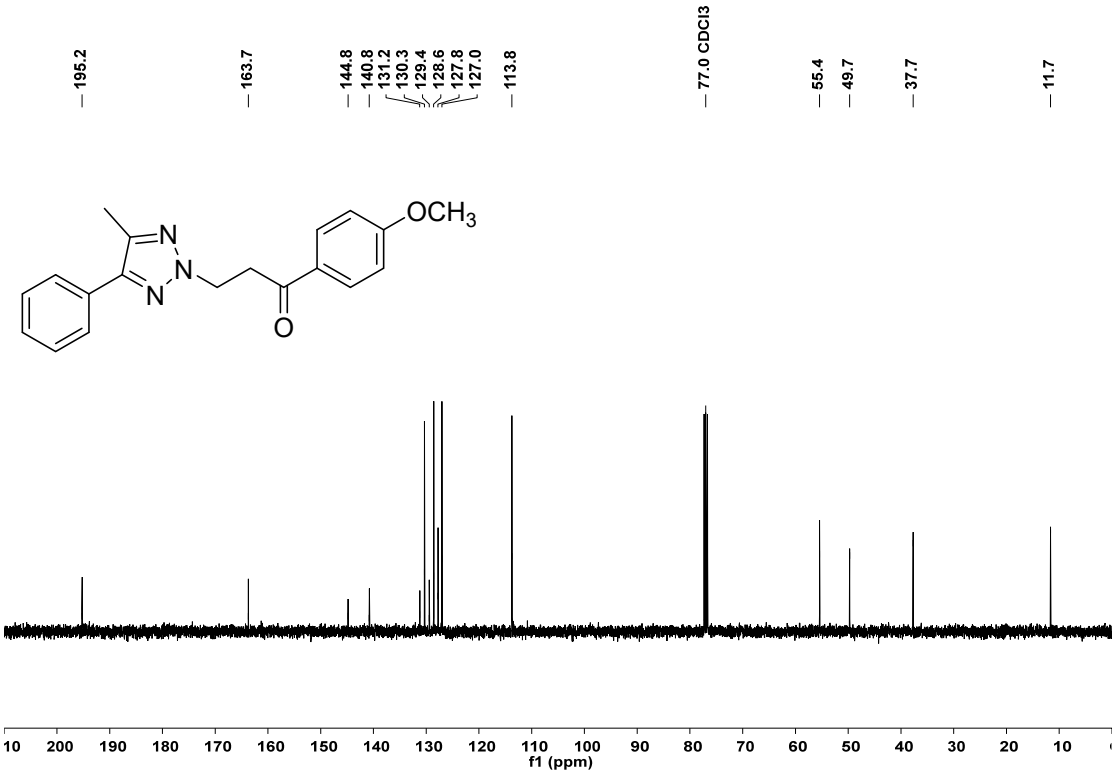
3-(5-methyl-4-phenyl-1H-1,2,3-triazol-1-yl)-1-phenylpropan-1- one (**3'l**)



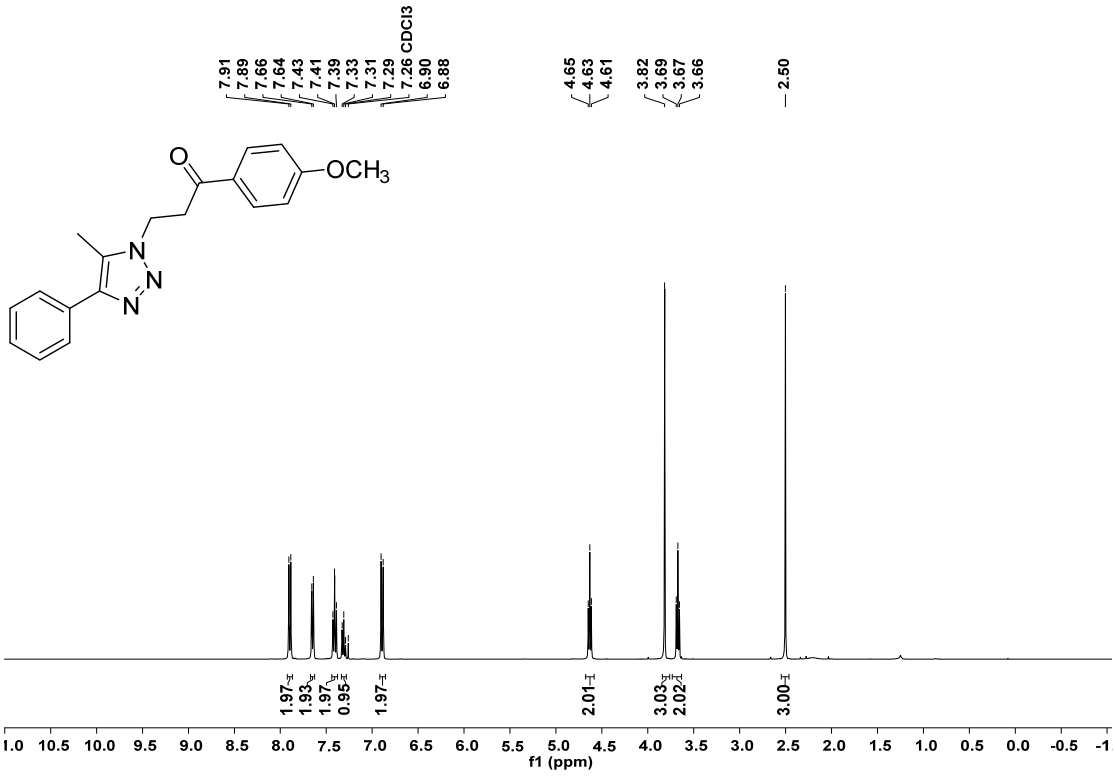


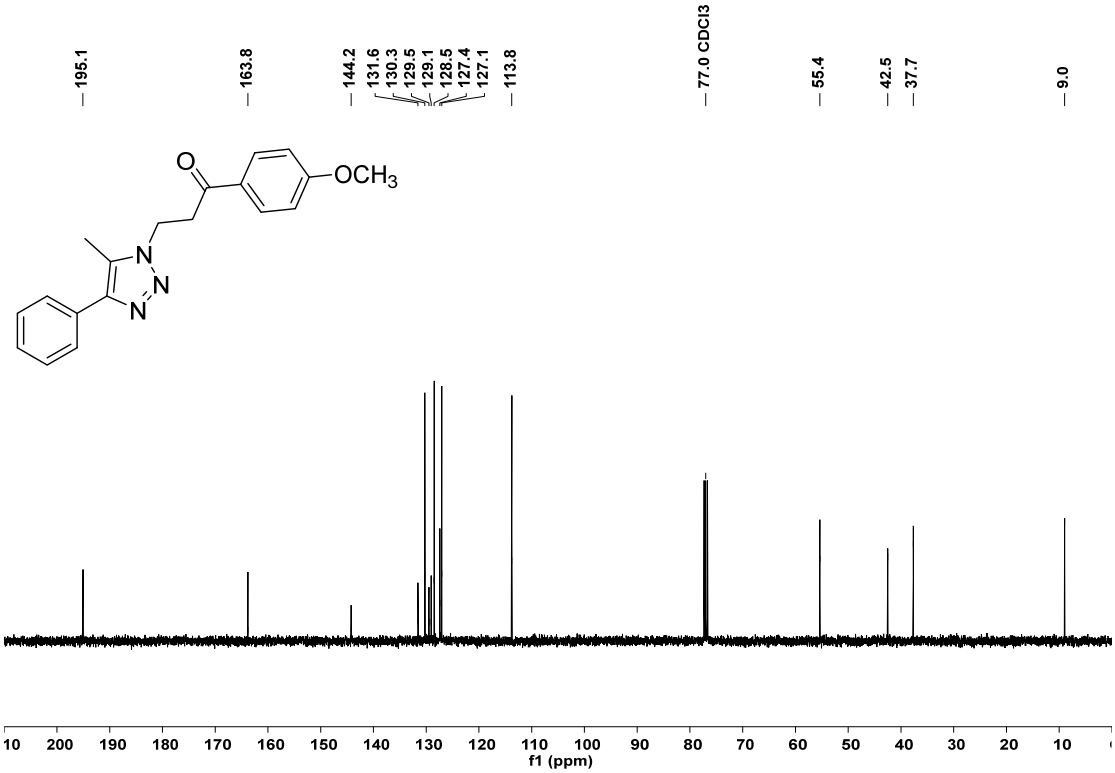
1-(4-methoxyphenyl)-3-(4-methyl-5-phenyl-2H-1,2,3-triazol-2-yl)propan-1-one (**3m**)



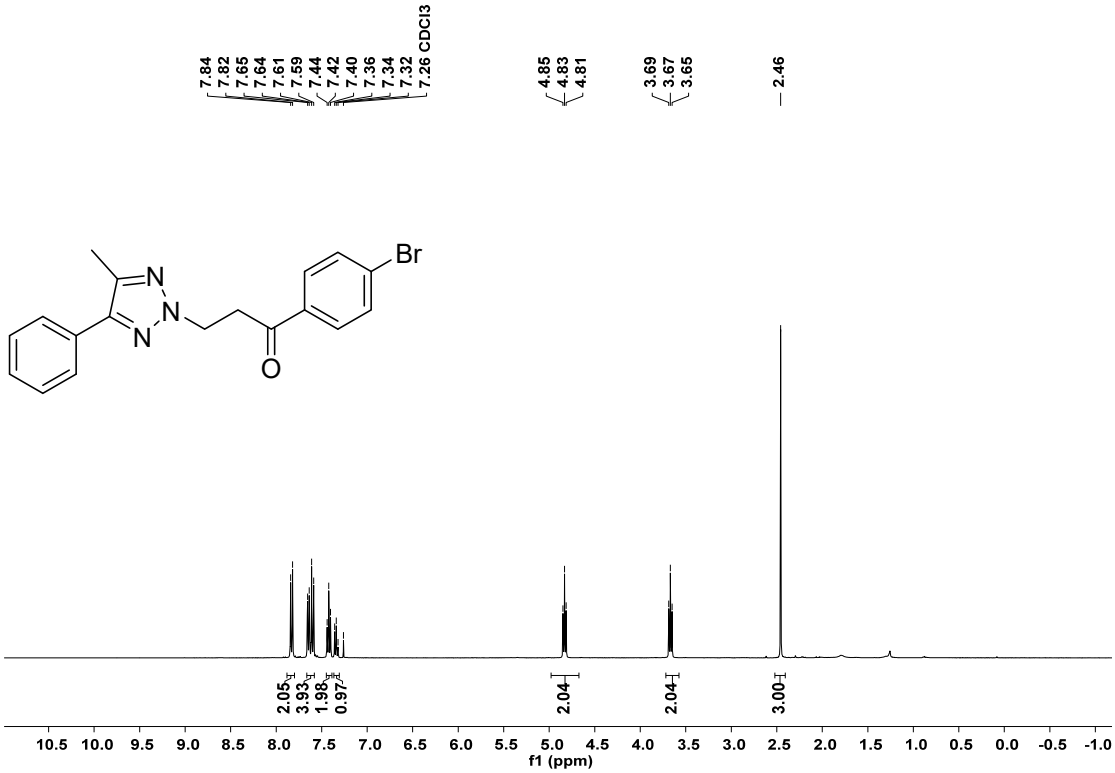


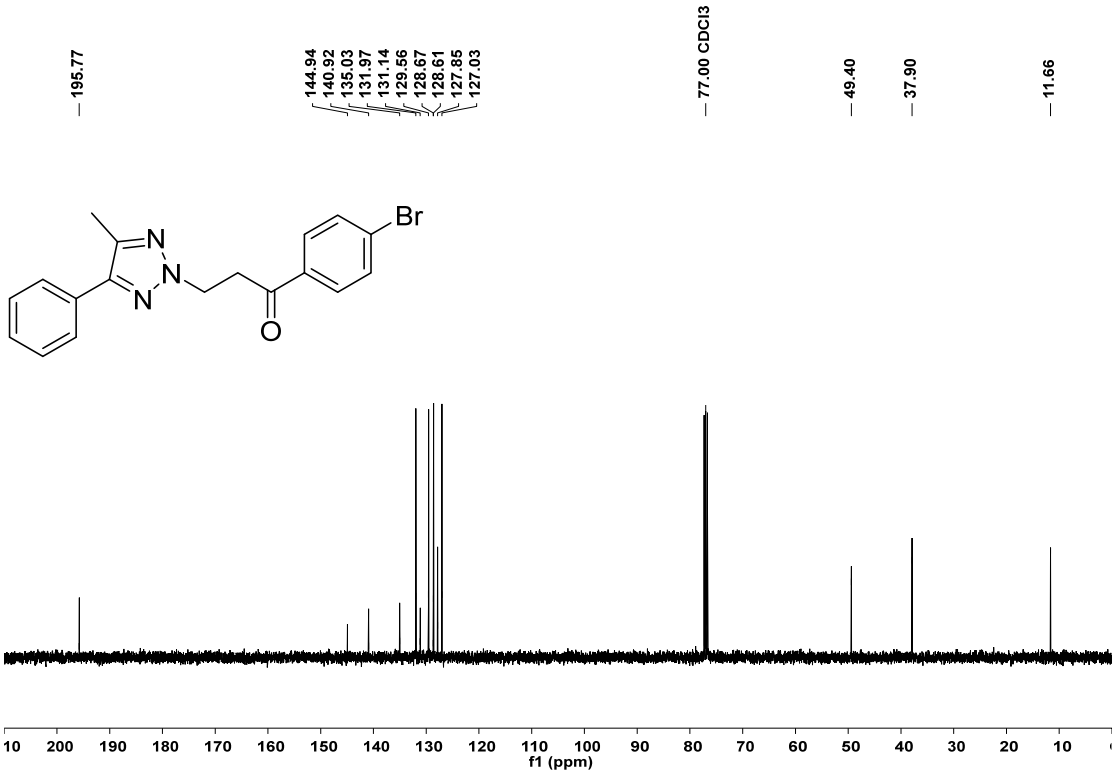
1-(4-methoxyphenyl)-3-(5-methyl-4-phenyl-1H-1,2,3-triazol-1-yl)propan-1- one (**3'm**)



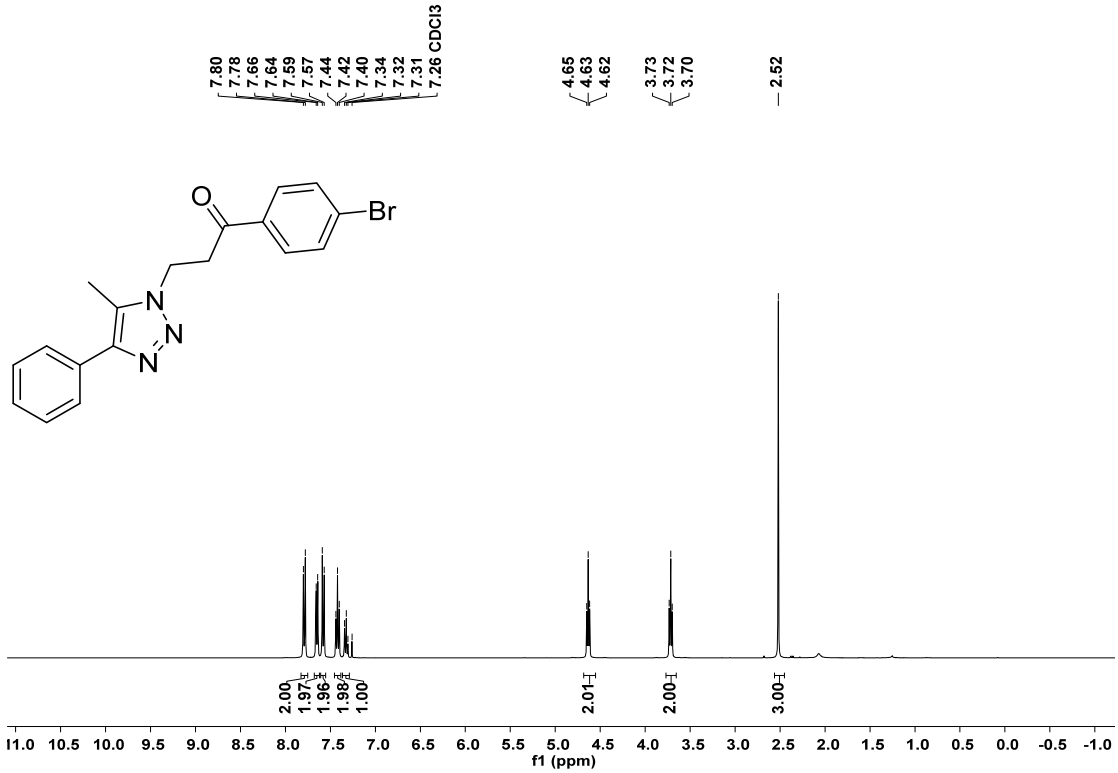


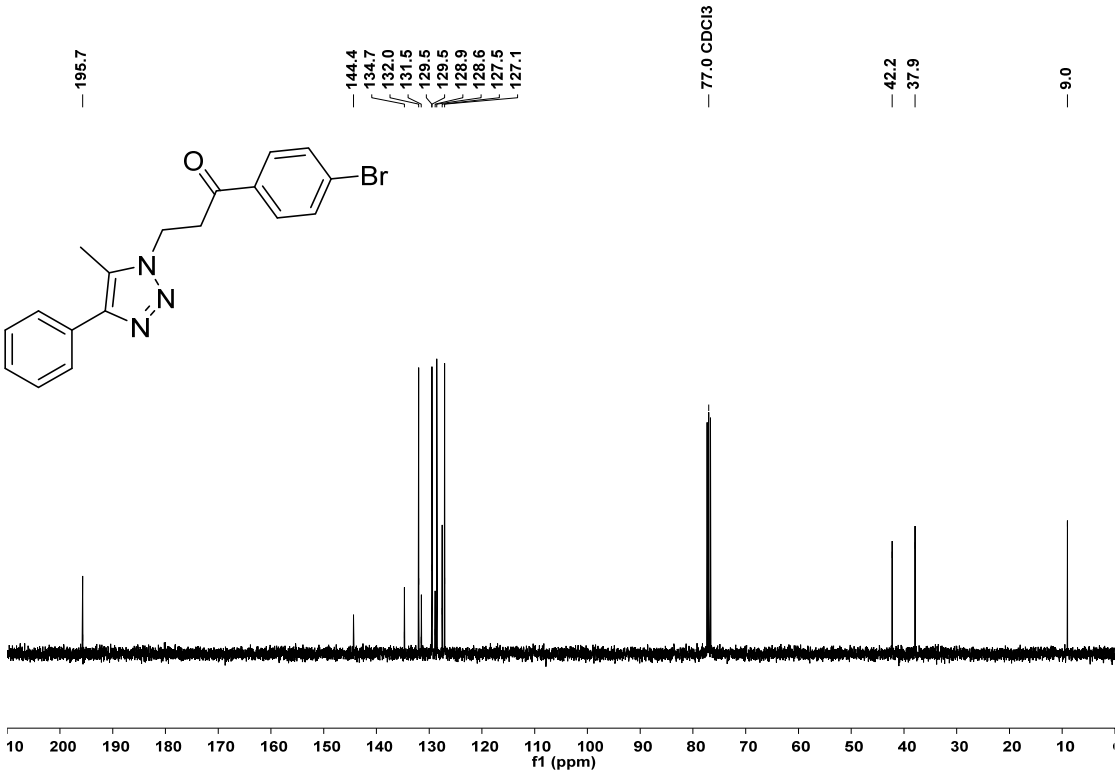
1-(4-bromophenyl)-3-(4-methyl-5-phenyl-2H-1,2,3-triazol-2-yl)propan-1-one (**3n**)



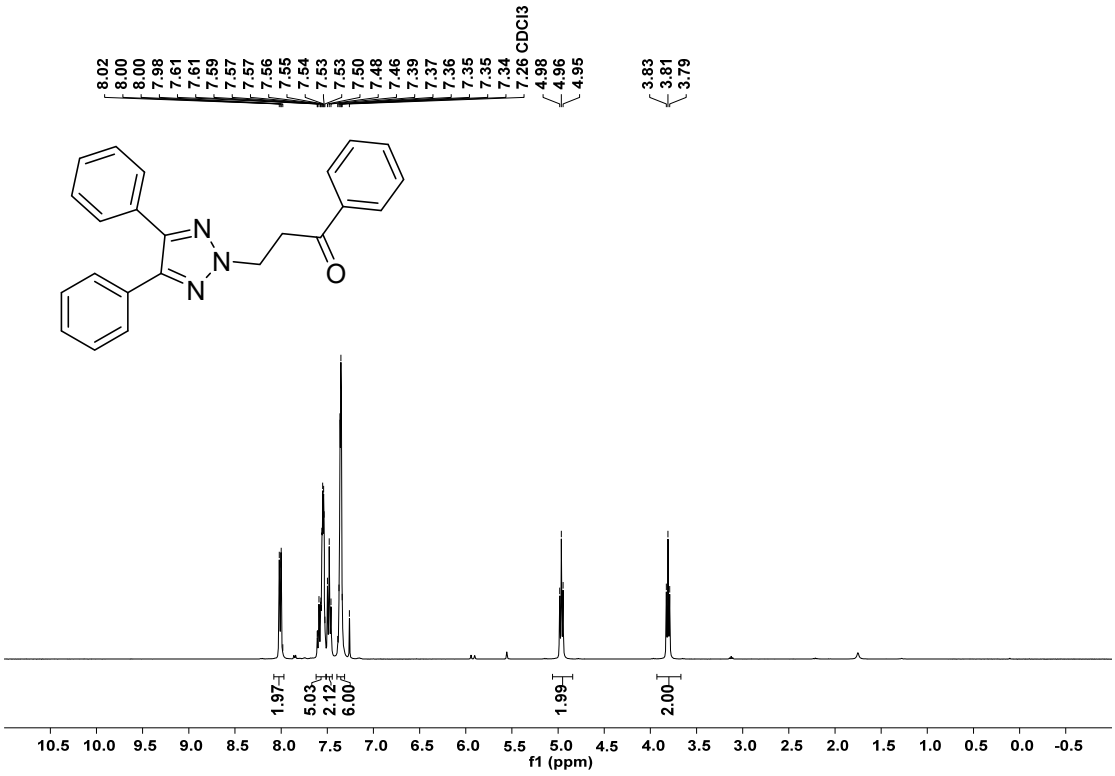


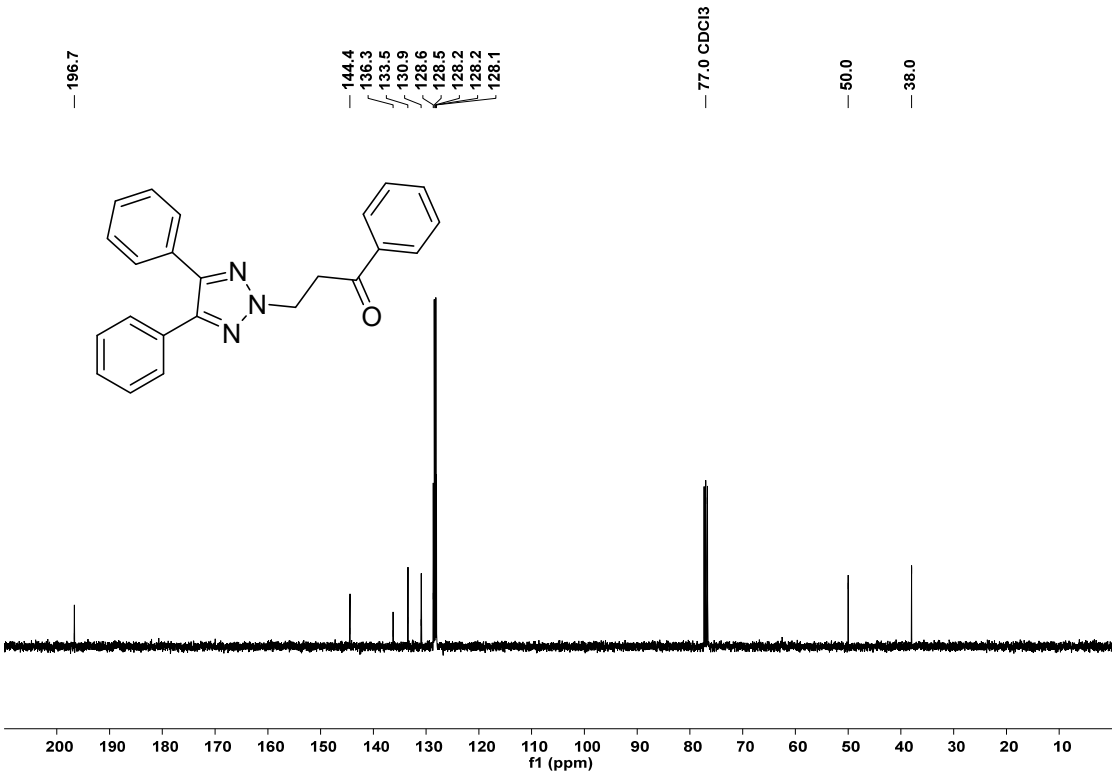
1-(4-bromophenyl)-3-(5-methyl-4-phenyl-1H-1,2,3-triazol-1-yl)propan-1-one (**3'n**)



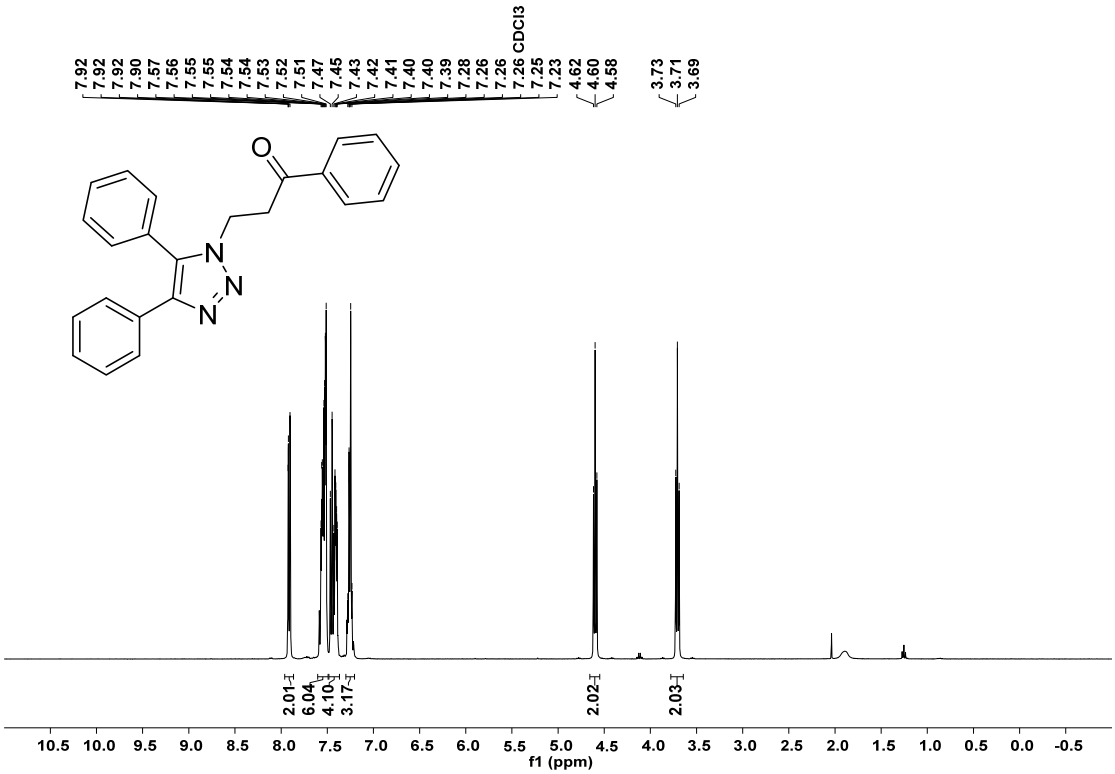


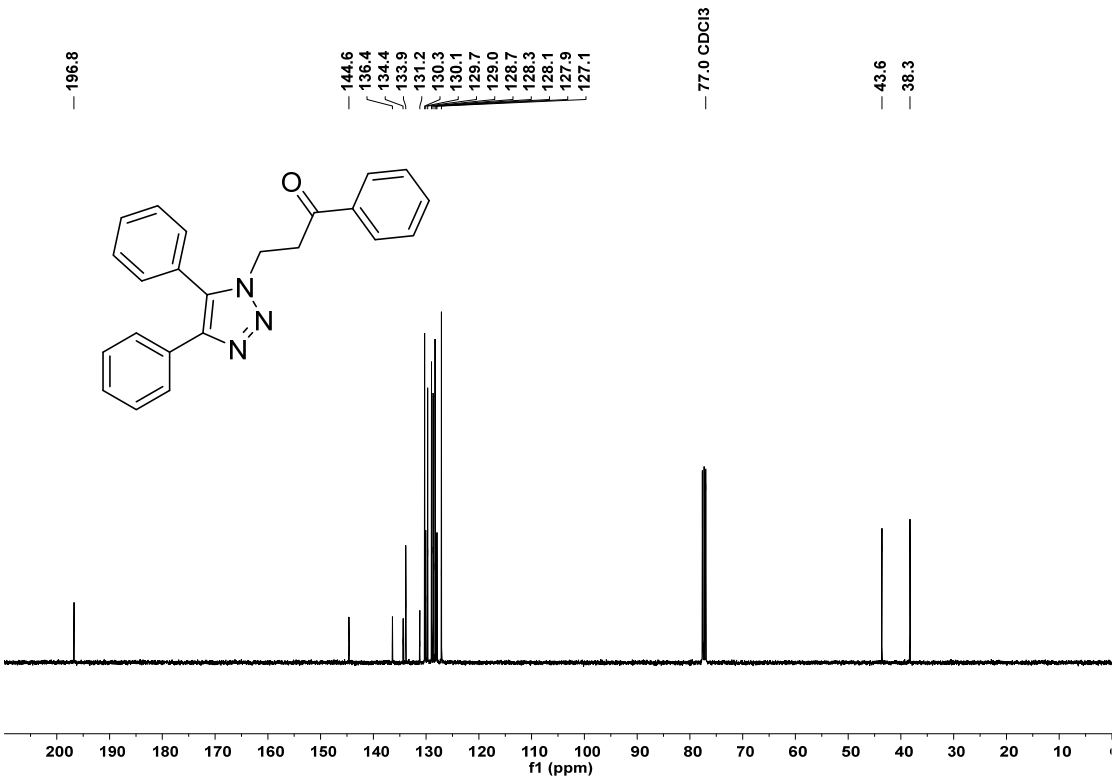
3-(4,5-diphenyl-2H-1,2,3-triazol-2-yl)-1-phenylpropan-1- one (**3o**)



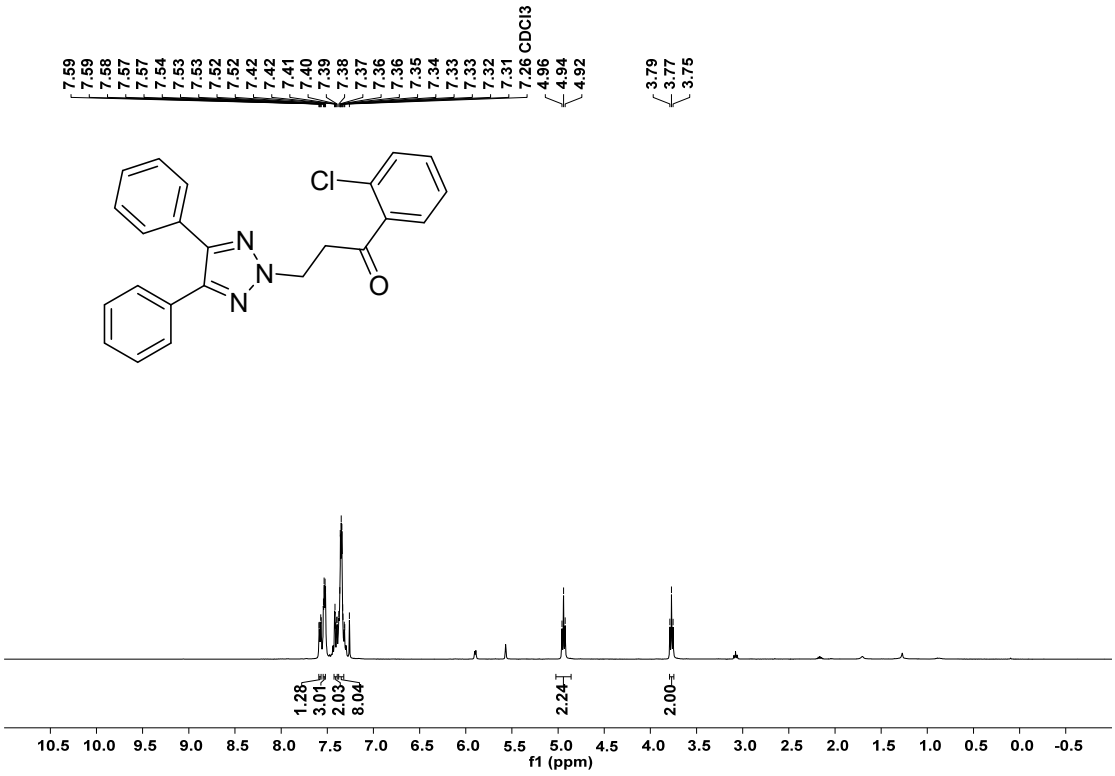


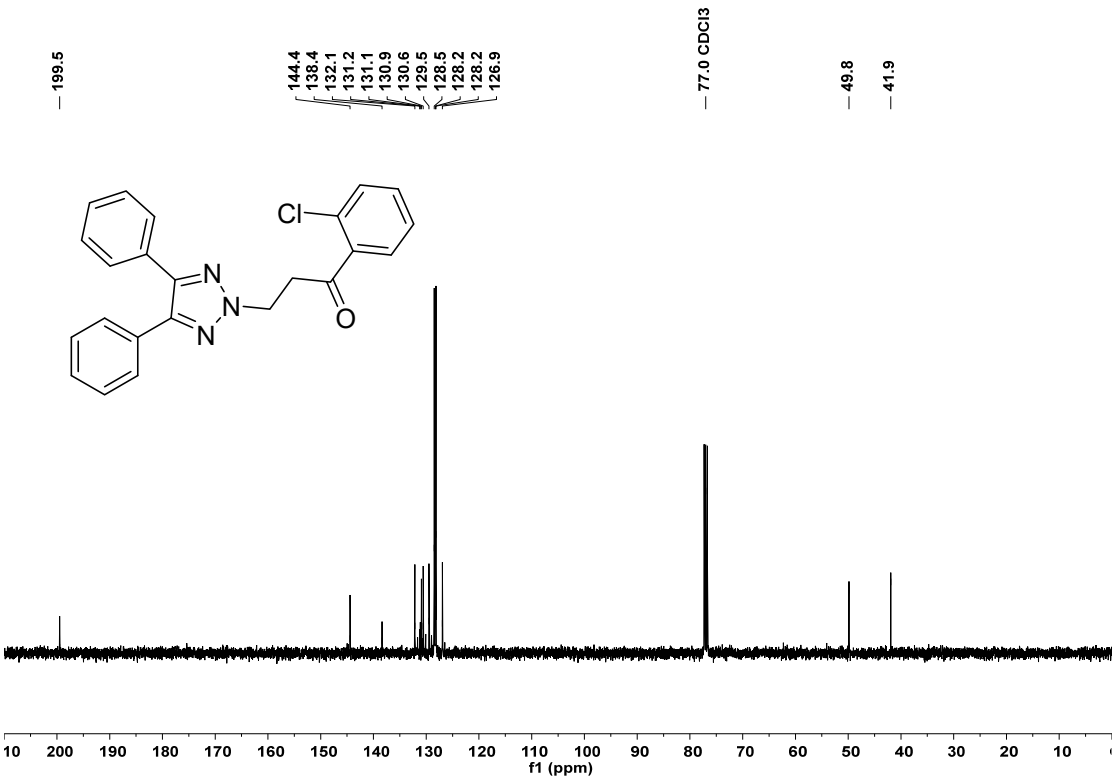
3-(4,5-diphenyl-1H-1,2,3-triazol-1-yl)-1-phenylpropan-1-one (**3'o**)



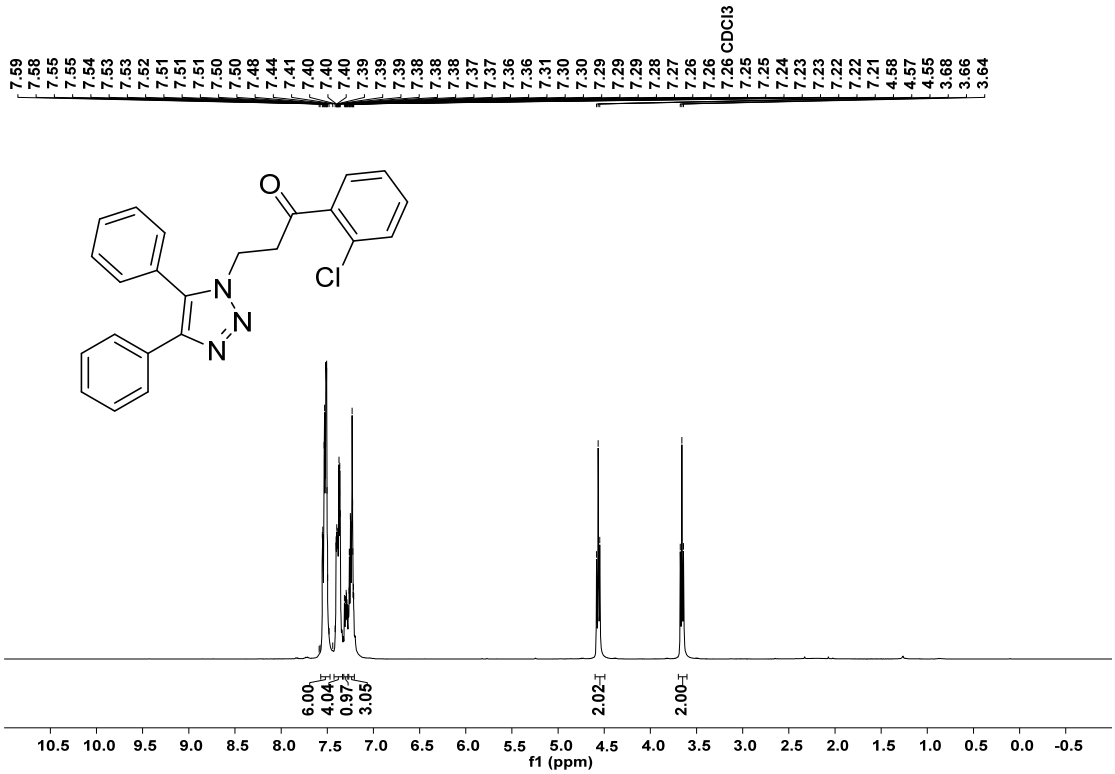


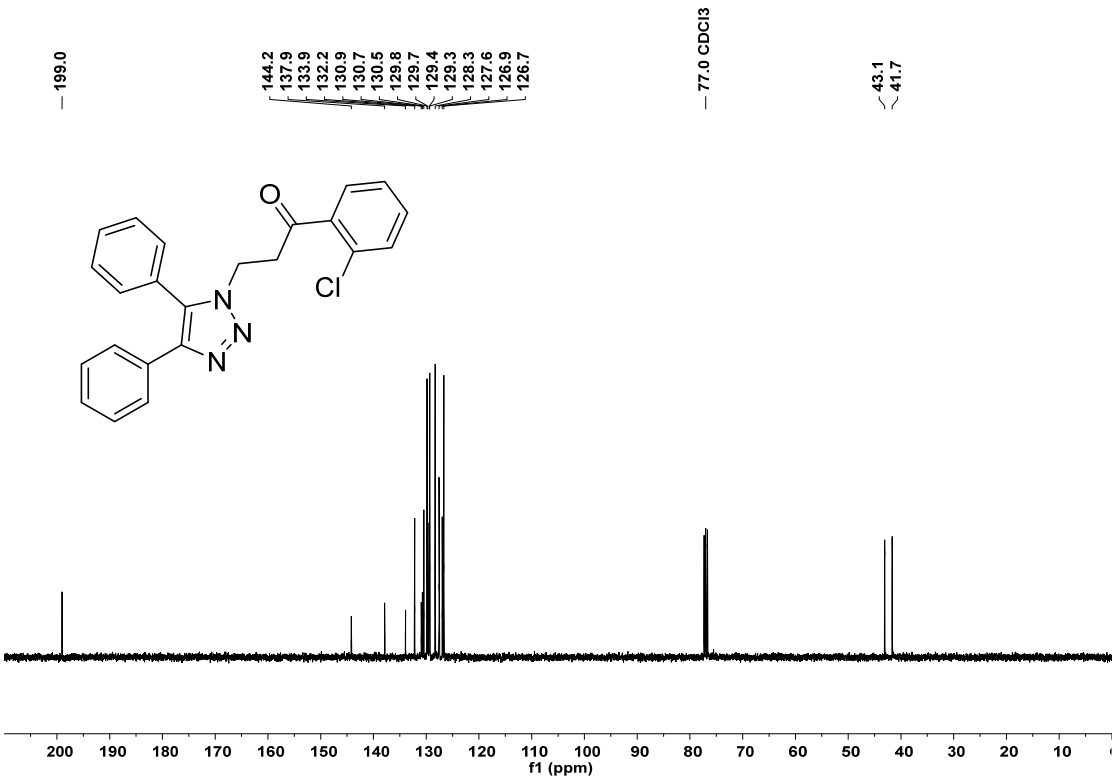
1-(2-chlorophenyl)-3-(4,5-diphenyl-2H-1,2,3-triazol-2-yl)propan-1- one (**3p**)



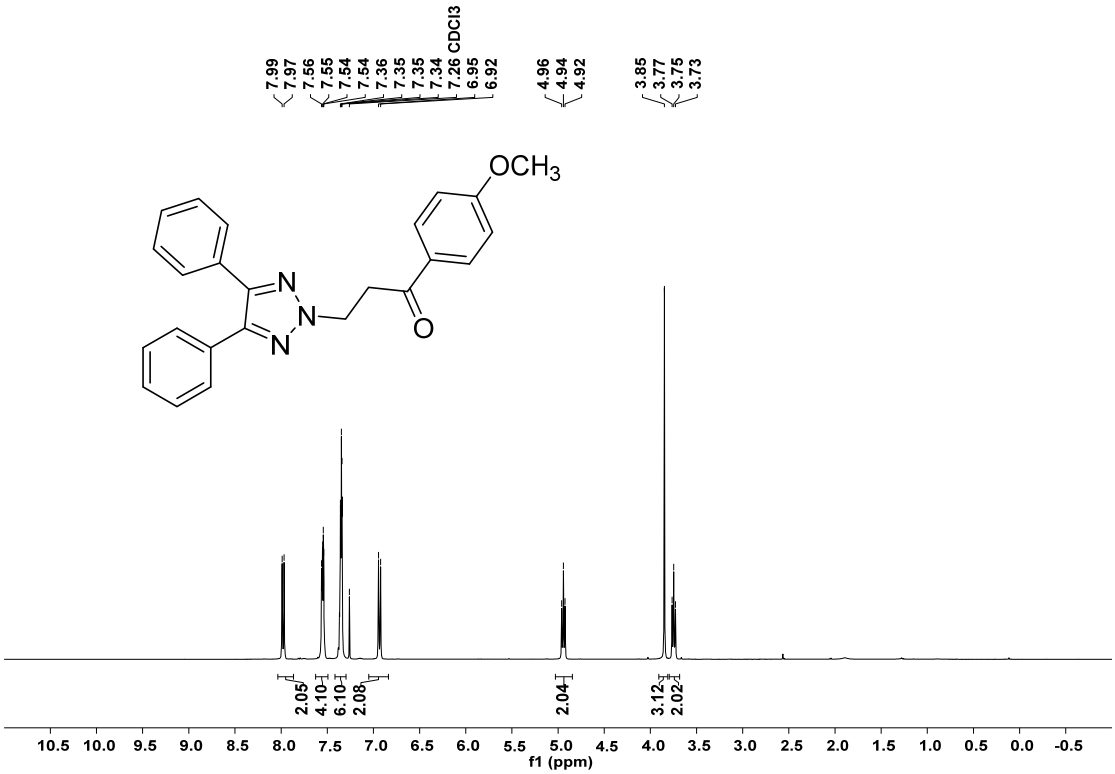


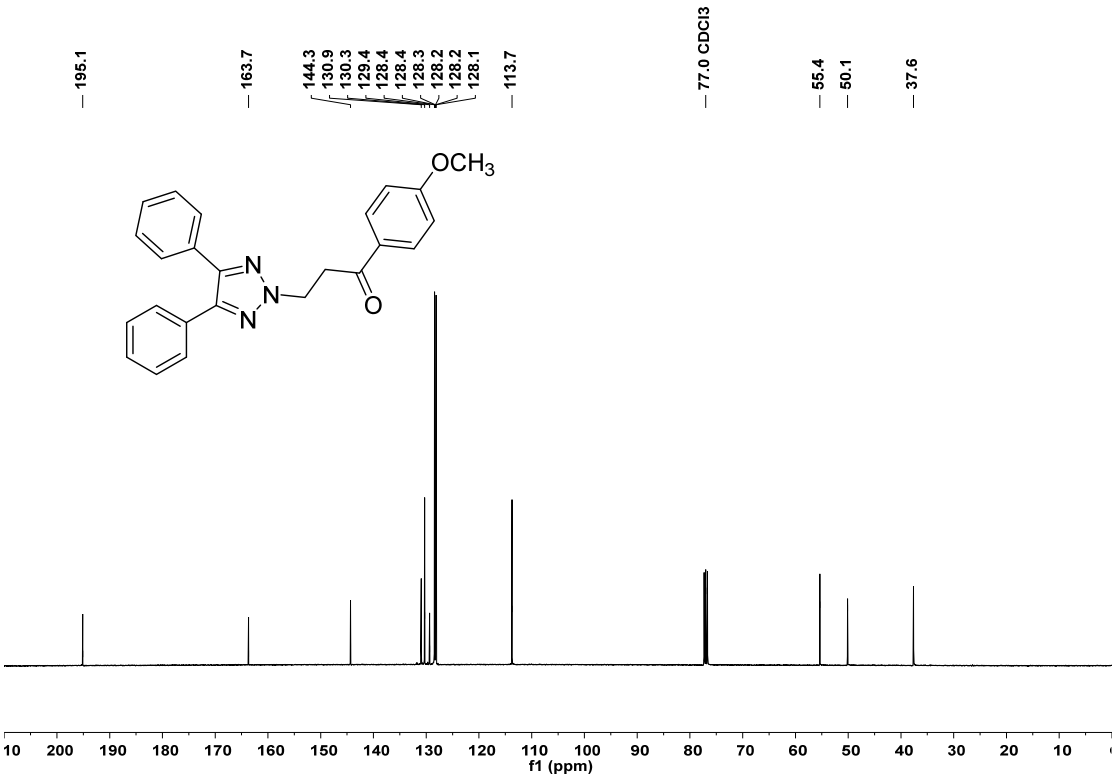
1-(2-chlorophenyl)-3-(4,5-diphenyl-1H-1,2,3-triazol-1-yl)propan-1-one (**3'p**)



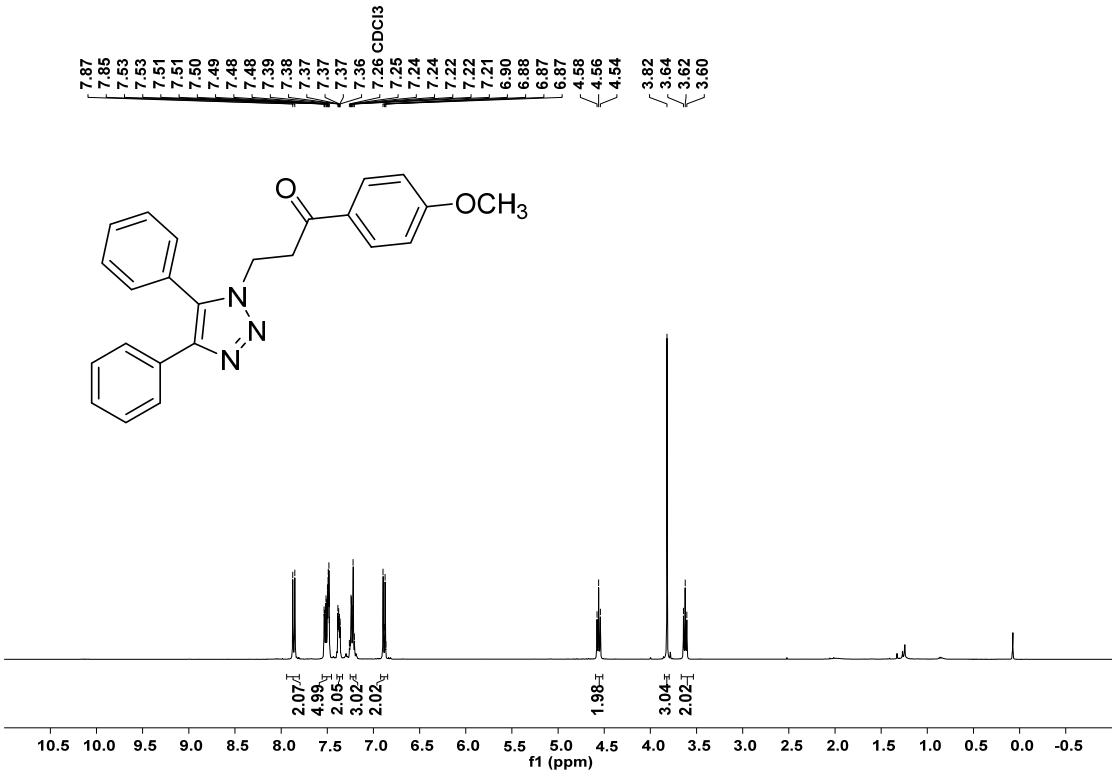


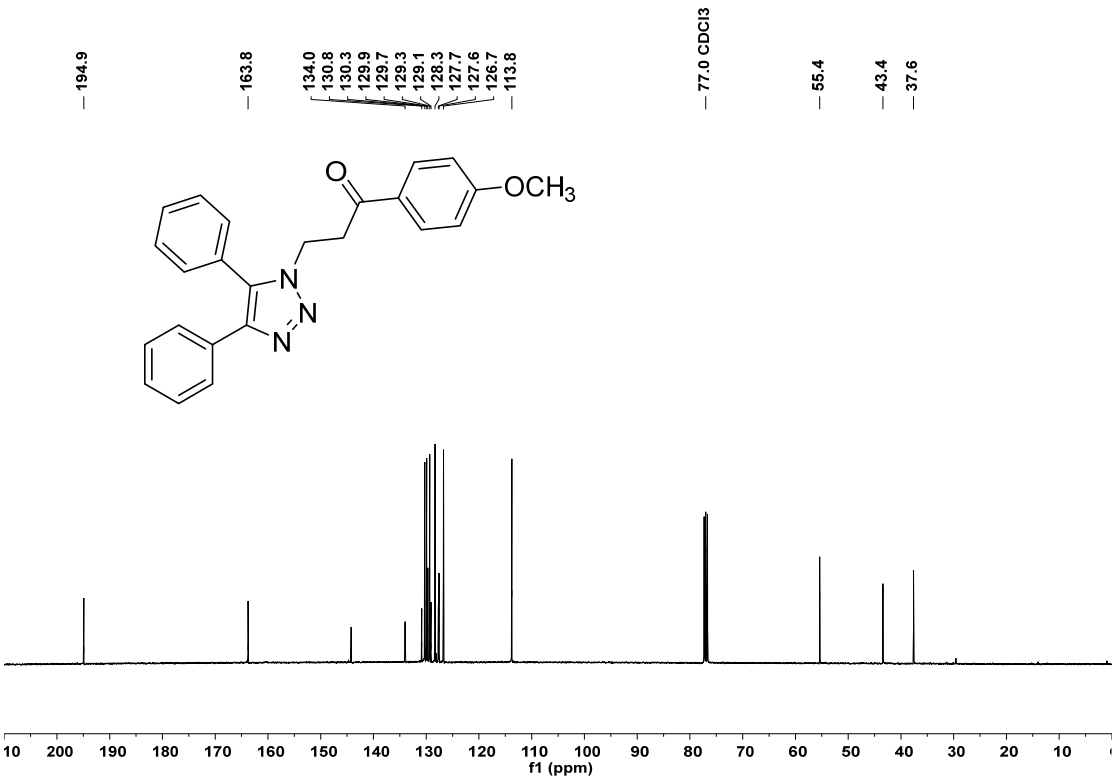
3-(4,5-diphenyl-2H-1,2,3-triazol-2-yl)-1-(4-methoxyphenyl)propan-1-one (**3q**)



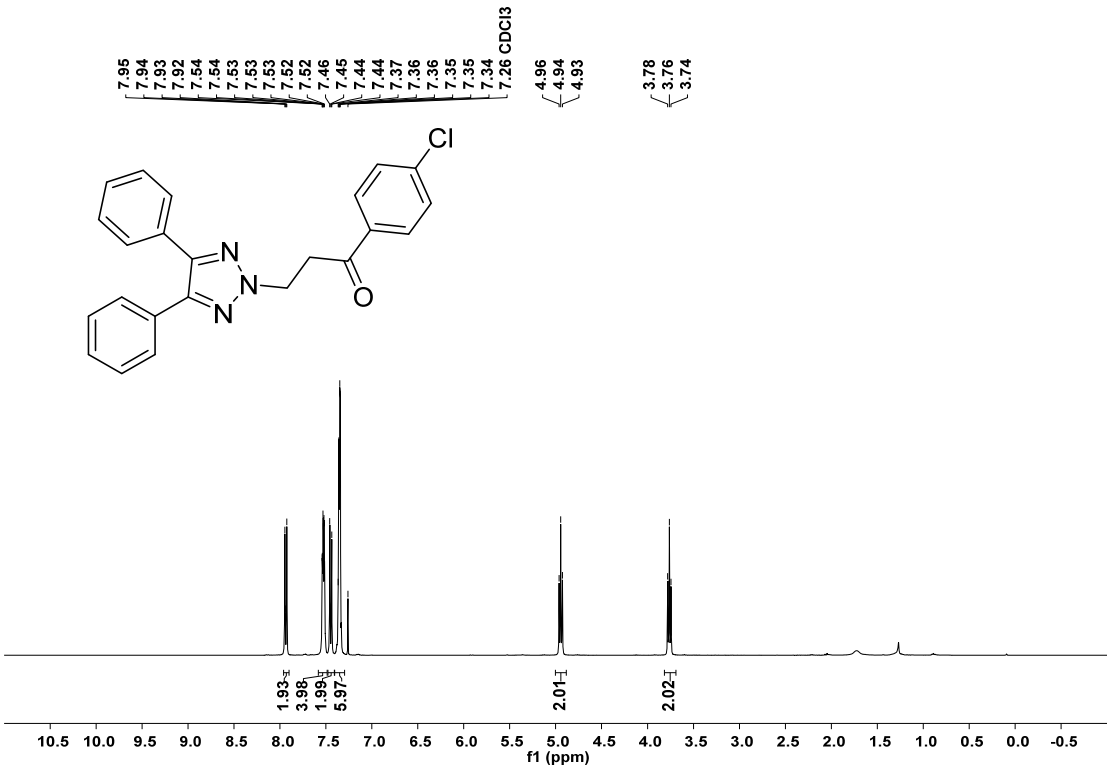


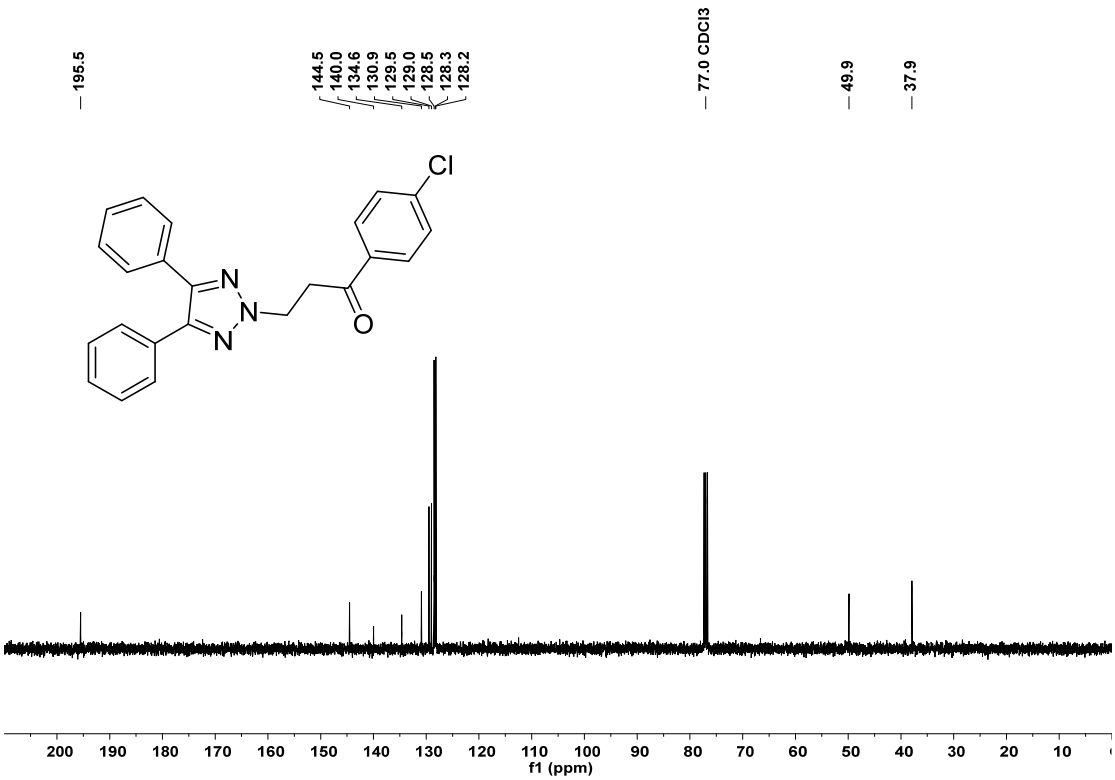
3-(4,5-diphenyl-1H-1,2,3-triazol-1-yl)-1-(4-methoxyphenyl)propan-1- one (**3'q**)



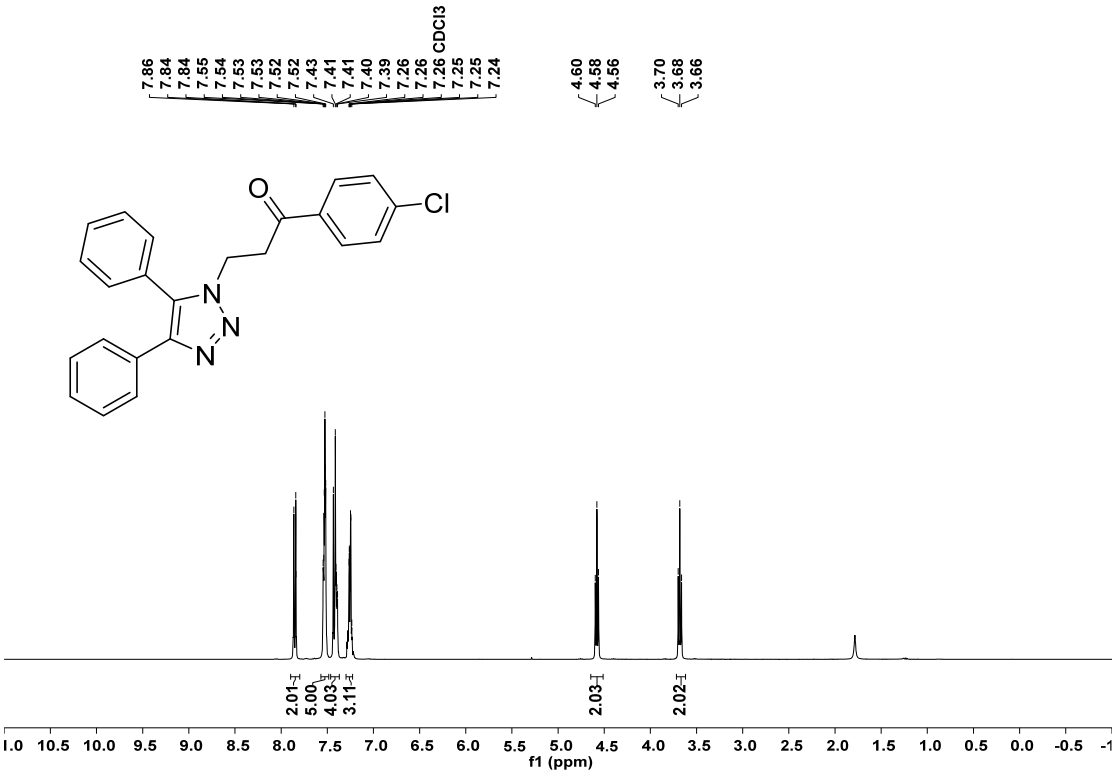


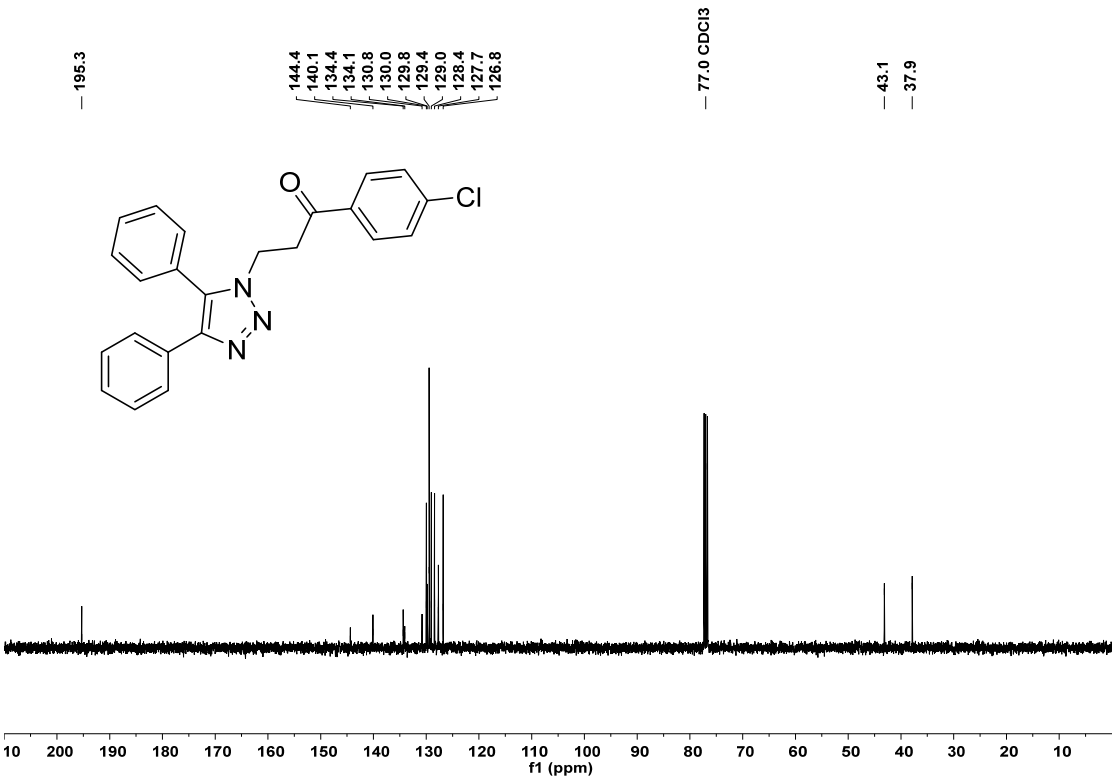
1-(4-chlorophenyl)-3-(4,5-diphenyl-2H-1,2,3-triazol-2-yl)propan-1- one (**3r**)



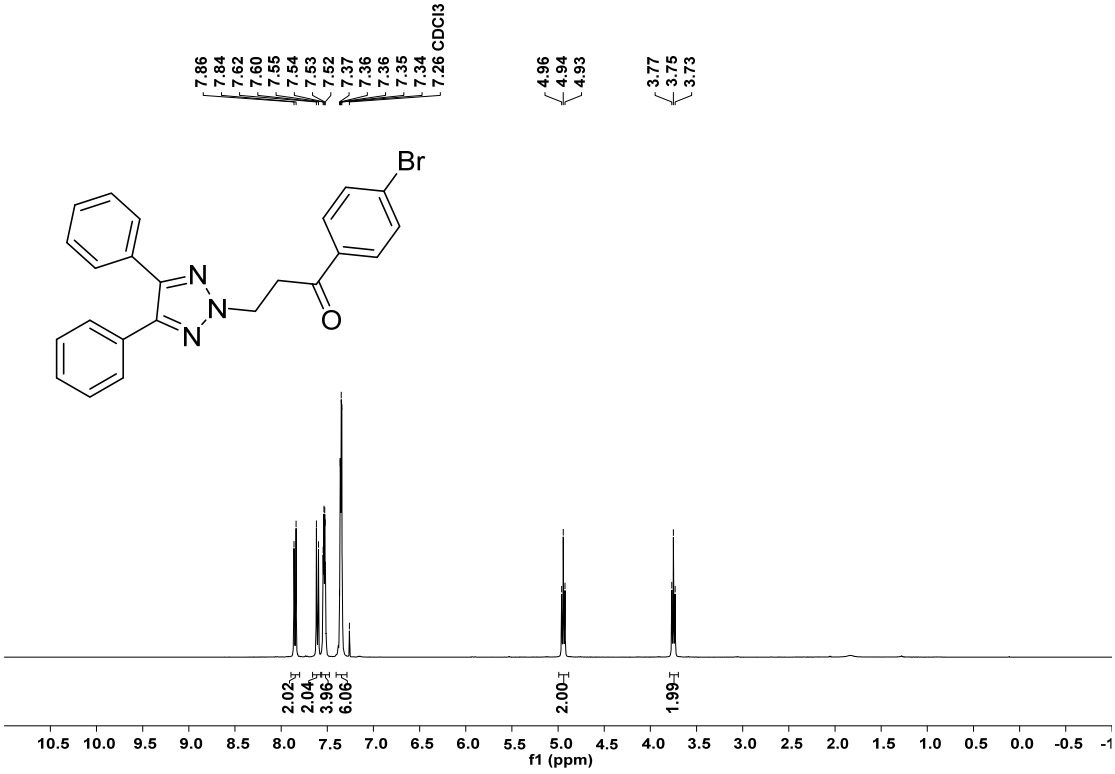


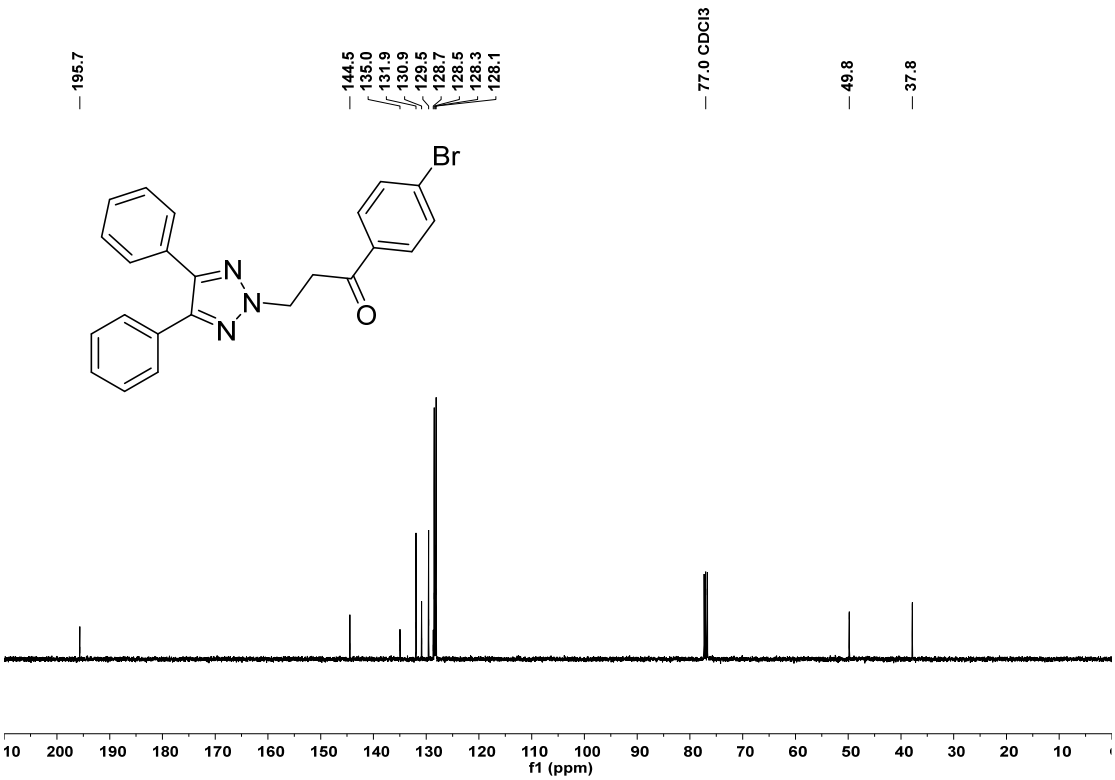
1-(4-chlorophenyl)-3-(4,5-diphenyl-1H-1,2,3-triazol-1-yl)propan-1- one (**3'r**)



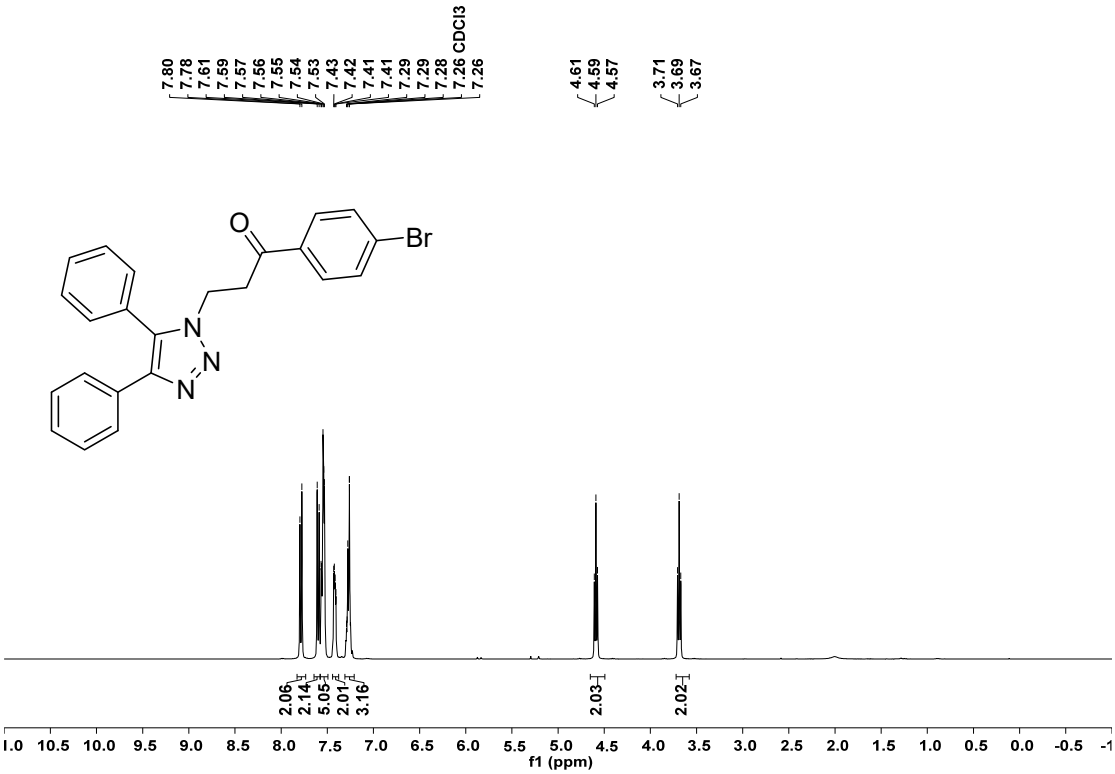


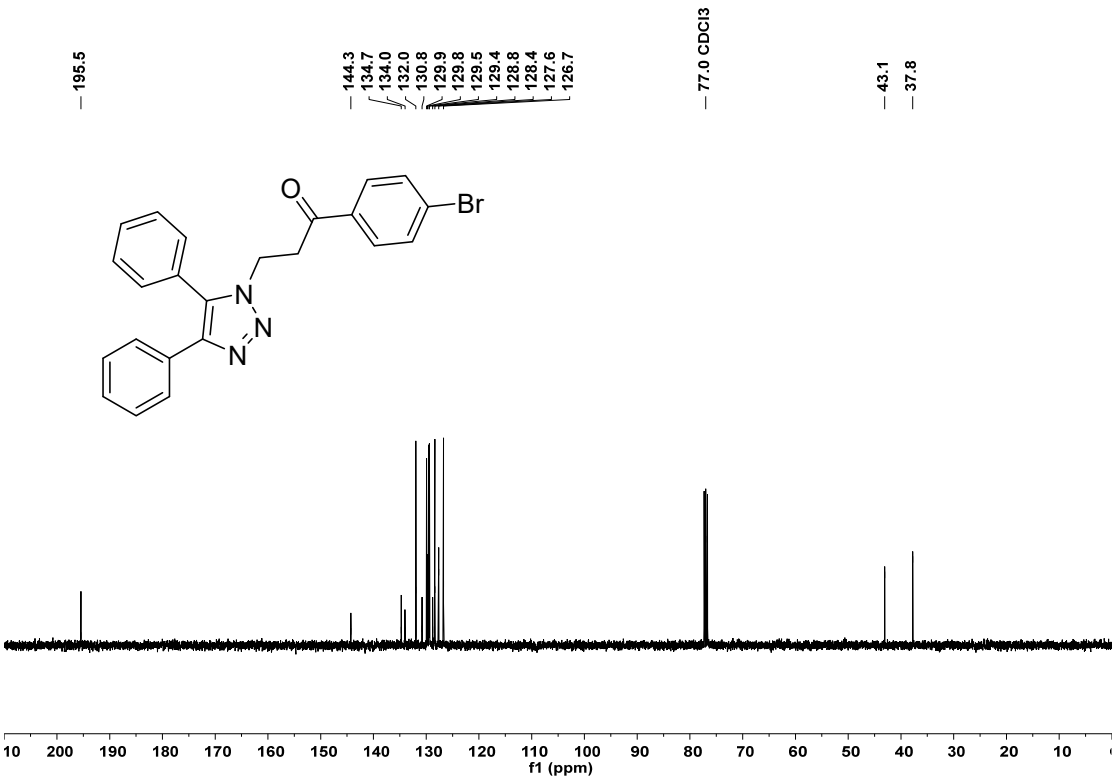
1-(4-bromophenyl)-3-(4,5-diphenyl-2H-1,2,3-triazol-2-yl)propan-1-one (**3s**)



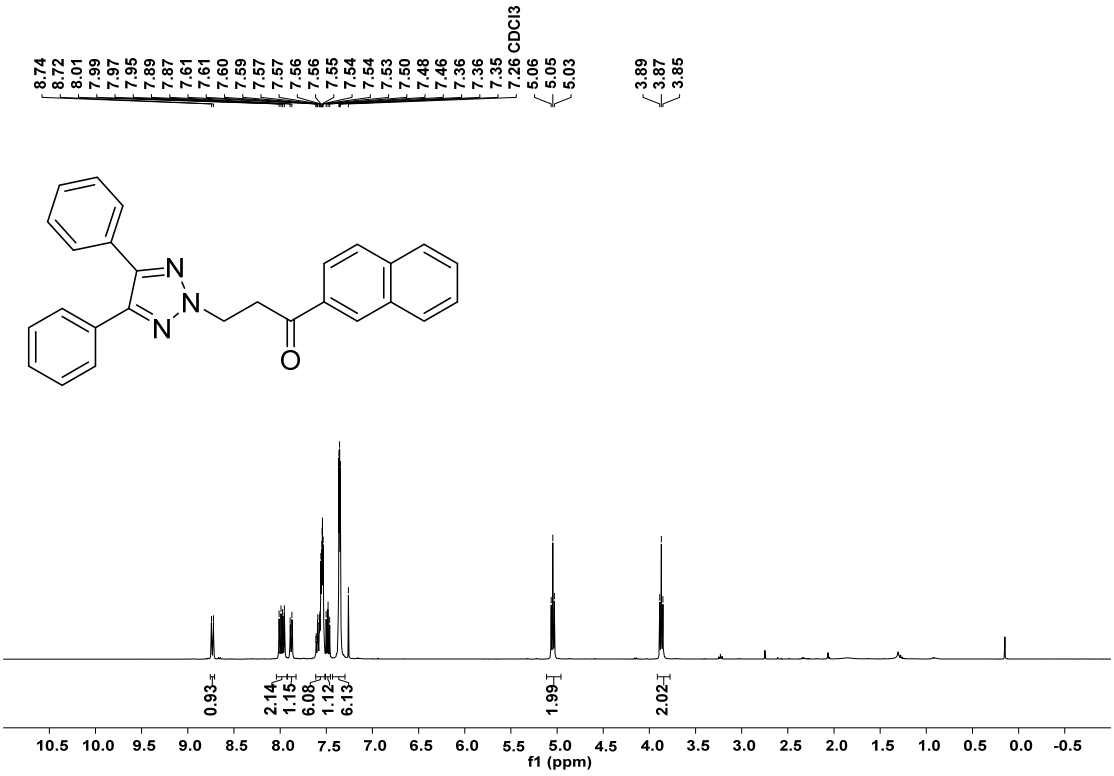


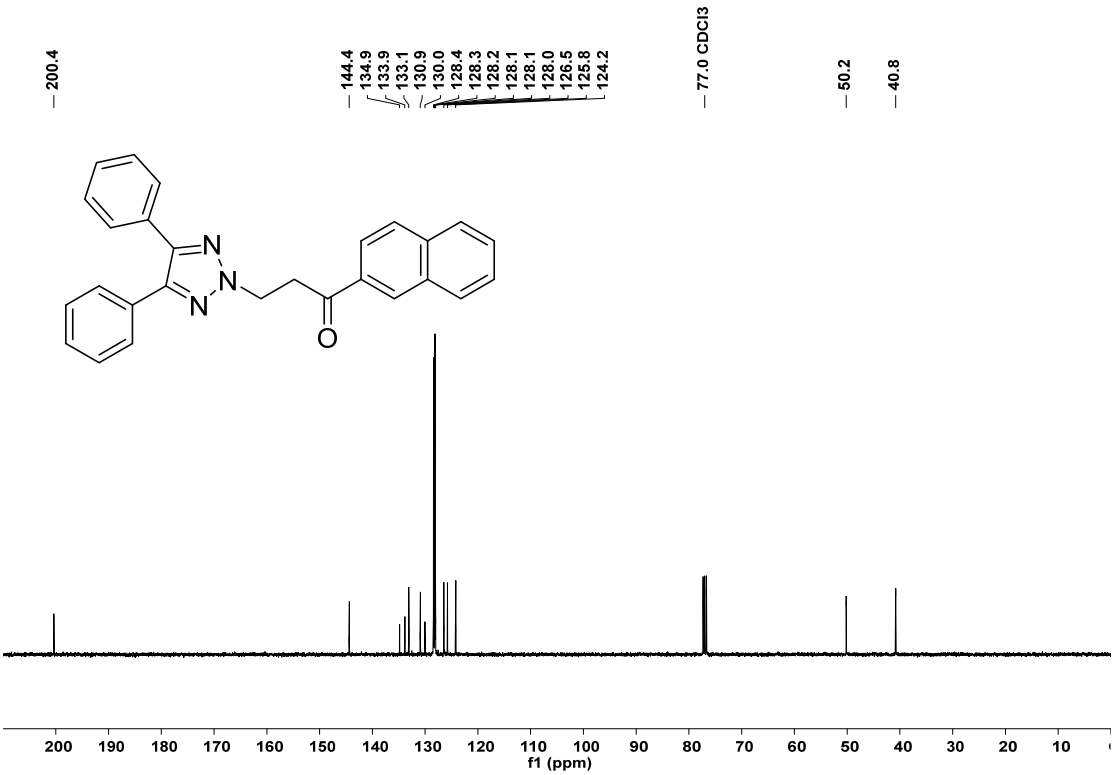
1-(4-bromophenyl)-3-(4,5-diphenyl-1H-1,2,3-triazol-1-yl)propan-1-one (**3's**)



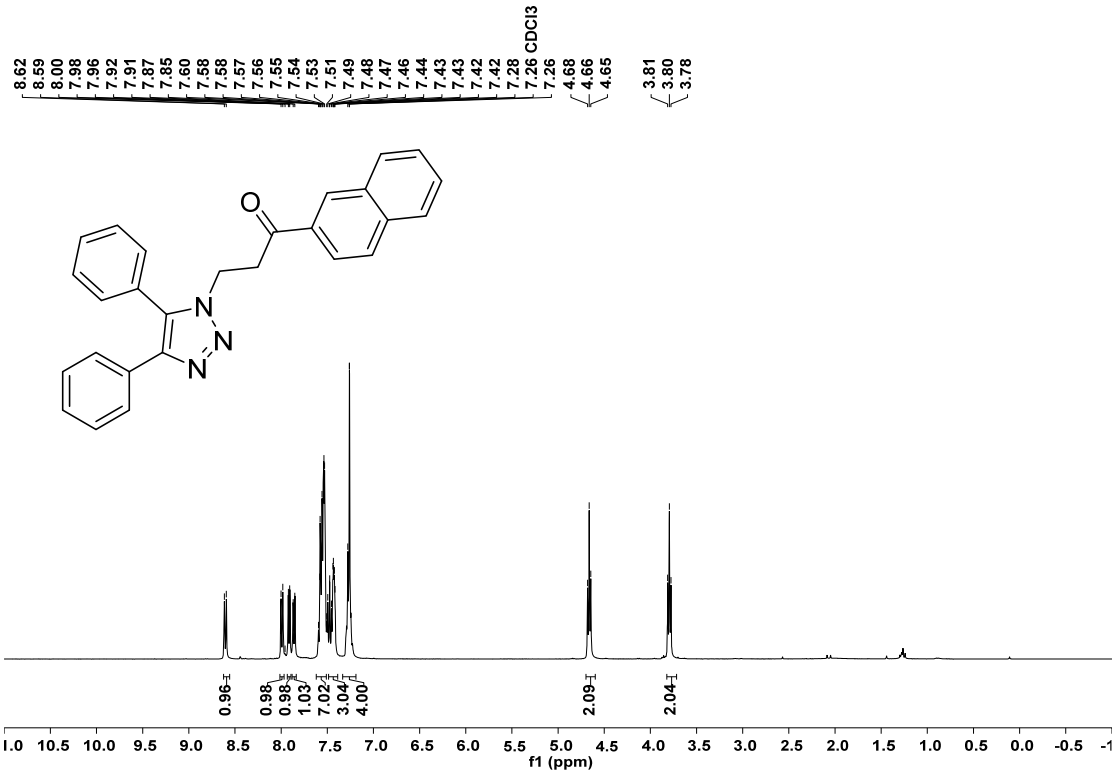


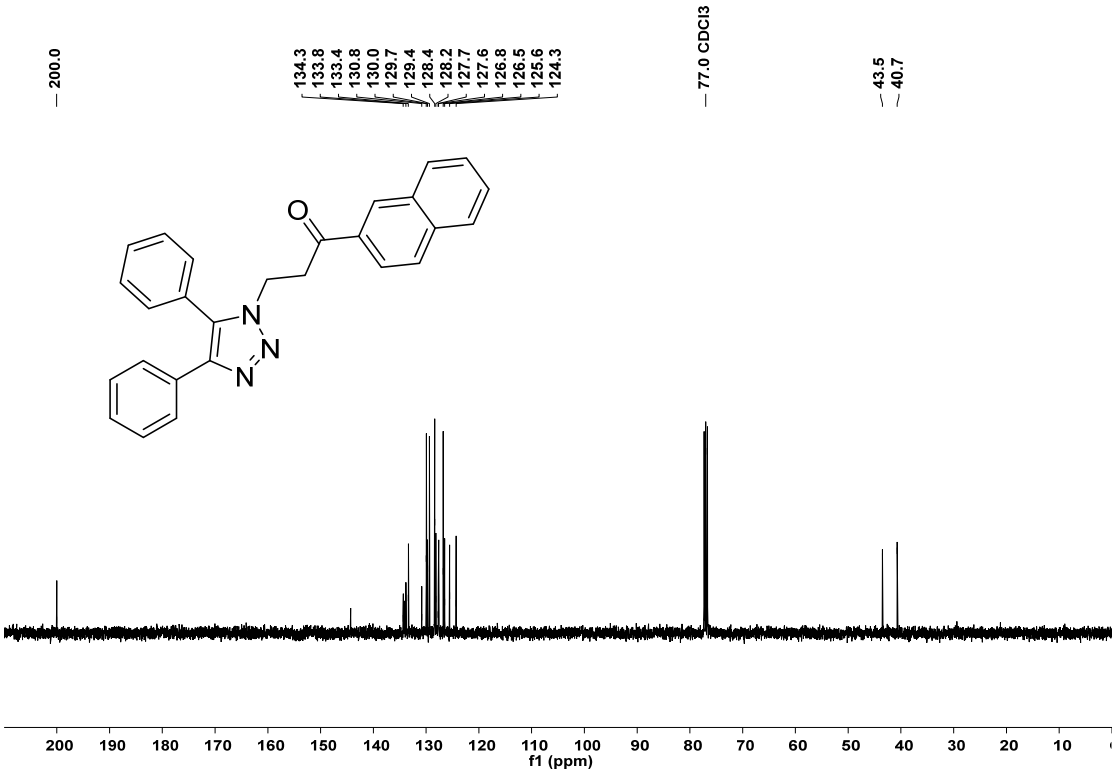
3-(4,5-diphenyl-2H-1,2,3-triazol-2-yl)-1-(naphthalen-2-yl)propan-1- one (**3t**)



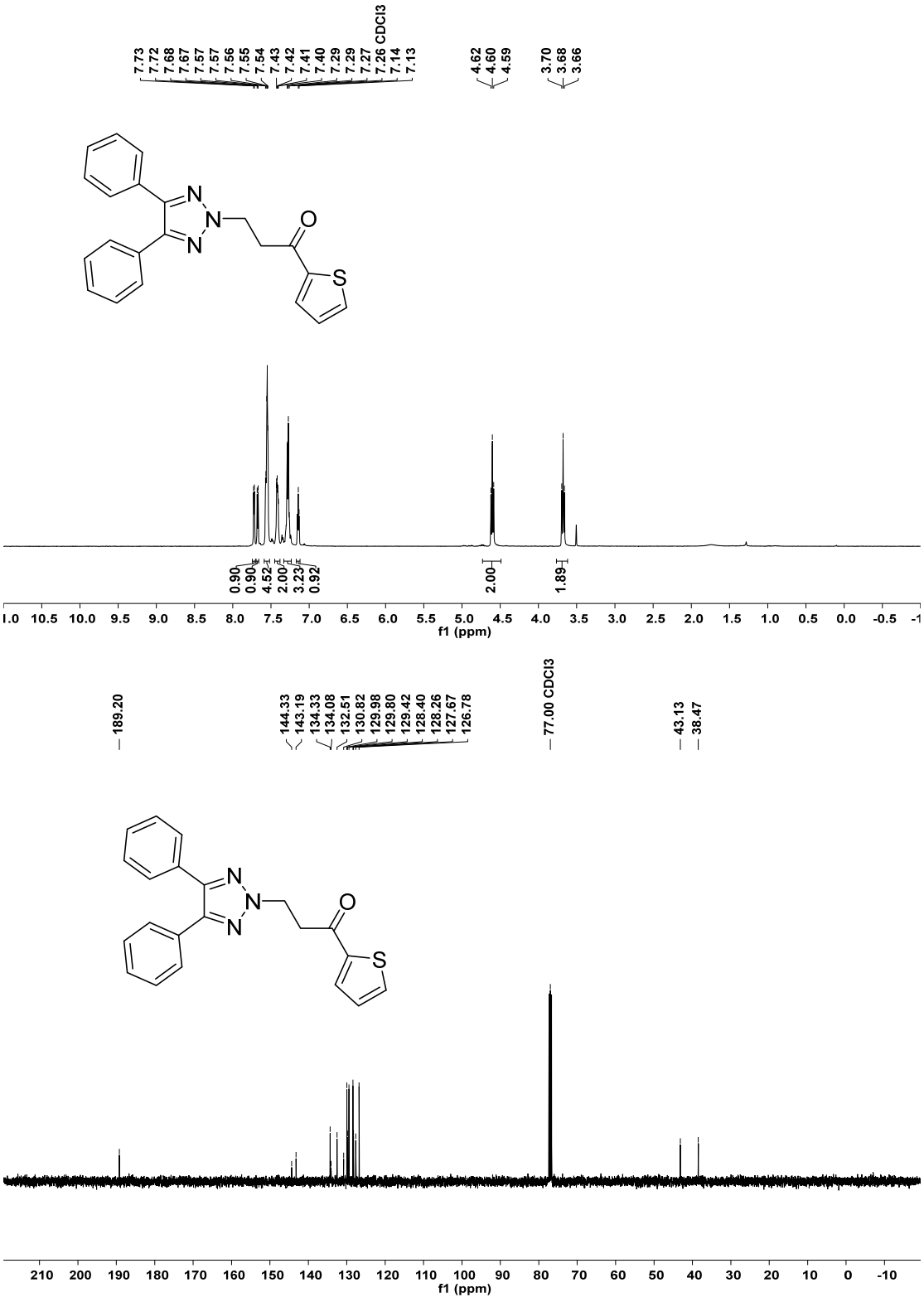


3-(4,5-diphenyl-1H-1,2,3-triazol-1-yl)-1-(naphthalen-2-yl)propan-1-one (**3't**)

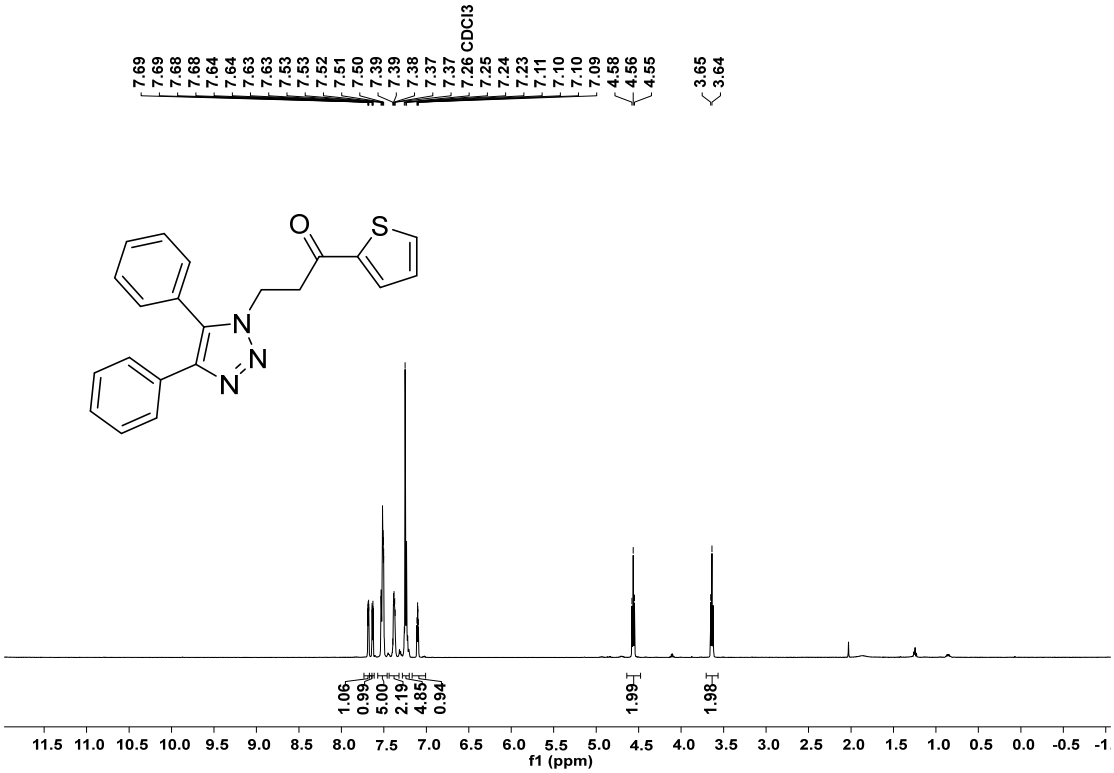


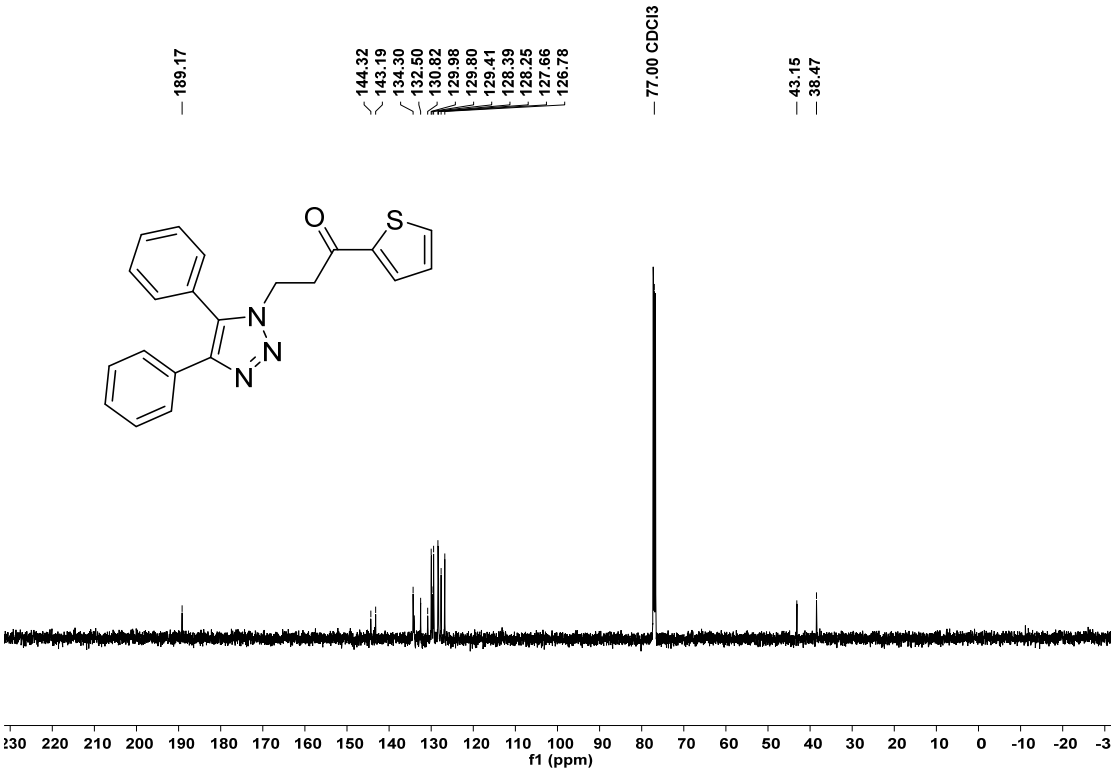


3-(4,5-diphenyl-2H-1,2,3-triazol-2-yl)-1-(thiophen-2-yl)propan-1-one (**3u**)

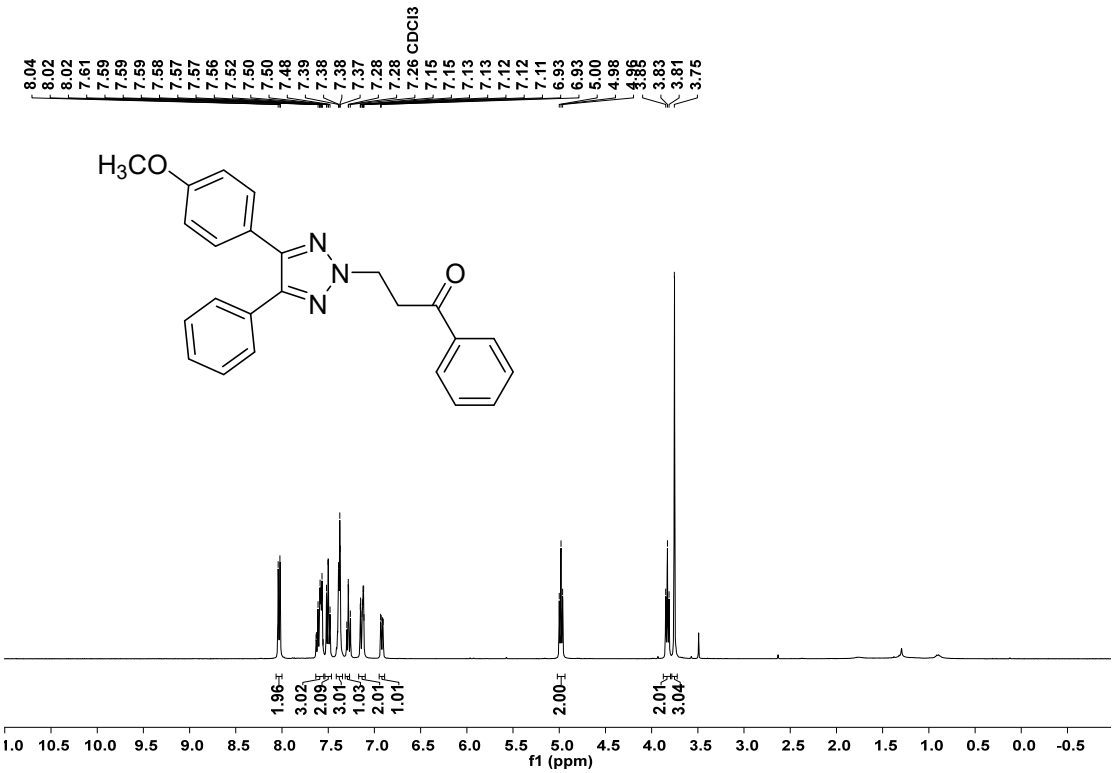


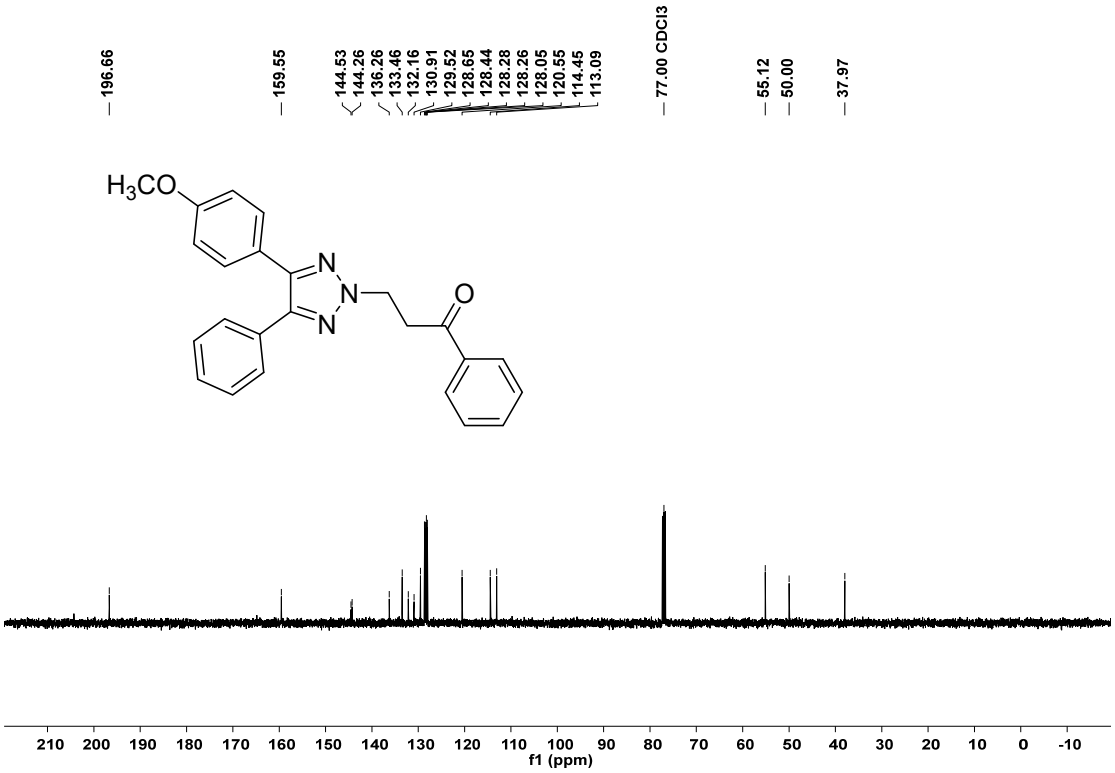
3-(4,5-diphenyl-1H-1,2,3-triazol-1-yl)-1-(thiophen-2-yl)propan-1-one (**3'u**)



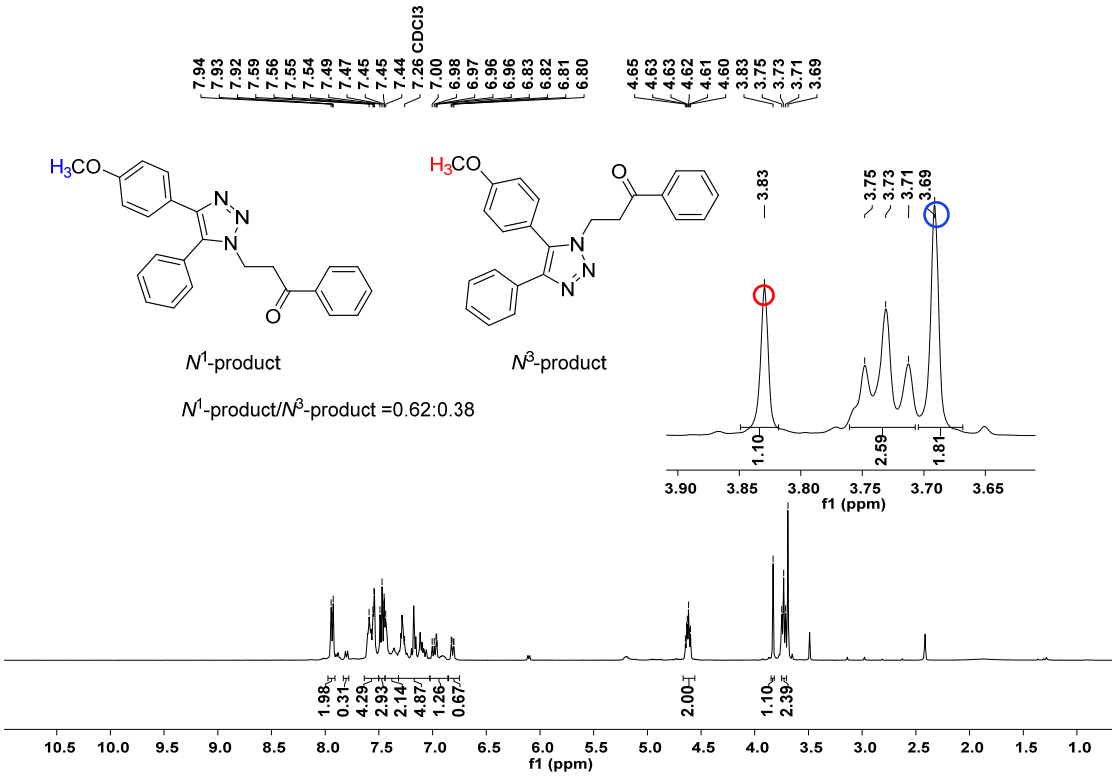


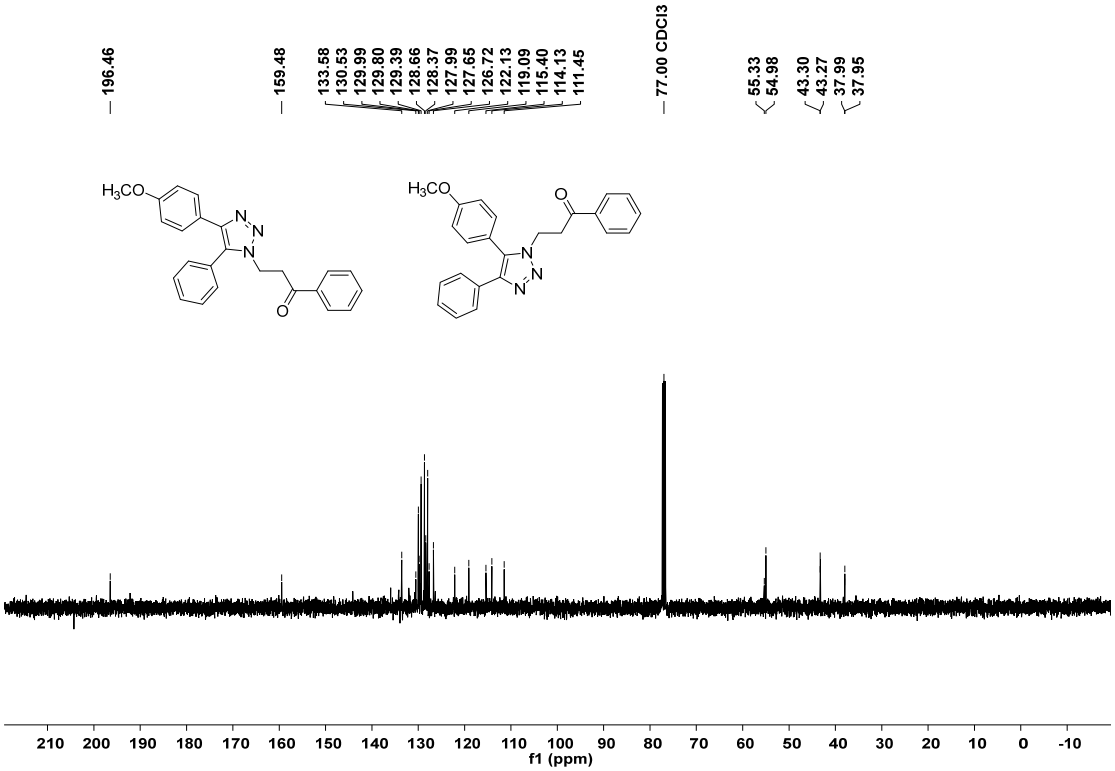
3-(4-(4-methoxyphenyl)-5-phenyl-2H-1,2,3-triazol-2-yl)-1-phenylpropan-1-one (**3v**)



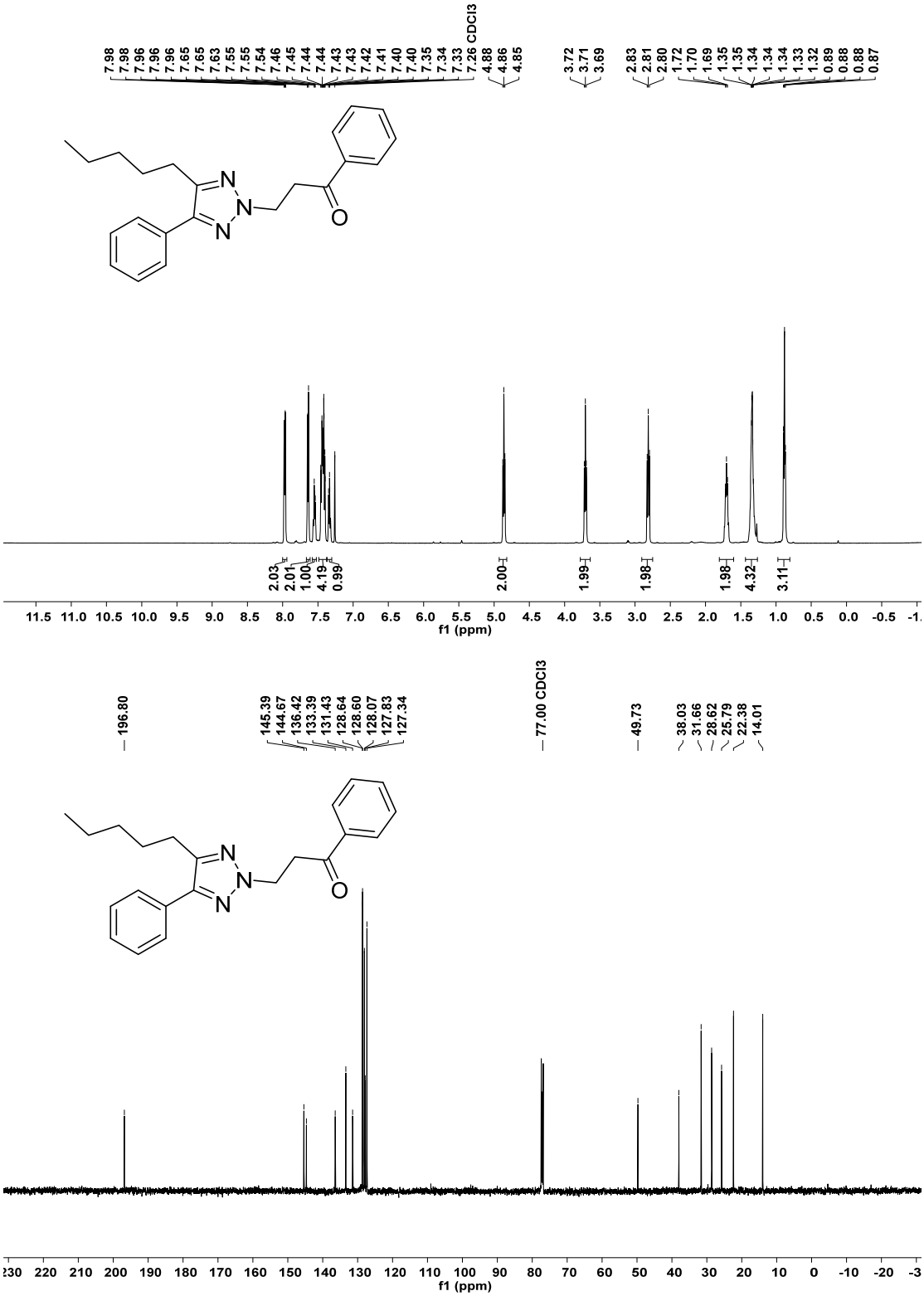


3-(4-(4-methoxyphenyl)-5-phenyl-1*H*-1,2,3-triazol-1-yl)-1-phenylpropan-1-one and 3-(5-(4-methoxyphenyl)-4-phenyl-1*H*-1,2,3-triazol-1-yl)-1-phenylpropan-1-one (**3'v**)

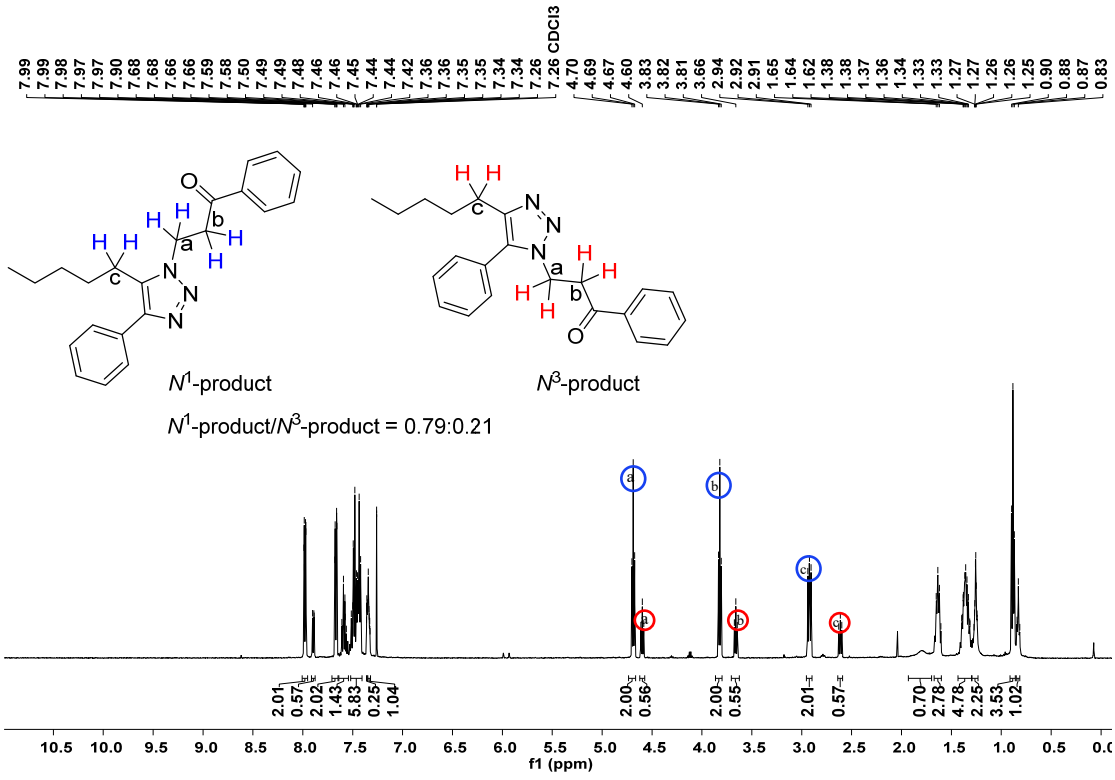


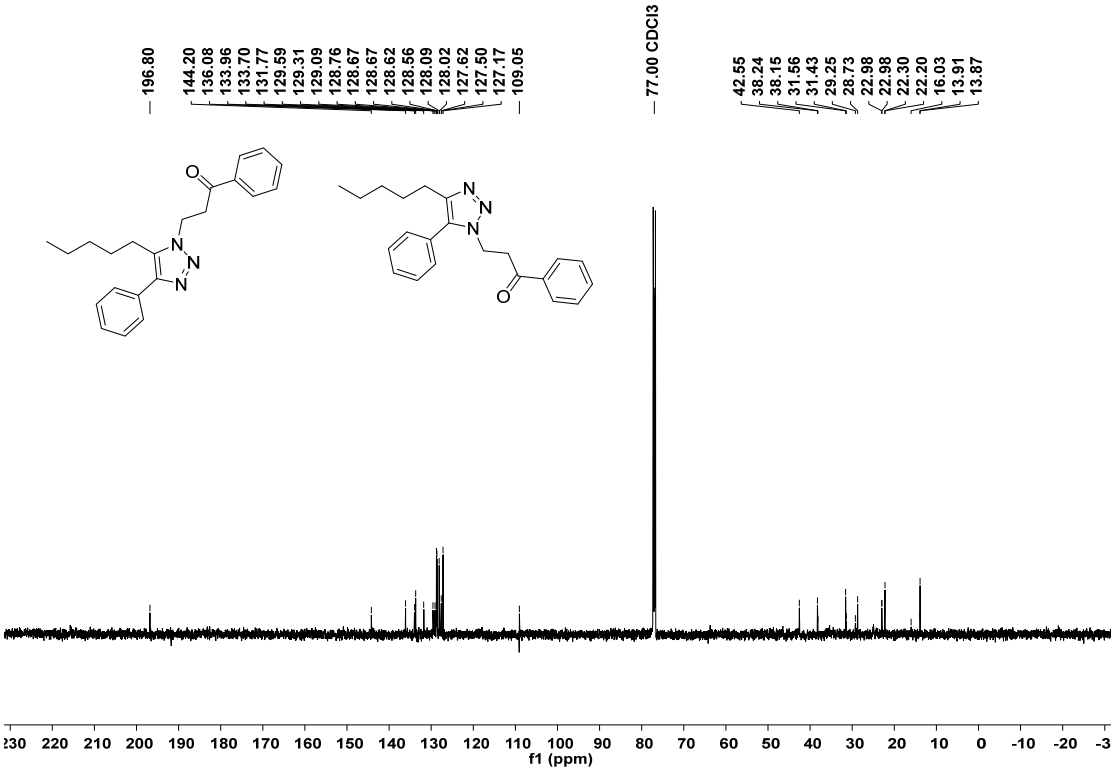


3-(4-pentyl-5-phenyl-2H-1,2,3-triazol-2-yl)-1-phenylpropan-1-one (**3w**)

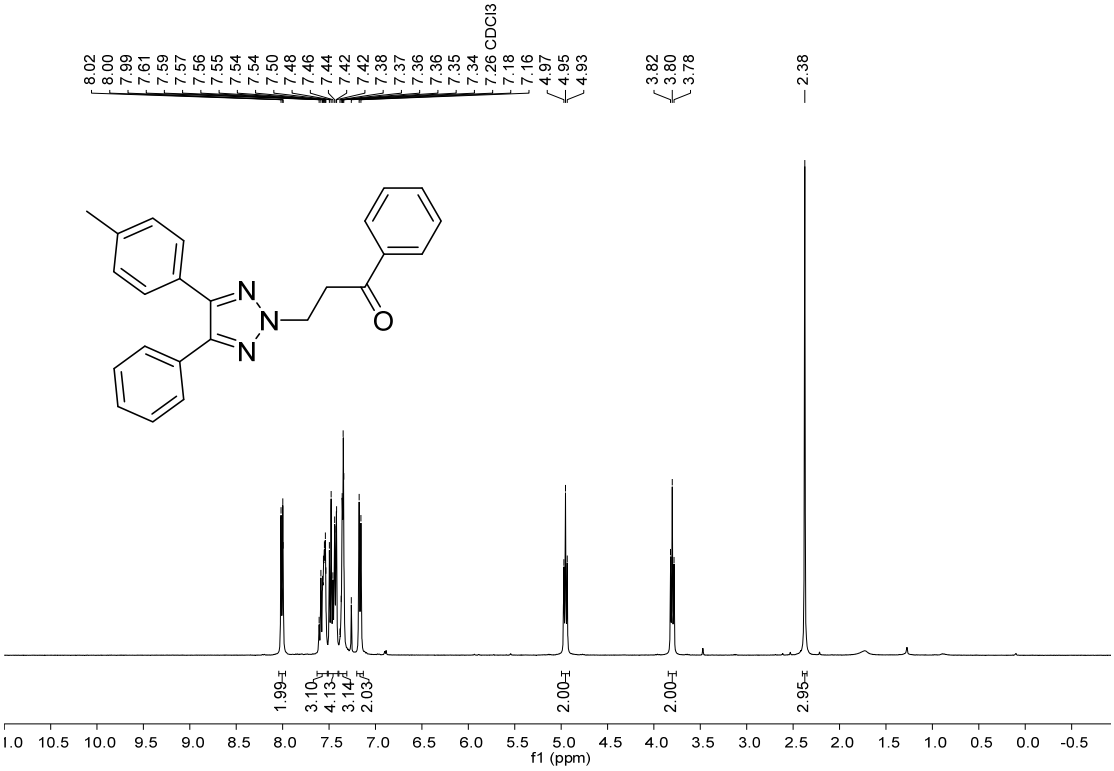


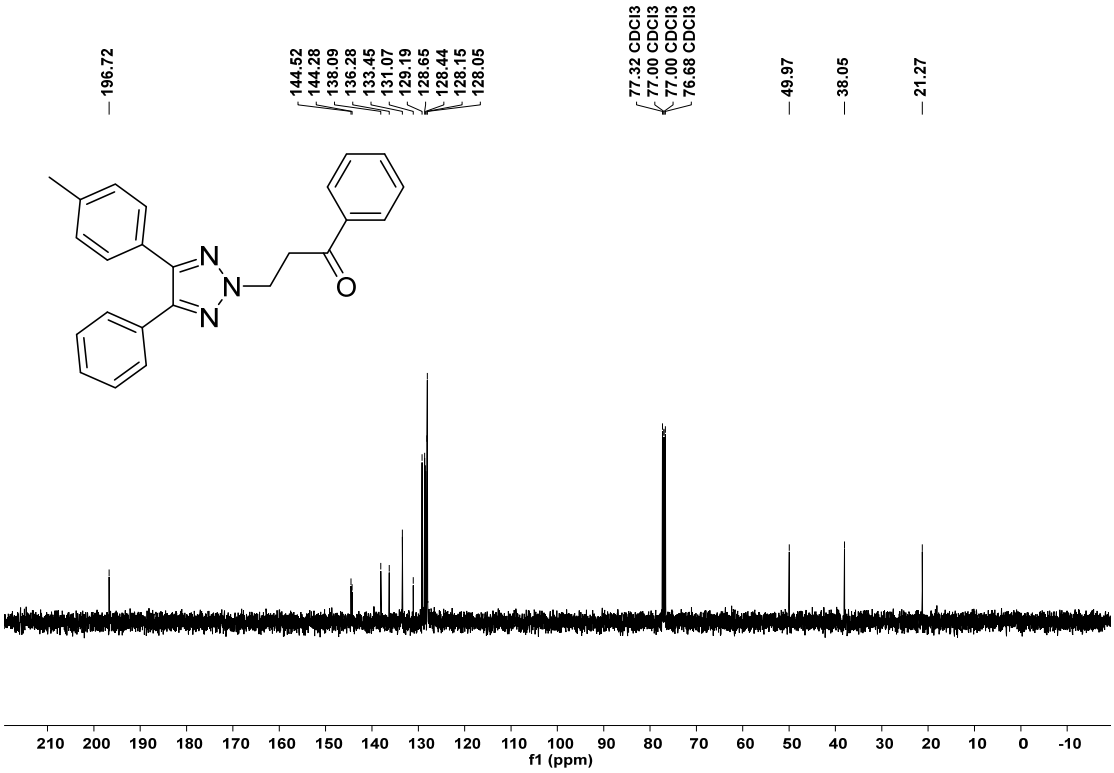
3-(5-pentyl-4-phenyl-1H-1,2,3-triazol-1-yl)-1-phenylpropan-1-one and 3-(4-pentyl-5-phenyl-1H-1,2,3-triazol-1-yl)-1-phenylpropan-1-one (**3'w**)



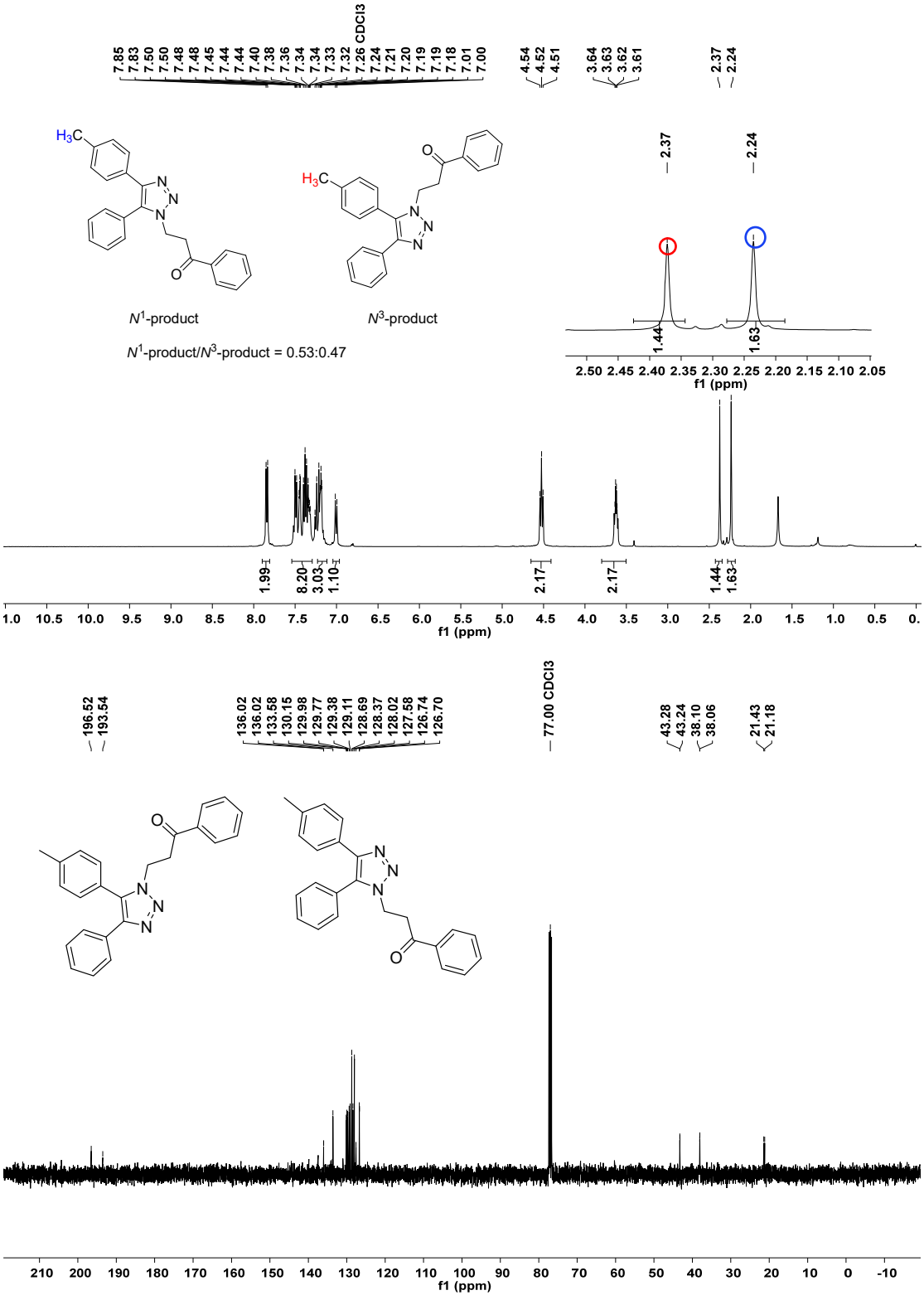


1-phenyl-3-(4-phenyl-5-(p-tolyl)-2H-1,2,3-triazol-2-yl)propan-1-one (**3x**)

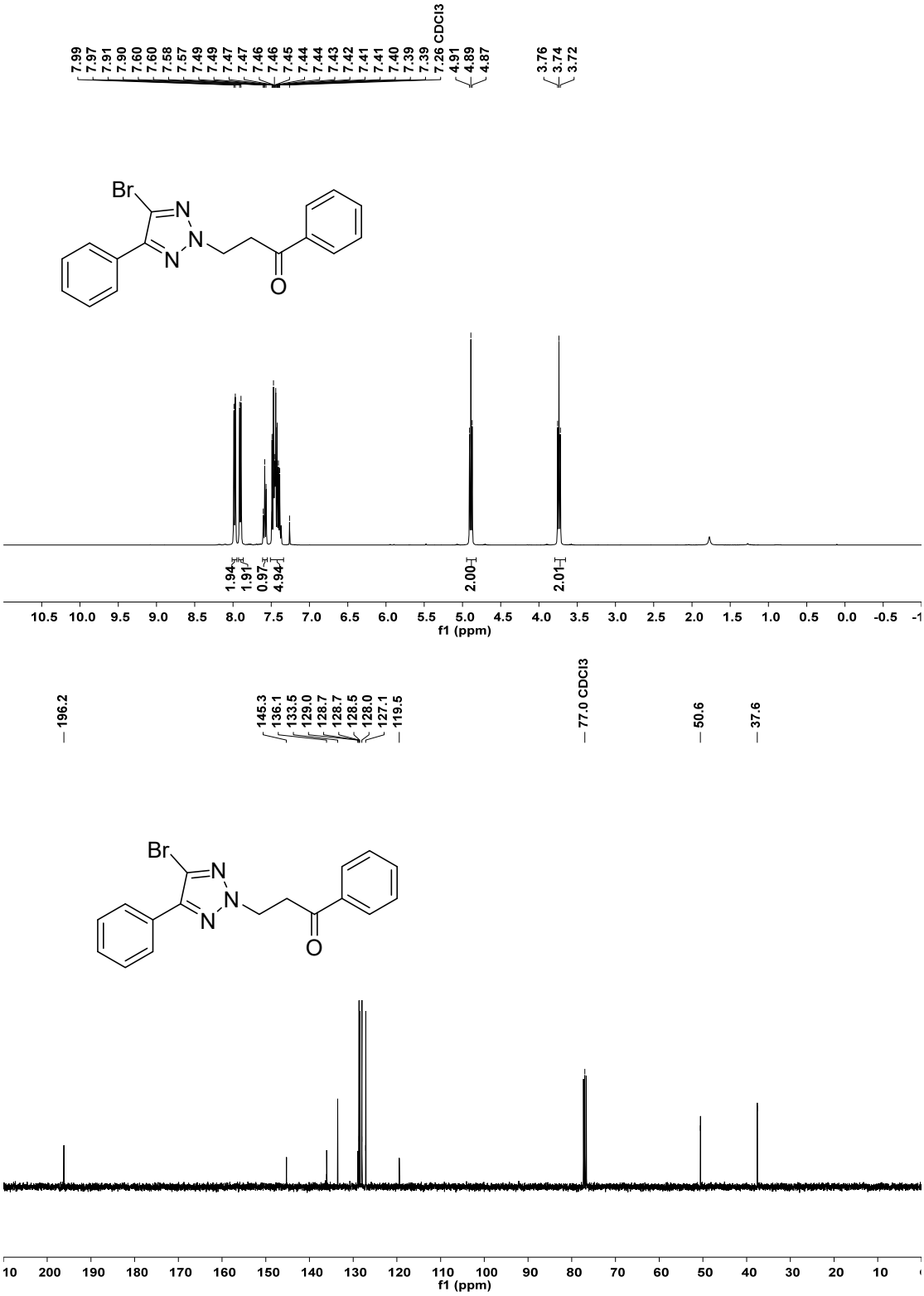




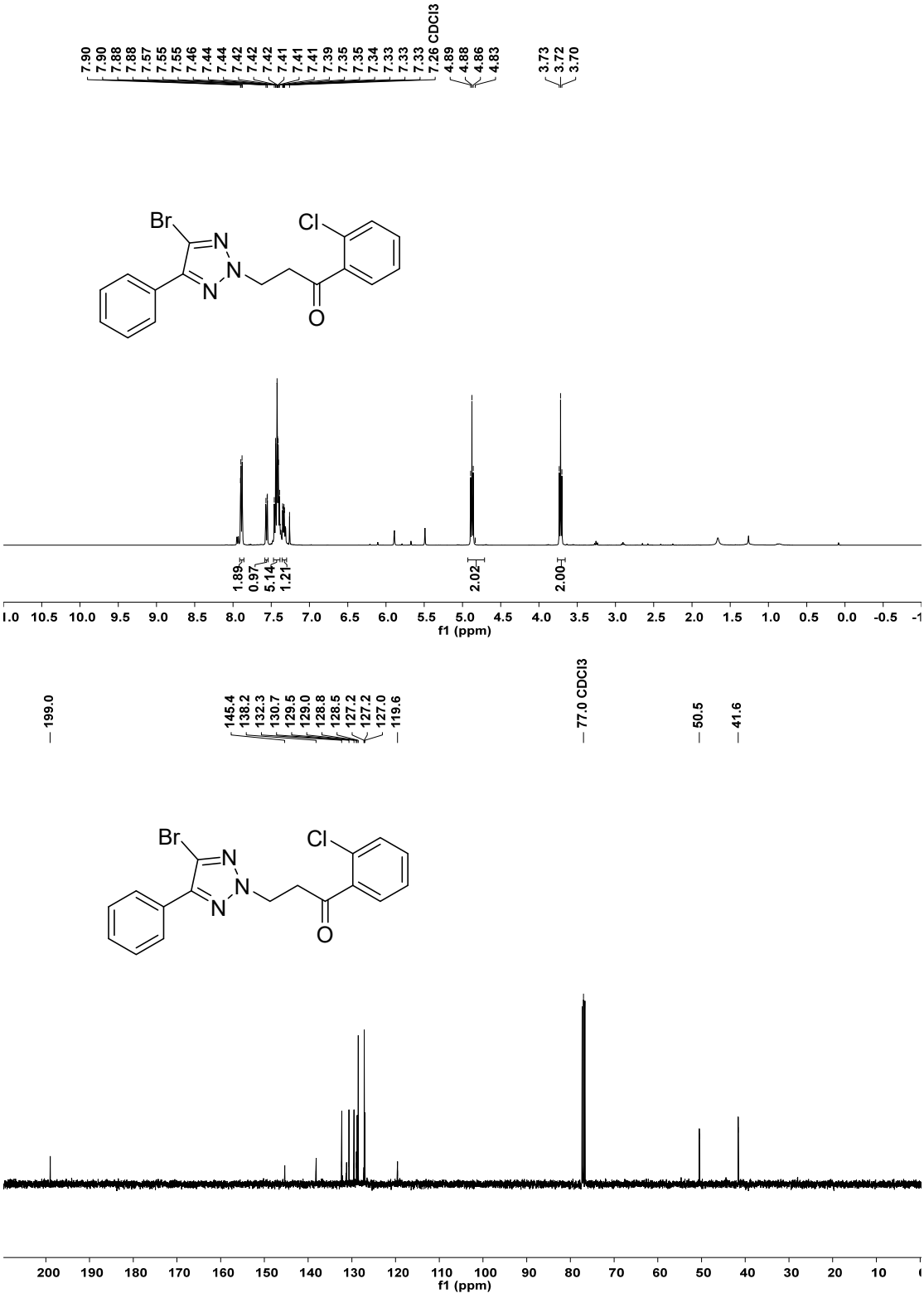
1-phenyl-3-(4-phenyl-5-(p-tolyl)-1H-1,2,3-triazol-1-yl)propan-1-one and 1-phenyl-3-(5-phenyl-4-(p-tolyl)-1H-1,2,3-triazol-1-yl)propan-1-one (**3'x**)



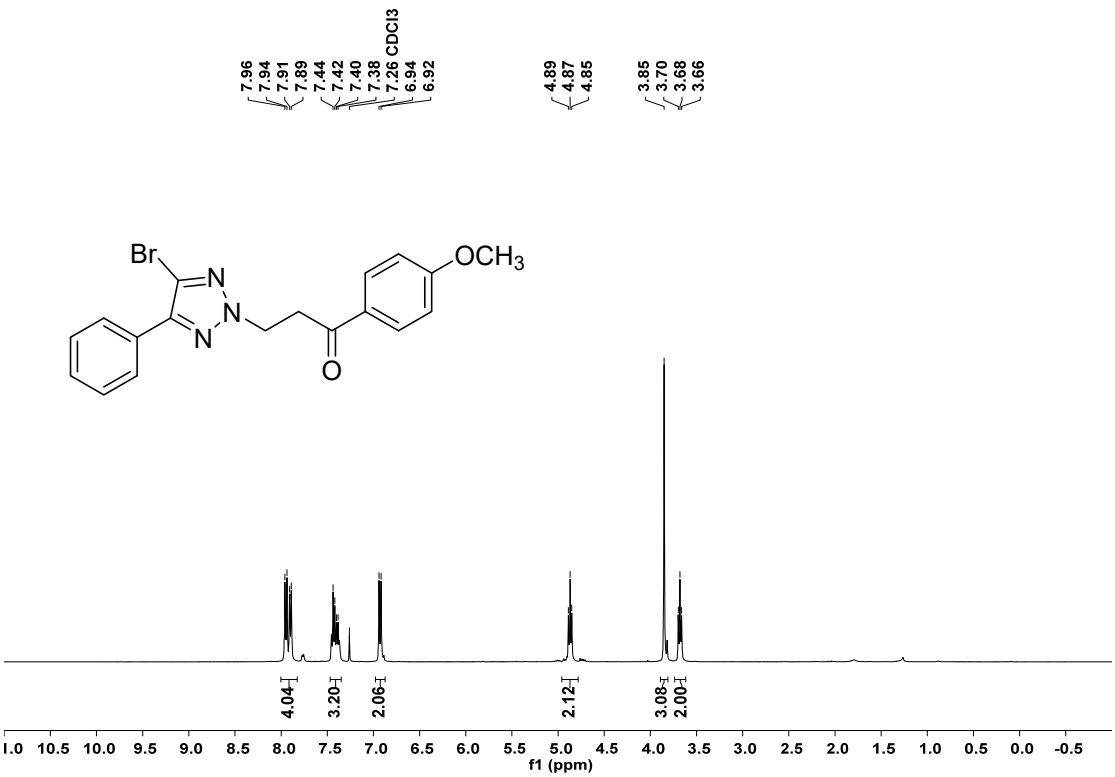
3-(4-bromo-5-phenyl-2H-1,2,3-triazol-2-yl)-1-phenylpropan-1-one (**4a**)

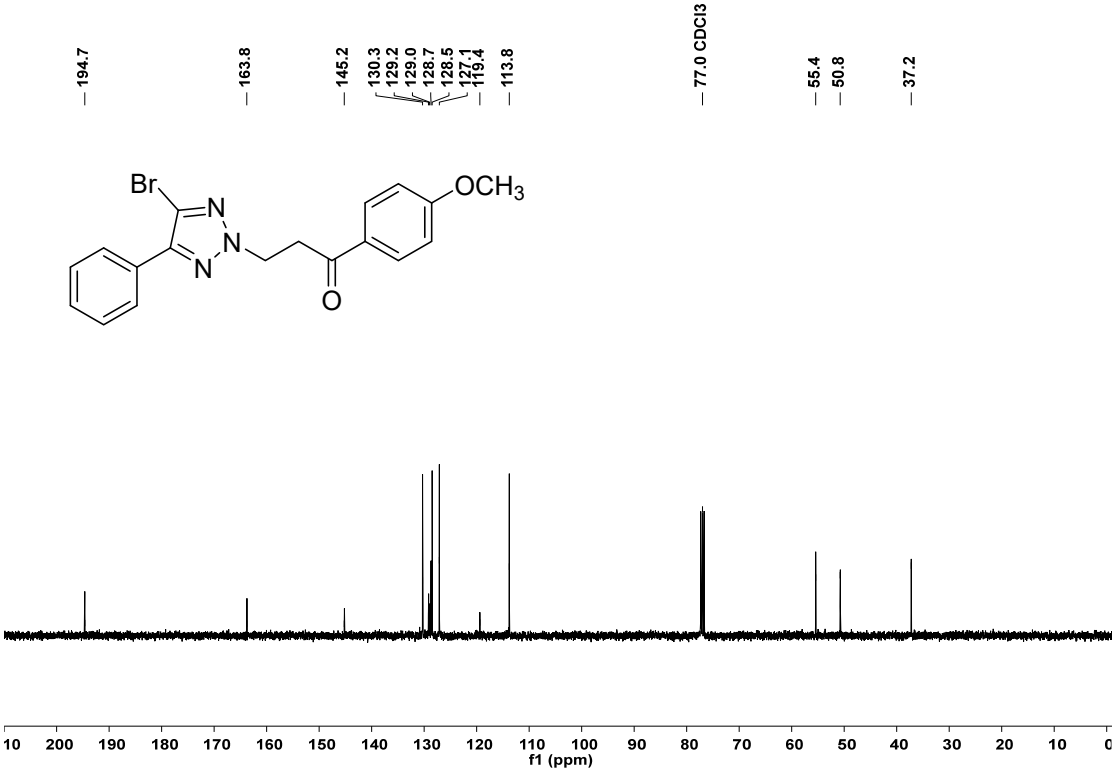


3-(4-bromo-5-phenyl-2H-1,2,3-triazol-2-yl)-1-(2-chlorophenyl)propan-1- one (**4b**)

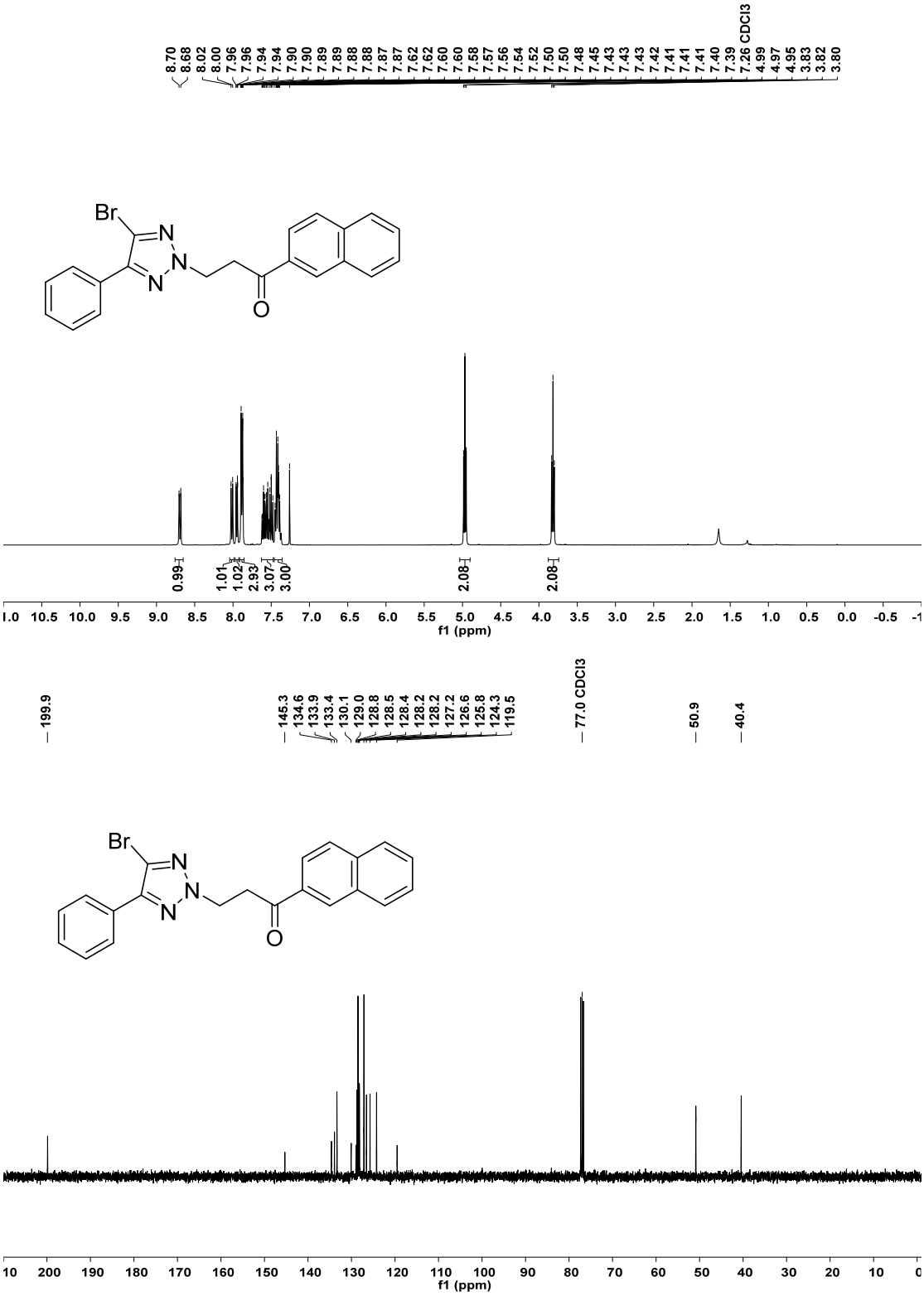


3-(4-bromo-5-phenyl-2H-1,2,3-triazol-2-yl)-1-(4-methoxyphenyl)propan-1-one (**4c**)

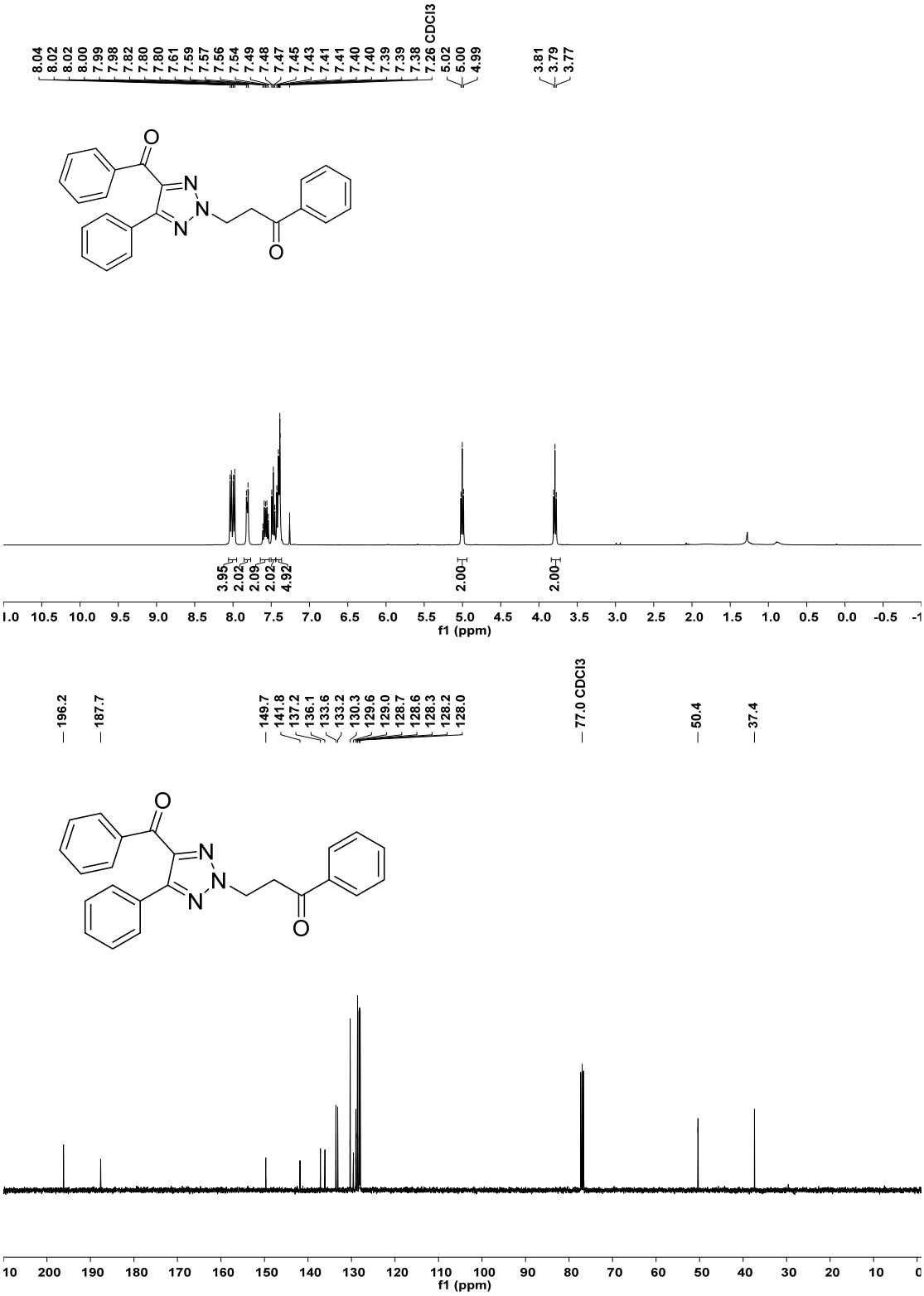




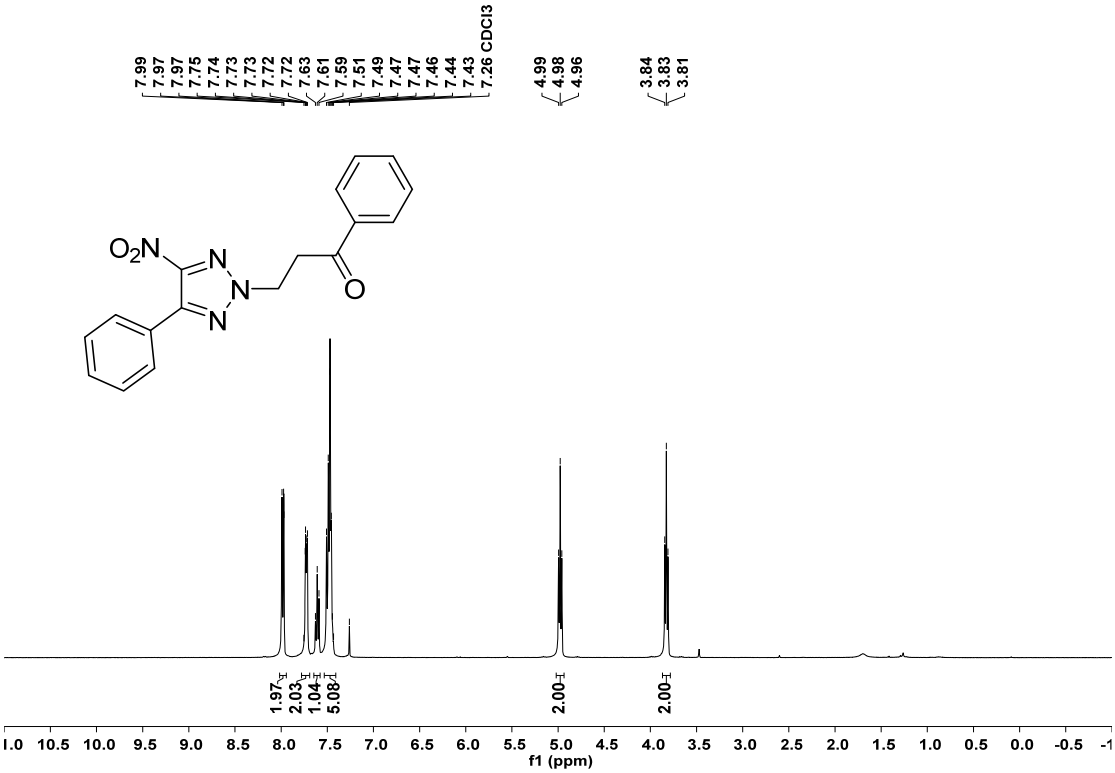
3-(4-bromo-5-phenyl-2H-1,2,3-triazol-2-yl)-1-(naphthalen-2-yl)propan-1-one (**4d**)

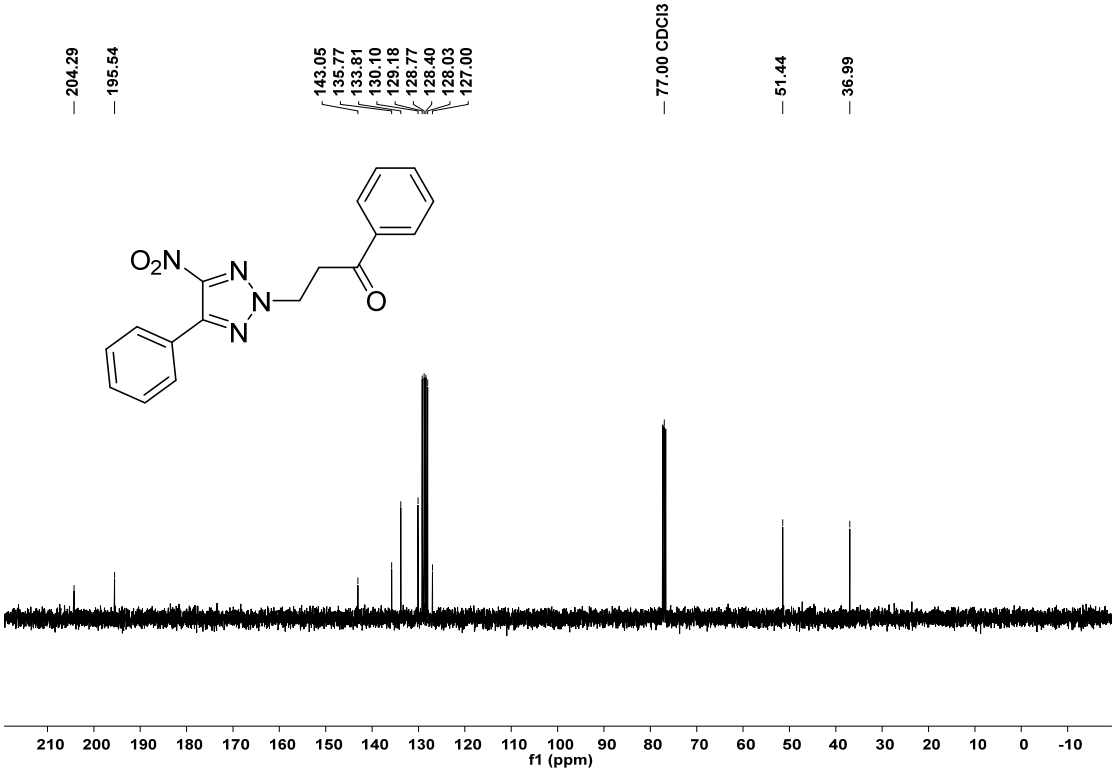


3-(4-benzoyl-5-phenyl-2H-1,2,3-triazol-2-yl)-1-phenylpropan-1- one (**4e**)

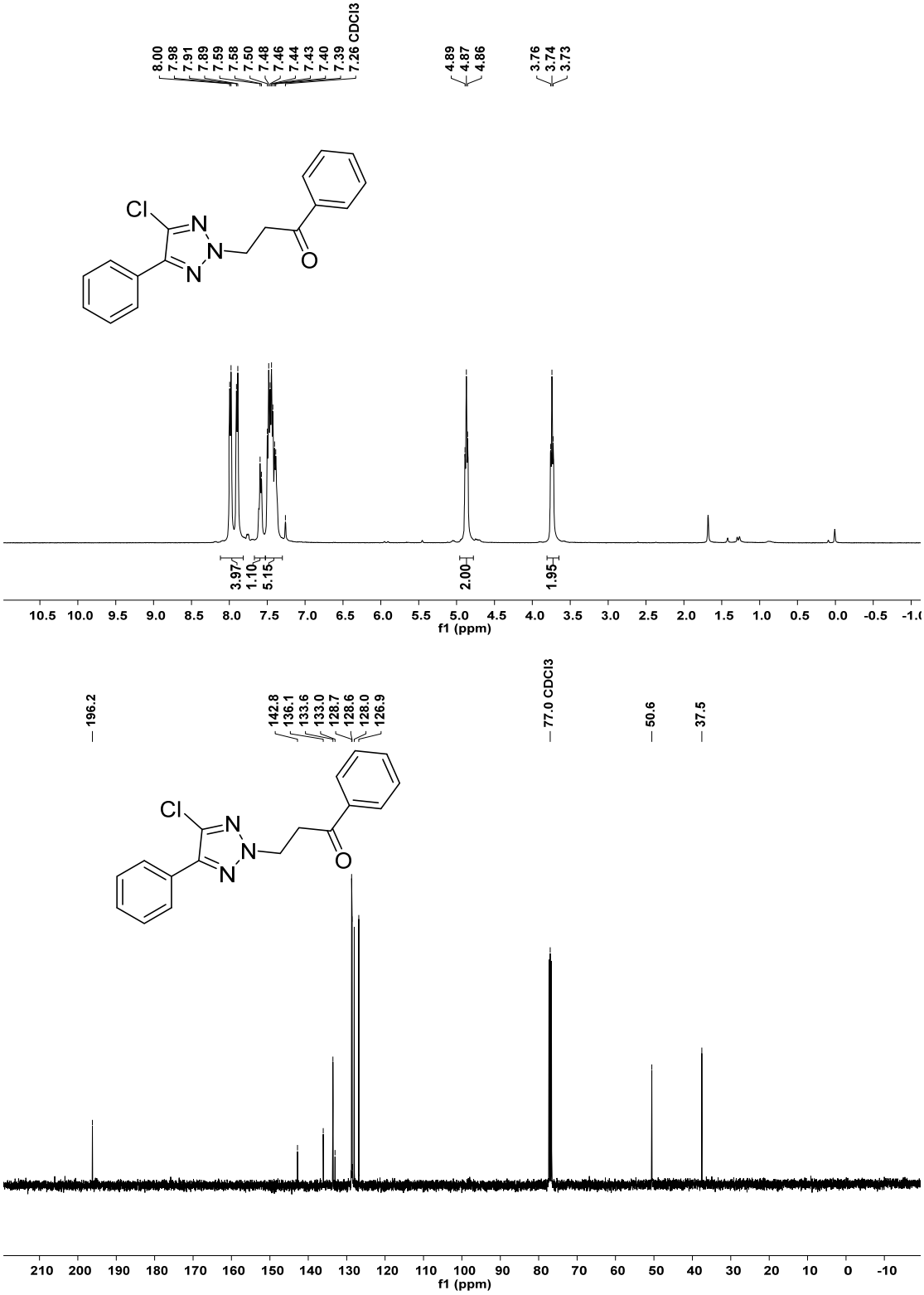


3-(4-nitro-5-phenyl-2H-1,2,3-triazol-2-yl)-1-phenylpropan-1-one (**4f**)

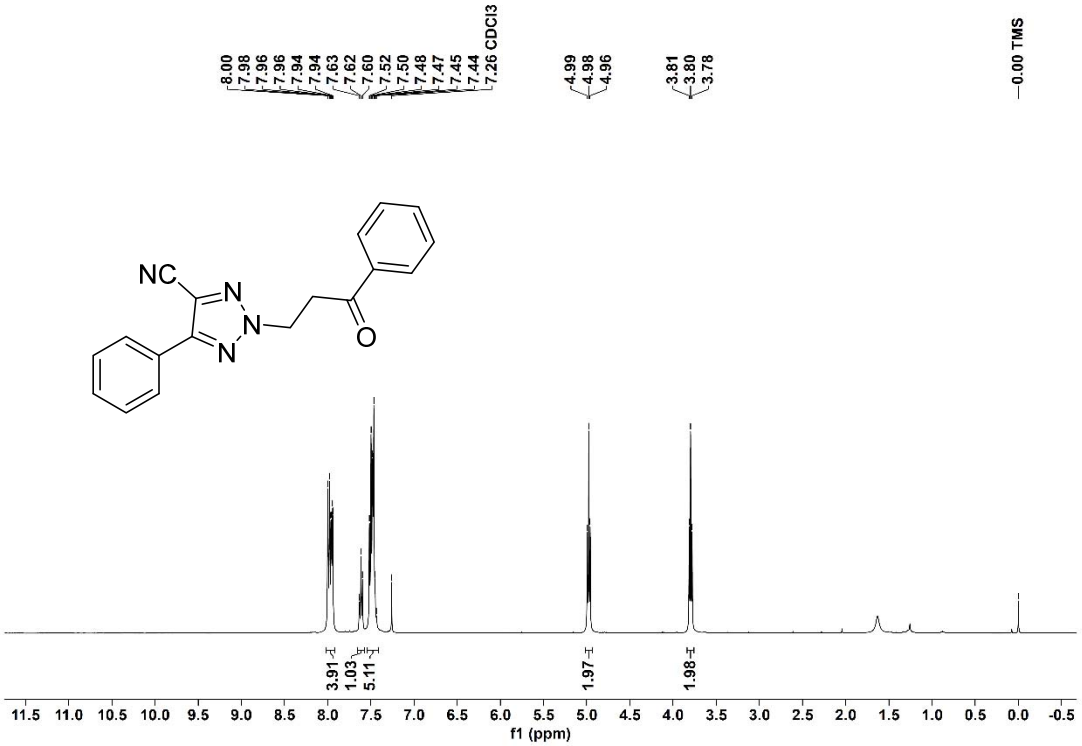


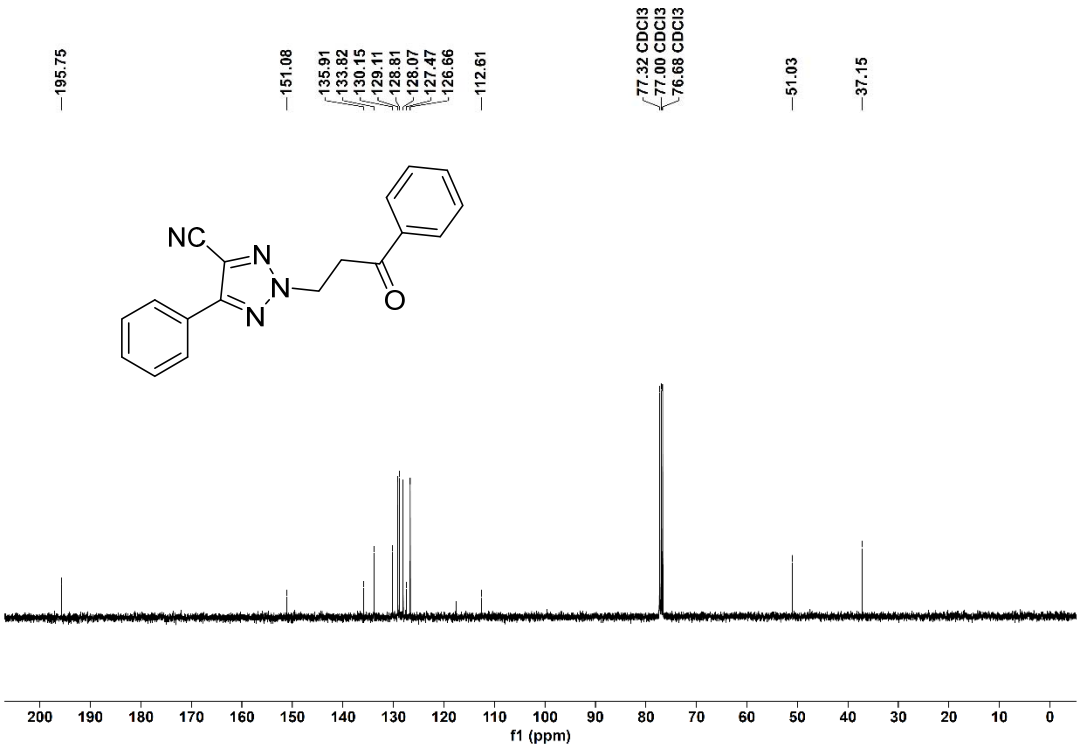


3-(4-chloro-5-phenyl-2H-1,2,3-triazol-2-yl)-1-phenylpropan-1-one (**4g**)

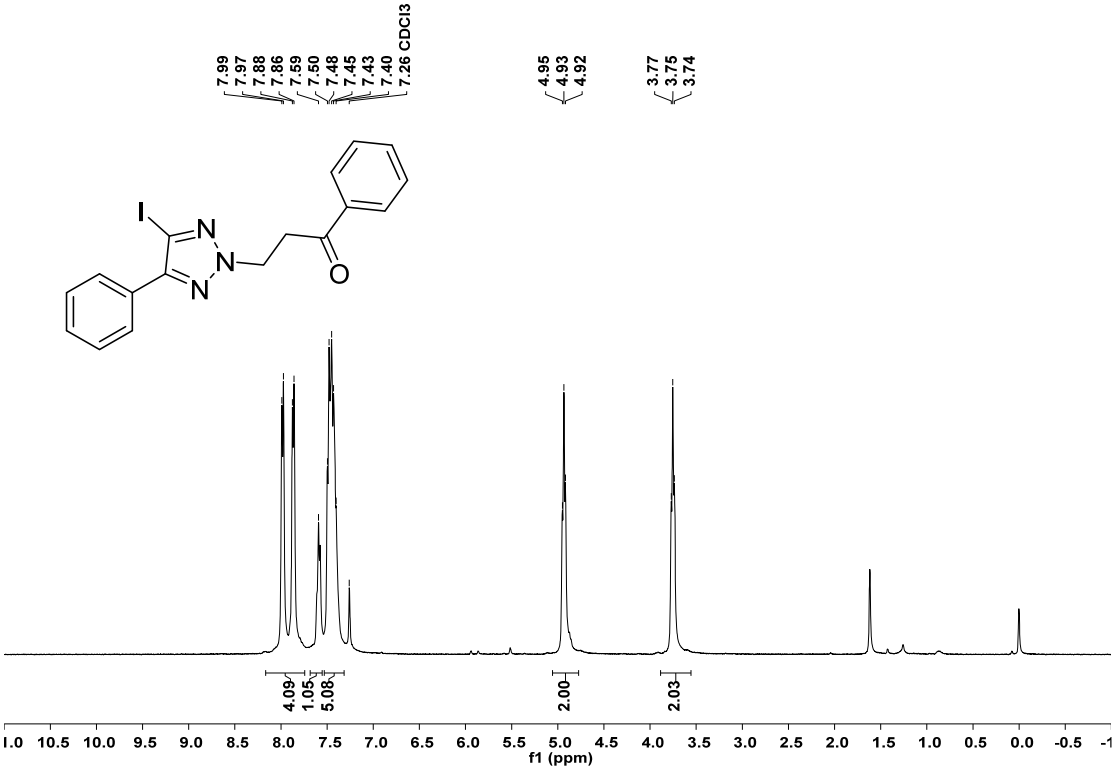


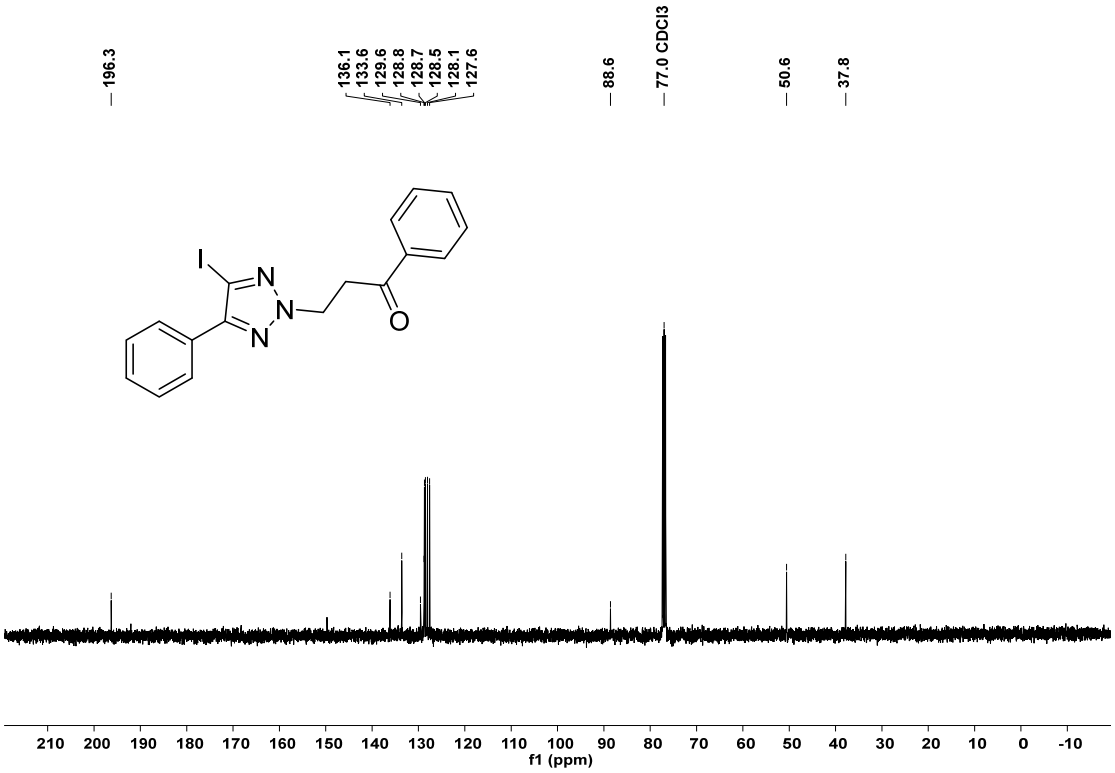
2-(3-oxo-3-phenylpropyl)-5-phenyl-2H-1,2,3-triazole-4-carbonitrile (**4h**)



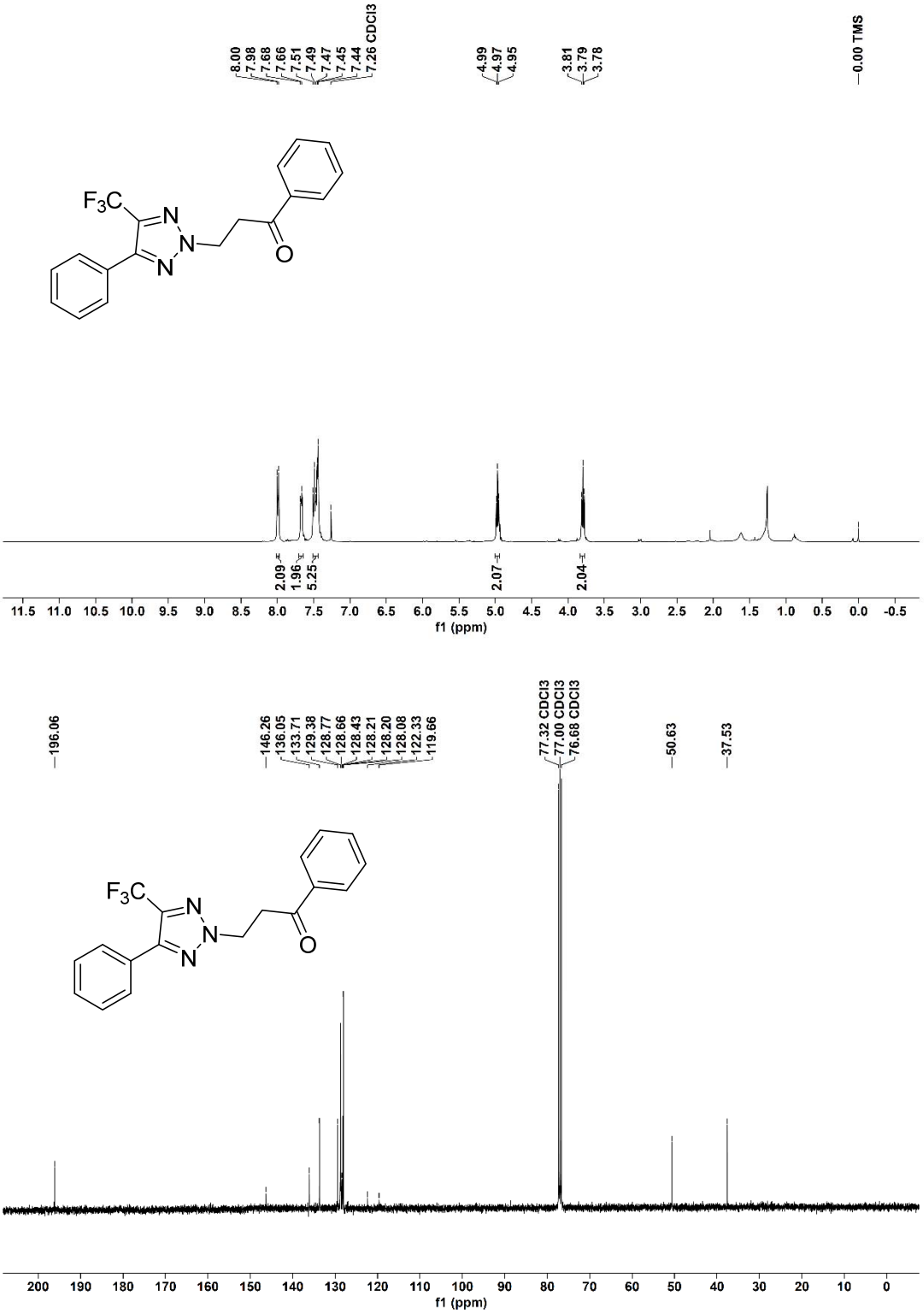


3-(4-iodo-5-phenyl-2H-1,2,3-triazol-2-yl)-1-phenylpropan-1-one (**4i**)

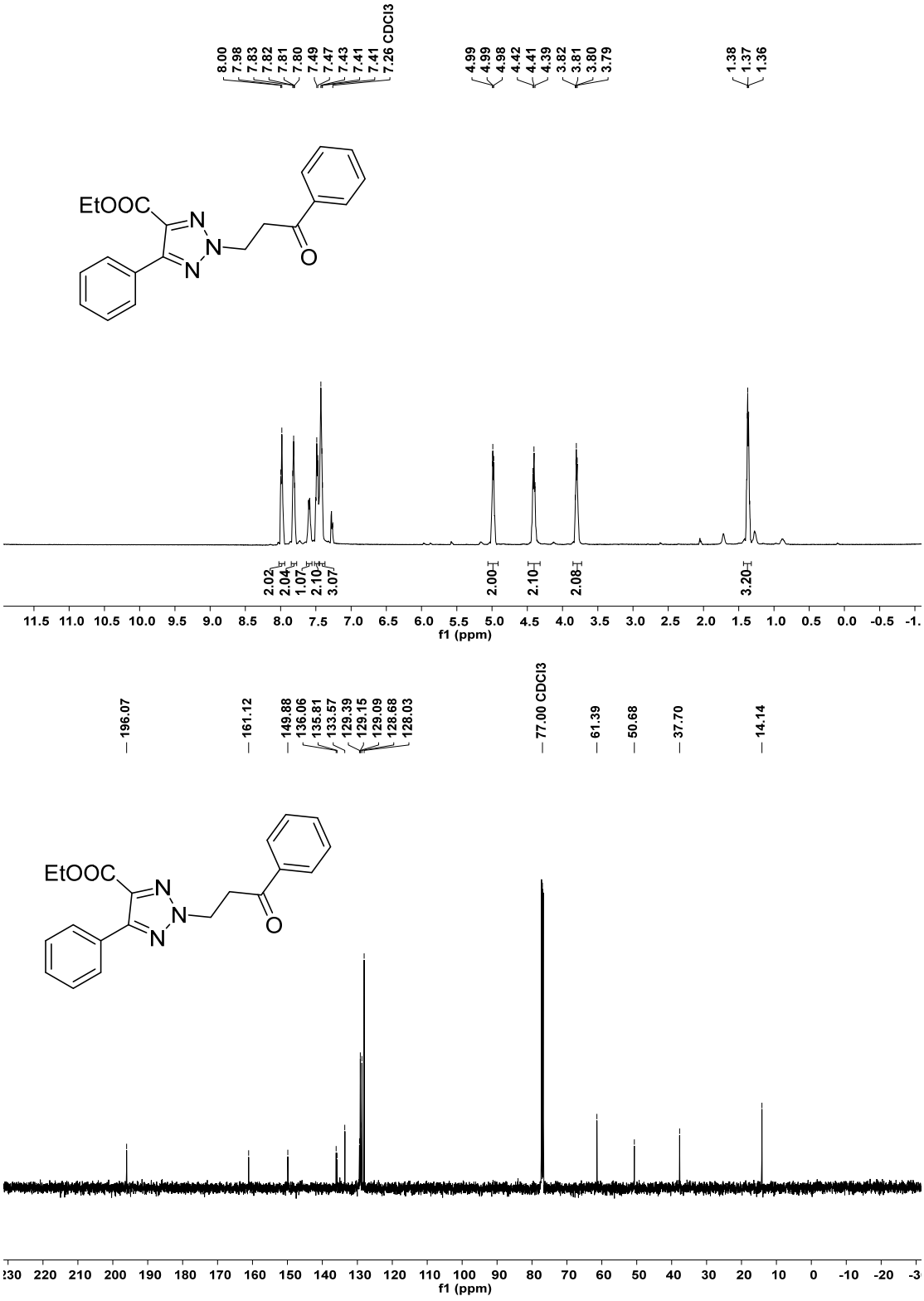




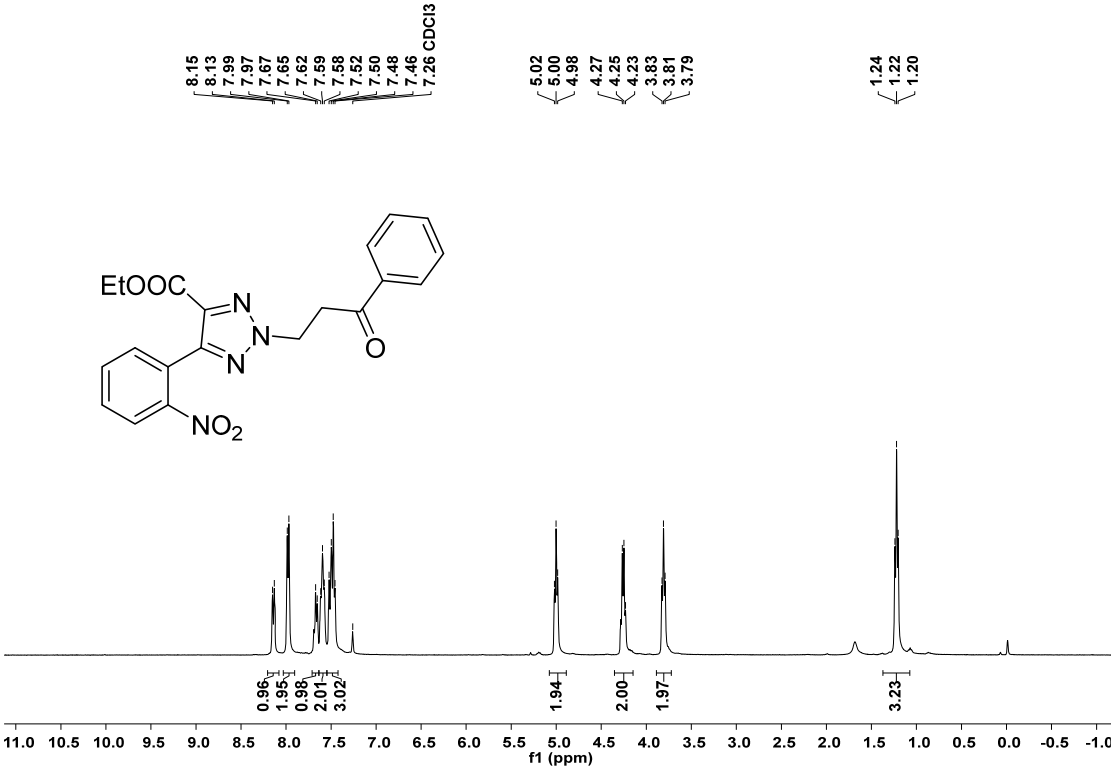
1-phenyl-3-(4-phenyl-5-(trifluoromethyl)-2H-1,2,3-triazol-2-yl)propan-1-one (**4j**)

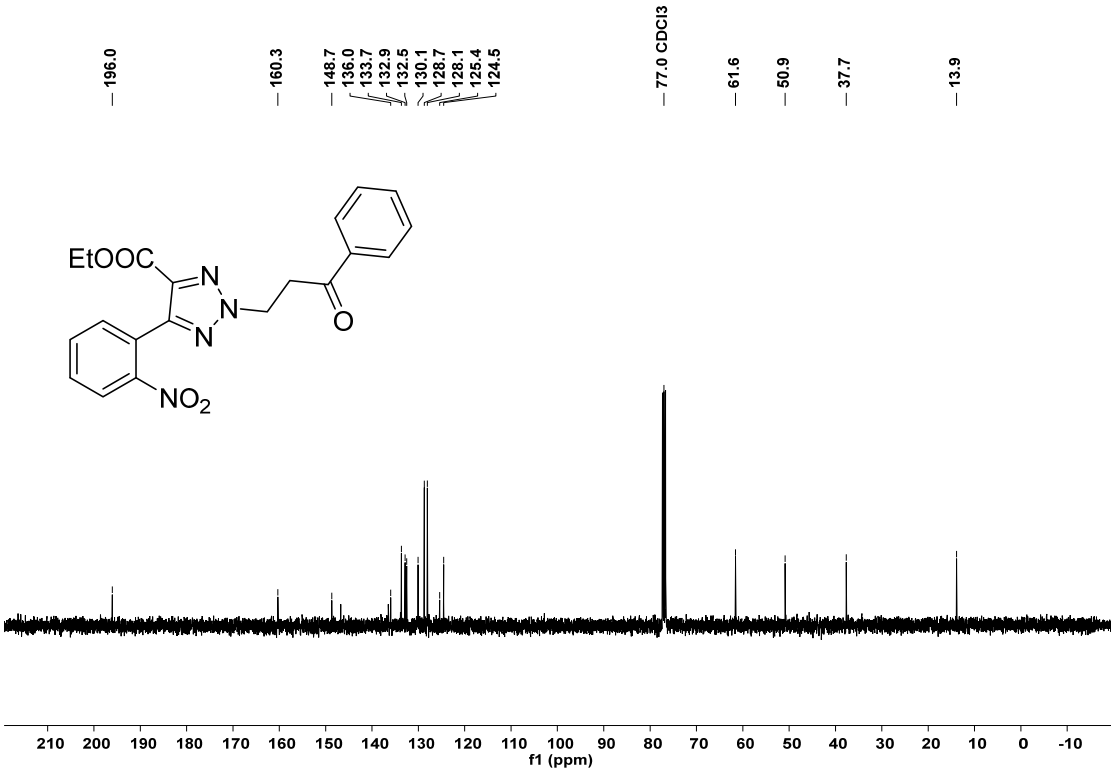


ethyl 2-(3-oxo-3-phenylpropyl)-5-phenyl-2H-1,2,3-triazole-4-carboxylate (**4k**)

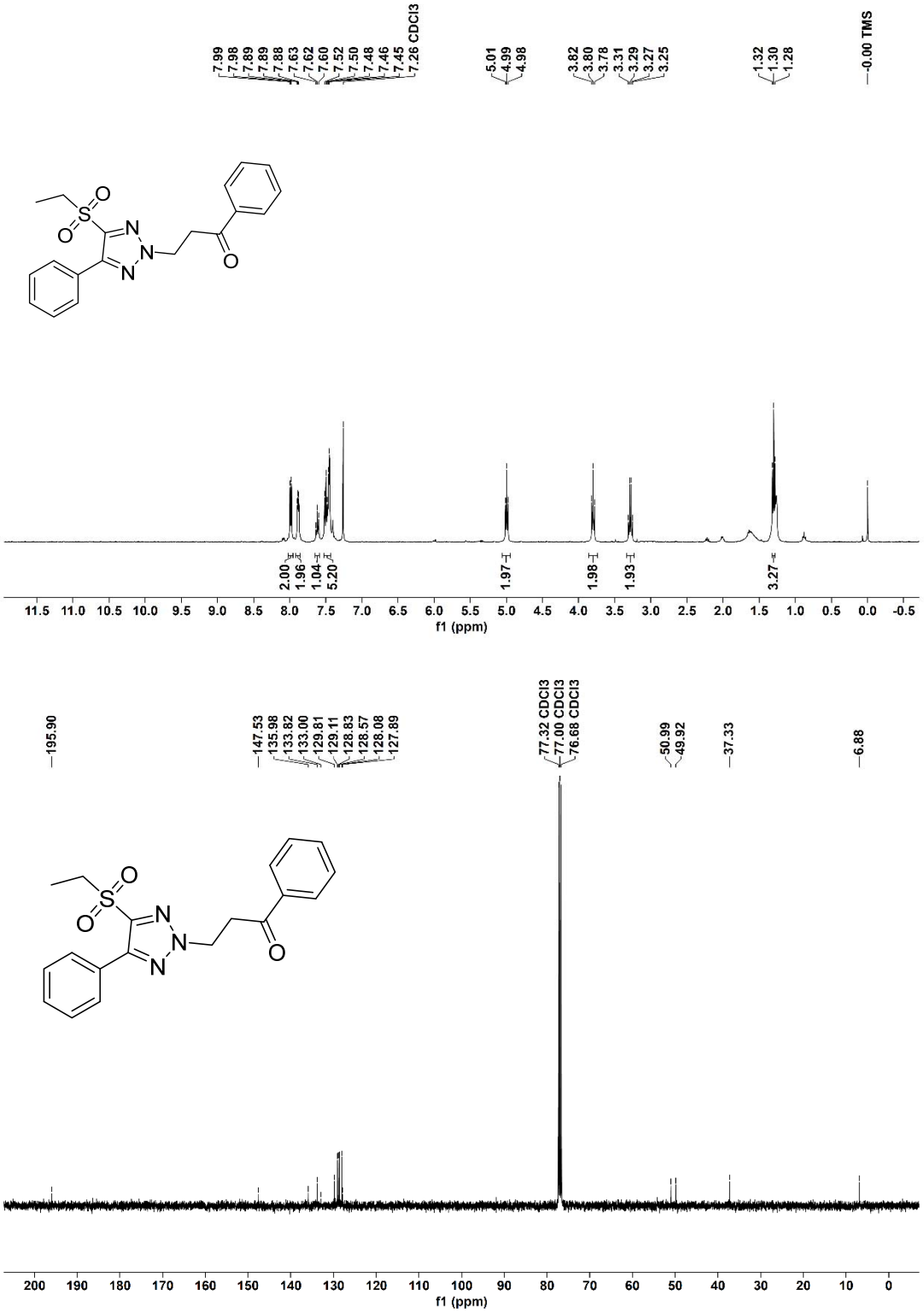


ethyl 5-(2-nitrophenyl)-2-(3-oxo-3-phenylpropyl)-2H-1,2,3-triazole-4-carboxylate (**4l**)

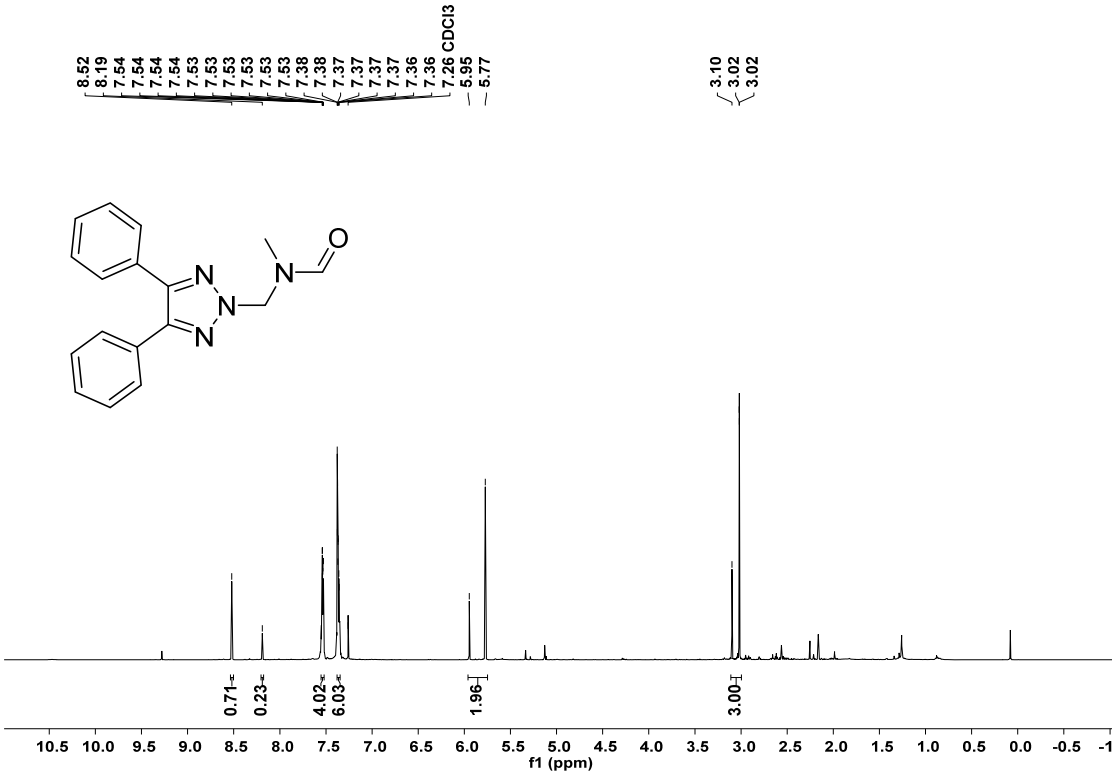


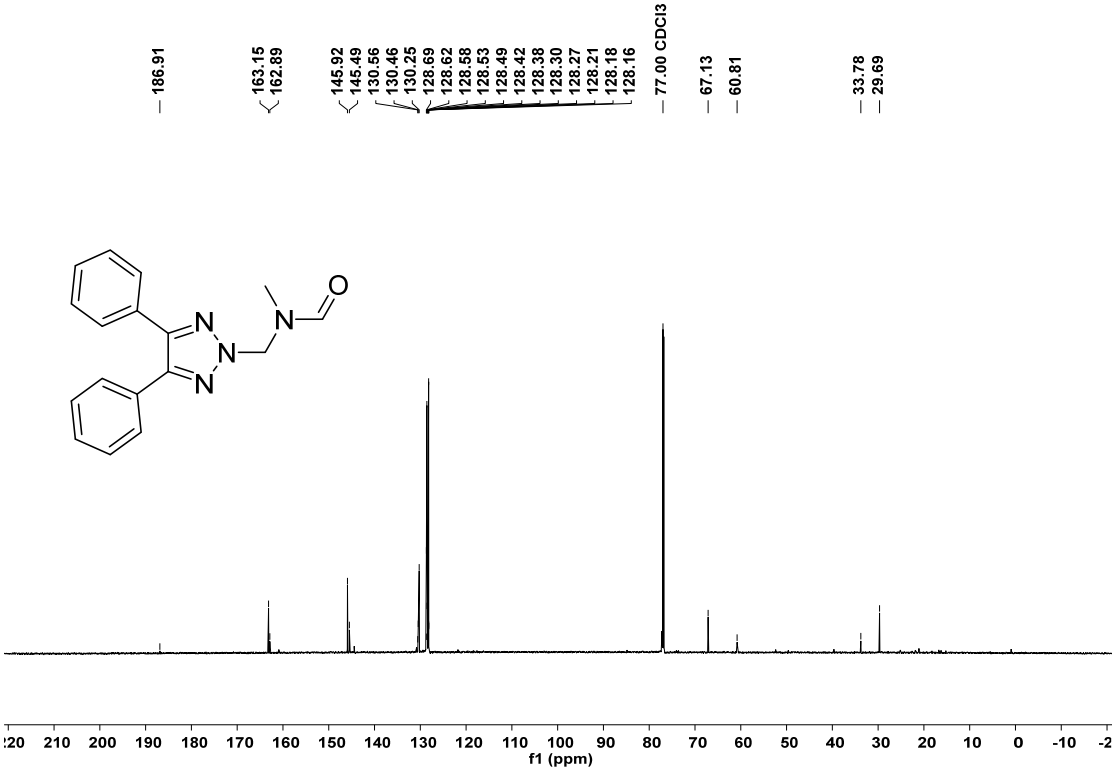


3-(4-(ethylsulfonyl)-5-phenyl-2H-1,2,3-triazol-2-yl)-1-phenylpropan-1-one (**4m**)

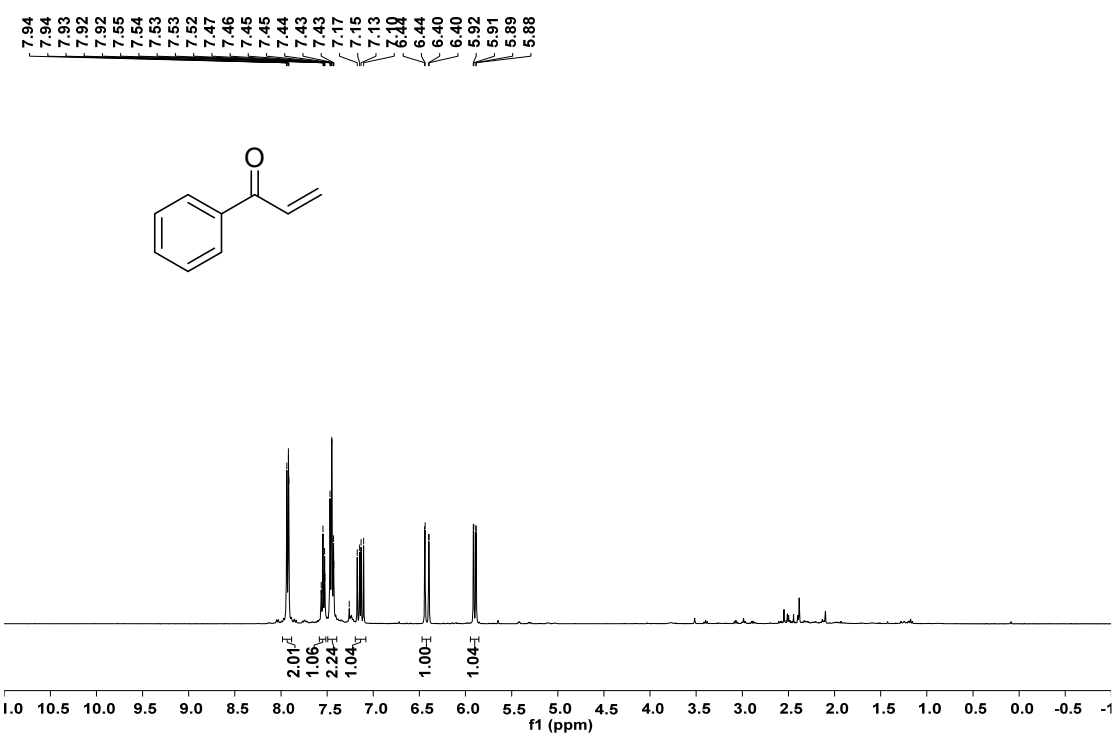


N-((4,5-diphenyl-2H-1,2,3-triazol-2-yl)methyl)-N-methylformamide (**5**)

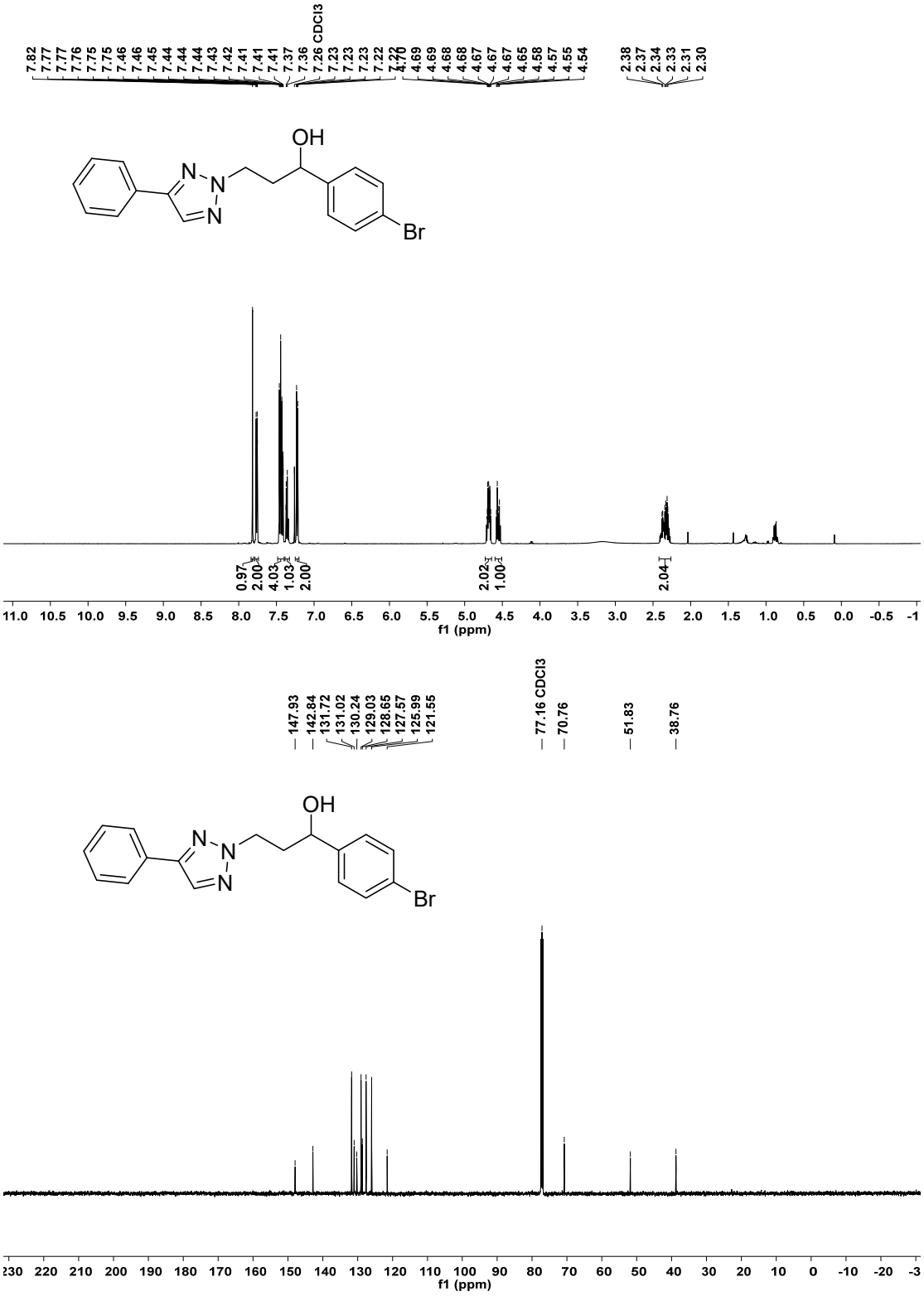




1-phenylprop-2-en-1-one (**6**)



1-(4-bromophenyl)-3-(4-phenyl-2H-1,2,3-triazol-2-yl)propan-1-ol (**9**)



2-(3,3-diphenylpropyl)-4,5-diphenyl-2H-1,2,3-triazole (**10**)