General Comments

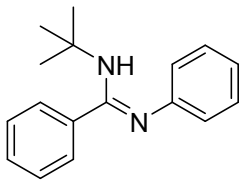
NMR spectra were recorded on Bruker Avance 300 (300 MHz. Chemical shifts (ppm) are given relative to solvent: references for DMSO were 2.50 ppm (^{1}H-NMR) and 39.50 ppm (^{13}C-NMR). ^{13}CNMR spectra were acquired on a broad band decoupled mode. Multiplets were assigned as s (singlet), d (doublet), t (triplet), dd (doublet of doublet), m (multiplet) and br. s (broad singlet). All measurements were carried out at room temperature unless otherwise stated. Electron impact (EI) mass spectra were recorded on AMD 402 mass spectrometer (70 eV). High resolution mass spectra (HRMS) were recorded on Agilent 6210. The data are given as mass units per charge (*m/z*). Gas chromatography analysis was performed on an Agilent HP-5890 instrument with a FID detector and HP-5 capillary column (polydimethylsiloxane with 5% phenyl groups, 30 m, 0.32 mm i.d., 0.25 μm film thickness) using argon as carrier gas. The products were isolated from the reaction mixture by column chromatography on silica gel 60, 0.063-0.2 mm, 70-230 mesh (Merck).

All reactions were carried out under air atmosphere. Dimethylformamide (anhydrous, 99.8%) was purchased from ACROS and used as received. All the reagents were purchased from Sigma-Aldrich or Alfa-Aesar chemical company. Various functionalized silanes were prepared based on literature.[1]

General procedure for the synthesis of *N*-(*tert*-butyl)-*N*'-phenylbenzimidamide

In a 5 mL pressure tube equipped with a stirring bar, trimethoxy(phenyl)silane (0.2 mmol), $Cu(OAc)_2$ (0.4 mmol), $PdCl_2$ (5 mol%), KF (0.4 mmol), *tert*-butyl isocyanide (0.3 mmol), aniline (0.3 mmol) and DMF (2 mL) were added. Then close the tube and heat it up to 120 ℃ for 24 h. Cool the reaction mixture to room temperature when the reaction completed. The reaction solution was quenched with distilled water and extracted with ethyl acetate three times. The combined organic phases were washed with saturated NaCl solution and dried over Na_2SO_4. The crude product was purified by column chromatography (ethyl acetate/pentante = 1:10) to give the pure product.

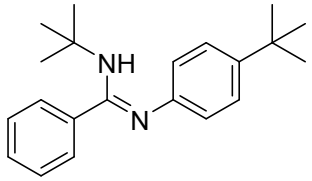
4a: *N*-(*tert*-Butyl)-*N*'-phenylbenzimidamide



67%, 33.8 mg.

^{1}H NMR (300 MHz, DMSO-d_6) δ 7.28-7.09 (m, 5H), 7.02-6.89 (m, 2H), 6.71-6.59 (m, 1H), 6.49-6.38 (m, 2H), 6.32 (s, 1H), 1.47 (s, 9H).
^{13}C NMR (75 MHz, DMSO) δ 156.65, 152.24, 136.25, 129.34, 128.83, 128.52, 128.19, 122.96, 120.26, 51.72, 28.98.
GC-MS(EI-70eV): m/z(%)=252 (32), 195.2 (95), 180 (33), 104 (25), 93 (100), 77.1 (71).

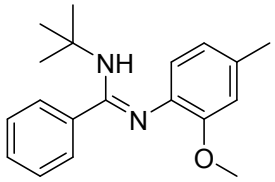
4b: *N*-(*tert*-Butyl)-*N*'-(4-(*tert*-butyl)phenyl)benzimidamide



61%, 30.6 mg.

^{1}H NMR (300 MHz, DMSO-d_6) δ 7.29-7.11 (m, 5H), 7.04-6.92 (m, 2H), 6.43-6.31 (m, 2H), 6.22 (s, 1H), 1.46 (s, 9H), 1.16 (s, 9H).
^{13}C NMR (75 MHz, DMSO) δ 156.38, 149.36, 142.16, 136.43, 129.33, 128.85, 128.21, 125.18, 122.41, 51.68, 34.07, 31.82, 29.00.
GC-MS(EI-70eV): m/z(%)=308 (61), 251 (80), 237 (24), 134 (100), 104 (28).

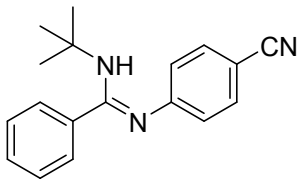
4c: *N*-(*tert*-Butyl)-*N*'-(2-methoxy-4-methylphenyl)benzimidamide



55%, 32.6 mg.

^{1}H NMR (300 MHz, DMSO-d_6) δ 7.23-7.05 (m, 5H), 6.64-6.44 (m, 3H), 6.15 (s, 1H), 3.48 (s, 3H), 2.04 (s, 3H), 1.50 (s, 9H).
^{13}C NMR (75 MHz, DMSO) δ 156.75, 150.45, 140.71, 137.47, 129.56, 128.63, 127.71, 127.54, 122.31, 120.84, 109.65, 55.67, 51.52, 29.16, 18.94.
GC-MS(EI-70eV): m/z(%)=296 (84), 225 (33), 209 (100), 137 (24), 122 (25), 104 (20).

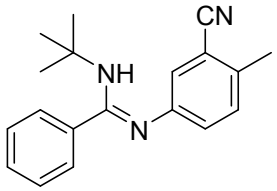
4d: *N*-(*tert*-Butyl)-*N*'-(4-cyanophenyl)benzimidamide



68%, 67.7 mg.

^{1}H NMR (300 MHz, DMSO-d_6) δ 7.37 (d, J = 8.4 Hz, 2H), 7.32-7.22 (m, 3H), 7.20-7.13 (m, 2H), 6.90 (s, 1H), 6.54 (d, J = 8.5 Hz, 2H), 1.46 (s, 9H).
^{13}C NMR (75 MHz, DMSO) δ 157.22, 156.45, 134.66, 132.39, 129.07, 128.93, 127.98, 123.23, 119.83, 101.05, 51.63, 28.26.
GC-MS(EI-70eV): m/z(%)=277 (35), 22 (100), 161(22), 118 (83), 77 (22).

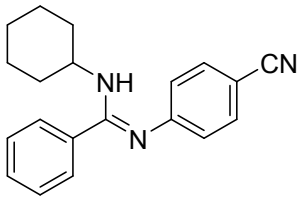
4e: *N*-(*tert*-Butyl)-*N*'-(3-cyano-4-methylphenyl)benzimidamide



66%, 38,4 mg.

^{1}H NMR (300 MHz, DMSO-d_6) δ 7.36-7.22 (m, 3H), 7.16 (tt, J = 4.5, 2.6 Hz, 2H), 7.00 (d, J = 8.2 Hz, 1H), 6.74-6.58 (m, 3H), 2.25 (s, 3H), 1.47 (s, 9H).
^{13}C NMR (75 MHz, DMSO) δ 157.47, 150.15, 135.01, 131.98, 130.25, 128.85, 128.71, 127.90, 127.72, 125.42, 118.21, 111.12, 51.43, 28.36, 18.88.
GC-MS(EI-70eV): m/z(%)=291 (38), 234 (100), 219 (29), 132 (54), 104 (38).

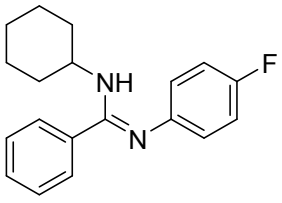
4f: *N*-(4-Cyanophenyl)-*N*'-cyclohexylbenzimidamide



61%, 37 mg.

^{1}H NMR (300 MHz, DMSO-d_6) δ 7.42-7.34 (m, 2H), 7.34-7.23 (m, 4H), 7.22-7.12 (m, 2H), 6.55 (d, J = 8.5 Hz, 2H), 3.85 (s, 1H), 2.07-1.94 (m, 2H), 1.80-1.54 (m, 3H), 1.36-1.05 (m, 5H).
^{13}C NMR (75 MHz, DMSO) δ 157.83, 157.26, 134.69, 132.87, 129.72, 129.28, 128.58, 123.96, 120.31, 101.73, 50.16, 32.39, 25.89, 25.27.
GC-MS(EI-70eV): m/z(%)=303 (67), 220 (100), 121 (39), 104 (98), 77 (22).

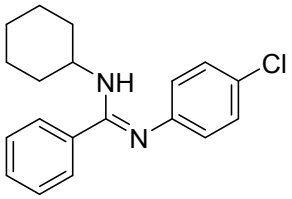
4g: *N*'-Cyclohexyl-*N*-(4-fluorophenyl)benzimidamide



63%, 37.2 mg.

^{1}H NMR (300 MHz, DMSO-d_6) δ 7.25 (dd, J = 4.9, 1.6 Hz, 3H), 7.17-7.10 (m, 2H), 6.77 (t, J = 8.8 Hz, 3H), 6.42 (dd, J = 8.3, 5.2 Hz, 2H), 3.85 (s, 1H), 2.12-1.91 (m, 2H), 1.56-1.77 (m, 3H), 1.36-1.10 (m, 5H).
^{13}C NMR (75 MHz, DMSO) δ 160.41 (d, 254.1 Hz), 157.26, 148.72, 135.67, 129.19, 129.08, 128.35, 124.09(d, J = 7.4 Hz), 114.99(d, J = 21.9 Hz), 49.71, 32.54, 25.99, 25.35.
^{19}F NMR (282 MHz, DMSO) δ -108.5.
GC-MS(EI-70eV): m/z(%)=295 (54), 213 (74), 176 (12), 111 (100), 95 (24), 77 (16).

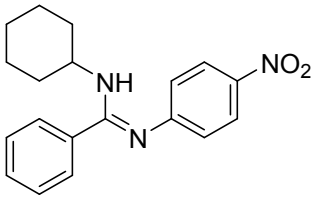
4h: *N*'-(4-Chlorophenyl)-*N*-cyclohexylbenzimidamide



64%, 39.9 mg.

^{1}H NMR (300 MHz, DMSO-d_6) δ 7.18-7.10 (m, 3H), 7.07-6.99 (m, 2H), 6.89-6.70 (m, 3H), 6.37-6.26 (m, 2H), 3.71 (s, 1H), 1.93-1.83 (m, 2H), 1.46-1.59 (m, 3H), 1.24-0.99 (m, 5H).
^{13}C NMR (75 MHz, DMSO) δ 157.32, 151.35, 135.40, 129.70, 129.20, 128.42, 128.37, 124.74, 124.24, 49.80 , 32.49, 25.96, 25.32.
GC-MS(EI-70eV): m/z(%)=312 (55), 229 (71), 192 (12), 127 (100), 104 (65), 77 (18).

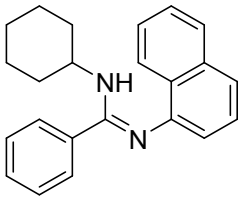
4i: *N*-Cyclohexyl-*N*'-(4-nitrophenyl)benzimidamide



47%, 30.4 mg.

^{1}H NMR (300 MHz, DMSO-d_6) δ 7.92-7.80 (m, 2H), 7.53 (d, J = 7.5 Hz, 1H), 7.32 (d, J = 1.8 Hz, 3H), 7.22 (dd, J = 2.6, 1.2 Hz, 2H), 6.57 (d, J = 9.0 Hz, 2H), 3.86 (d, J = 9.4 Hz, 1H), 2.09-1.89 (m, 2H), 1.83-1.49 (m, 3H), 1.42-1.04 (m, 5H).
^{13}C NMR (75 MHz, DMSO) δ 159.97, 158.28, 140.29, 134.42, 130.00, 129.33, 128.69, 124.87, 123.30, 50.38, 32.34, 25.85, 25.23.
GC-MS(EI-70eV): m/z(%)=323 (32), 293 (74), 240 (54), 195 (42), 173 (32), 138 (21), 108 (100).

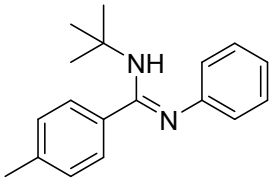
4j: *N*-Cyclohexyl-*N*'-(naphthalen-1-yl)benzimidamide



57%, 37.4 mg.

^{1}H NMR (300 MHz, DMSO-d_6) δ 8.15- 8.07 (m, 1H), 7.77-7.64 (m, 1H), 7.49-7.37 (m, 2H), 7.28-6.94 (m, 8H), 6.25 (dd, J = 7.2, 1.1 Hz, 1H), 4.00 (s, 1H), 2.28-2.11 (m, 2H), 1.77 (dd, J = 8.7, 4.4 Hz, 2H), 1.65-1.60 (m, 1H), 1.45-1.21 (m, 5H).
^{13}C NMR (75 MHz, DMSO) δ 156.99, 148.75, 135.75, 134.15, 129.40, 129.16, 128.45, 128.24, 127.99, 126.41, 126.00, 125.09, 124.49, 120.39, 117.04, 50.14, 32.69, 26.03, 25.40.
GC-MS(EI-70eV): m/z(%)=328 (59), 245 (68), 230 (50), 208 (21), 143 (100), 127 (44), 104 (28), 77 (10).

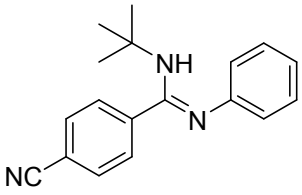
4l: *N*-(*tert*-Butyl)-4-methyl-*N*'-phenylbenzimidamide



67%, 35.6 mg.

^{1}H NMR (300 MHz, DMSO-d_6) δ 7.23-7.11 (m, 6H), 6.82 (d, J = 7.3 Hz, 1H), 6.63 (d, J = 8.4 Hz, 2H), 6.39 (s, 1H), 2.40 (s, 3H), 1.65 (s, 9H).
^{13}C NMR (75 MHz, DMSO) δ 156.60, 152.37, 138.22, 133.37, 129.32, 128.73, 128.54, 122.91, 120.18, 51.64, 28.96, 21.20.
GC-MS(EI-70eV): m/z(%)=266 (42), 209 (100), 194 (31), 118 (35), 93 (69), 77 (20).

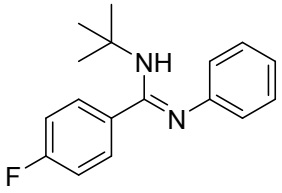
4m: *N*-(*tert*-Butyl)-4-cyano-*N*'-phenylbenzimidamide



64%, 35.5 mg.

^{1}H NMR (300 MHz, DMSO-d_6) δ 7.76-7.66 (m, 2H), 7.37-7.26 (m, 2H), 7.05-6.92 (m, 2H), 6.75-6.62 (m, 1H), 6.59 (s, 1H), 6.50-6.39 (m, 2H), 1.47 (s, 9H).
^{13}C NMR (75 MHz, DMSO) δ 155.16, 151.57, 140.81, 132.16, 130.37, 128.70, 122.96, 120.82, 118.85, 111.40, 51.99, 28.87.
GC-MS(EI-70eV): m/z(%)=277 (30), 220 (100), 205 (20), 129 (20), 93 (80), 77 (38).

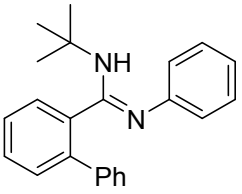
4n: *N*-(*tert*-Butyl)-4-fluoro-*N*'-phenylbenzimidamide



58%, 31.3 mg.

^{1}H NMR (300 MHz, DMSO-d_6) δ 7.17 (dd, J = 8.8, 5.6 Hz, 2H), 7.07- 6.91 (m, 4H), 6.78- 6.57 (m, 1H), 6.43 (dd, J = 8.3, 1.1 Hz, 2H), 6.37 (s, 1H), 1.46 (s, 9H).
^{13}C NMR (75 MHz, DMSO) δ 162.20 (d, J = 224.7 Hz), 155.69, 152.10, 132.60 (d, J = 3.1 Hz), 131.60(d, J = 8.6 Hz), 128.60, 122.96, 120.40, 114.99(d, J = 21.6 Hz), 51.73, 28.91. ^{19}F NMR (282 MHz, DMSO) δ -108.5.
GC-MS(EI-70eV): m/z(%)=270 (42), 213 (100), 198 (33), 122 (28), 93 (67), 77 (25).

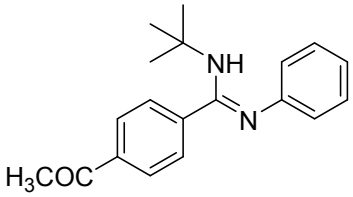
4o: *N*-(*tert*-Butyl)-*N*'-phenyl-[1,1'-biphenyl]-2-carboximidamide



53%, 34.8 mg.

^{1}H NMR (300 MHz, DMSO-d_6) δ 7.41-7.27 (m, 6H), 7.24-7.18 (m, 2H), 7.16-7.10 (m, 1H), 6.83-6.69 (m, 2H), 6.62-6.53 (m, 1H), 6.50 (s, 1H), 5.95-5.84 (m, 2H), 1.40 (s, 9H).
^{13}C NMR (75 MHz, DMSO) δ 155.64, 152.27, 140.72, 139.95, 130.72, 129.63, 129.19, 129.08, 128.00, 127.77, 127.50, 126.91, 122.72, 120.24, 51.69, 28.71.
GC-MS(EI-70eV): m/z(%)=328 (32), 271 (100), 180 (33), 93 (31).

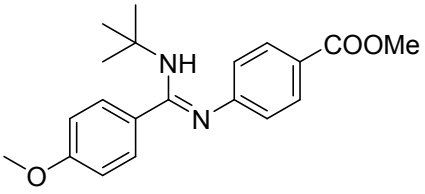
4p: 4-Acetyl-*N*-(*tert*-butyl)-*N*'-phenylbenzimidamide



58%, 34.1 mg.

^{1}H NMR (300 MHz, DMSO-d_6) δ 7.86-7.75 (m, 2H), 7.36-7.23 (m, 2H), 7.04-6.90 (m, 2H), 6.75-6.60 (m, 1H), 6.46 (dtd, J = 8.5, 1.9, 1.2 Hz, 3H), 2.52 (s, 3H), 1.48 (s, 9H).
^{13}C NMR (75 MHz, DMSO) δ 198.04, 155.79, 151.84, 140.67, 136.78, 129.70, 128.65, 128.06, 122.92, 120.62, 51.91, 28.92, 27.20.
GC-MS(EI-70eV): m/z(%)=294 (41), 237 (100), 222 (20), 146 (26), 93 (81), 77 (43).

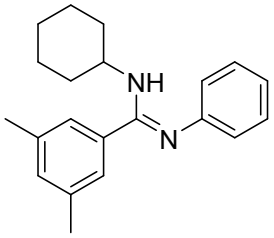
4q: Methyl 4-(((*tert*-butylamino)(4-methoxyphenyl)methylene)amino)benzoate



58%, 39.5 mg.

^{1}H NMR (300 MHz, DMSO-d_6) δ 7.66-7.55 (m, 2H), 7.17-7.05 (m, 2H), 6.85-6.74 (m, 2H), 6.67 (s, 1H), 6.56-6.45 (m, 2H), 3.74 (s, 3H), 3.70 (s, 3H), 1.46 (s, 9H).
^{13}C NMR (75 MHz, DMSO) δ 166.77, 160.05, 157.58, 157.11, 131.04, 130.26, 127.70, 122.80, 120.81, 113.69, 55.57, 51.96, 51.91, 28.86.
GC-MS(EI-70eV): m/z(%)=340 (35), 283 (90), 191 (22), 151 (100), 120 (51).

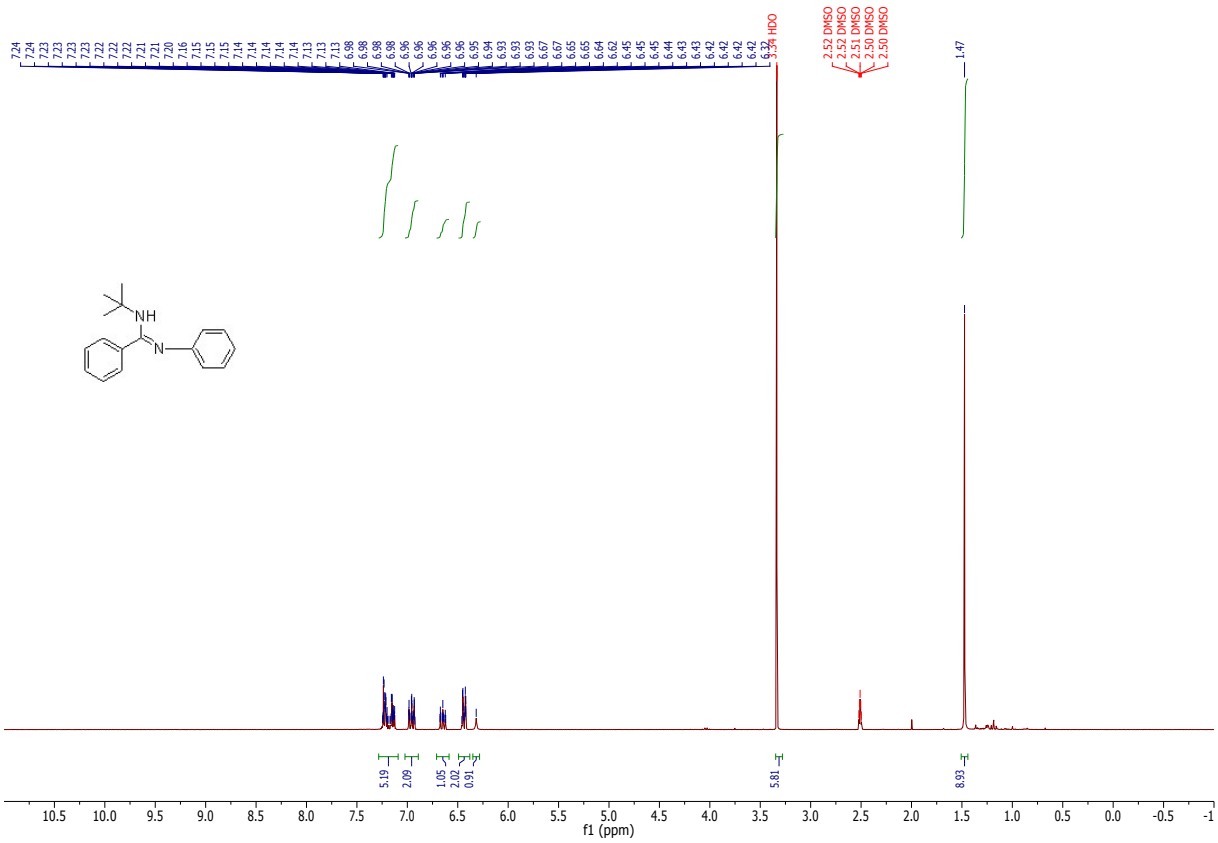
4r: *N*-Cyclohexyl-3,5-dimethyl-*N*'-phenylbenzimidamide



57%, 34.9 mg.

^{1}H NMR (300 MHz, DMSO-d_6) δ 7.06- 6.91 (m, 2H), 6.87 (s, 1H), 6.76 (s, 2H), 6.73-6.56 (m, 2H), 6.45 (d, J = 7.4 Hz, 2H), 3.82 (s, 1H), 2.13 (s, 6H), 2.02-1.99 (m, 2H), 1.76-1.55 (m, 3H), 1.34-1.14 (m, 5H). ^{13}C NMR (75 MHz, DMSO) δ 156.68, 152.32, 137.15, 135.80, 130.37, 128.47, 126.89, 123.01, 120.36, 49.68, 32.59, 26.02, 25.40, 21.24.
GC-MS(EI-70eV): m/z(%)=306 (50), 223 (100), 149 (25), 132 (45), 93 (58).
HRMS (EI), m/z: $[M]^+$ calculated for $C_{21}H_{26}N_2$:306.2096, found $[M+H]^+$: 307.21715.

[1] A. S. Manoso, C. Ahn, A. Soheli, C. J. Handy, R. Correia, W. M. Segamish, P. Deshong, *J. Org. Chem*. **2004**, *69*, 8305-8314.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2.52 DMSO
2.51 DMSO
2.50 DMSO
2.50 DMSO
1.47
NH
N
5.19
2.09
1.05
2.02
0.91
5.81
8.93
10.5
10.0
9.5
9.0
8.5
8.0
7.5
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6.0
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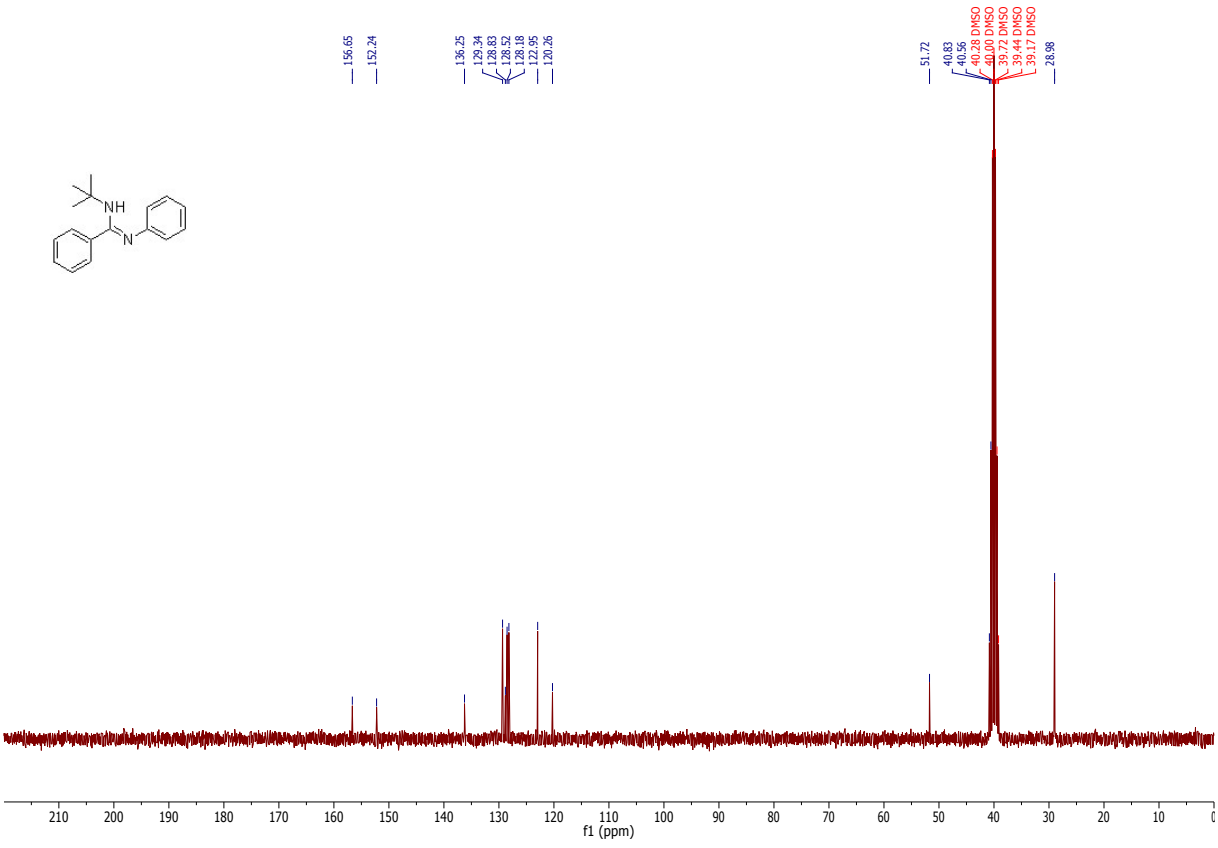
-1
f1 (ppm)


156.65
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40.00 DMSO
39.72 DMSO
39.44 DMSO
39.17 DMSO
28.98
NH
N
210
200
190
180
170
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140
130
120
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100
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80
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60
50
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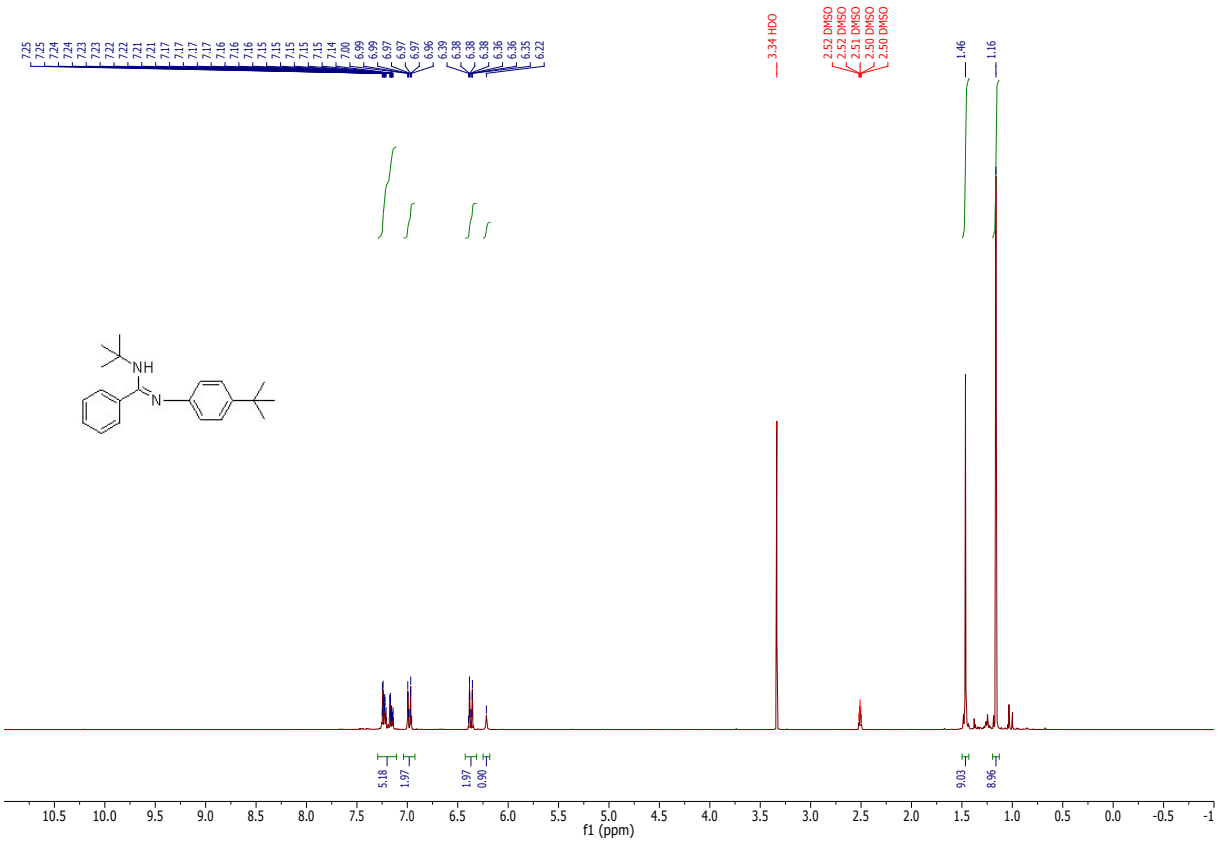
30
20
10
f1 (ppm)


7.25
7.25
7.24
7.24
7.23
7.23
7.22
7.22
7.21
7.21
7.17
7.17
7.17
7.17
7.16
7.16
7.16
7.16
7.15
7.15
7.15
7.15
7.15
7.14
7.00
6.99
6.99
6.97
6.97
6.97
6.96
6.39
6.38
6.38
6.38
6.36
6.36
6.35
6.22
3.34 HDO
2.52 DMSO
2.52 DMSO
2.51 DMSO
2.50 DMSO
2.50 DMSO
1.46
1.16
NH
N
5.18
1.97
1.97
0.90
9.03
8.96
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
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1.5
1.0
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0.0
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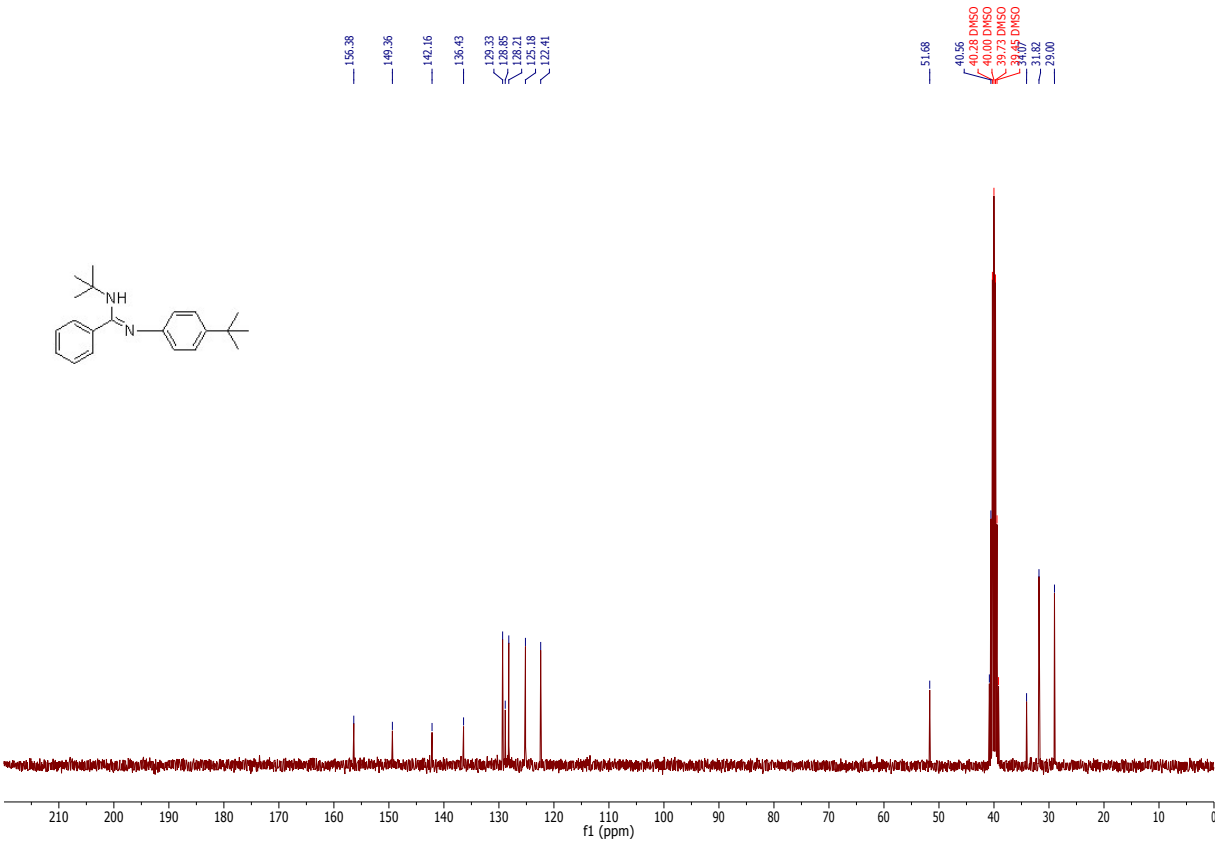
-1
f1 (ppm)


156.38
149.36
142.16
136.43
129.33
128.85
128.21
125.18
122.41
51.68
40.56
40.28 DMSO
40.00 DMSO
39.73 DMSO
39.45 DMSO
34.07
31.82
29.00
NH
N
210
200
190
180
170
160
150
140
130
120
110
100
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80
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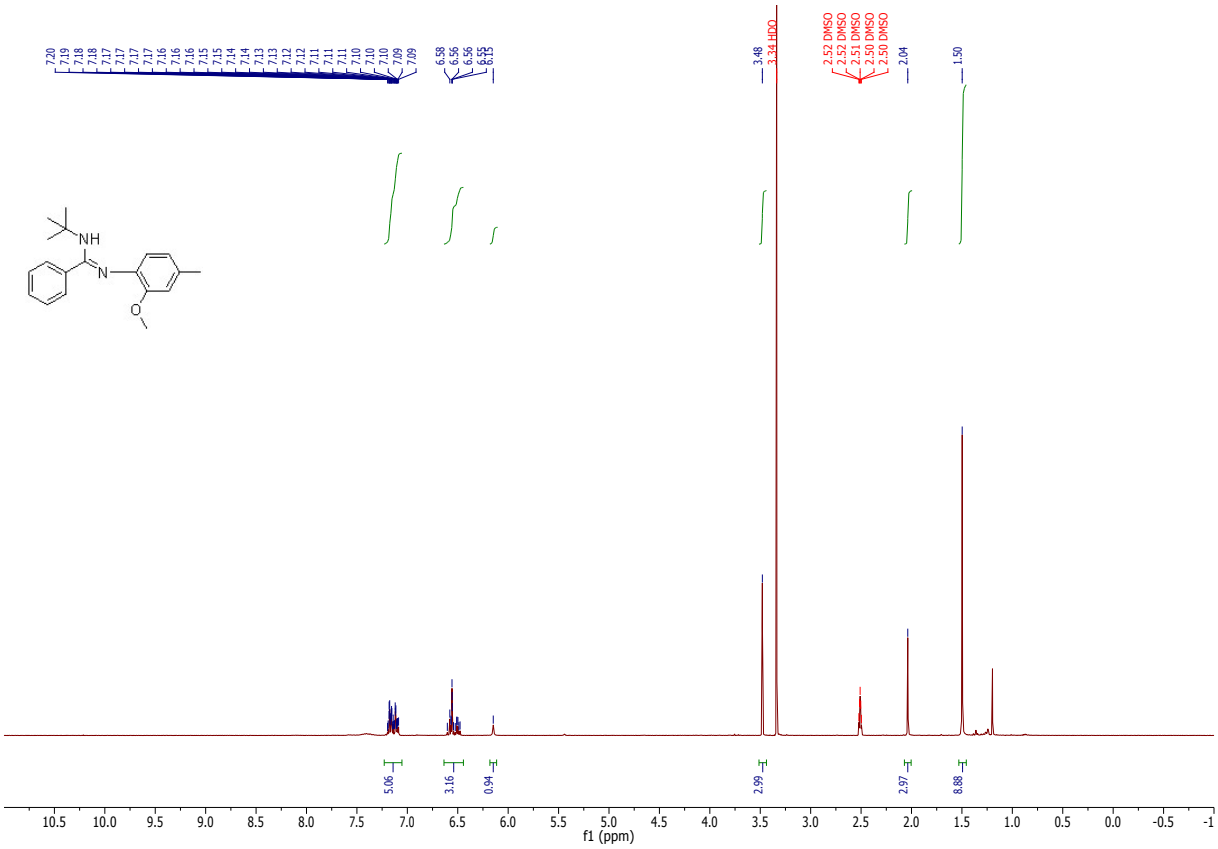
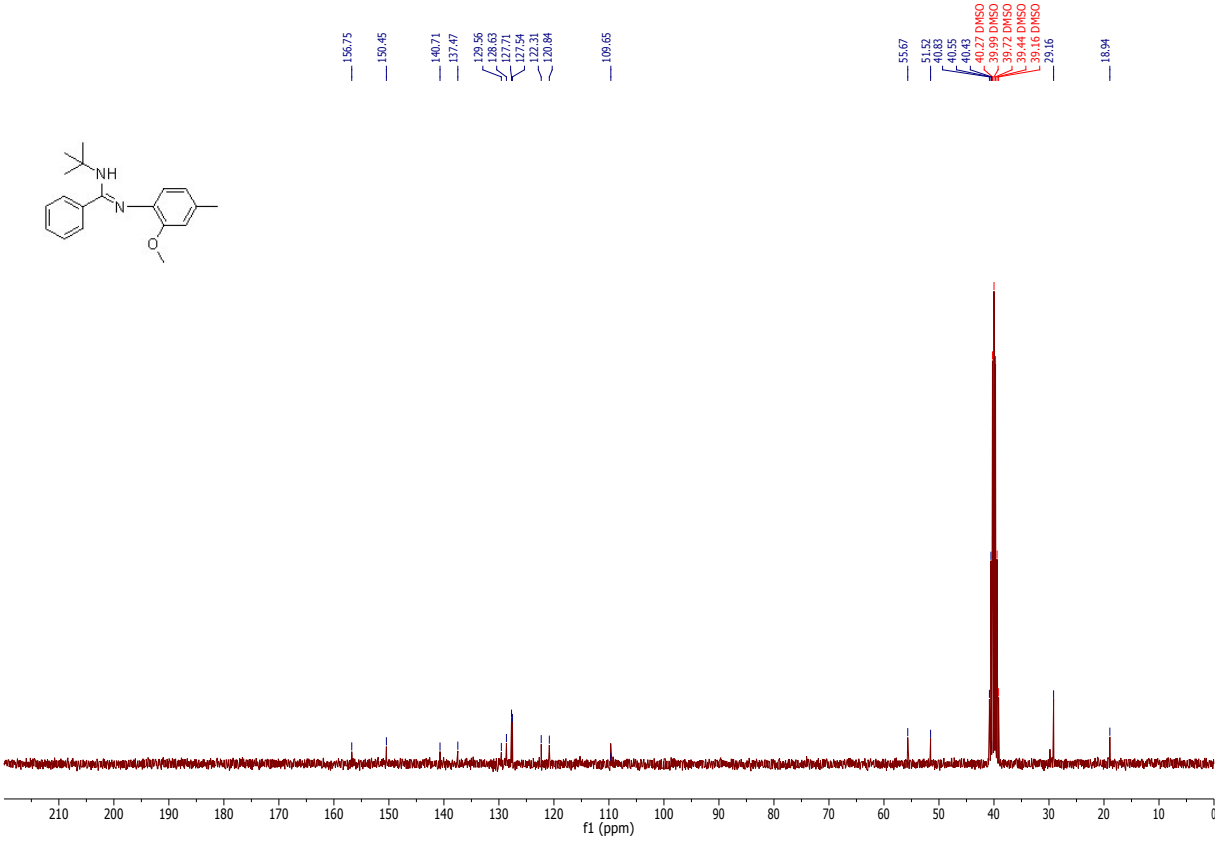
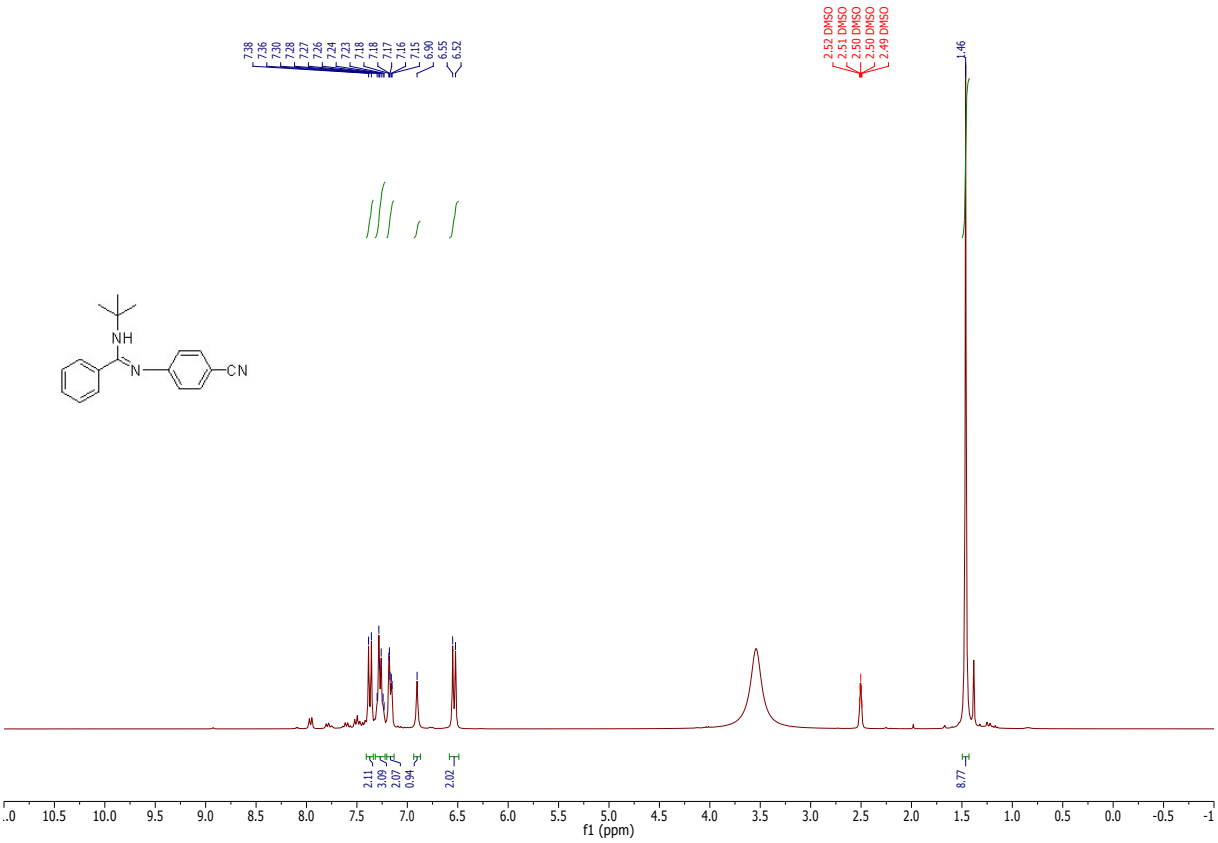
60
50
40
30
20
10
f1 (ppm)


7.20 7.19 7.18 7.18 7.17 7.17 7.17 7.17 7.16 7.16 7.16 7.15 7.15 7.14 7.14 7.13 7.13 7.12 7.12 7.11 7.11 7.11 7.10 7.10 7.10 7.09 7.09 7.09
6.58 6.56 6.56 6.55 6.15
3.48 3.34 HDO
2.52 DMSO 2.52 DMSO 2.51 DMSO 2.50 DMSO 2.50 DMSO
2.04
1.50
NH
N
O
5.06 3.16 0.94 2.99 2.97 8.88
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1
f1 (ppm)


156.75 150.45 140.71 137.47 129.56 128.63 127.71 127.54 122.31 120.84 109.65
55.67 51.52 40.83 40.55 40.43 40.27 DMSO 39.99 DMSO 39.72 DMSO 39.44 DMSO 39.16 DMSO 29.16 18.94
NH
N
O
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10
f1 (ppm)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7.36
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7.24
7.23
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7.18
7.17
7.16
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6.90
6.55
6.52
2.52 DMSO
2.51 DMSO
2.50 DMSO
2.50 DMSO
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NH
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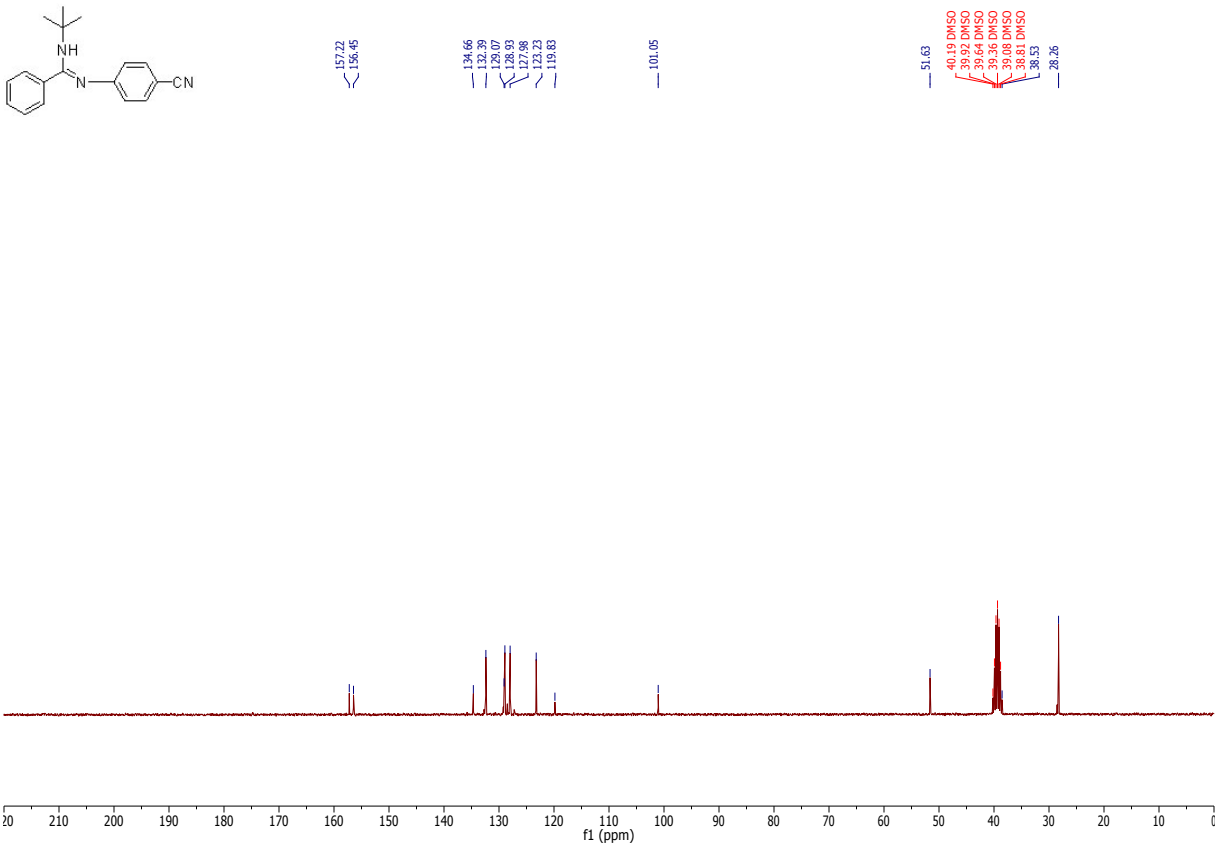
CN
2.11
3.09
2.07
0.94
2.02
8.77
f1 (ppm)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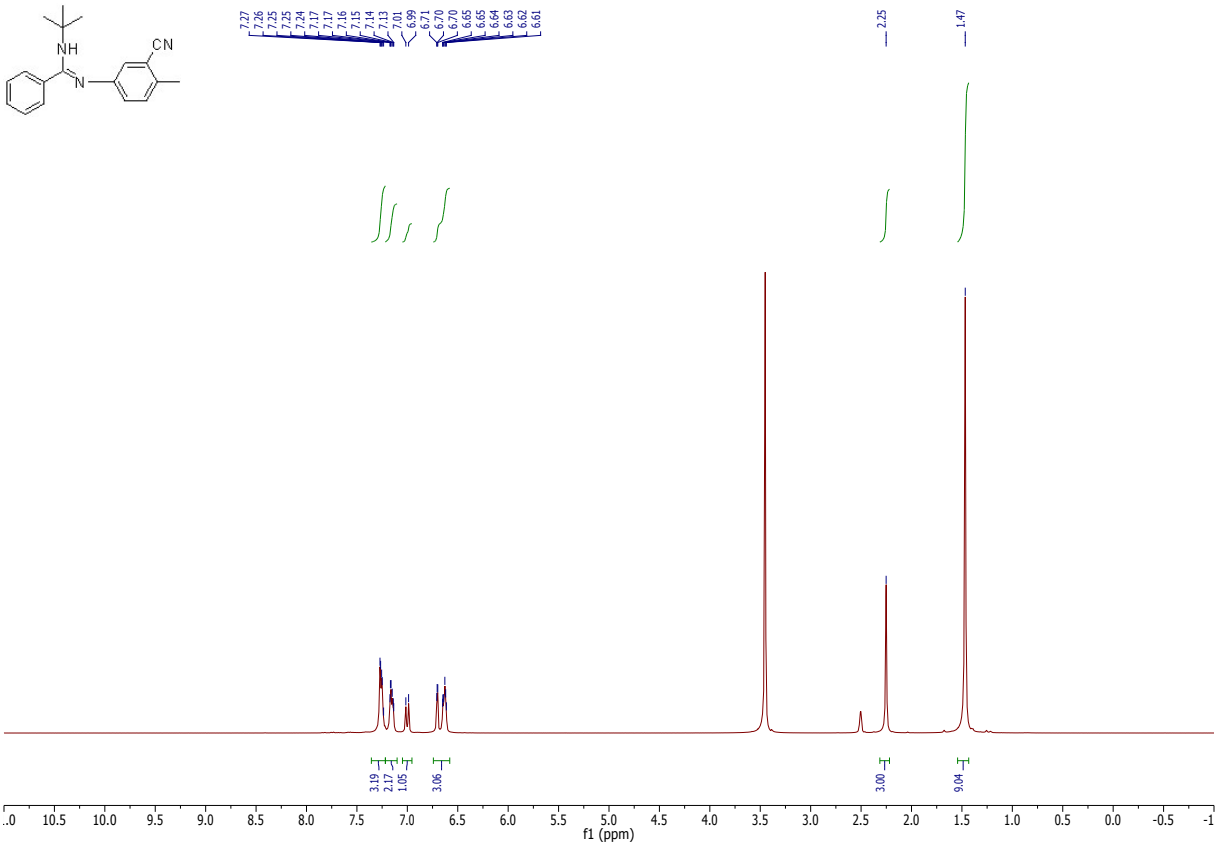
132.39
129.07
128.93
127.98
123.23
119.83
101.05
51.63
40.19 DMSO
39.92 DMSO
39.64 DMSO
39.36 DMSO
39.08 DMSO
38.81 DMSO
38.53
28.26
f1 (ppm)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N
CN
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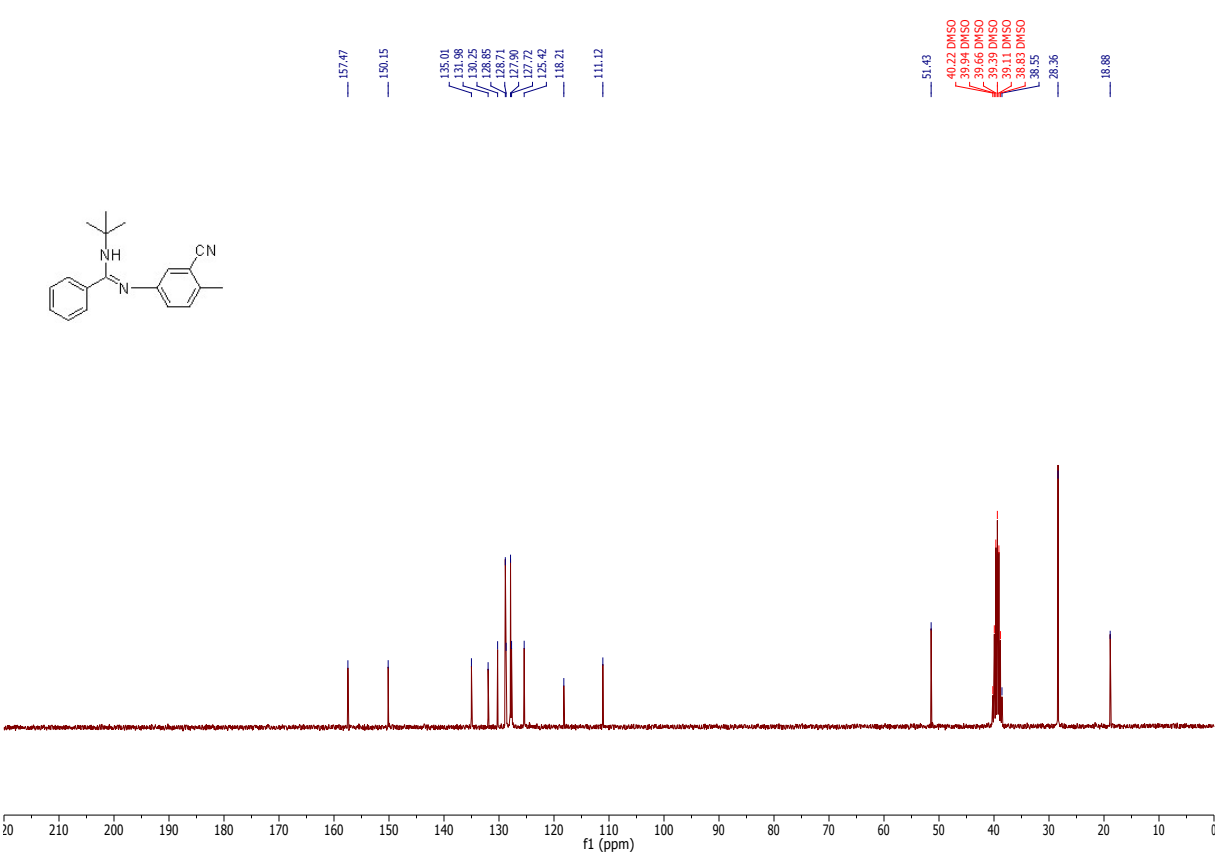
7.26
7.25
7.25
7.24
7.17
7.17
7.16
7.15
7.14
7.13
7.01
6.99
6.71
6.70
6.70
6.65
6.64
6.63
6.62
6.61
2.25
1.47
3.19
2.17
1.05
3.06
3.00
9.04
f1 (ppm)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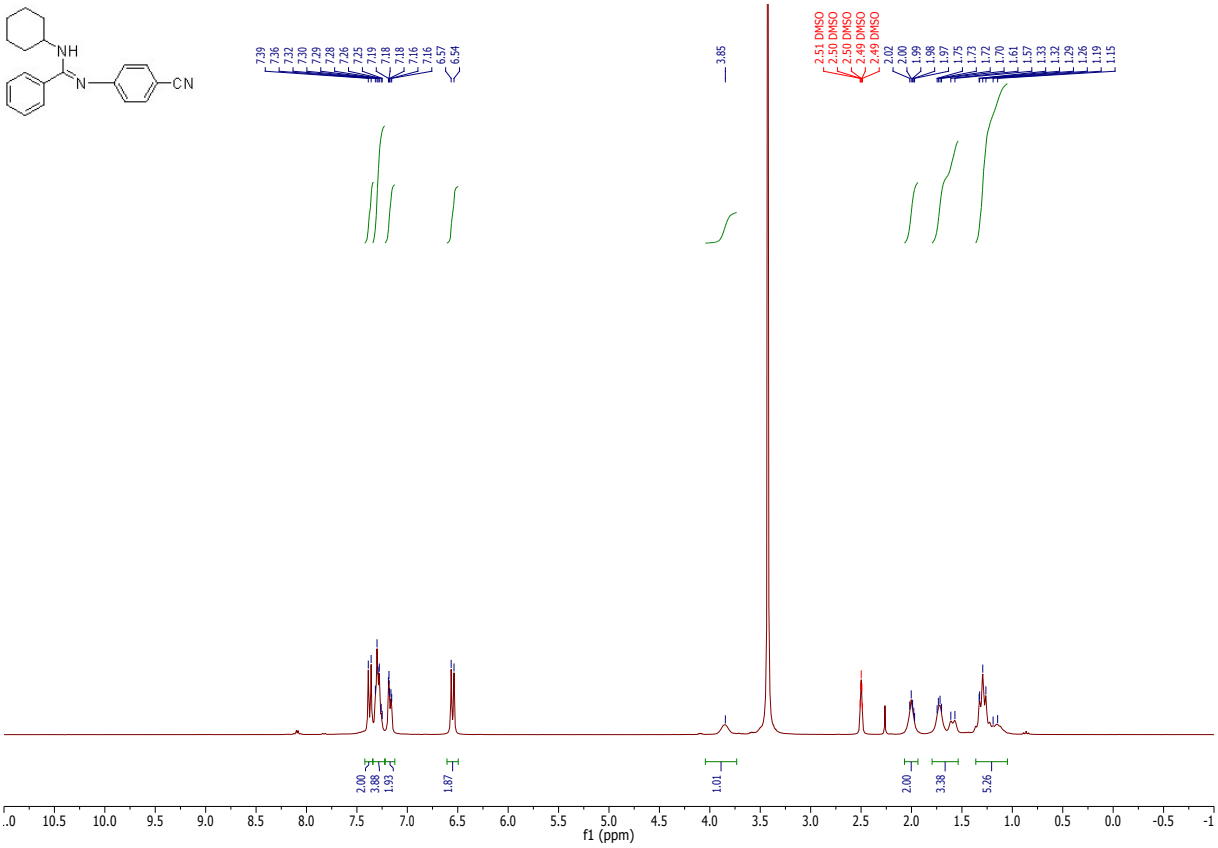
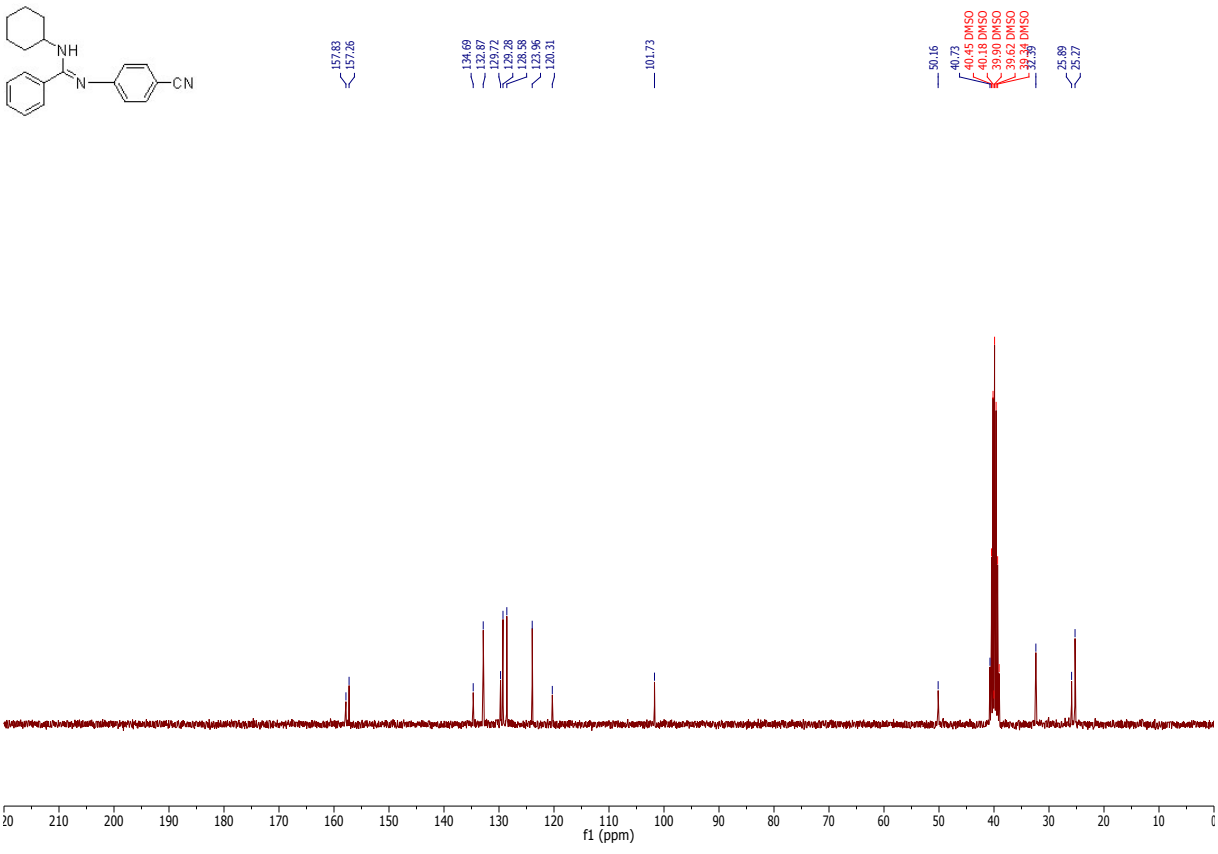
N
CN
157.47
150.15
135.01
131.98
130.25
128.85
128.71
127.90
127.72
125.42
118.21
111.12
51.43
40.22 DMSO
39.94 DMSO
39.66 DMSO
39.39 DMSO
39.11 DMSO
38.83 DMSO
38.55
28.36
18.88
f1 (ppm)


NH
N
CN
7.39
7.36
7.32
7.30
7.29
7.28
7.26
7.25
7.19
7.18
7.18
7.16
7.16
6.57
6.54
3.85
2.51 DMSO
2.50 DMSO
2.50 DMSO
2.49 DMSO
2.49 DMSO
2.02
2.00
1.99
1.98
1.97
1.75
1.73
1.72
1.70
1.61
1.57
1.33
1.32
1.29
1.26
1.19
1.15
2.00
3.88
1.93
1.87
1.01
2.00
3.38
5.26
f1 (ppm)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N
CN
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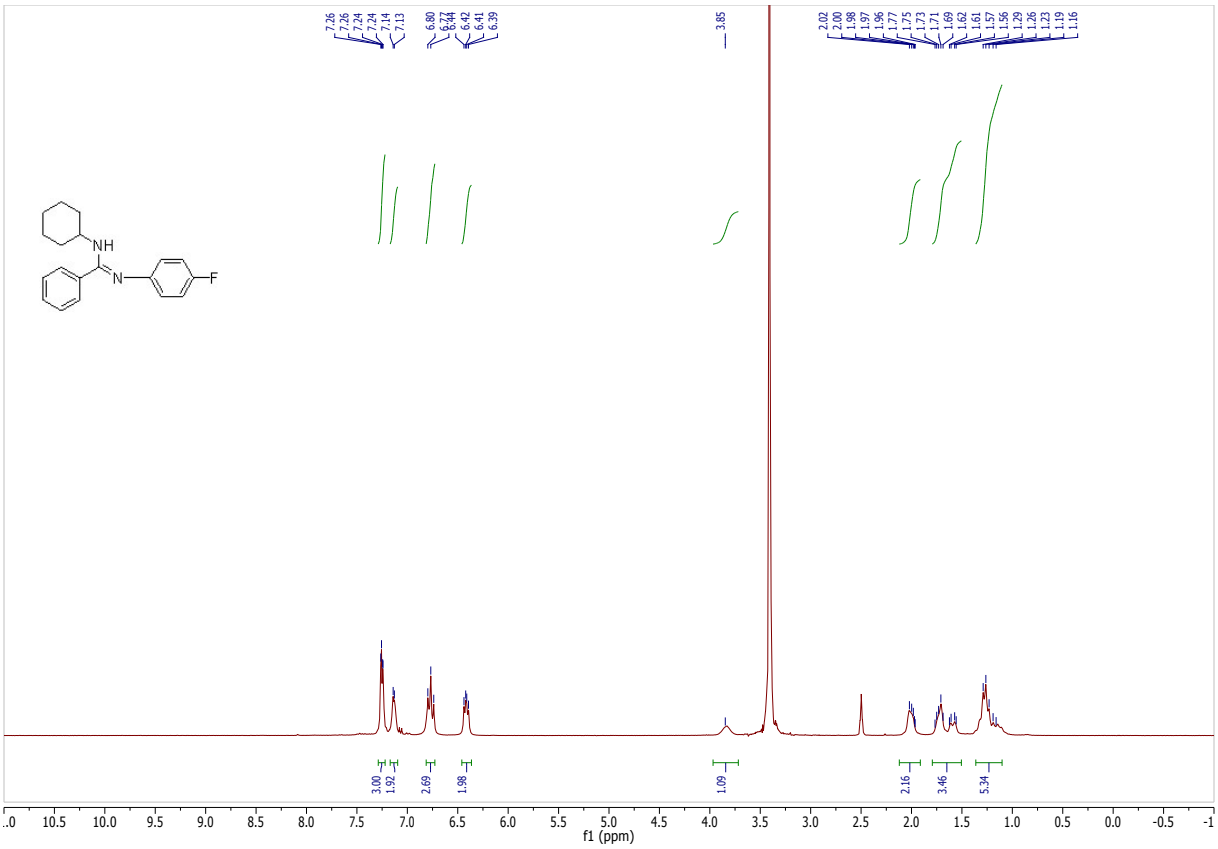
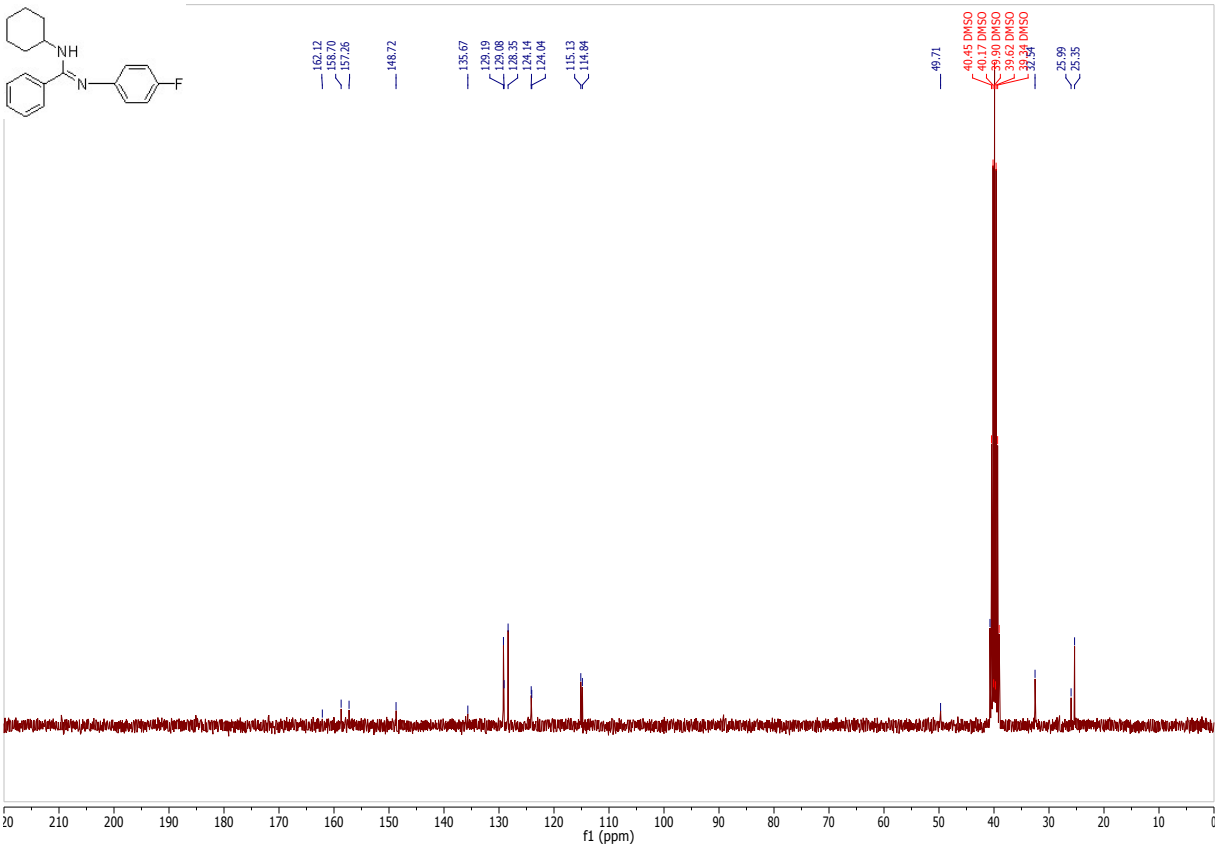
157.26
134.69
132.87
129.72
129.28
128.58
123.96
120.31
101.73
50.16
40.73
40.45 DMSO
40.18 DMSO
39.90 DMSO
39.62 DMSO
39.34 DMSO
32.39
25.89
25.27
f1 (ppm)


NH
N
F
7.26
7.26
7.24
7.24
7.14
7.13
6.80
6.77
6.44
6.42
6.41
6.39
3.85
2.02
2.00
1.98
1.97
1.96
1.77
1.75
1.73
1.71
1.69
1.62
1.61
1.57
1.56
1.29
1.26
1.23
1.19
1.16
3.00
1.92
2.69
1.98
1.09
2.16
3.46
5.24
f1 (ppm)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N
F
162.12
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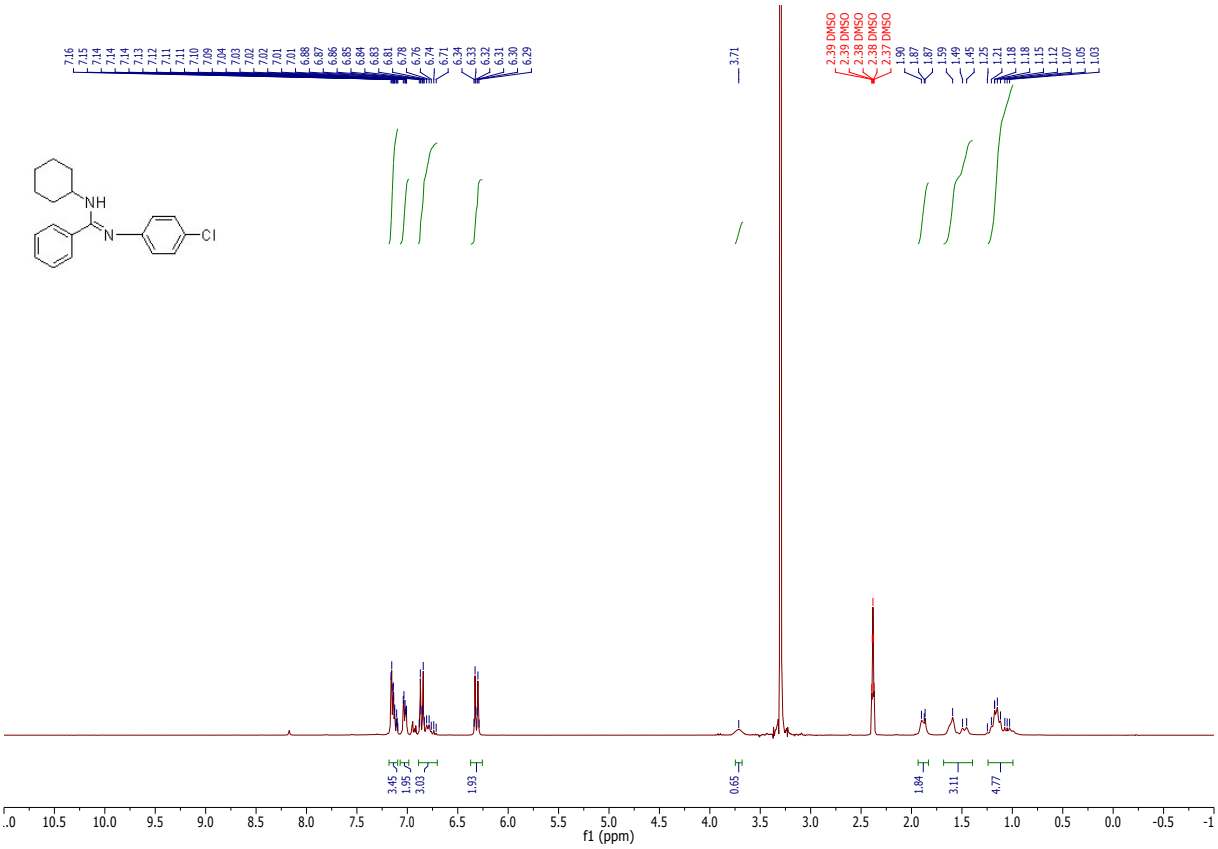
157.26
148.72
135.67
129.19
129.08
128.35
124.14
124.04
115.13
114.84
49.71
40.45 DMSO
40.17 DMSO
39.90 DMSO
39.62 DMSO
39.34 DMSO
32.94
25.99
25.35
f1 (ppm)


7.16
7.15
7.14
7.14
7.14
7.13
7.12
7.11
7.11
7.10
7.09
7.04
7.03
7.02
7.02
7.01
7.01
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6.86
6.85
6.84
6.83
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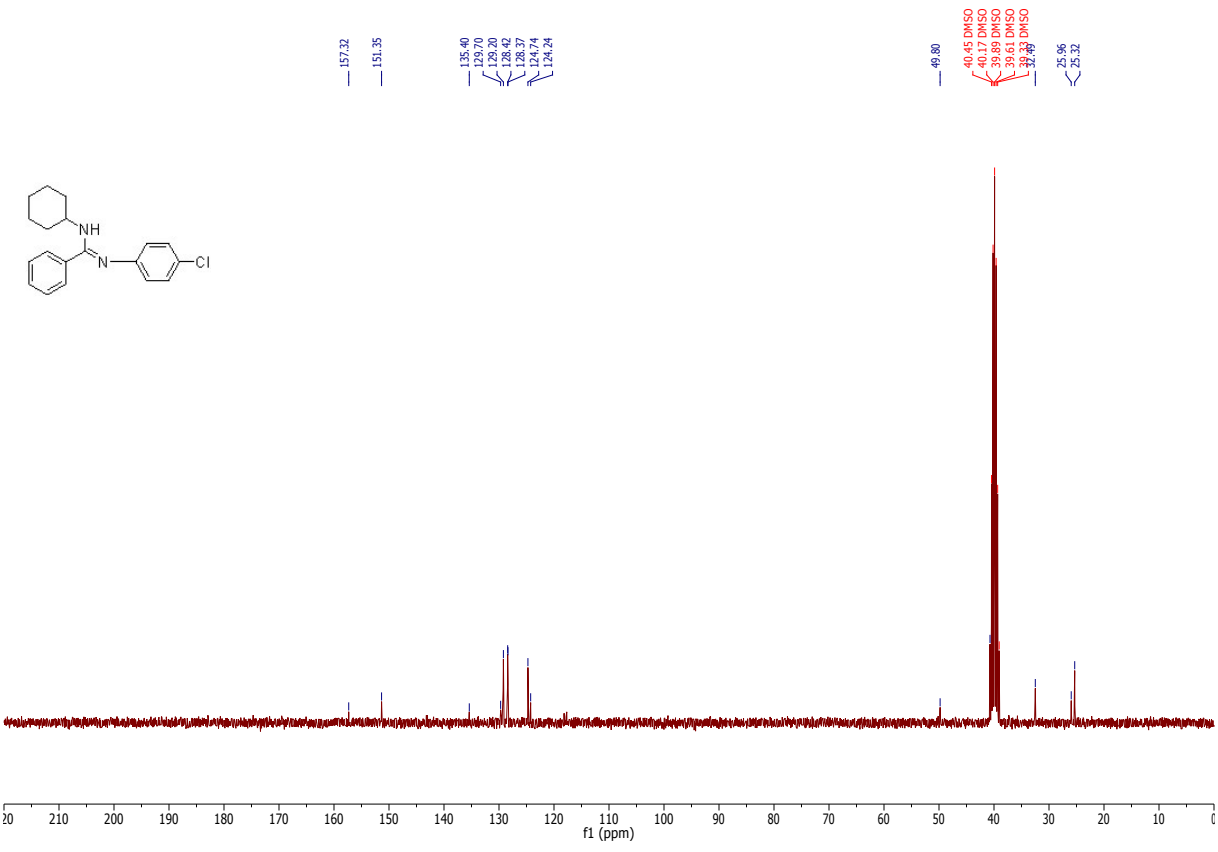
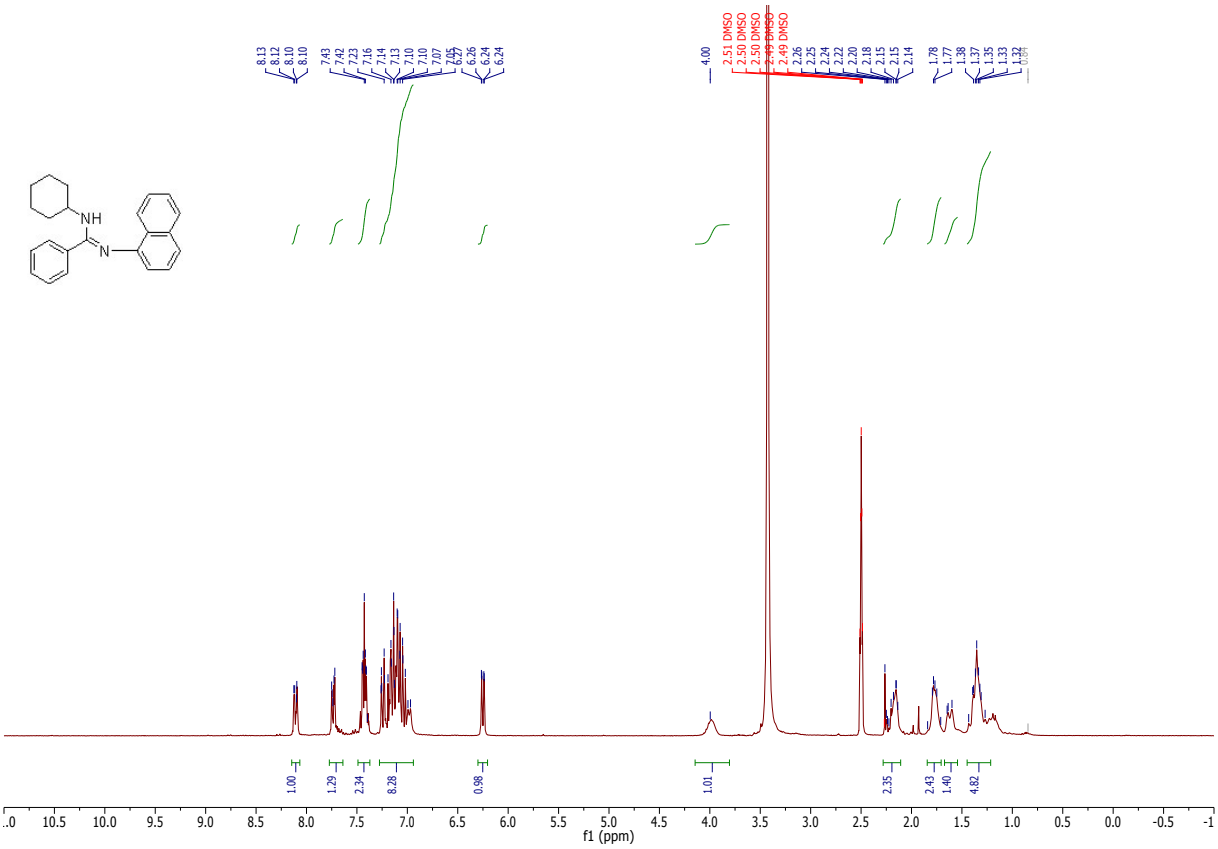
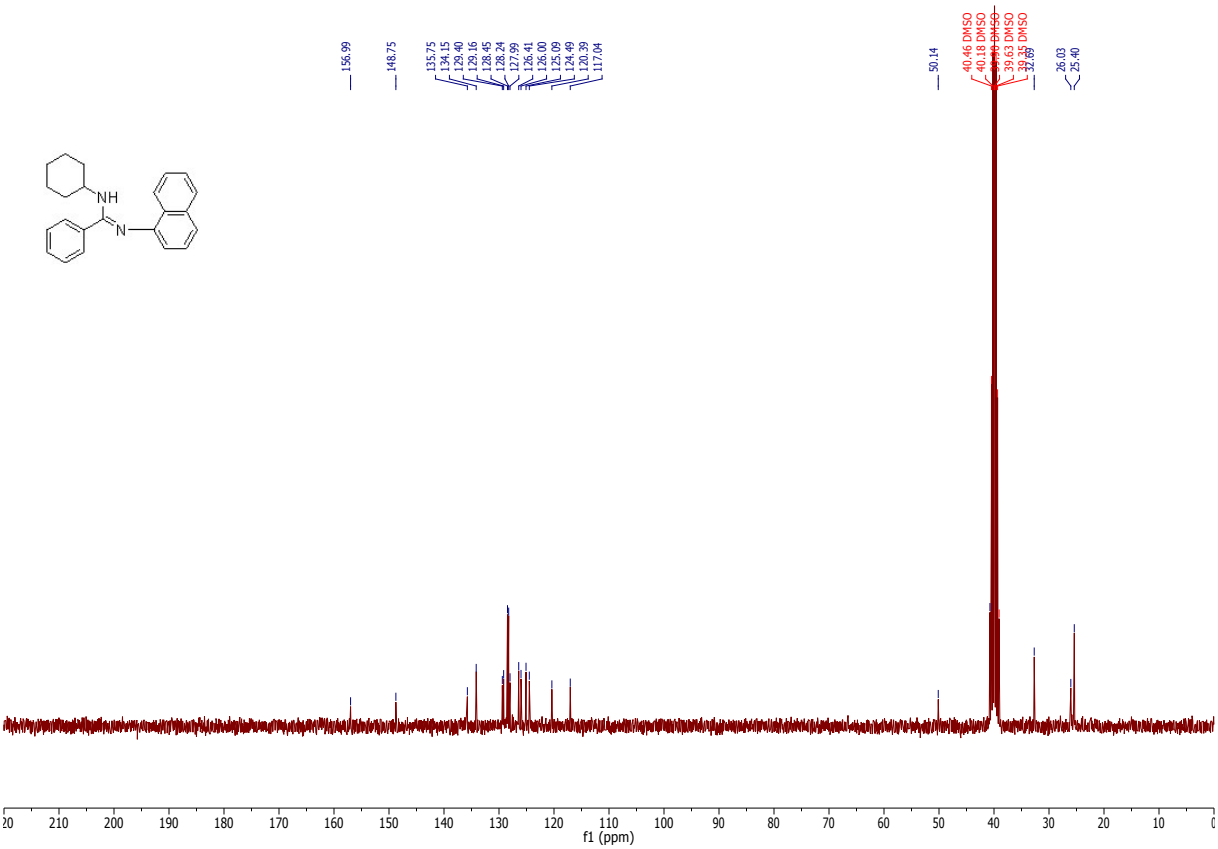
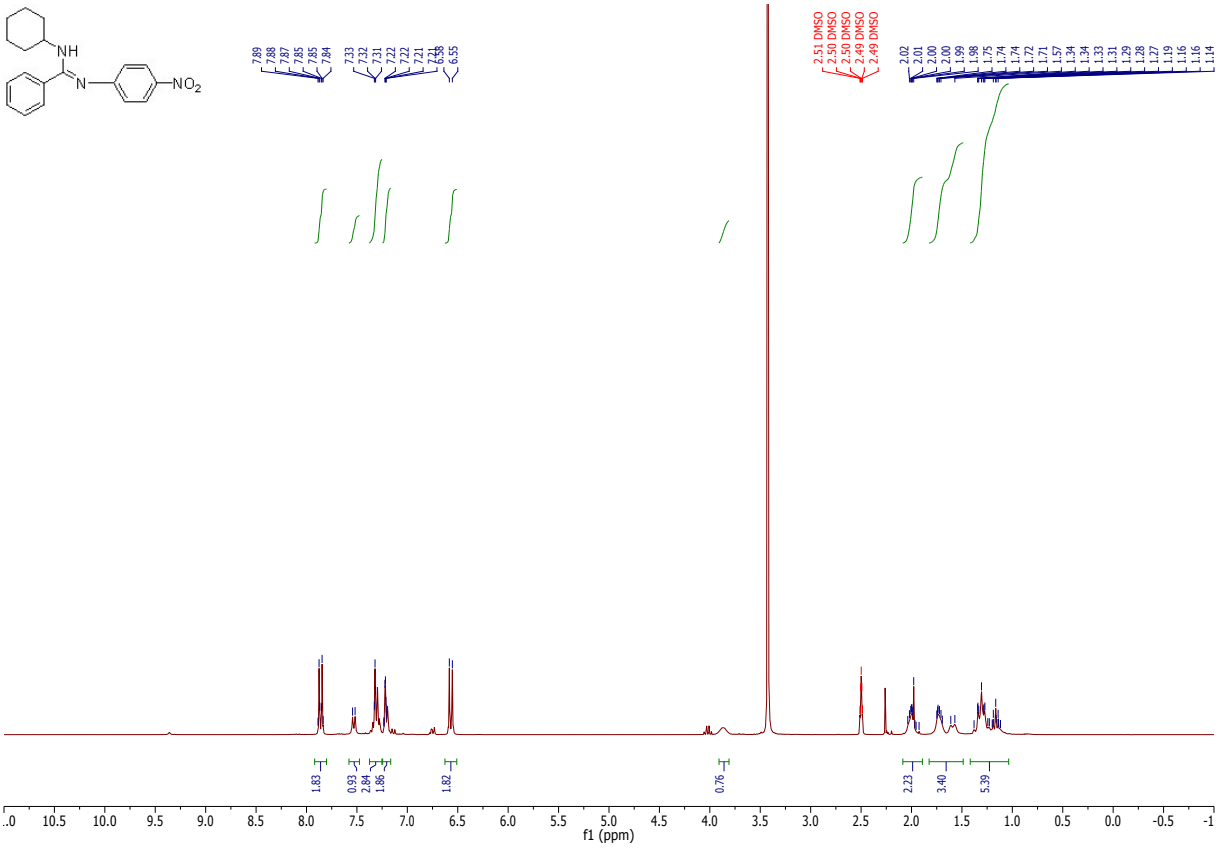
6.78
6.76
6.74
6.71
6.34
6.33
6.32
6.31
6.30
6.29
3.71
2.39 DMSO
2.39 DMSO
2.38 DMSO
2.38 DMSO
2.38 DMSO
2.37 DMSO
1.90
1.87
1.87
1.59
1.49
1.45
1.25
1.21
1.18
1.18
1.15
1.12
1.07
1.05
1.03
NH
N
Cl
3.45
1.95
3.03
1.93
0.65
1.84
3.11
4.77
f1 (ppm)


157.32
151.35
135.40
129.70
129.20
128.42
128.37
124.74
124.24
49.80
40.45 DMSO
40.17 DMSO
39.89 DMSO
39.61 DMSO
39.33 DMSO
32.49
25.96
25.32
NH
N
Cl
f1 (ppm)


NH
N
f1 (ppm)


NH
N
f1 (ppm)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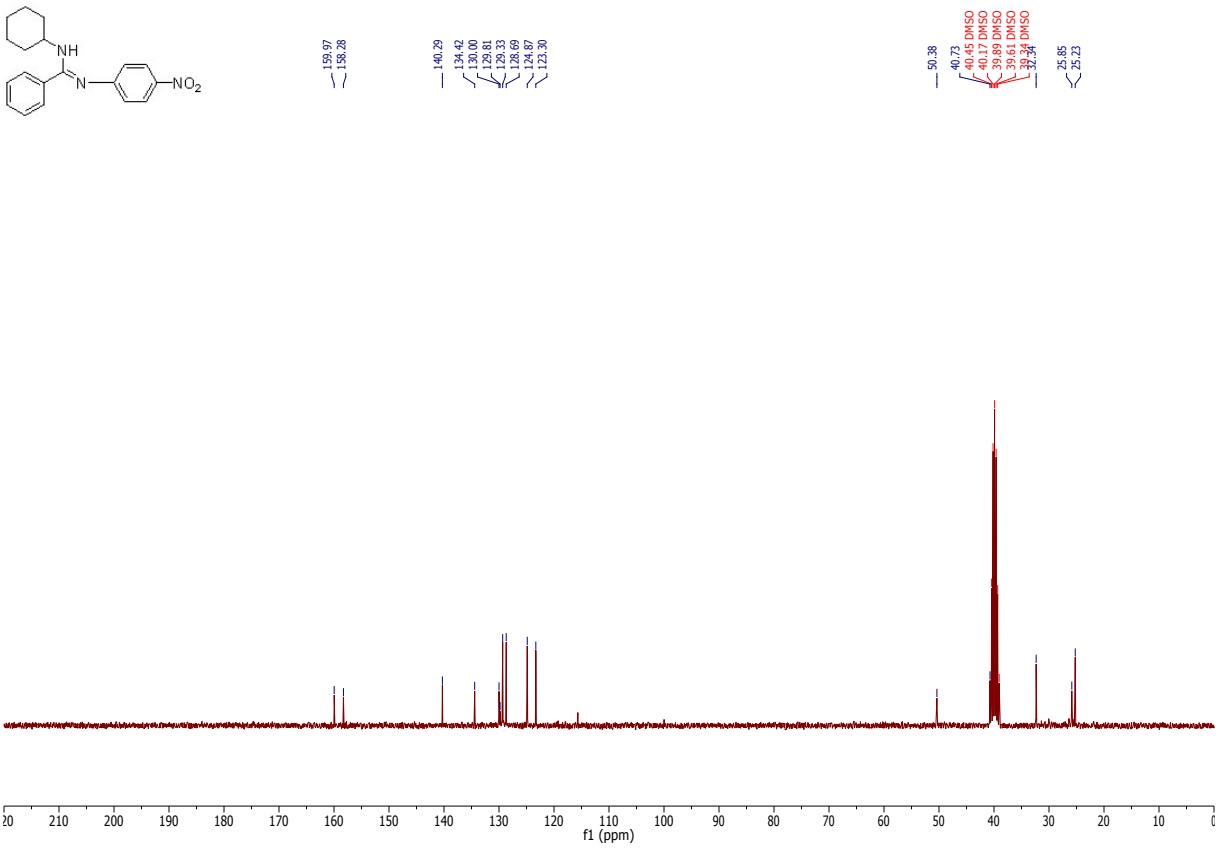
7.85
7.84
7.33
7.32
7.31
7.22
7.22
7.21
6.58
6.55
2.51 DMSO
2.50 DMSO
2.50 DMSO
2.49 DMSO
2.49 DMSO
2.02
2.01
2.00
2.00
1.99
1.98
1.75
1.74
1.74
1.72
1.71
1.57
1.34
1.34
1.33
1.31
1.29
1.28
1.27
1.19
1.16
1.16
1.14
1.83
0.93
2.84
1.86
1.82
0.76
2.23
3.40
5.39
f1 (ppm)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NO2
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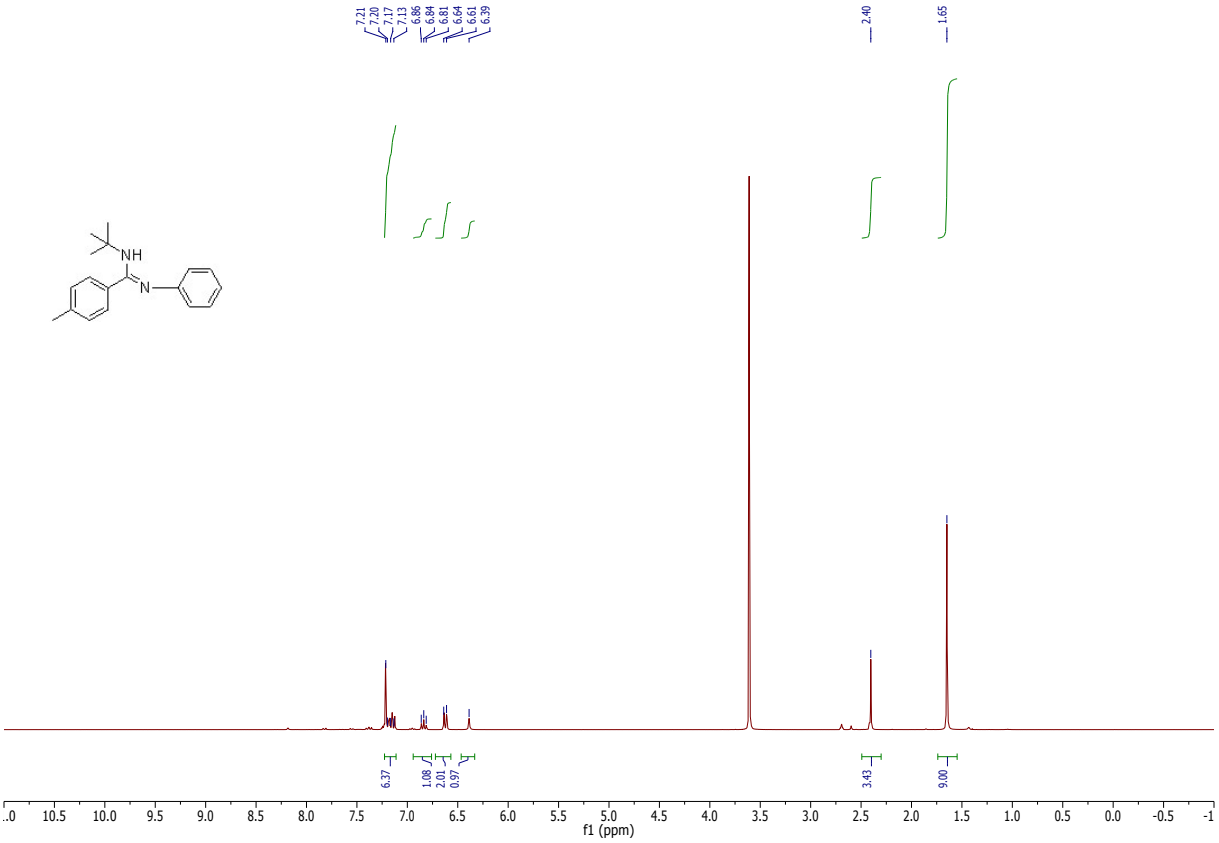
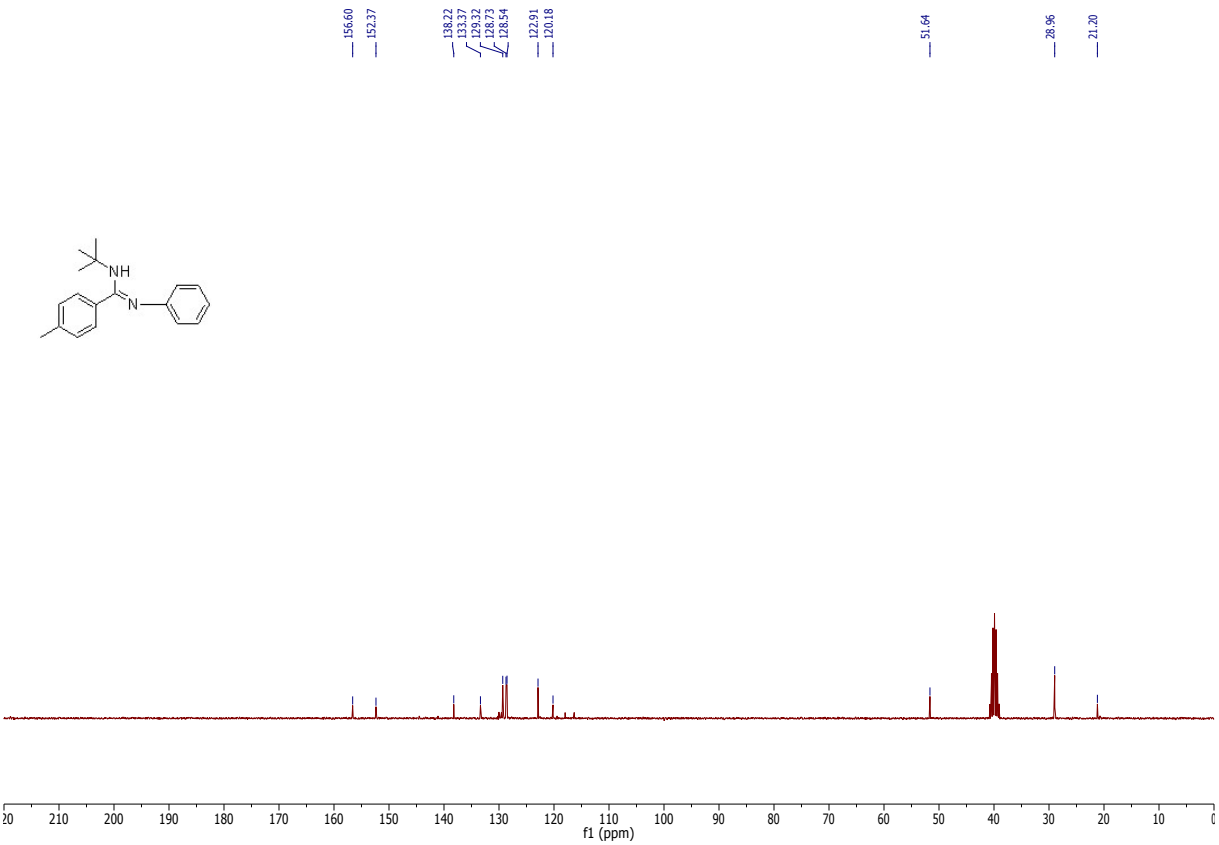
158.28
140.29
134.42
130.00
129.81
129.33
128.69
124.67
123.30
50.38
40.73
40.45 DMSO
40.17 DMSO
39.89 DMSO
39.61 DMSO
39.34 DMSO
32.34
25.85
25.23
f1 (ppm)


7.21
7.20
7.17
7.13
6.86
6.84
6.81
6.64
6.61
6.39
2.40
1.65
NH
N
6.37
1.08
2.01
0.97
3.43
9.00
f1 (ppm)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152.37
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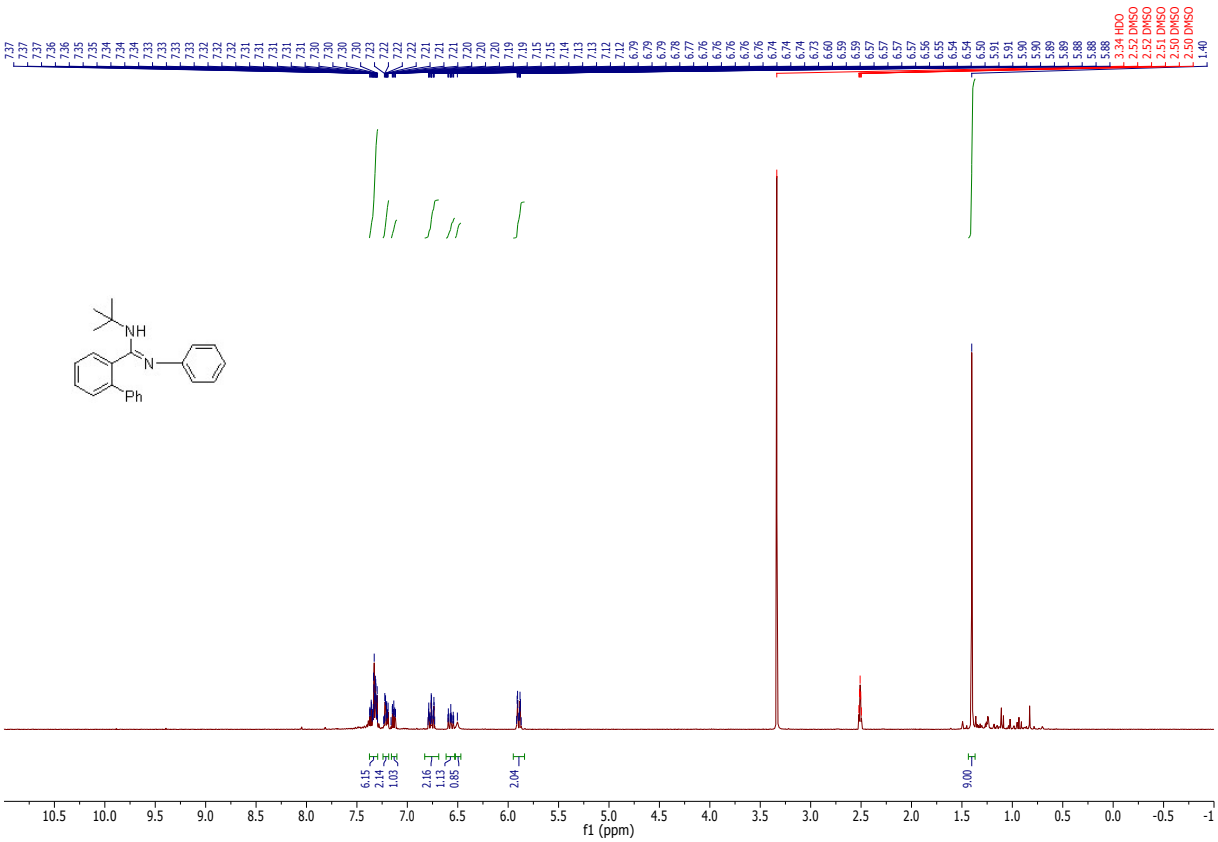
129.32
128.73
128.54
122.91
120.18
51.64
28.96
21.20
NH
N
f1 (ppm)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Ph
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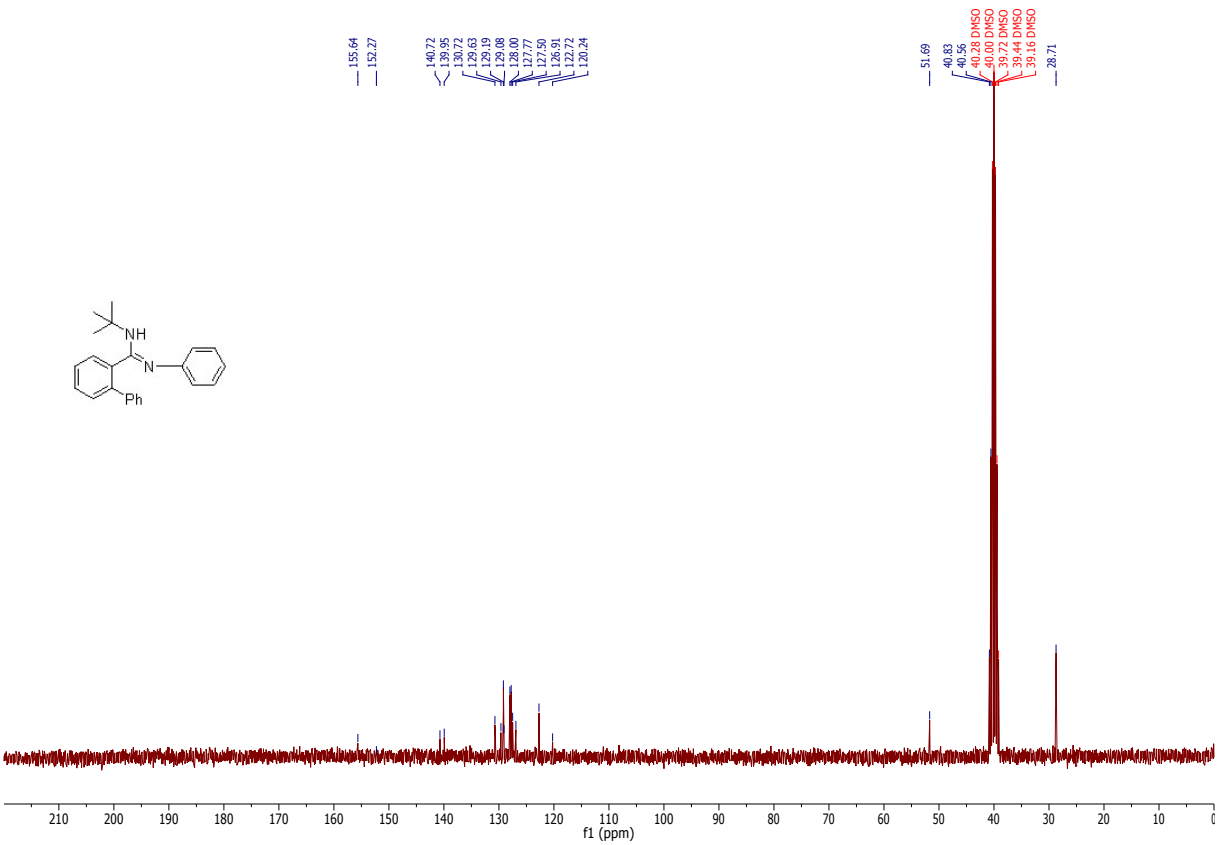
1.03
2.16
1.13
0.85
2.04
9.00
f1 (ppm)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Ph
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138.72
129.63
129.19
129.08
128.00
127.77
127.50
126.91
122.72
120.24
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40.56
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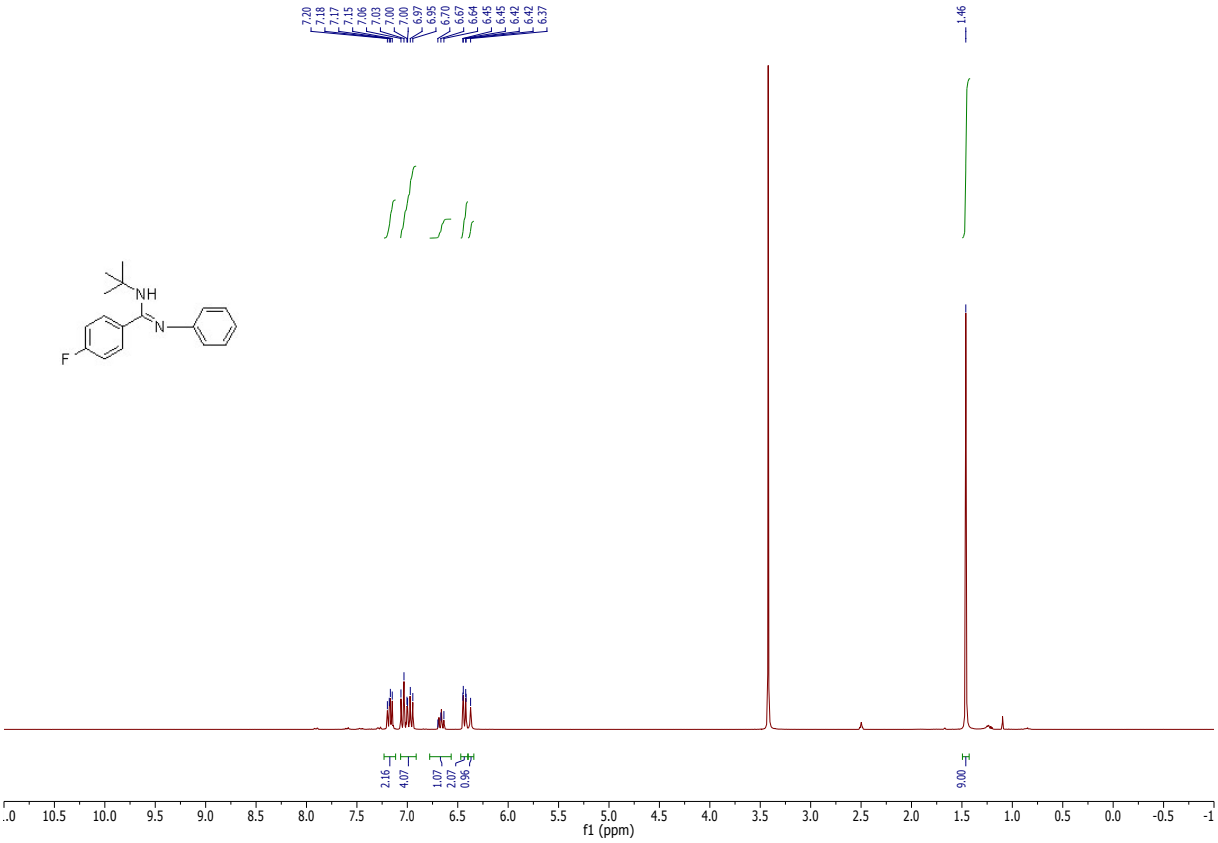
40.00 DMSO
39.72 DMSO
39.44 DMSO
39.16 DMSO
28.71
f1 (ppm)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7.18
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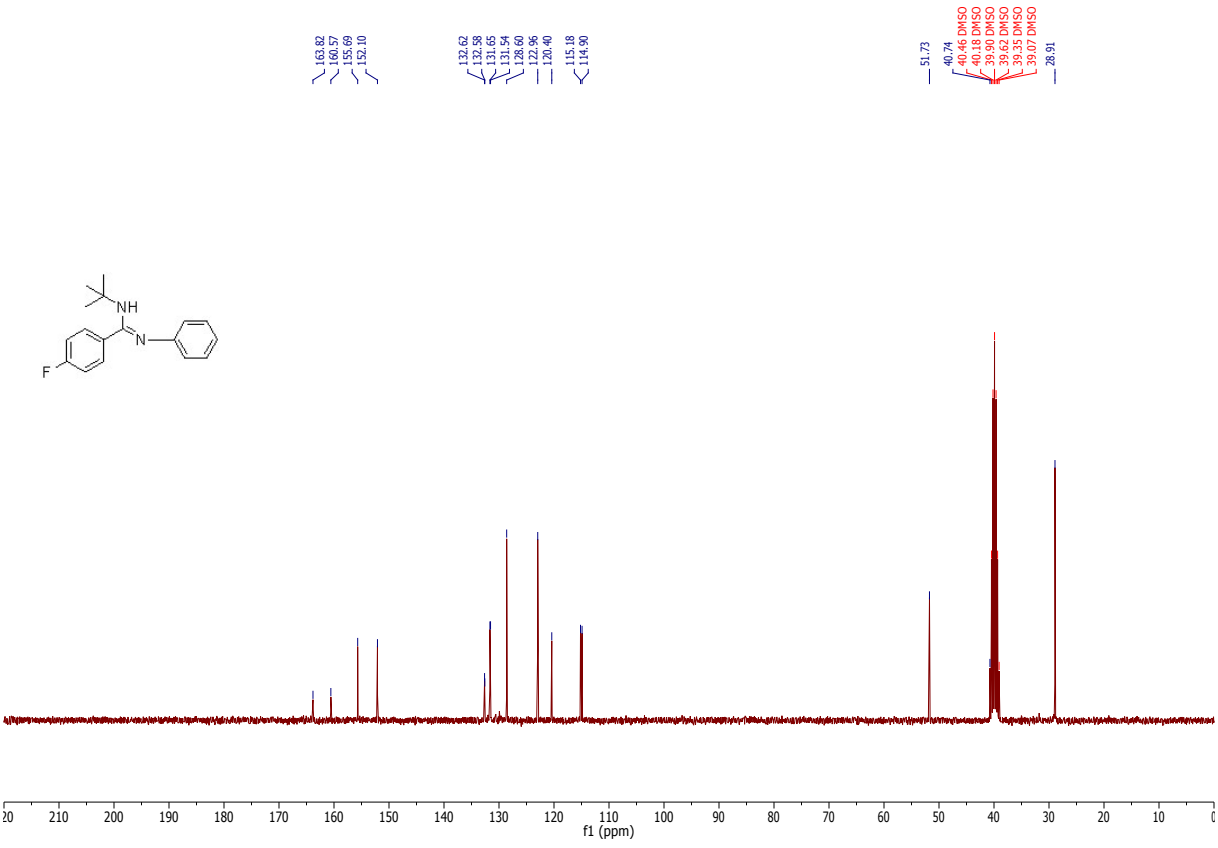
7.06
7.03
7.00
7.00
6.97
6.95
6.70
6.67
6.64
6.45
6.45
6.42
6.42
6.37
1.46
NH
N
F
2.16
4.07
1.07
2.07
0.96
9.00
f1 (ppm)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132.58
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131.54
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122.96
120.40
115.18
114.90
51.73
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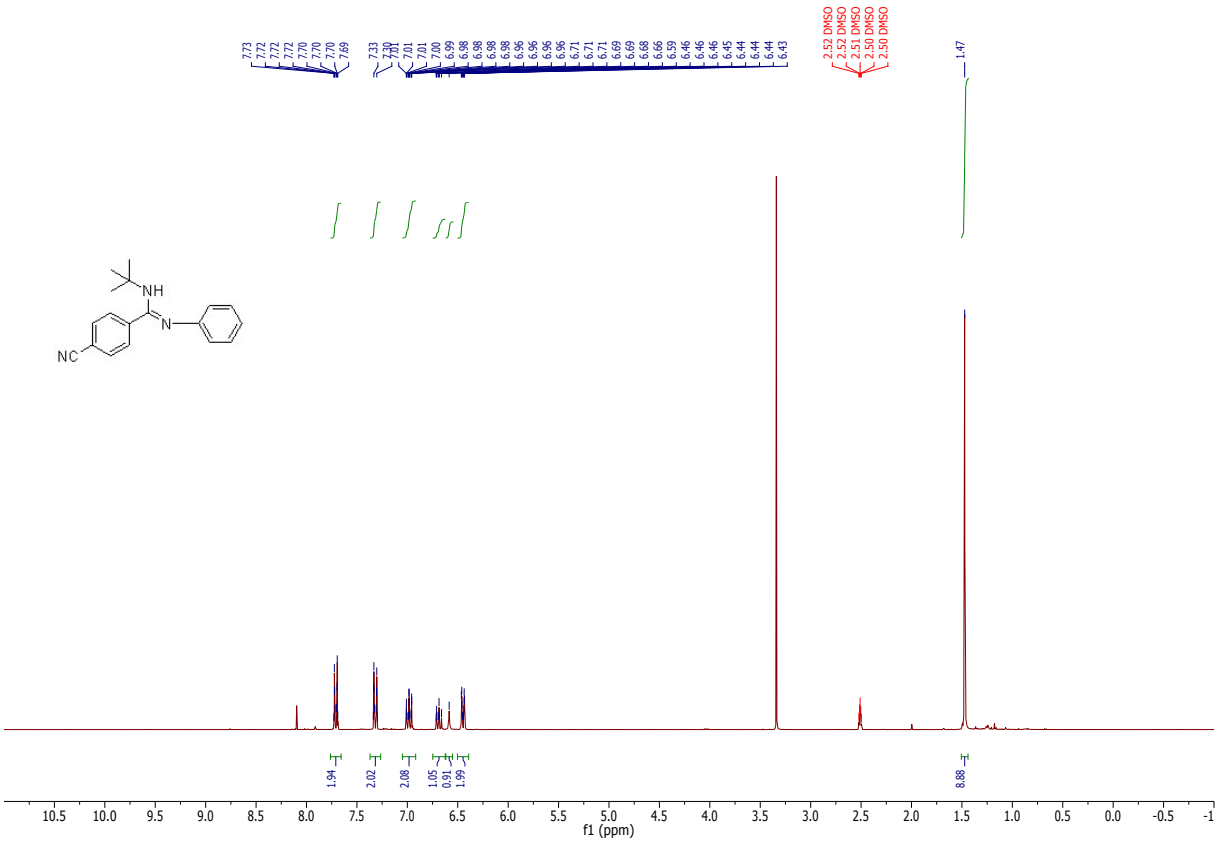
39.90 DMSO
39.62 DMSO
39.35 DMSO
39.07 DMSO
28.91
NH
N
F
f1 (ppm)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7.72
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7.70
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7.69
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7.01
7.01
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2.52 DMSO
2.51 DMSO
2.50 DMSO
2.50 DMSO
1.47
NH
N
NC
1.94
2.02
2.08
1.05
0.91
1.99
8.88
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
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3.5
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2.5
2.0
1.5
1.0
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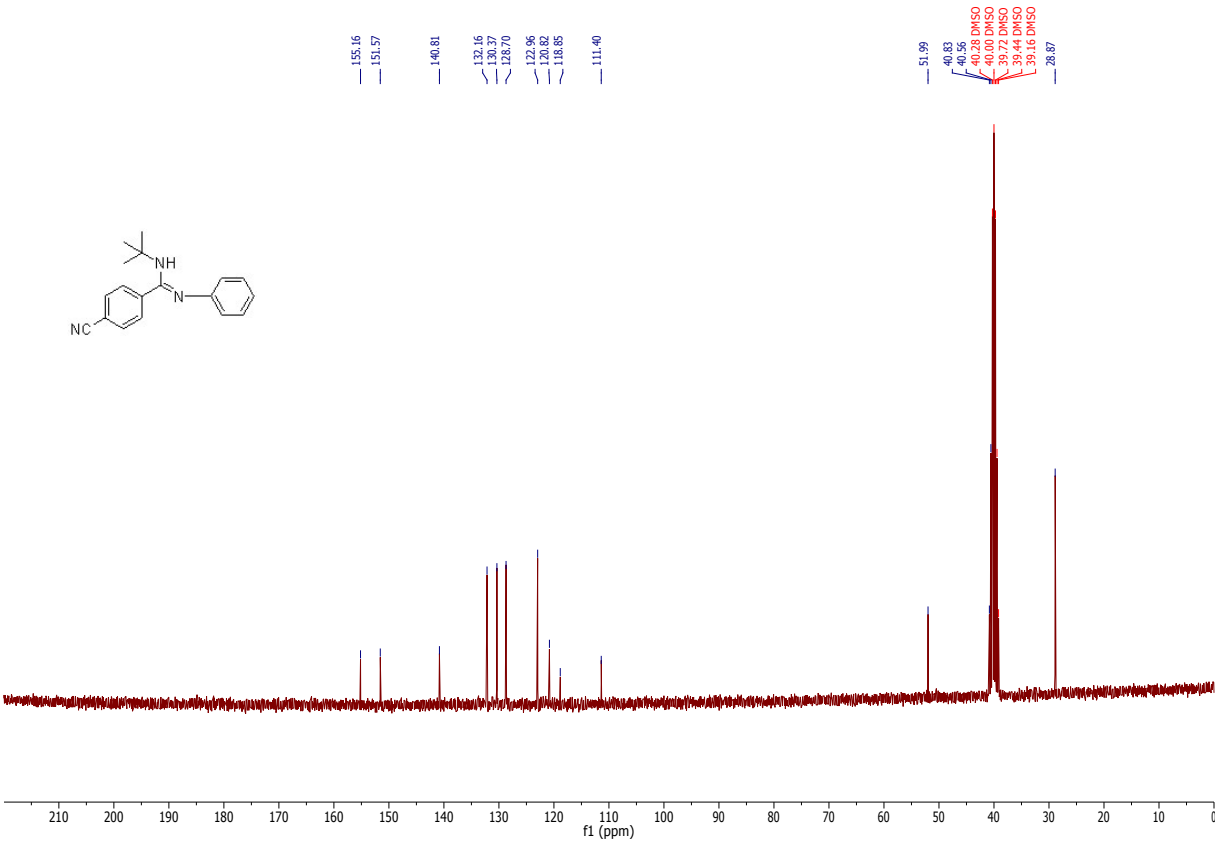
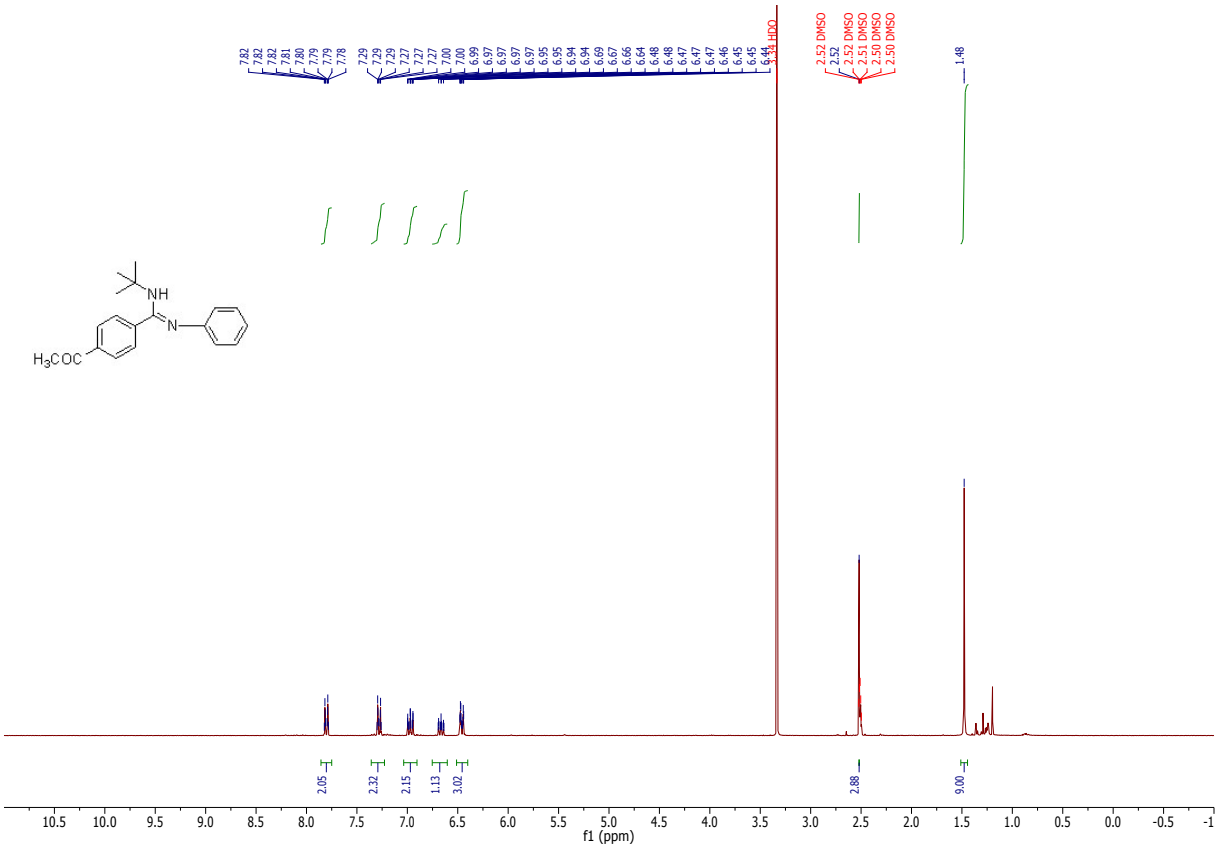
0.0
-0.5
-1
f1 (ppm)


155.16
151.57
140.81
132.16
130.37
128.70
122.96
120.82
118.85
111.40
51.99
40.83
40.56
40.28 DMSO
40.00 DMSO
39.72 DMSO
39.44 DMSO
39.16 DMSO
28.87
NH
N
NC
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
f1 (ppm)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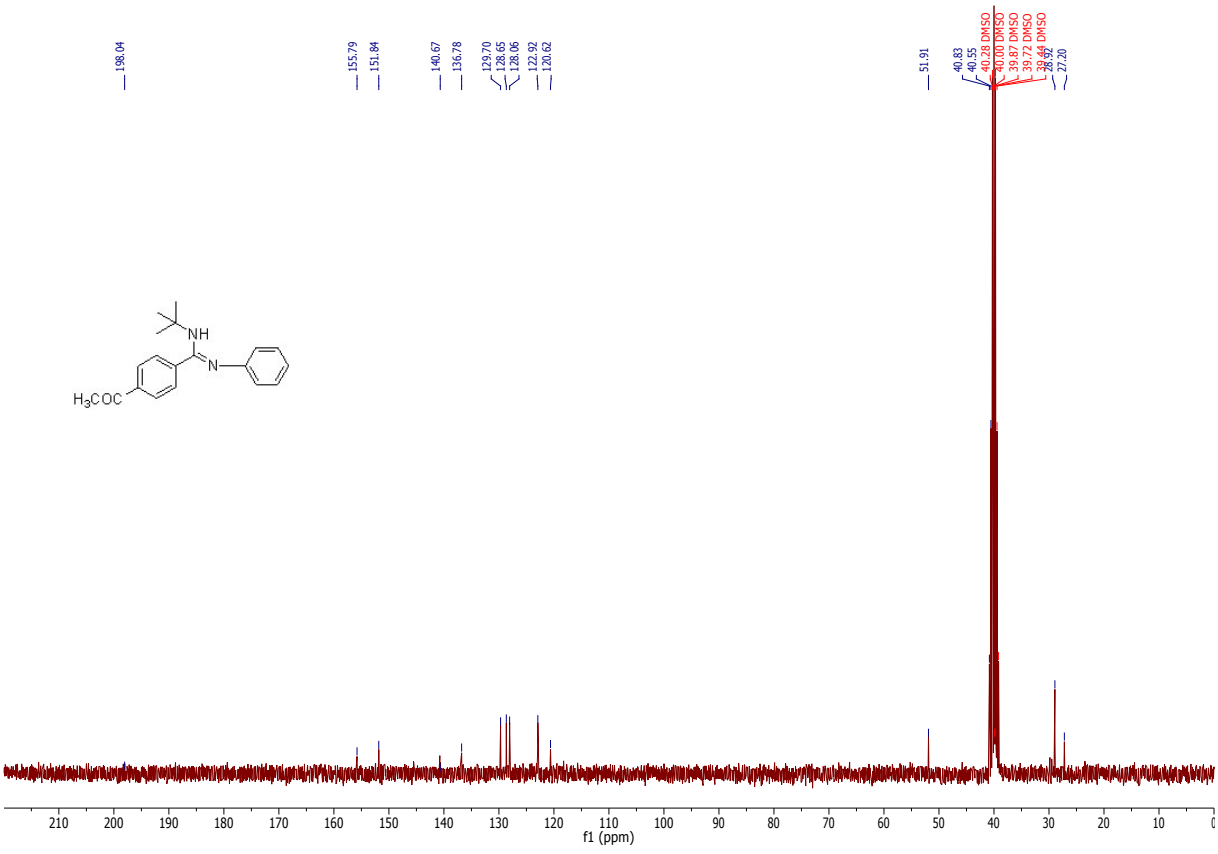
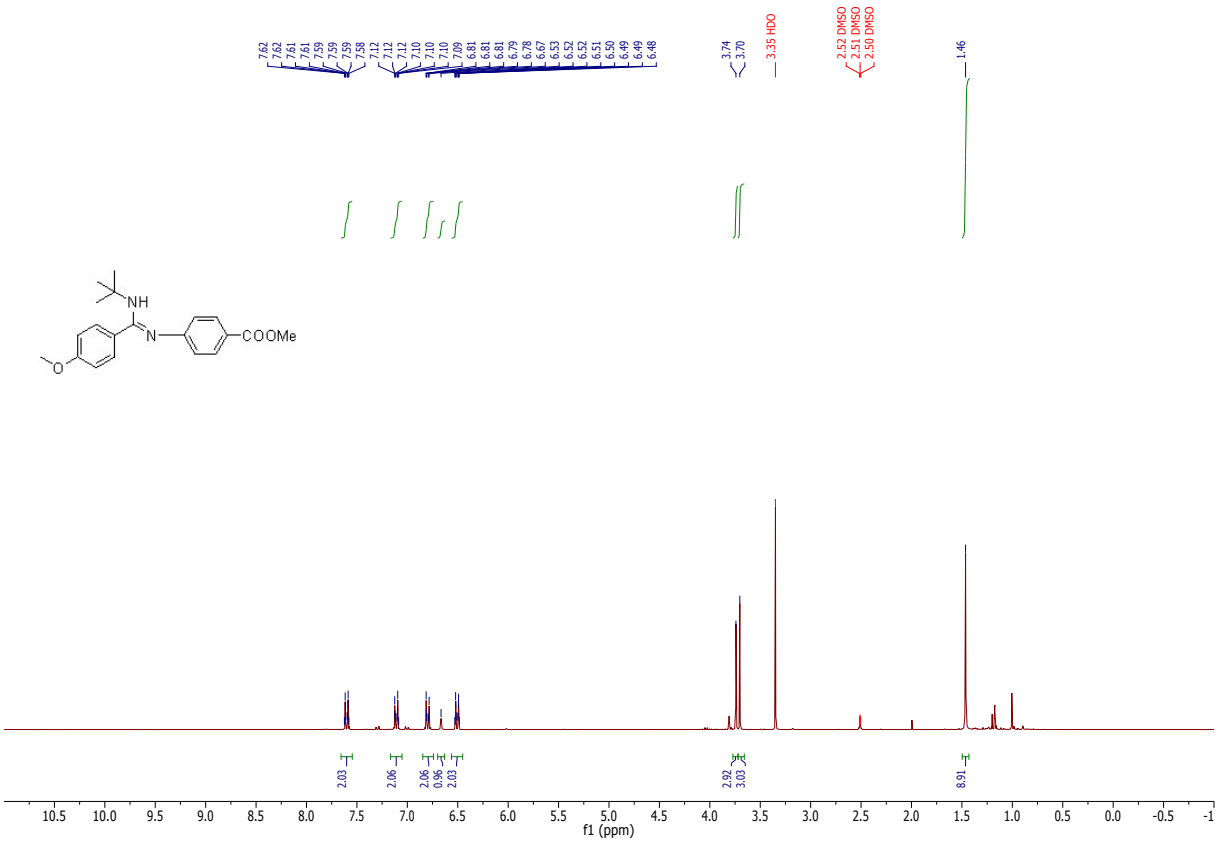
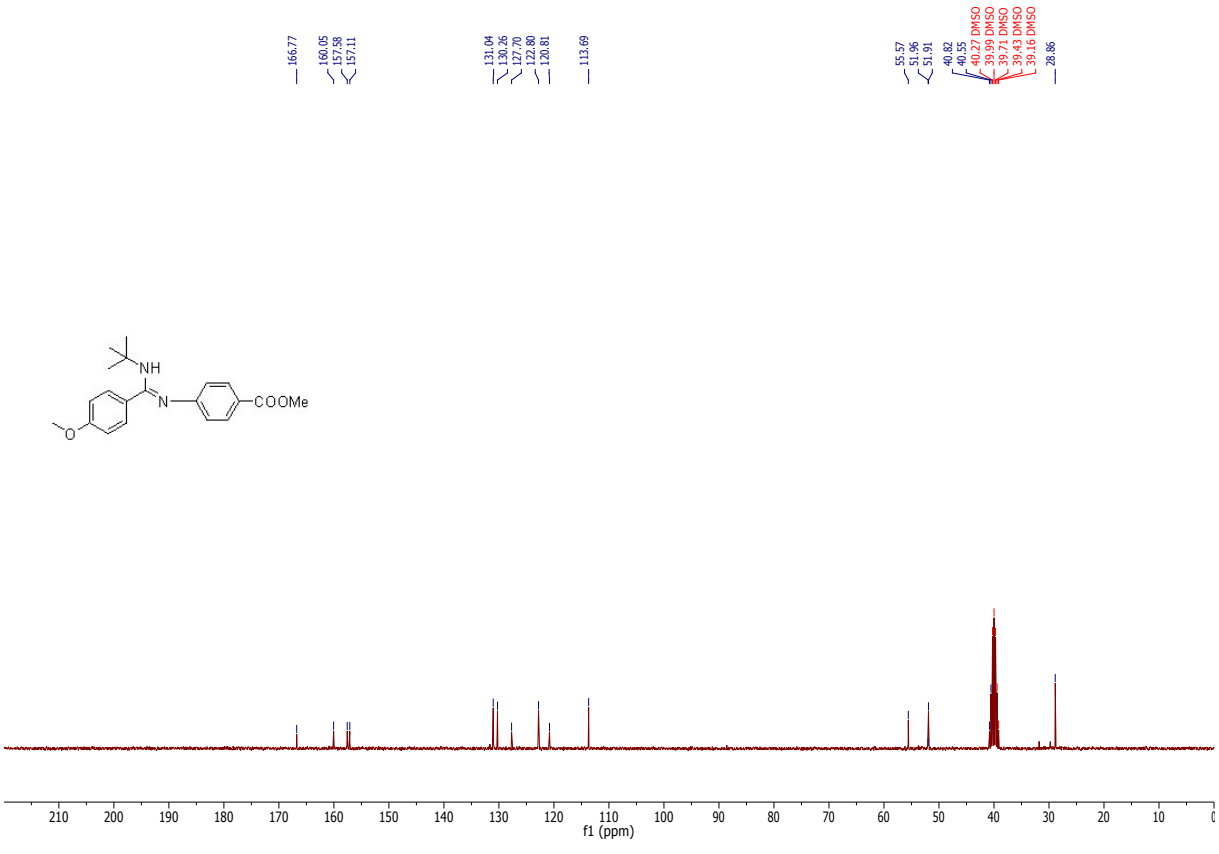
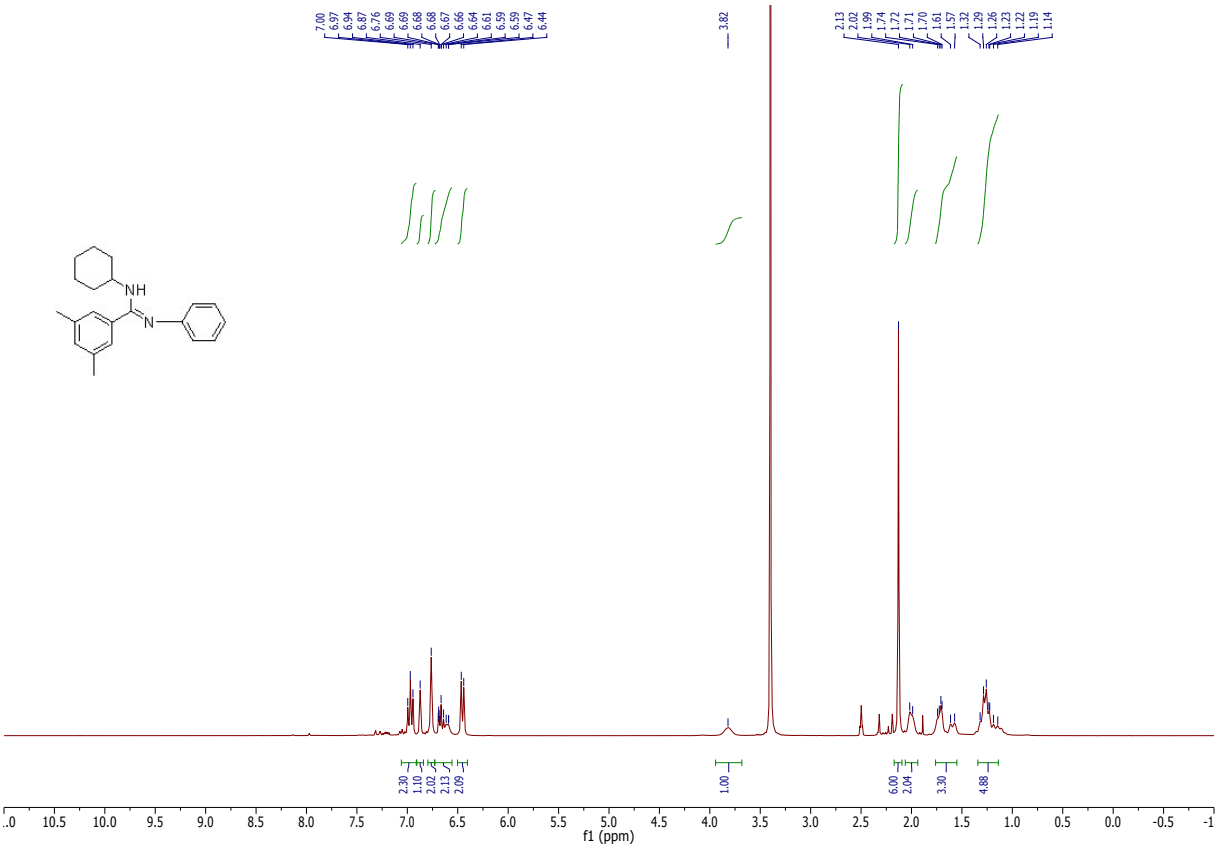
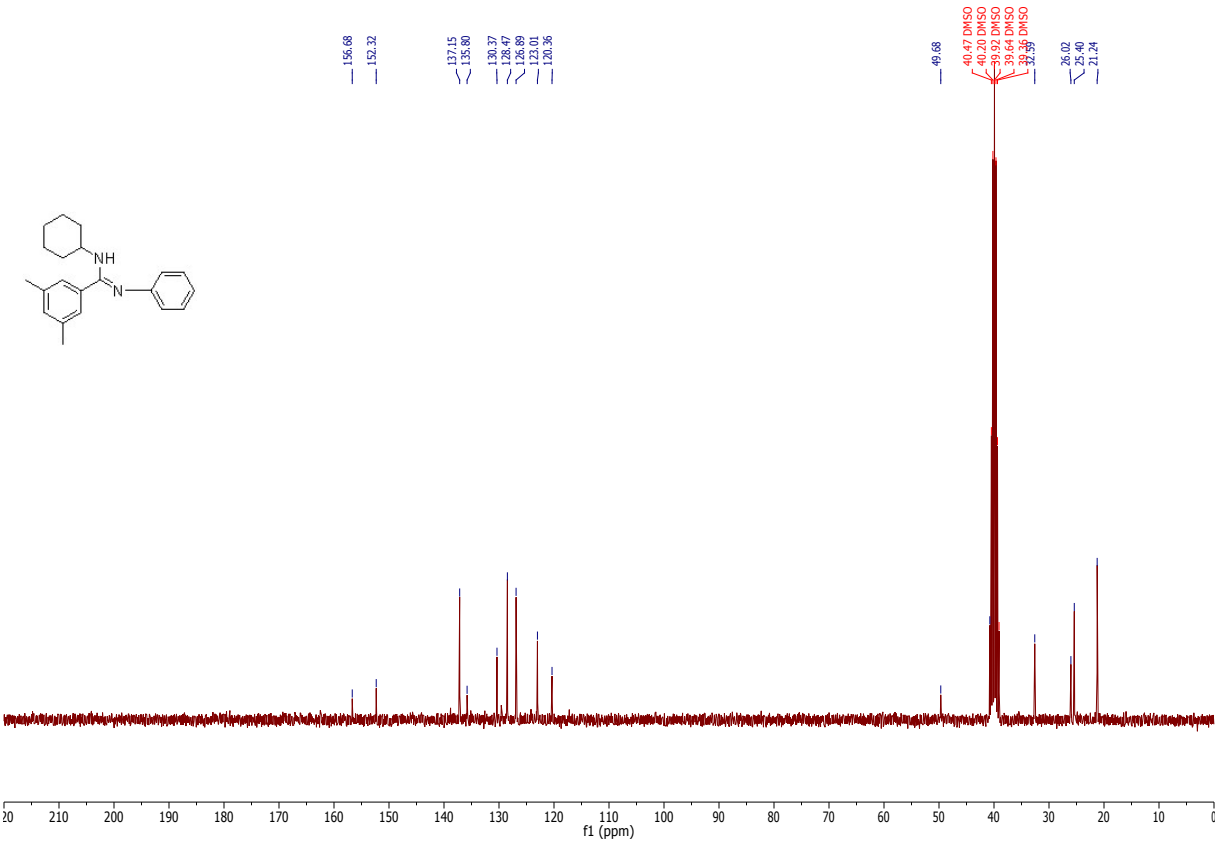
6.48
6.47
6.47
6.46
6.45
6.45
6.44
3.38 HDO
2.52 DMSO
2.52
2.52 DMSO
2.51 DMSO
2.50 DMSO
2.50 DMSO
1.48
2.05
2.32
2.15
1.13
3.02
2.88
9.00
NH
N
H3COC
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1
f1 (ppm)


198.04
155.79
151.84
140.67
136.78
129.70
128.65
128.06
122.92
120.62
51.91
40.83
40.55
40.28 DMSO
40.00 DMSO
39.87 DMSO
39.72 DMSO
39.44 DMSO
28.92
27.20
NH
N
H3COC
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


7.62
7.62
7.61
7.61
7.59
7.59
7.59
7.58
7.12
7.12
7.12
7.10
7.10
7.10
7.10
7.09
6.81
6.81
6.81
6.79
6.78
6.67
6.53
6.52
6.52
6.51
6.50
6.49
6.49
6.48
3.74
3.70
3.35 HDO
2.52 DMSO
2.51 DMSO
2.50 DMSO
1.46
NH
N
COOMe
O
2.03
2.06
2.06
0.96
2.03
2.92
3.03
8.91
f1 (ppm)


166.77
160.05
157.58
157.11
131.04
130.26
127.70
122.80
120.81
113.69
55.57
51.96
51.91
40.82
40.55
40.27 DMSO
39.99 DMSO
39.71 DMSO
39.43 DMSO
39.16 DMSO
28.86
NH
N
COOMe
O
f1 (ppm)


7.00
6.97
6.94
6.87
6.76
6.69
6.69
6.68
6.68
6.67
6.67
6.66
6.64
6.61
6.59
6.59
6.47
6.44
3.82
2.13
2.02
1.99
1.74
1.72
1.71
1.70
1.61
1.57
1.32
1.29
1.26
1.23
1.22
1.19
1.14
NH
N
2.30
1.10
2.02
2.13
2.09
1.00
6.00
2.04
3.30
4.88
f1 (ppm)


156.68
152.32
137.15
135.80
130.37
128.47
126.89
123.01
120.36
49.68
40.47 DMSO
40.20 DMSO
39.92 DMSO
39.64 DMSO
39.36 DMSO
32.39
26.02
25.40
21.24
NH
N
f1 (ppm)