Supporting Information

Exploiting the CNC Side-Chain in Heterocyclic Rearrangements: Synthesis of 4(5)-Acylamino-imidazoles.

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Contents

Experimental Section

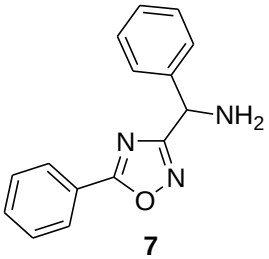
Instrumentation and Chemicals

Melting points were determined on a hotstage apparatus and are uncorrected. FT-IR spectra were registered in Nujol mull. ^{1}H-NMR and ^{13}C-NMR spectra were recorded at 300MHz and 62.5 MHz, respectively, with residual solvent peak as external standard. Minor tautomer peaks are given in parentheses. Flash chromatography was performed by using silica gel (Merck, 0.040–0.063 mm) and mixtures of ethyl acetate and petroleum ether (fraction boiling in the range of 40–60°C) in various ratios. 3-Benzoyl-5-phenyl-1,2,4-oxadiazole **6** was obtained as previously reported.[1]

(1) Vivona, N.; Frenna, V.; Buscemi, S.; Ruccia, M. *J. Heterocycl. Chem*. **1985**, *22*, 97-99.

Experimental Procedures and Characterization Data for Products

Synthesis of phenyl(5-phenyl-1,2,4-oxadiazol-3-yl)methanamine 7

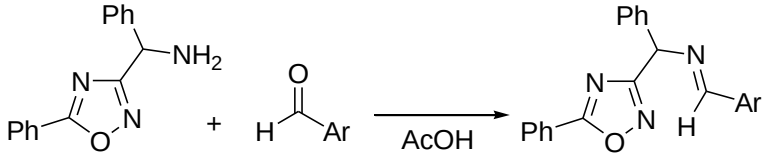


7

To a solution of 3-benzoyl-5-phenyl-1,2,4-oxadiazole **6** (1 g, 4 mmol) in toluene (10 ml) benzylamine (2.5 mL, 10 mmol) and Montmorillonite K-10 (1 g) were added and the mixture kept at 60°C under good stirring. After 24h, the mixture was cooled to room temperature and filtered, washing with ethyl acetate. The filtrate was evaporated and the residue chromatographed giving phenyl(5-phenyl-1,2,4-oxadiazol-3-yl)methanamine **7** (0.94 g, 93%).

phenyl(5-phenyl-1,2,4-oxadiazol-3-yl)methanamine 7: Mp 103-105°C (ethyl acetate); ^{1}H NMR (300 MHz, DMSO-d_6) δ 2.60 (s, 2H, exch. with D_2O), 5.34 (s, 1H) 7.30–7.43 (m, 3H), 7.54–7.75 (m, 5H), 8.10 (m, 2H); ^{13}C NMR (62.5 MHz, DMSO-d_6) δ 51.8, 123.3, 126.9, 127.2, 127.6, 128.2, 129.4, 133.1, 141.8, 173.8, 174.8; FTIR (Nujol) 3391, 3316, 1608 cm^{-1}; GC–MS (m/z): 251 (M^+,100%). Anal. Calcd for $C_{15}H_{13}N_3O$: C, 71.70; H, 5.21; N, 16.72. Found: C, 71.70; H, 5.20; N, 16.75.

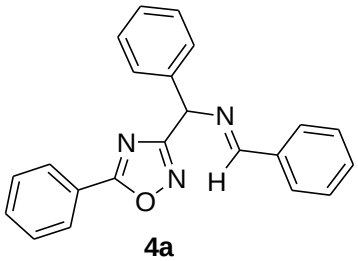
Synthesis of imines 4a-i. General procedure A.



7 **8** **4**

To a solution of **7** (0.251 g, 1 mmol) in glacial acetic acid (10 mL) the appropriate aldehyde **8** (1.5 mmol) was added. After 12h at room temperature the solvent was removed in vacuo and the residual oil treated with petroleum ether. The formed precipitate was collected by filtration giving *N*-arylidene-phenyl-(5-phenyl-1,2,4-oxadiazol-3-yl)methanamine **4**.

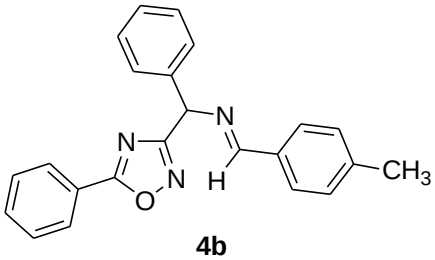
Synthesis of *N*-benzylidene-phenyl-(5-phenyl-1,2,4-oxadiazol-3-yl)methanamine 4a.



4a

Compound **4a** was obtained accordingly to general procedure A by adding benzaldehyde **8a** (156 mg, 1.5 mmol). ***N*-benzylidene-phenyl-(5-phenyl-1,2,4-oxadiazol-3-yl)methanamine 4a:** 329 mg, 97% yield; Mp 106-108°C (petroleum ether); ^{1}H NMR (300 MHz, $CDCl_3$) δ 6.04 (s, 1H), 7.42–7.63 (m, 9H), 7.72–7.74 (m, 2H), 7.96–7.99 (m, 2H), 8.20–8.23 (m, 2H), 8.62 (s, 1H); ^{13}C NMR (62.5 MHz, $CDCl_3$) δ 69.7, 124.2, 127.9, 128.0, 128.2, 128.5, 128.6, 128.8, 128.9, 131.3, 132.7, 135.7, 138.9, 163.9, 171.8, 176.0; FTIR (Nujol) 1645, 1609 cm^{-1}; GC–MS (m/z): 339 (M^+,100%). Anal. Calcd for $C_{22}H_{17}N_3O$: C, 77.86; H, 5.05; N, 12.38. Found: C, 77.90; H, 5.10; N, 12.30.

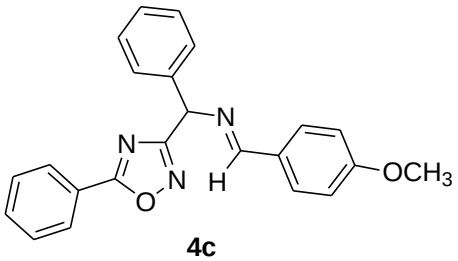
Synthesis of *N*-(4-methylbenzylidene)-phenyl-(5-phenyl-1,2,4-oxadiazol-3-yl)methanamine 4b.



4b

Compound **4b** was obtained accordingly to general procedure A by adding 4-methylbenzaldehyde **8b** (180 mg, 1.5 mmol). ***N*-(4-methylbenzylidene)-phenyl-(5-phenyl-1,2,4-oxadiazol-3-yl)methanamine 4b**: 314 mg, 89% yield; Mp 110–112°C (petroleum ether); ^{1}H NMR (300 MHz, $CDCl_3$) δ 2.46 (s, 3H), 5.99 (s, 1H), 7.30 (d, 2H, *J* = 7.8 Hz), 7.40-7.70 (m, 8H), 7.85 (d, 2H, *J* = 7.8 Hz), 8.19–8.22 (m, 2H), 8.57 (s, 1H); ^{13}C NMR (62.5 MHz, $CDCl_3$) δ 21.5, 69.6, 124.3, 127.9, 128.3, 128.6, 128.8, 128.9, 129.3, 132.6, 133.1, 139.1, 141.7, 163.8, 171.9, 176.0; FTIR (Nujol) 1647, 1608 cm^{-1}; GC–MS (m/z): 353 (M^+,100%). Anal. Calcd for $C_{23}H_{19}N_3O$: C, 78.16; H, 5.46; N, 11.89. Found: C, 78.10; H, 5.50; N, 11.90.

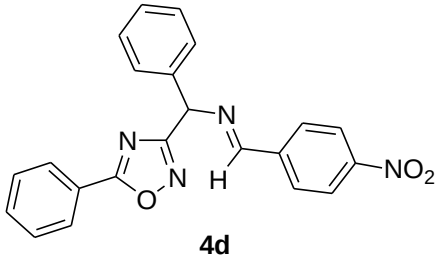
Synthesis of *N*-(4-methoxybenzylidene)-phenyl-(5-phenyl-1,2,4-oxadiazol-3-yl)methanamine 4c.



4c

Compound **4c** was obtained accordingly to general procedure A by adding 4-methoxybenzaldehyde **8c** (204 mg, 1.5 mmol). ***N*-(4-methoxybenzylidene)-phenyl-(5-phenyl-1,2,4-oxadiazol-3-yl)methanamine 4c**: 350 mg, 95% yield; Mp 116–118°C (petroleum ether); ^{1}H NMR (300 MHz, $CDCl_3$) δ 3.85 (s, 3H), 5.90 (s, 1H), 6.93 (d, 2H, *J* = 8.7 Hz), 7.30–7.63 (m, 8H), 7.83 (d, 2H, *J* = 8.7 Hz), 8.12–8.15 (m, 2H), 8.46 (s, 1H); ^{13}C NMR (62.5 MHz, $CDCl_3$) δ 55.3, 69.6, 114.0, 124.2, 127.8, 127.9, 128.2, 128.6, 128.7, 128.9, 130.4, 132.6, 139.2, 162.1, 163.2, 171.9, 176.0; FTIR (Nujol) 1632, 1608 cm^{-1}; GC–MS (m/z): 369 (M^+,100%). Anal. Calcd for $C_{23}H_{19}N_3O_2$: C, 74.78; H, 5.18; N, 11.37. Found: C, 74.80; H, 5.20; N, 11.30.

Synthesis of *N*-(4-nitrobenzylidene)-phenyl-(5-phenyl-1,2,4-oxadiazol-3-yl)methanamine 4d.

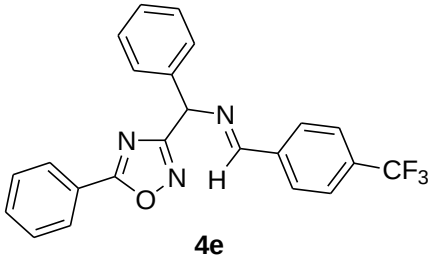


4d

Compound **4d** was obtained accordingly to general procedure A by adding 4-nitrobenzaldehyde **8d** (226 mg, 1.5 mmol) was added. ***N*-(4-nitrobenzylidene)-phenyl-(5-phenyl-1,2,4-oxadiazol-3-yl)methanamine 4d**: 349 mg, 91% yield; Mp 129°C dec. (petroleum ether); ^{1}H NMR (300 MHz, $CDCl_3$) δ 6.00 (s, 1H), 7.34–7.64 (m, 8H), 8.05 (d, 2H, *J* = 8.7 Hz), 8.11-8.14 (m, 2H), 8.29 (d, 2H, *J* = 8.7 Hz), 8.60 (s, 1H); ^{13}C NMR (62.5 MHz, $CDCl_3$) δ 69.8, 123.8, 124.1, 128.0, 128.2, 128.4, 128.8, 129.0, 129.5, 132.9, 138.2, 141.0, 149.4, 161.5, 171.3, 176.2; FTIR (Nujol) 1638, 1600 cm^{-1};

GC–MS (m/z): 384 (M^+,100%). Anal. Calcd for $C_{22}H_{16}N_4O_3$: C, 68.74; H, 4.20; N, 14.58. Found: C, 68.70; H, 4.30; N, 14.70.

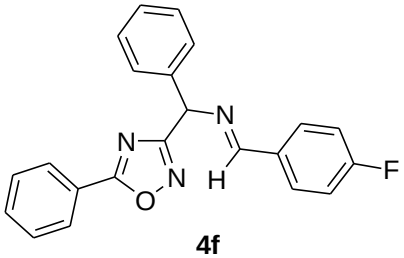
Synthesis of *N*-(4-trifluoromethylbenzylidene)-phenyl-(5-phenyl-1,2,4-oxadiazol-3-yl)methanamine 4e.



4e

Compound **4e** was obtained accordingly to general procedure A by adding 4-trifluoromethylbenzaldehyde **8e** (261 mg, 1.5 mmol). ***N*-(4-trifluoromethylbenzylidene)-phenyl-(5-phenyl-1,2,4-oxadiazol-3-yl)methanamine 4e**: 334 mg, 82% yield; Mp 95–97°C (petroleum ether); ^{1}H NMR (300 MHz, $CDCl_3$) δ 5.98 (s, 1H), 7.35–7.63 (m, 8H), 7.69 (d, 2H, *J* = 8.1 Hz), 7.99 (d, 2H, *J* = 8.1 Hz), 8.12–8.15 (m, 2H), 8.57 (s, 1H); ^{13}C NMR (62.5 MHz, $CDCl_3$) δ 69.7, 123.8 (q, *J* = 269 Hz), 124.1, 125.5 (q, *J* = 3.7 Hz), 127.9, 128.2, 128.7, 128.9, 130.3 (q, *J* = 50 Hz), 132.8, 138.5, 138.7, 162.4, 171.5, 176.1; FTIR (Nujol) 1641, 1607 cm^{-1}; GC–MS (m/z): 407 (M^+,100%). Anal. Calcd for $C_{23}H_{16}F_3N_3O$: C, 67.81; H, 3.96; N, 10.31. Found: C, 67.90; H, 4.10; N, 10.10.

Synthesis of *N*-(4-fluorobenzylidene)-phenyl-(5-phenyl-1,2,4-oxadiazol-3-yl)methanamine 4f.

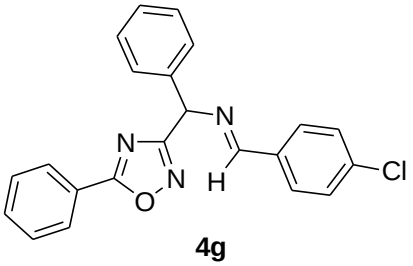


4f

Compound **4f** was obtained accordingly to general procedure A by adding 4-fluorobenzaldehyde **8f** (186 mg, 1.5 mmol). ***N*-(4-fluorobenzylidene)-phenyl-(5-phenyl-1,2,4-oxadiazol-3-yl)methanamine 4f**: 303 mg, 85% yield; Mp 93–95°C (petroleum ether); ^{1}H NMR (300 MHz,

$CDCl_3$) δ 5.92 (s, 1H), 7.09–7.14 (m, 2H), 7.33–7.62 (m, 8H), 7.86–7.90 (m, 2H), 8.12–8.15 (m, 2H), 8.49 (s, 1H); ^{13}C NMR (62.5 MHz, $CDCl_3$) δ 69.6, 115.7 (d, *J* = 21.8Hz), 124.2, 127.9, 128.1, 128.2, 128.7, 128.9, 130.8 (d, *J* = 9 Hz), 132.0, 132.7, 138.9, 162.4, 164.7 (d, *J* = 250 Hz), 171.7, 176.1; FTIR (Nujol) 1641, 1599 cm^{-1}; GC–MS (m/z): 357 (M^+,100%). Anal. Calcd for $C_{22}H_{16}FN_3O$: C, 73.94; H, 4.51; N, 11.76. Found: C, 74.00; H, 4.40; N, 11.90.

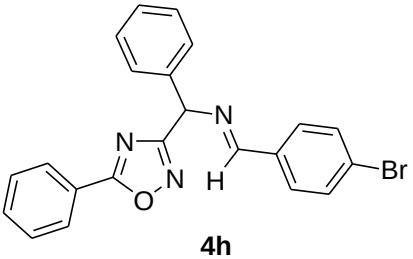
Synthesis of *N*-(4-chlorobenzylidene)-phenyl-(5-phenyl-1,2,4-oxadiazol-3-yl)methanamine 4g.



4g

Compound **4g** was obtained accordingly to general procedure A by adding 4-chlorobenzaldehyde **8g** (210 mg, 1.5 mmol). ***N*-(4-chlorobenzylidene)-phenyl-(5-phenyl-1,2,4-oxadiazol-3-yl)methanamine 4g**: 328 mg, 88% yield; Mp 96–98°C (petroleum ether); ^1H NMR (300 MHz, $CDCl_3$) δ 6.00 (s, 1H), 7.41–7.70 (m, 10H), 7.88 (d, 2H, *J* = 8.4 Hz), 8.19–8.22 (m, 2H), 8.56 (s, 1H); ^{13}C NMR (62.5 MHz, $CDCl_3$) δ 69.6, 124.2, 127.9, 128.1, 128.2, 128.7, 128.8, 128.9, 129.9, 132.7, 134.1, 137.3, 138.7, 162.5, 171.6, 176.1; FTIR (Nujol) 1643, 1609 cm^{-1}; GC–MS (m/z): 375 [$(M+2)^+$, 31%], 373 (M^+,100%). Anal. Calcd for $C_{22}H_{16}ClN_3O$: C, 70.68; H, 4.31; N, 11.24. Found: C, 70.70; H, 4.40; N, 11.10.

Synthesis of *N*-(4-bromobenzylidene)-phenyl-(5-phenyl-1,2,4-oxadiazol-3-yl)methanamine 4h.

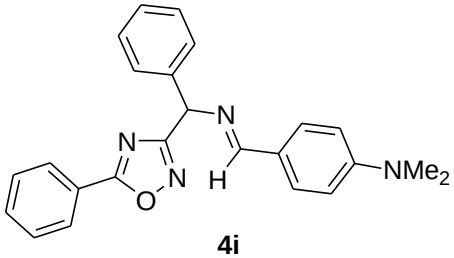


4h

Compound **4h** was obtained accordingly to general procedure A by adding 4-bromobenzaldehyde **8h** (277 mg, 1.5 mmol). ***N*-(4-bromobenzylidene)-phenyl-(5-phenyl-1,2,4-oxadiazol-3-**

yl)methanamine 4h: 333 mg, 80% yield; Mp 103–105°C (petroleum ether); ^{1}H NMR (300 MHz, $CDCl_3$) δ 5.93 (s, 1H), 7.34–7.62 (m, 10H), 7.75 (d, 2H, *J* = 8.1 Hz), 8.12–8.15 (m, 2H), 8.47 (s, 1H); ^{13}C NMR (62.5 MHz, $CDCl_3$) δ 69.6, 124.1, 125.8, 127.9, 128.1, 128.2, 128.7, 128.9, 130.1, 131.8, 132.7, 134.5, 138.7, 162.6, 171.6, 176.1; FTIR (Nujol) 1654, 1609 cm^{-1}; GC–MS (m/z): 419 [$(M+2)^+$, 98%], 417 (M^+,100%). Anal. Calcd for $C_{22}H_{16}BrN_3O$: C, 63.17; H, 3.86; N, 10.05. Found: C, 63.10; H, 3.80; N, 10.20.

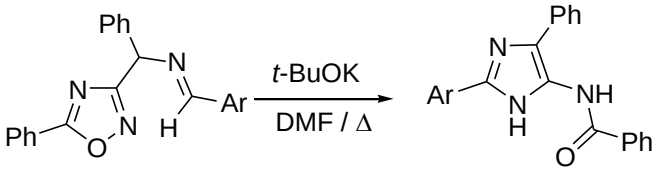
Synthesis of *N*-(4-dimethylaminobenzylidene)-phenyl-(5-phenyl-1,2,4-oxadiazol-3-yl)methanamine 4i.



4i

Compound **4i** was obtained accordingly to general procedure A by adding 4-dimethylaminobenzaldehyde **8i** (223 mg, 1.5 mmol). ***N*-(4-dimethylaminobenzylidene)-phenyl-(5-phenyl-1,2,4-oxadiazol-3-yl)methanamine 4i**: 317 mg, 83% yield; Mp 154–156°C (petroleum ether-ethyl acetate); ^{1}H NMR (300 MHz, $CDCl_3$) δ 3.03 (s, 6H), 5.87 (s, 1H), 6.70 (d, 2H, *J* = 9.0 Hz), 7.30-7.62 (m, 8H), 7.75 (d, 2H, *J* = 9.0 Hz), 8.13-8.16 (m, 2H), 8.40 (s, 1H); ^{13}C NMR (62.5 MHz, $CDCl_3$) δ 35.1, 64.4, 106.4, 118.9, 122.7, 122.8, 123.2, 123.5, 123.8, 125.2, 127.5, 134.7, 145.9, 158.7, 167.2, 170.8; FTIR (Nujol) 1632, 1607 cm^{-1}; GC–MS (m/z): 382 (M^+,100%). Anal. Calcd for $C_{24}H_{22}N_4O$: C, 75.37; H, 5.80; N, 14.65. Found: C, 75.50; H, 5.60; N, 14.80.

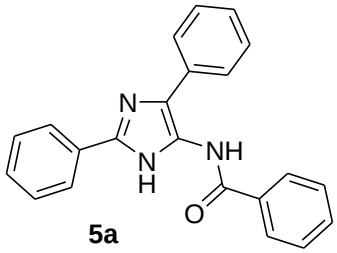
Synthesis of imidazoles 5 from thermal rearrangement of imines 4. General procedure B



4 **5**

To a solution of imine **4** (1 mmol) in DMF (5 ml) *t*-BuOK (123 mg, 1.1 mmol) was added and the solution refluxed for 1h. After cooling, the mixture was reduced to dryness under vacum and the residue treated with water. The resulting mixture was neutralized with HCl 0.1 M, extracted with EtOAc, which was dried and evaporated, and the residue was chromatographed giving 2-aryl-4(5)-phenyl-5(4)-*N*-benzoylamino-imidazoles **5a-i**.

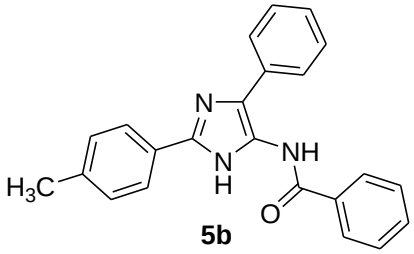
Synthesis of 2,4(5)-diphenyl-5(4)-*N*-benzoylamino-imidazole 5a.



5a

Compound **5a** was obtained accordingly to general procedure B from compound **4a** (339 mg, 1 mmol). Chromatography of the residue gave **5a** (302 mg, 89% yield). **2,4(5)-diphenyl-5(4)-*N*-benzoylamino-imidazole 5a**: Mp 232–234°C (petroleum ether-ethyl acetate); ^{1}H NMR (300 MHz, DMSO-d_6) δ 7.22-7.88 (m, 11H), 8.00-8.08 (m, 4H), 10.21 (10.45) (two s, 1H, exch. with D_2O, tautomeric ratio = 3.0), 12.63 (12.87) (two s, 1H, exch. with D_2O, tautomeric ratio = 3.0); ^{13}C NMR (62.5 MHz, DMSO-d_6) δ 125.2 (124.9), 125.4 (122.9), 125.9 (125.6), 127.0 (126.4), 127.8, 128.5, 128.6, 128.7, 128.9, 129.9, 130.4, 131.8 (132.3), 132.9 (133.5), 134.3 (133.4), 143.3 (142.9), 166.7 (166.9); FTIR (Nujol) 3314, 3240, 1713, 1678, 1658 cm^{-1}; GC–MS (m/z): 339 (M^+,100%). Anal. Calcd for $C_{22}H_{17}N_3O$: C, 77.86; H, 5.05; N, 12.38. Found: C, 77.80; H, 5.00; N, 12.40.

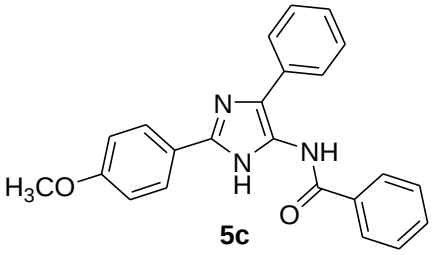
Synthesis of 2-(4-methylphenyl)-4(5)-phenyl-5(4)-*N*-benzoylamino-imidazole 5b.



5b

Compound **5b** was obtained accordingly to general procedure B from compound **4b** (353 mg, 1 mmol). Chromatography of the residue gave **5b** (304 mg, 86% yield). **2-(4-methylphenyl)-4(5)-phenyl-5(4)-*N*-benzoylamino-imidazole 5b**: Mp 275°C dec. (ethyl acetate); ^{1}H NMR (300 MHz, DMSO-d_6) δ 2.29 (2.35) (two s, 3H), 7.20-7.78 (m, 10H), 8.02-8.09 (m, 4H), 10.19 (10.43) (two s, 1H, exch. with D_2O, tautomeric ratio = 3.4), 12.58 (12.84) (two s, 1H, exch. with D_2O, tautomeric ratio = 3.4); ^{13}C NMR (62.5 MHz, DMSO-d_6) δ 20.9, 125.2, 125.5, 125.9, 127.2, 127.8, 128.3, 128.6, 128.9, 129.3, 130.5, 131.7, 132.5, 134.4, 136.4, 143.1, 166.7; FTIR (Nujol) 3300, 3140, 1652.9 cm^{-1}; GC–MS (m/z): 353 (M^+,100%). Anal. Calcd for $C_{23}H_{19}N_3O$: C, 78.16; H, 5.46; N, 11.89. Found: C, 78.10; H, 5.40; N, 11.80.

Synthesis of 2-(4-methoxyphenyl)-4(5)-phenyl-5(4)-*N*-benzoylamino-imidazole 5c.

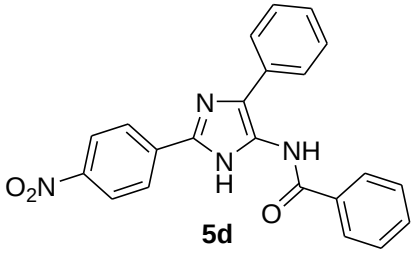


5c

Compound **5c** was obtained accordingly to general procedure B from compound **4c** (369 mg, 1 mmol). Chromatography of the residue gave **5c** (232 mg, 63% yield). **2-(4-methoxyphenyl)-4(5)-phenyl-5(4)-*N*-benzoylamino-imidazole 5c**: Mp 252–254°C (ethyl acetate); ^{1}H NMR (300 MHz, DMSO-d_6) δ 3.76 (3.82) (two s, 3H), 6.98-7.01 (m, 2H), 7.67-7.66 (m, 8H), 8.06-8.11 (m, 4H), 10.15 (10.40) (two s, 1H, exch. with D_2O, tautomeric ratio = 3.21), 12.53 (12.79) (two s, 1H, exch. with D_2O, tautomeric ratio = 3.21); ^{13}C NMR (62.5 MHz, DMSO-d_6) δ 55.3, 114.2, 122.5, 125.1,

125.5, 126.9, 127.4, 127.8, 128.3, 128.6, 128.9, 130.6, 131.8, 134.3, 142.7, 158.5, 166.9; FTIR (Nujol) 3400, 3200, 1657.7 cm^{-1}; GC–MS (m/z): 369 (M^+,100%). Anal. Calcd for $C_{23}H_{19}N_3O_2$: C, 74.78; H, 5.18; N, 11.37. Found: C, 74.70; H, 5.20; N, 11.40.

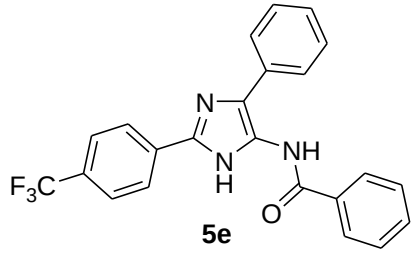
Synthesis of 2-(4-nitrophenyl)-4(5)-phenyl-5(4)-*N*-benzoylamino-imidazole 5d.



5d

Compound **5d** was obtained accordingly to general procedure B from compound **4d** (384 mg, 1 mmol). Chromatography of the residue gave **5d** (307 mg, 80% yield). **2-(4-nitrophenyl)-4(5)-phenyl-5(4)-*N*-benzoylamino-imidazole 5d**: Mp 300°C dec. (petroleum ether-ethyl acetate); ^1H NMR (300 MHz, DMSO-d_6) δ 7.39-7.66 (m, 6H), 8.09-8.20 (m, 6H), 8.26-8.36 (m, 2H), 10.57 (bs, 1H, exch. with D_2O), 13.09 (bs, 1H, exch. with D_2O); ^{13}C NMR (62.5 MHz, DMSO-d_6) δ 124.1, 124.4, 125.5, 126.0, 128.0, 128.7, 128.9 (overlapped signals), 130.0 (overlapped signals), 132.2, 133.8 (overlapped signals), 144.6, 145.3, 166.7; FTIR (Nujol) 3300, 3150, 1662 cm^{-1}; GC–MS (m/z): 384 (M^+,100%). Anal. Calcd for $C_{22}H_{16}N_4O_3$: C, 68.74; H, 4.20; N, 14.58. Found: C, 68.70; H, 4.20; N, 14.60.

Synthesis of 2-(4-trifluoromethylphenyl)-4(5)-phenyl-5(4)-*N*-benzoylamino-imidazole 5e.

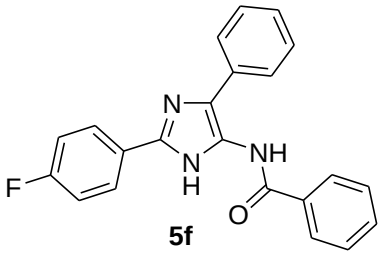


5e

Compound **5e** was obtained accordingly to general procedure B from compound **4e** (407 mg, 1 mmol). Chromatography of the residue gave **5e** (326 mg, 80% yield). **2-(4-trifluoromethylphenyl)-4(5)-phenyl-5(4)-*N*-benzoylamino-imidazole 5e**: Mp 255-259°C (ethyl acetate); ^1H NMR (300

MHz, DMSO-d_6) δ 7.41-7.76 (m, 8H), 7.92-8.09 (m, 6H), 10.19 (bs, 1H, exch. with D_2O), 12.67 (bs, 1H, exch. with D_2O); ^{13}C NMR (62.5 MHz, DMSO-d_6) δ 124.4 (q, J = 269 Hz), 123.7, 125.1 (124.6), 125.6 (125.8), 126.1, 127.8, 128.6, 128.8-128.9 (overlapped signals), 130.1 (130.3), 131.9 (132.4), 134.1 (133.4), 134.5 (134.0), 138.4, 144.3 (143.5), 166.5 (166.9); FTIR (Nujol) 3290, 3195, 1656, 1618 cm^{-1}; GC–MS (m/z): 407 (M^+,100%). Anal. Calcd for $C_{23}H_{16}F_3N_3O$: C, 67.81; H, 3.96; N, 10.31. Found: C, 67.80; H, 4.00; N, 10.20.

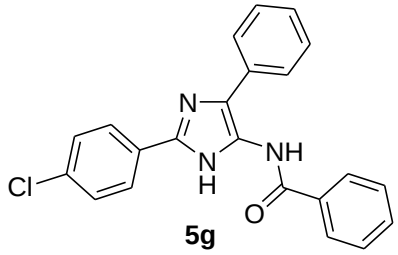
Synthesis of 2-(4-fluorophenyl)-4(5)-phenyl-5(4)-*N*-benzoylamino-imidazole 5f.



5f

Compound **5f** was obtained accordingly to general procedure B from compound **4f** (357 mg, 1 mmol). Chromatography of the residue gave **5f** (271 mg, 76% yield). **2-(4-fluorophenyl)-4(5)-phenyl-5(4)-*N*-benzoylamino-imidazole 5f**: Mp 255-259°C (ethyl acetate); ^1H NMR (300 MHz, DMSO-d_6) δ 7.20-7.91 (m, 10H), 8.01-8.10 (m, 4H), 10.23 (10.46) (two s, 1H, exch. with D_2O, tautomeric ratio = 2.5), 12.63 (12.88) (two s, 1H, exch. with D_2O, tautomeric ratio = 2.5); ^{13}C NMR (62.5 MHz, DMSO-d_6) δ 115.7 (115.3) (d, J = 21 Hz), 124.5, 125.2 (124.9), 126.6, 127.8, 128.0 (127.5) (d, J = 8 Hz), 128.6 (128.5), 128.9 (overlapped signals), 130.4, 131.8 (132.3), 132.7, 134.2, 143.3, 161.3 (d, J = 243 Hz), 166.7; FTIR (Nujol) 3200, 1658 cm^{-1}; GC–MS (m/z): 357 (M^+,100%). Anal. Calcd for $C_{22}H_{16}FN_3O$: C, 73.94; H, 4.51; N, 11.76. Found: C, 74.00; H, 4.40; N, 11.90.

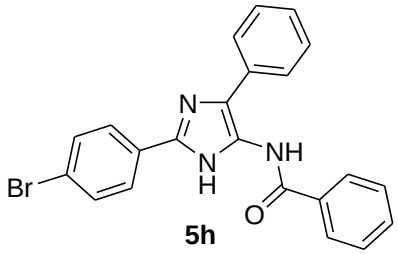
Synthesis of 2-(4-chlorophenyl)-4(5)-phenyl-5(4)-*N*-benzoylamino-imidazole 5g.



5g

Compound **5g** was obtained accordingly to general procedure B from compound **4g** (373 mg, 1 mmol). Chromatography of the residue gave **5g** (265 mg, 71% yield). **2-(4-chlorophenyl)-4(5)-phenyl-5(4)-*N*-benzoylamino-imidazole 5g**: Mp 270-272°C (ethyl acetate); ^{1}H NMR (300 MHz, DMSO-d_6) δ 7.36-7.90 (m, 10H), 8.02-8.09 (m, 4H), 10.29 (10.50) (two s, 1H, exch. with D_2O, tautomeric ratio = 2.1), 12.70 (12.97) (two s, 1H, exch. with D_2O, tautomeric ratio = 2.1); ^{13}C NMR (62.5 MHz, DMSO-d_6) δ 124.2, 125.3 (125.0), 127.5 (127.3), 127.9, 128.6 (overlapped signals), 128.9 (overlapped signals), 130.3 (130.9), 131.5, 131.8 (132.3), 133.4 (overlapped signals), 134.2, 143.7, 166.7 (166.9); FTIR (Nujol) 3300, 3150, 1656 cm^{-1}; GC–MS (m/z): 375 [$(M+2)^+$, 31%], 373 (M^+,100%). Anal. Calcd for $C_{22}H_{16}ClN_3O$: C, 70.68; H, 4.31; N, 11.24. Found: C, 70.70; H, 4.30; N, 11.20.

Synthesis of 2-(4-bromophenyl)-4(5)-phenyl-5(4)-*N*-benzoylamino-imidazole 5h.

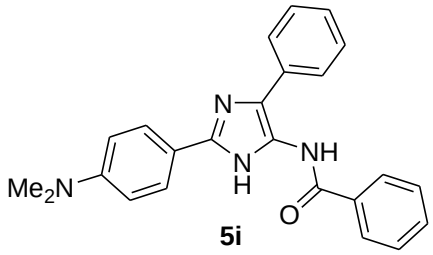


5h

Compound **5h** was obtained accordingly to general procedure B from compound **4h** (417 mg, 1 mmol). Chromatography of the residue gave **5h** (296 mg, 71% yield). **2-(4-bromophenyl)-4(5)-phenyl-5(4)-*N*-benzoylamino-imidazole 5h**: Mp 251-253°C (ethyl acetate); ^{1}H NMR (300 MHz, DMSO-d_6) δ 7.37-7.96 (m, 10 H), 8.04-8.16 (m, 4H), 10.31 (10.51) (two s, 1H, exch. with D_2O, tautomeric ratio = 3.0), 12.71 (12.98) (two s, 1H, exch. with D_2O, tautomeric ratio = 3.0); ^{13}C

NMR (62.5 MHz, DMSO-d_6) δ 120.0, 124.2, 125.3 (125.0), 127.9 (overlapped signals), 128.7 (overlapped signals), 128.9 (overlapped signals), 130.3, 131.6 (131.8), 132.3, 133.4, 134.2, 143.7, 166.7 (166.9); FTIR (Nujol) 3300, 3180, 1647 cm^{-1}; GC–MS (m/z): 419 [$(M+2)^+$, 98%], 417 (M^+,100%). Anal. Calcd for $C_{22}H_{16}BrN_3O$: C, 63.17; H, 3.86; N, 10.05. Found: C, 63.10; H, 3.80; N, 10.20.

Synthesis of 2-(4-*N*,*N*-dimethylaminophenyl)-4(5)-phenyl-5(4)-*N*-benzoylamino-imidazole 5i.



5i

Compound **5i** was obtained accordingly to general procedure B from compound **4i** (382 mg, 1 mmol). Chromatography of the residue gave **5i** (199 mg, 52% yield). **2-(4-*N*,*N*-dimethylaminophenyl)-4(5)-phenyl-5(4)-*N*-benzoylamino-imidazole 5i**: Mp 244-246°C (ethyl acetate); ^{1}H NMR (300 MHz, $CDCl_3$) δ 2.89 (s, 6H), 6.75 (d, 2H, *J* = 8.7 Hz), 7.32–7.60 (m, 8H), 8.01-8.06 (m, 4H), 10.09 (10.34) (two s, 1H, exch. with D_2O, tautomeric ratio = 6.7), 12.40 (12.69) (two s, 1H, exch. with D_2O, tautomeric ratio = 6.7); ^{13}C NMR (62.5 MHz, DMSO-d_6) δ 40.1, 112.3, 117.8, 124.9 (124.8), 126.3, 126.9 (126.5), 127.8 (127.6), 128.0, 128.6 (128.3), 128.8, 130.7, 131.0, 131.7 (131.4), 134.5, 142.1, 149.5 (149.2), 166.7; FTIR (Nujol) 3273, 3181, 1646 cm^{-1}; GC–MS (m/z): 382 (M^+,100%). Anal. Calcd for $C_{24}H_{22}N_4O$: C, 75.37; H, 5.80; N, 14.65. Found: C, 75.40; H, 5.80; N, 14.70.

NMR Spectra

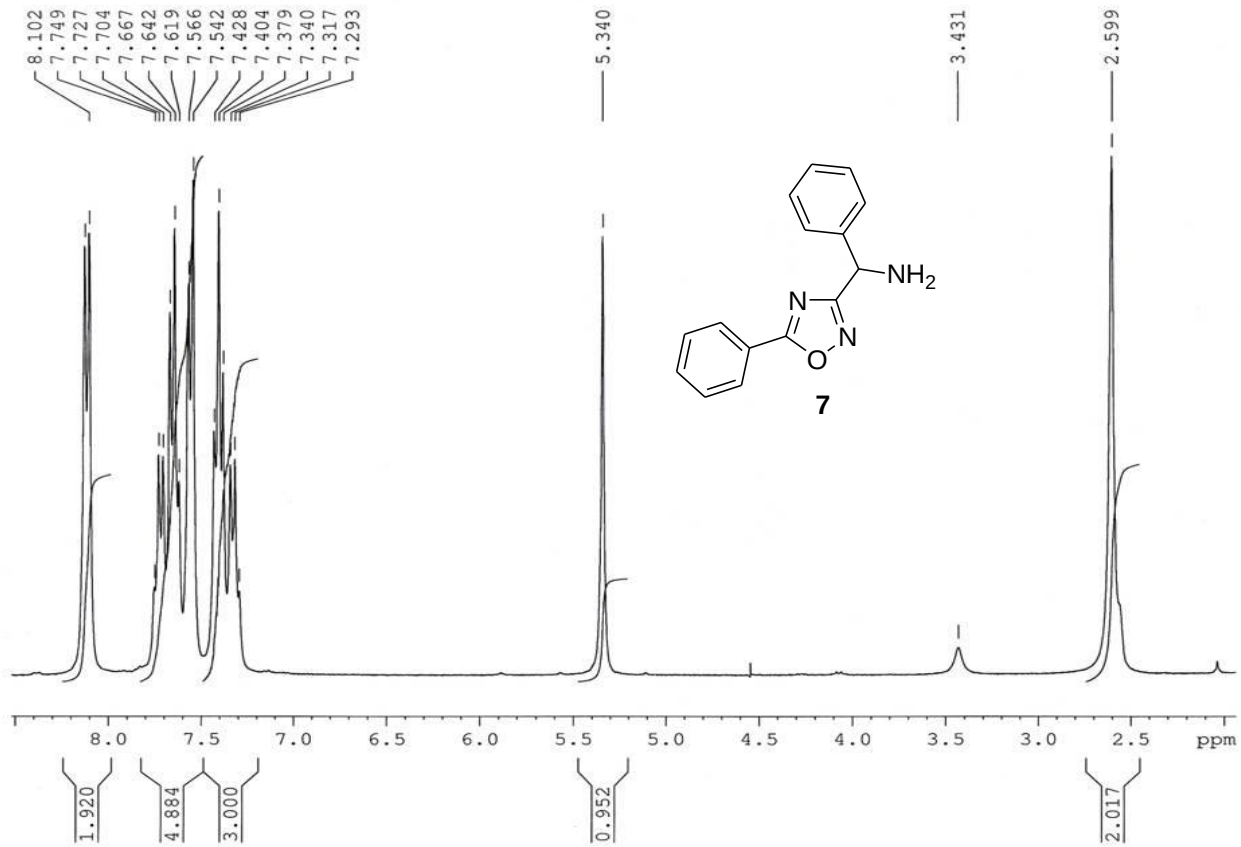


Figure S1 ^{1}H NMR (300 MHz, DMSO-d_6) spectrum of compound **7**.

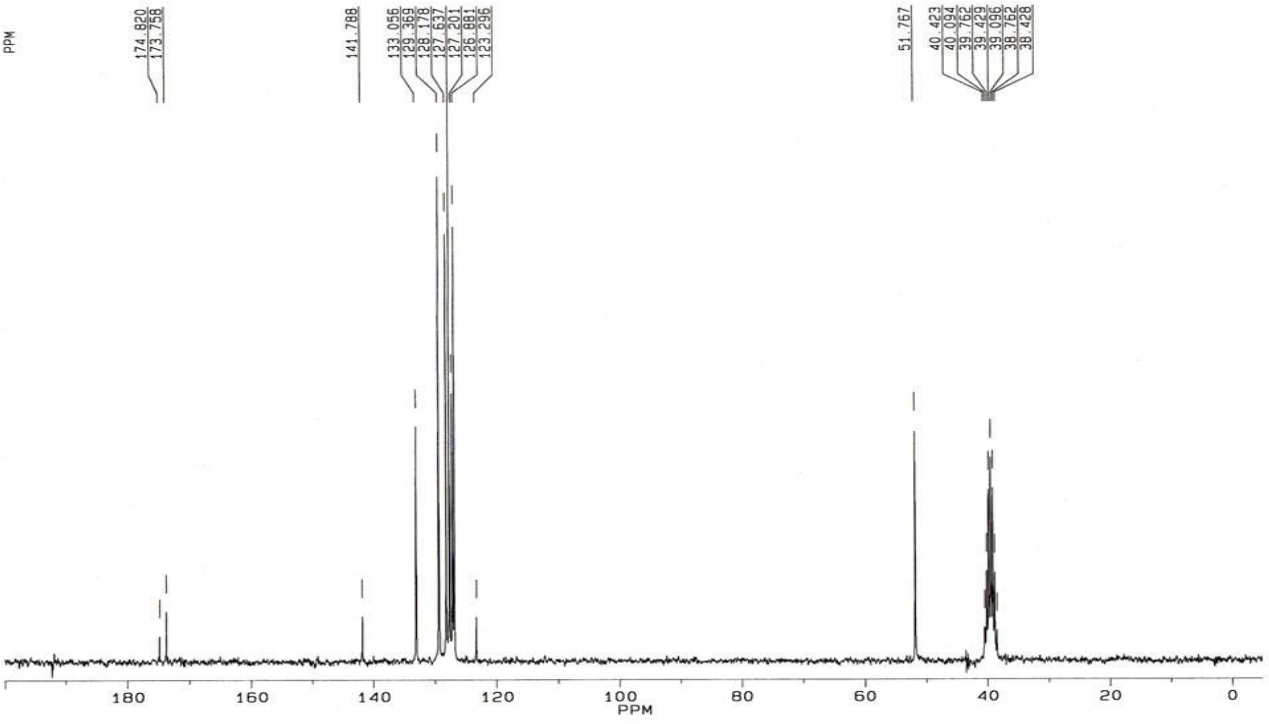


Figure S2 ^{13}C NMR (62.5 MHz, DMSO-d_6) spectrum of compound **7**.

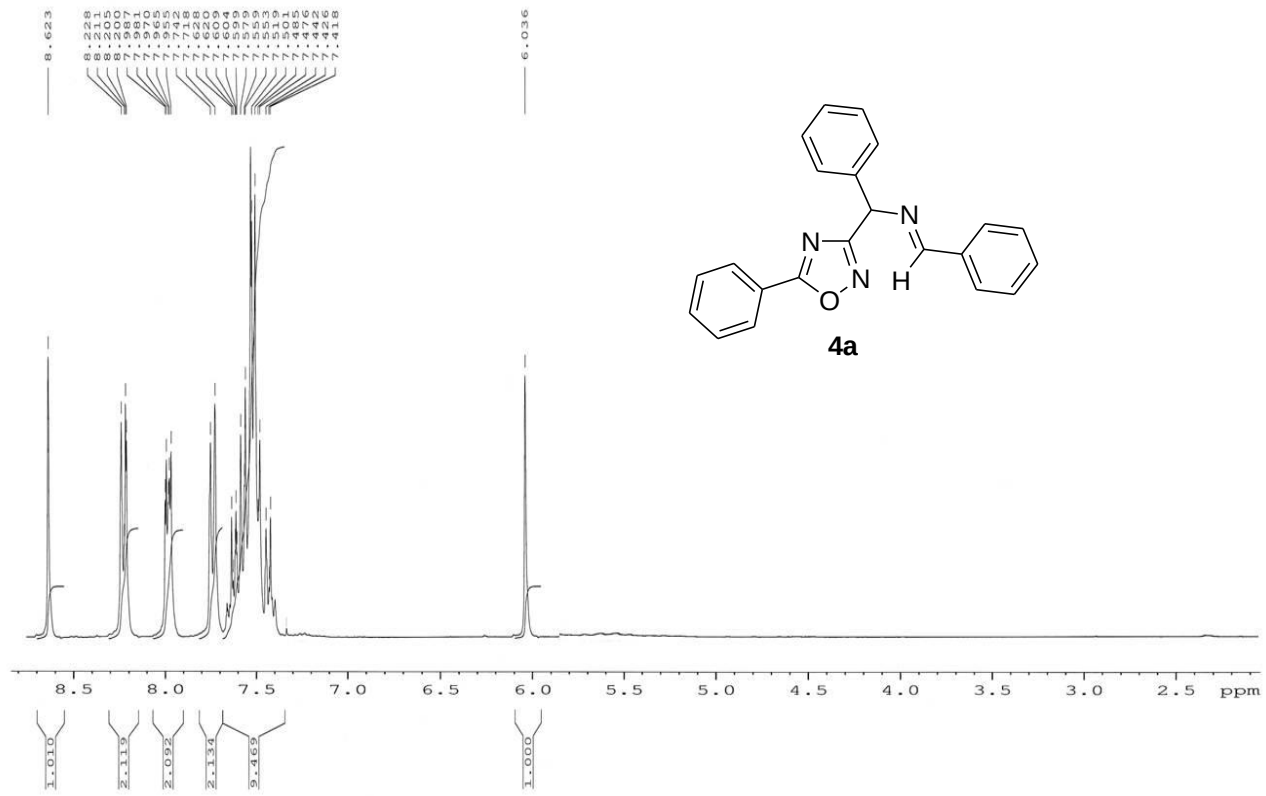


Figure S3 ^{1}H NMR (300 MHz, $CDCl_3$) spectrum of compound **4a**.

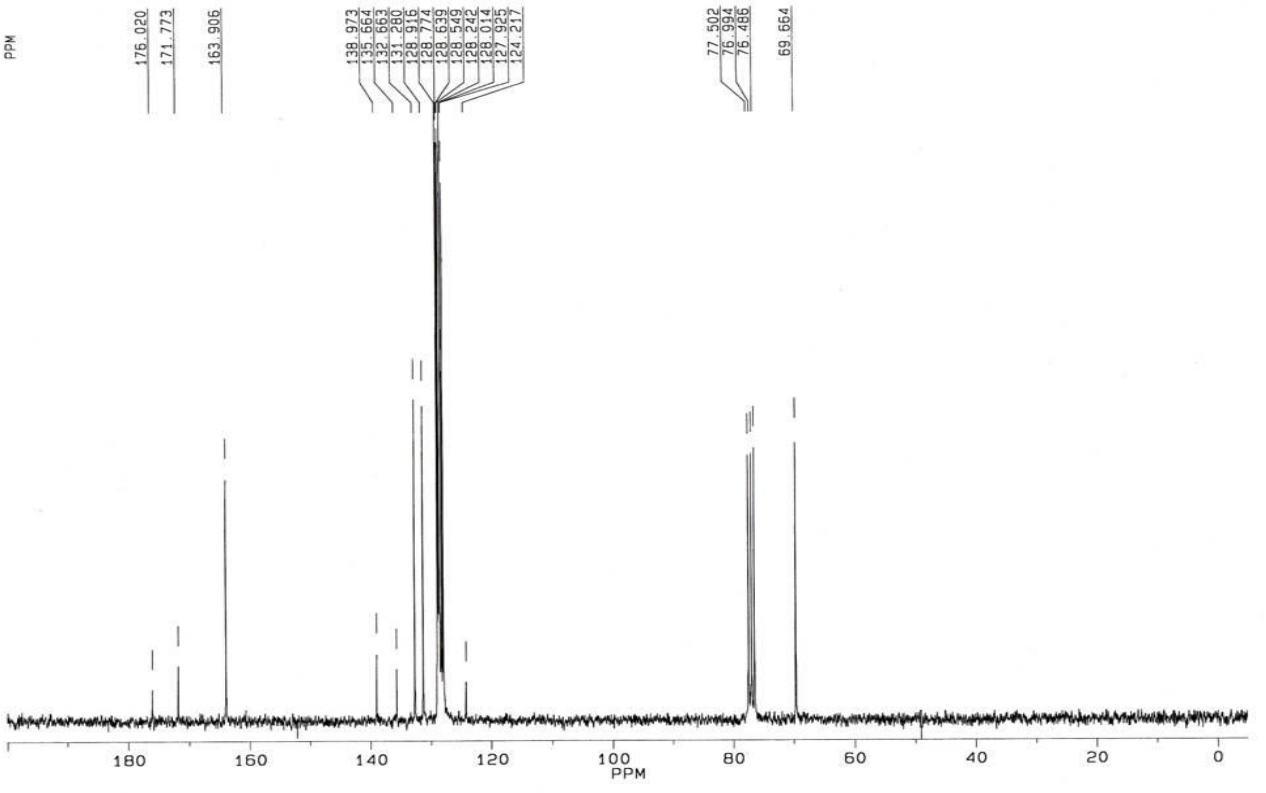


Figure S4 ^{13}C NMR (62.5 MHz, $CDCl_3$) spectrum of compound **4a**.

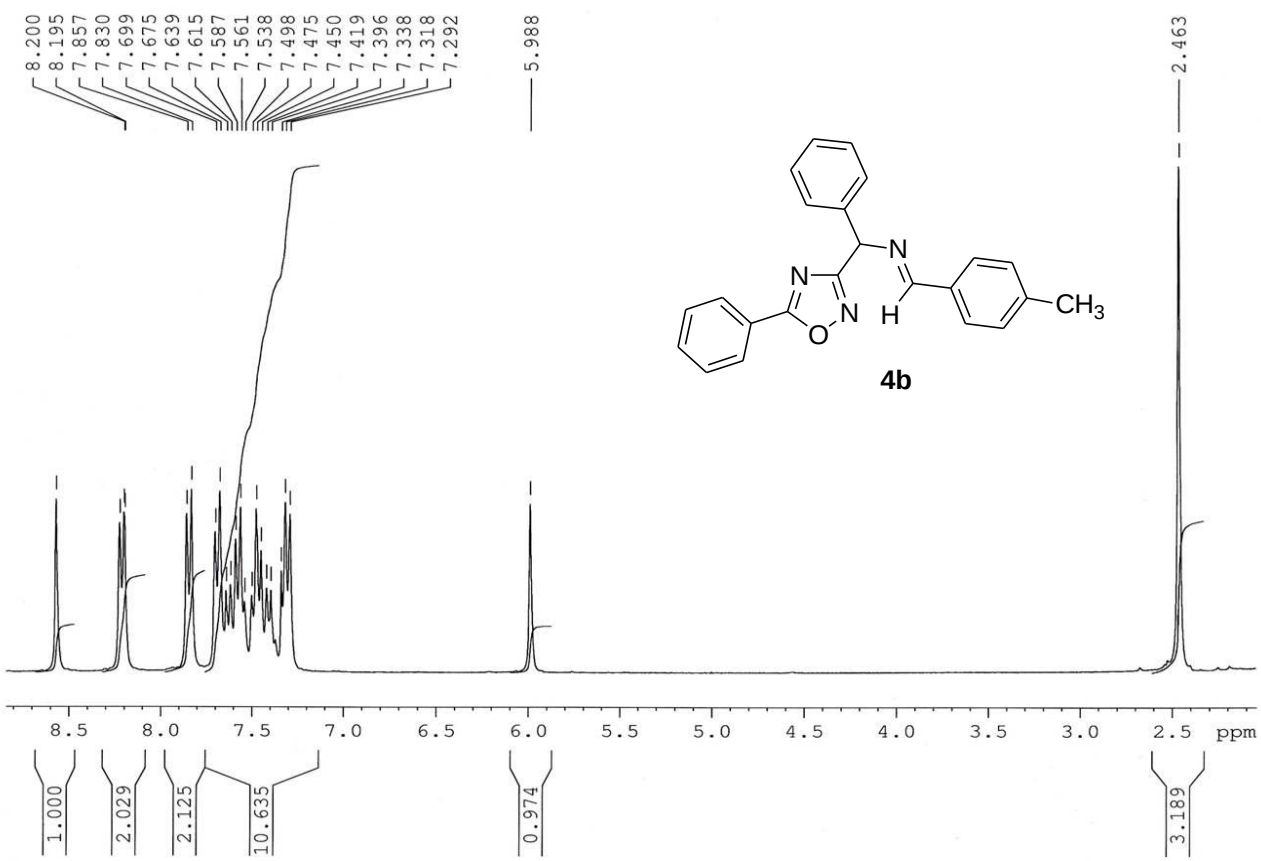


Figure S5 ^{1}H NMR (300 MHz, $CDCl_3$) spectrum of compound **4b**.

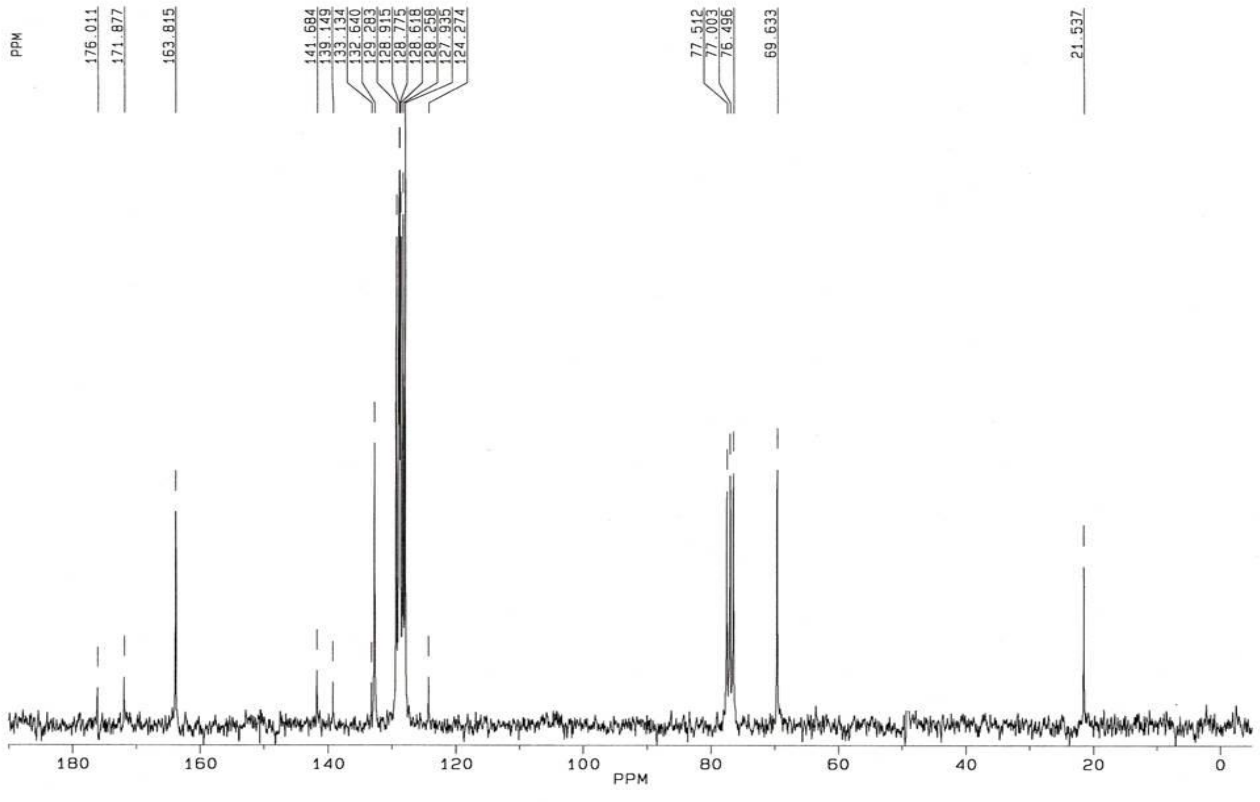


Figure S6 ^{13}C NMR (62.5 MHz, $CDCl_3$) spectrum of compound **4b**.

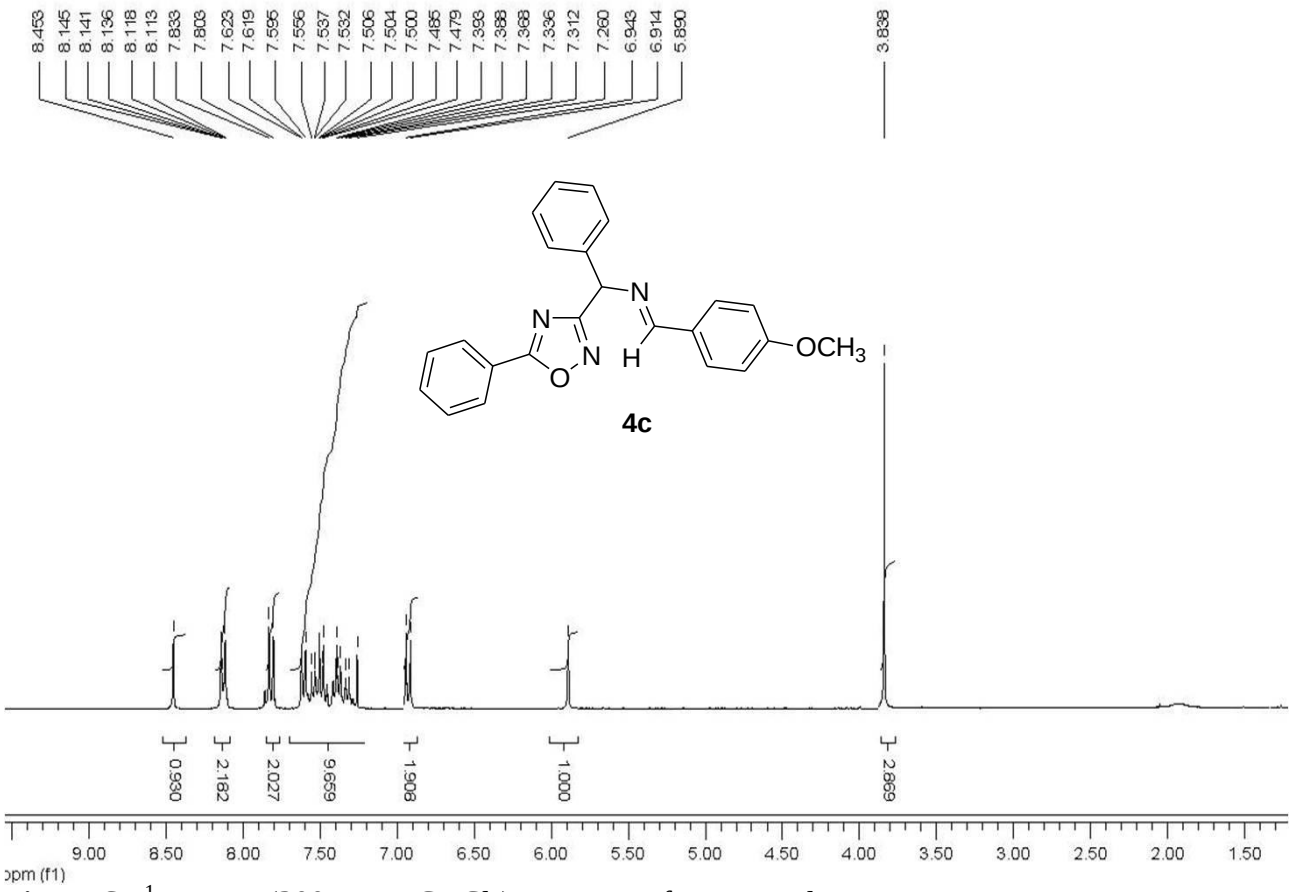


Figure S7 ^{1}H NMR (300 MHz, $CDCl_3$) spectrum of compound **4c**.

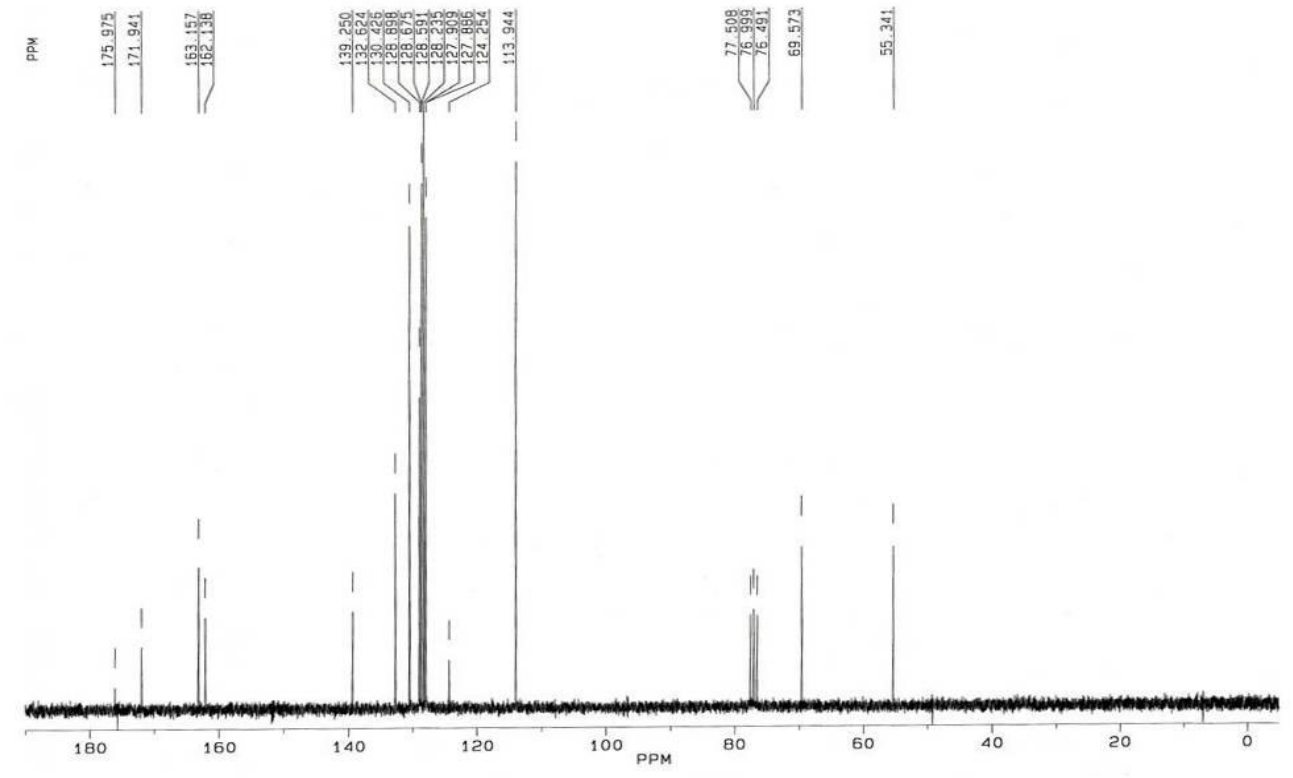


Figure S8 ^{13}C NMR (62.5 MHz, $CDCl_3$) spectrum of compound **4c**.

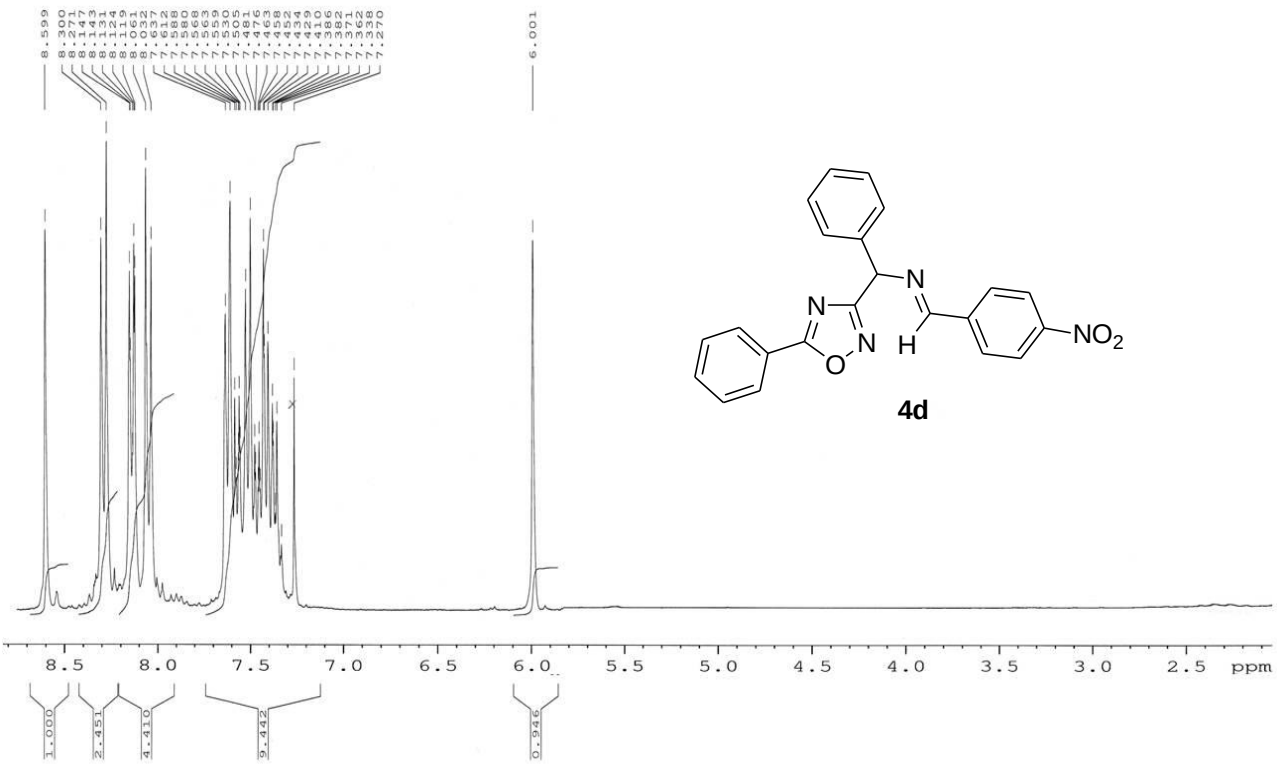


Figure S9 ^{1}H NMR (300 MHz, $CDCl_3$) spectrum of compound **4d**.

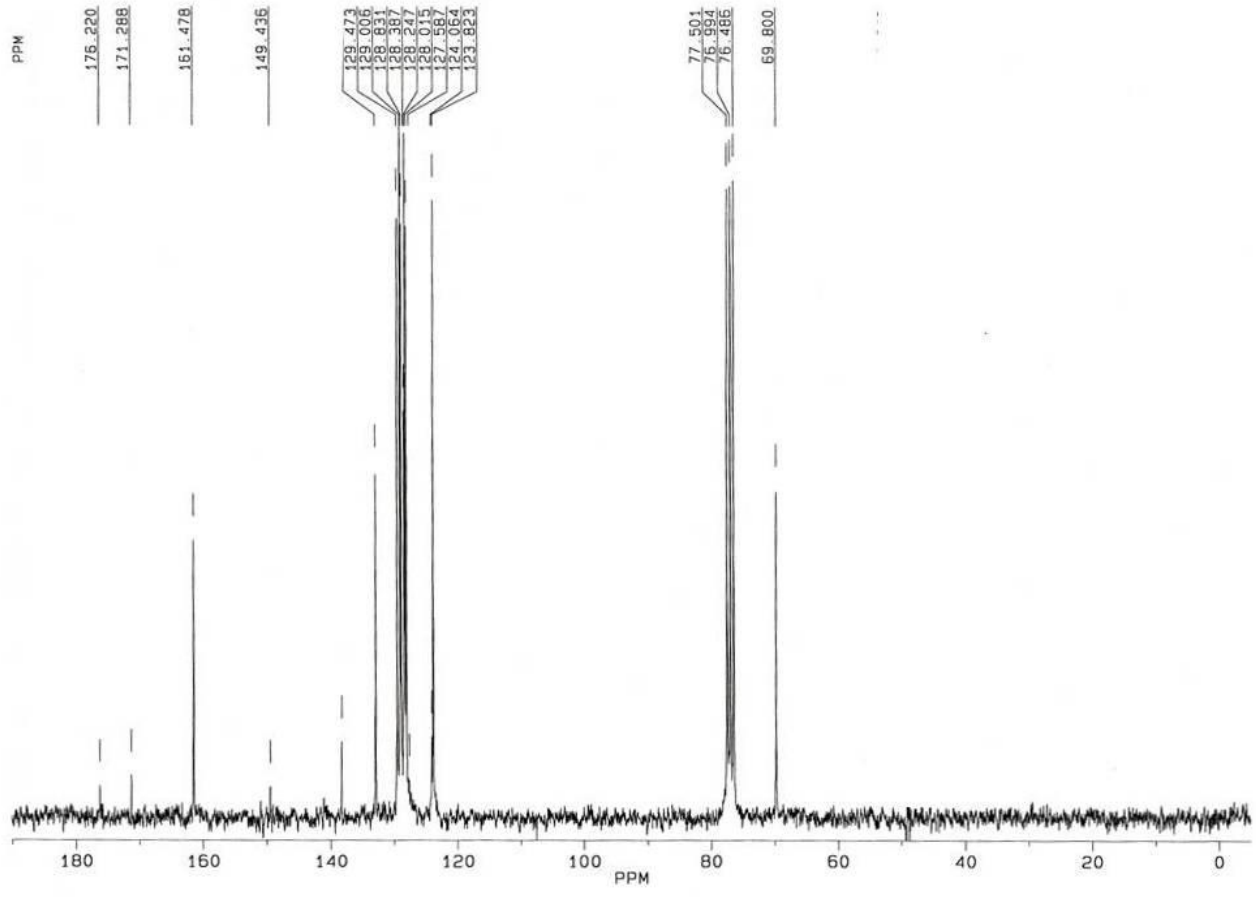


Figure S10 ^{13}C NMR (62.5 MHz, $CDCl_3$) spectrum of compound **4d**.

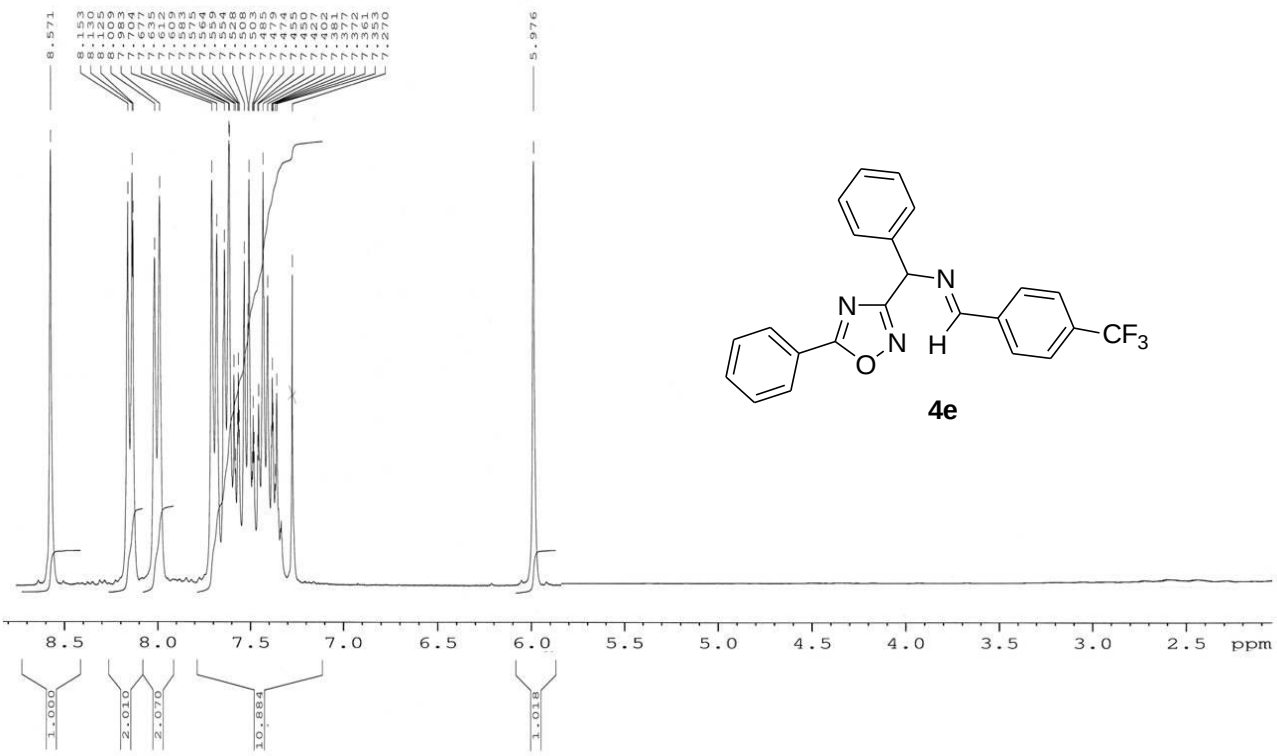


Figure S11 ^{1}H NMR (300 MHz, $CDCl_3$) spectrum of compound **4e**.

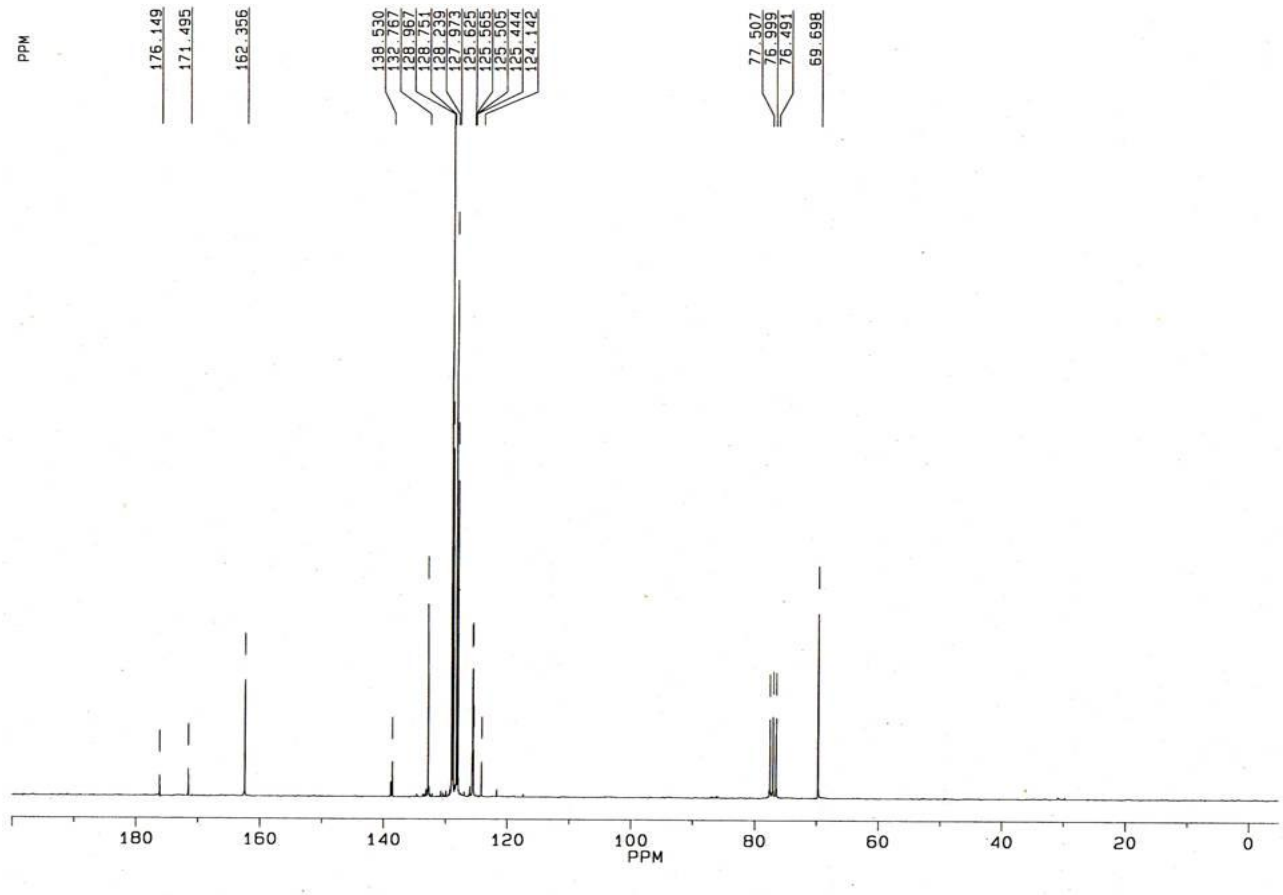


Figure S12 ^{13}C NMR (62.5 MHz, CDCl3) spectrum of compound **4e**.

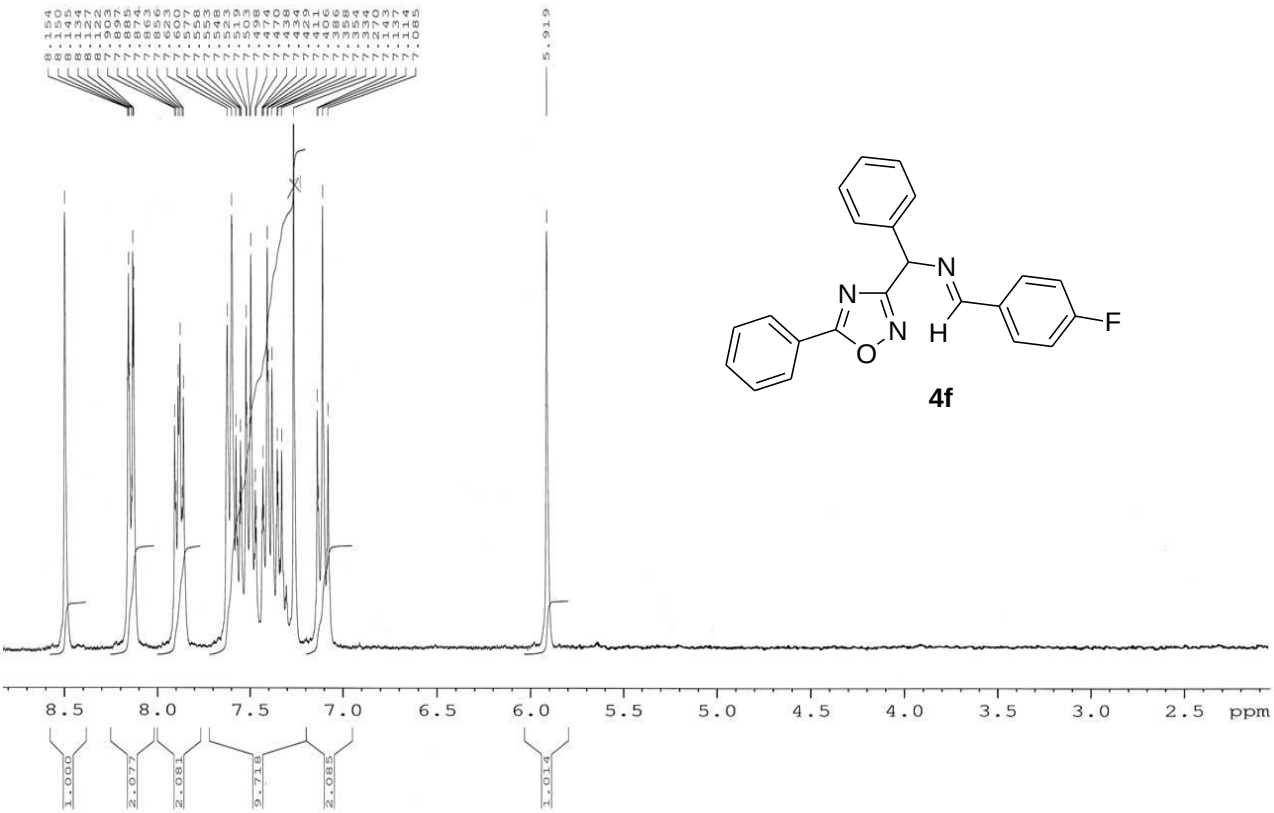


Figure S13 ^{1}H NMR (300 MHz, $CDCl_3$) spectrum of compound **4f**.

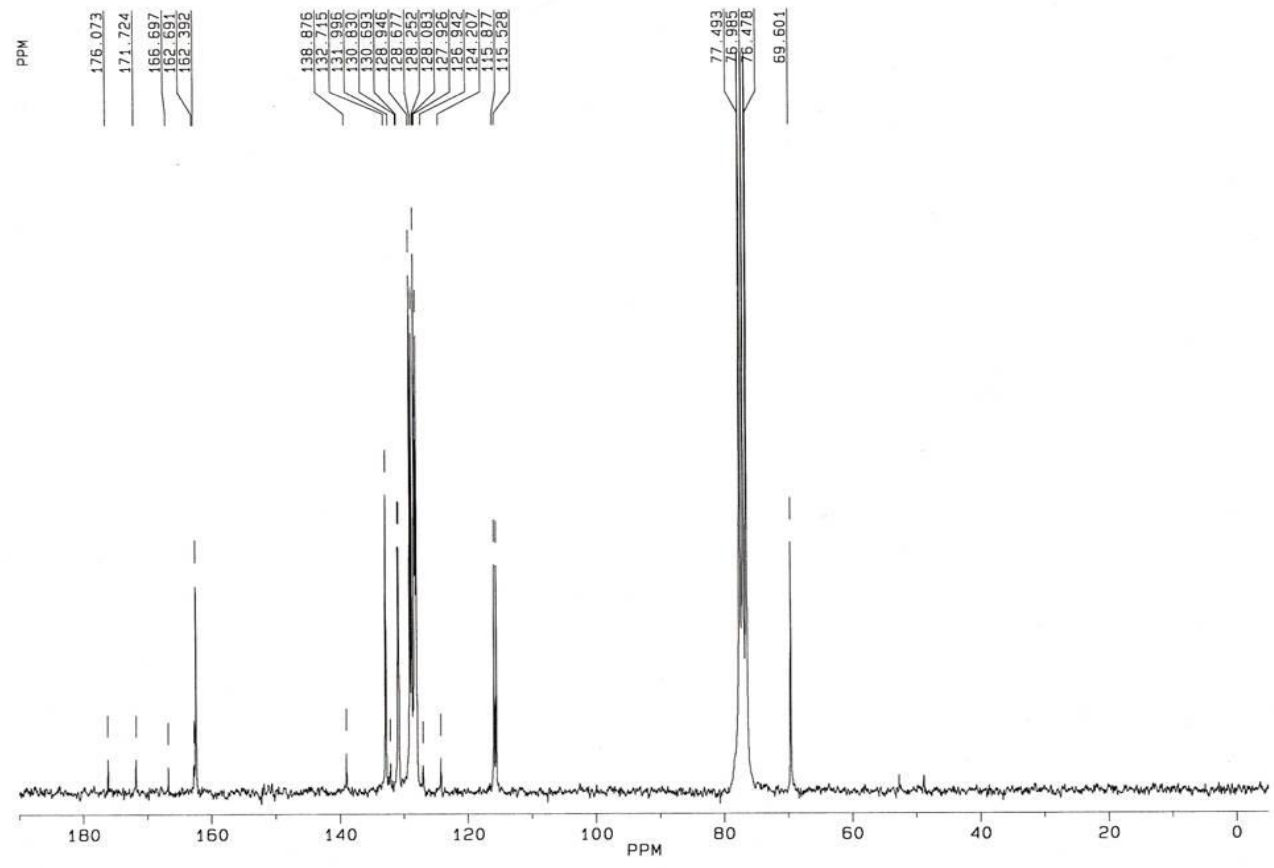


Figure S14 ^{13}C NMR (62.5 MHz, $CDCl_3$) spectrum of compound **4f**.

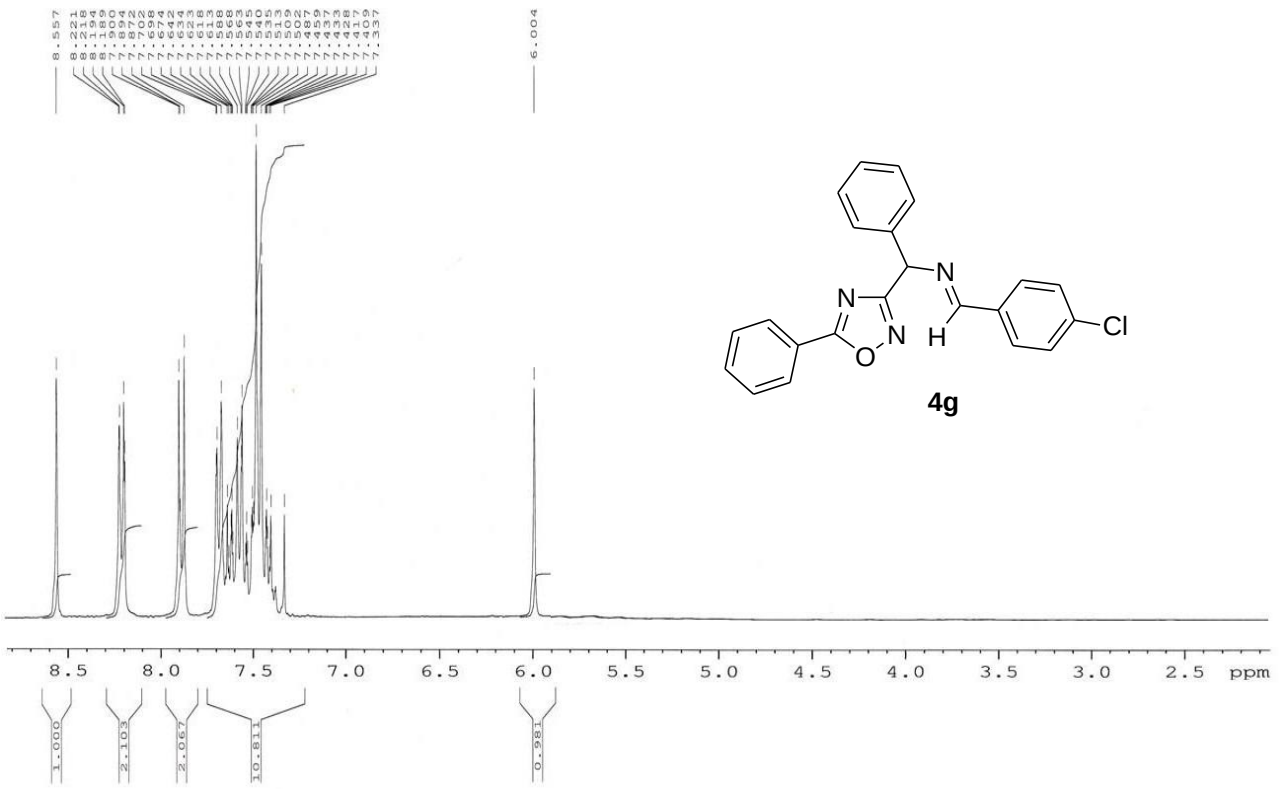


Figure S15 ^{1}H NMR (300 MHz, $CDCl_3$) spectrum of compound **4g**.

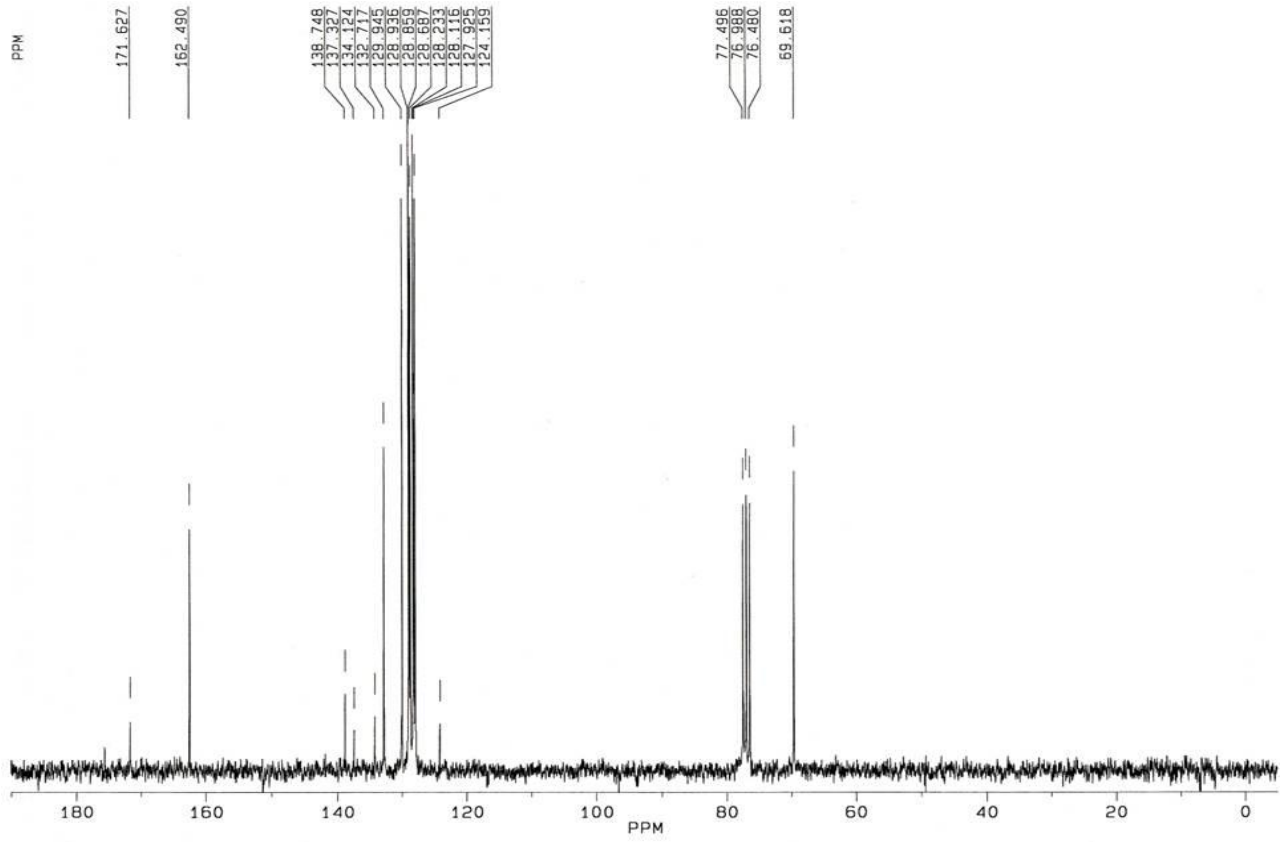


Figure S16 ^{13}C NMR (62.5 MHz, $CDCl_3$) spectrum of compound **4g**.

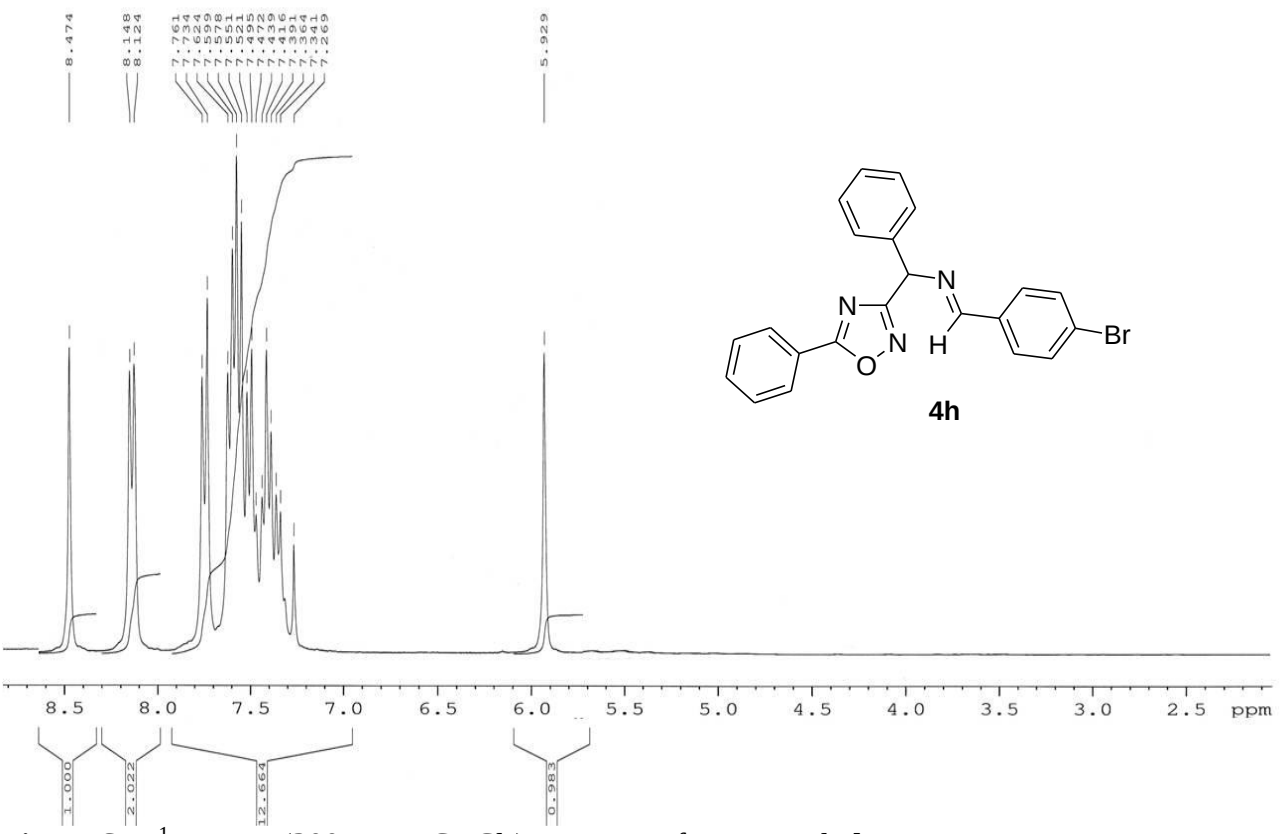


Figure S17 ^{1}H NMR (300 MHz, $CDCl_3$) spectrum of compound **4h**.

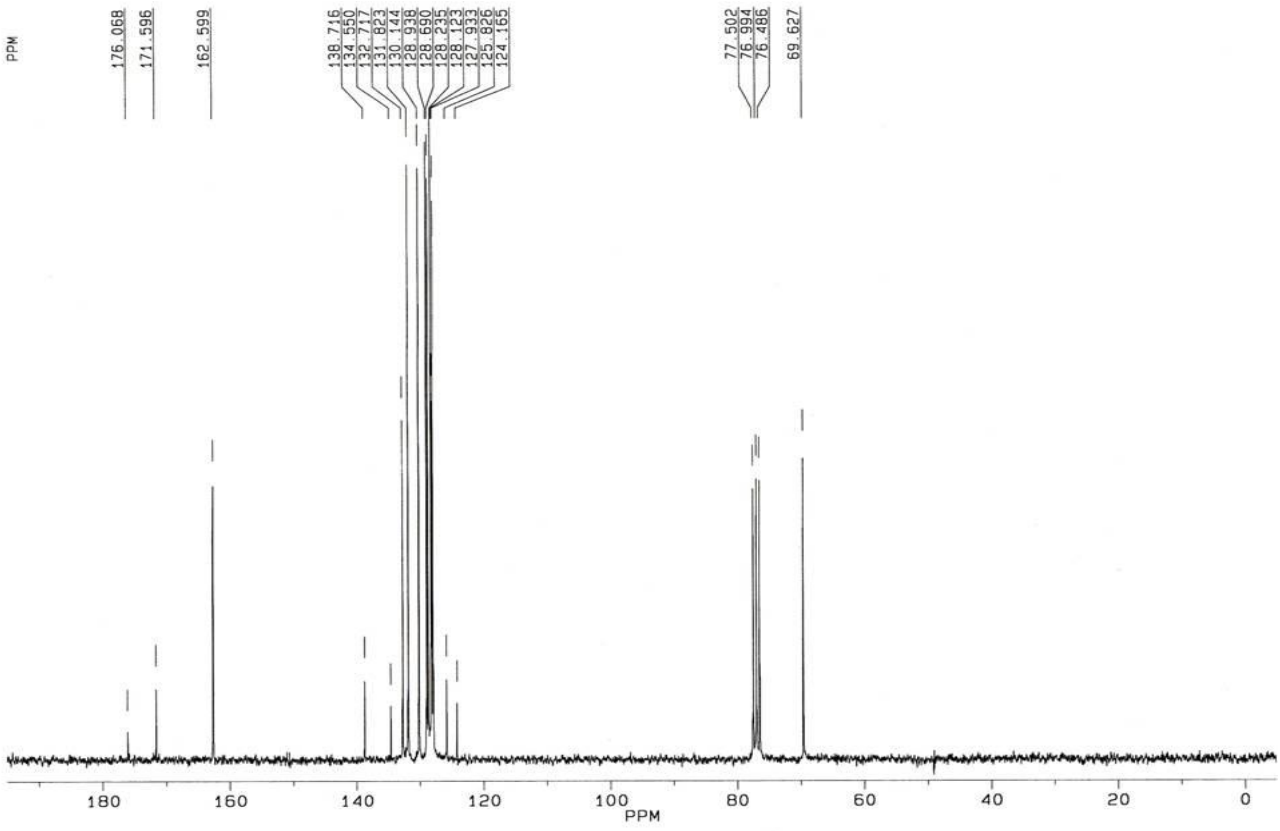


Figure S18 ^{13}C NMR (62.5 MHz, $CDCl_3$) spectrum of compound **4h**.

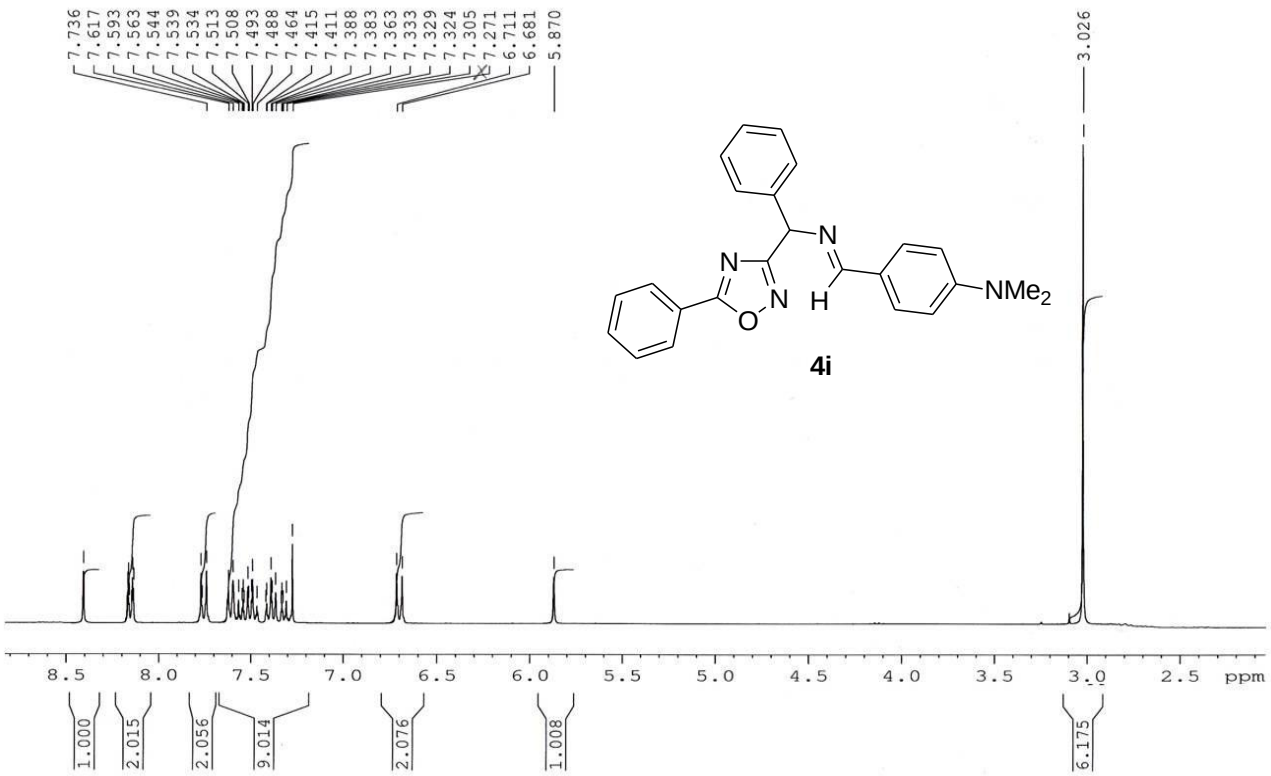


Figure S19 ^{1}H NMR (300 MHz, $CDCl_3$) spectrum of compound **4i**.

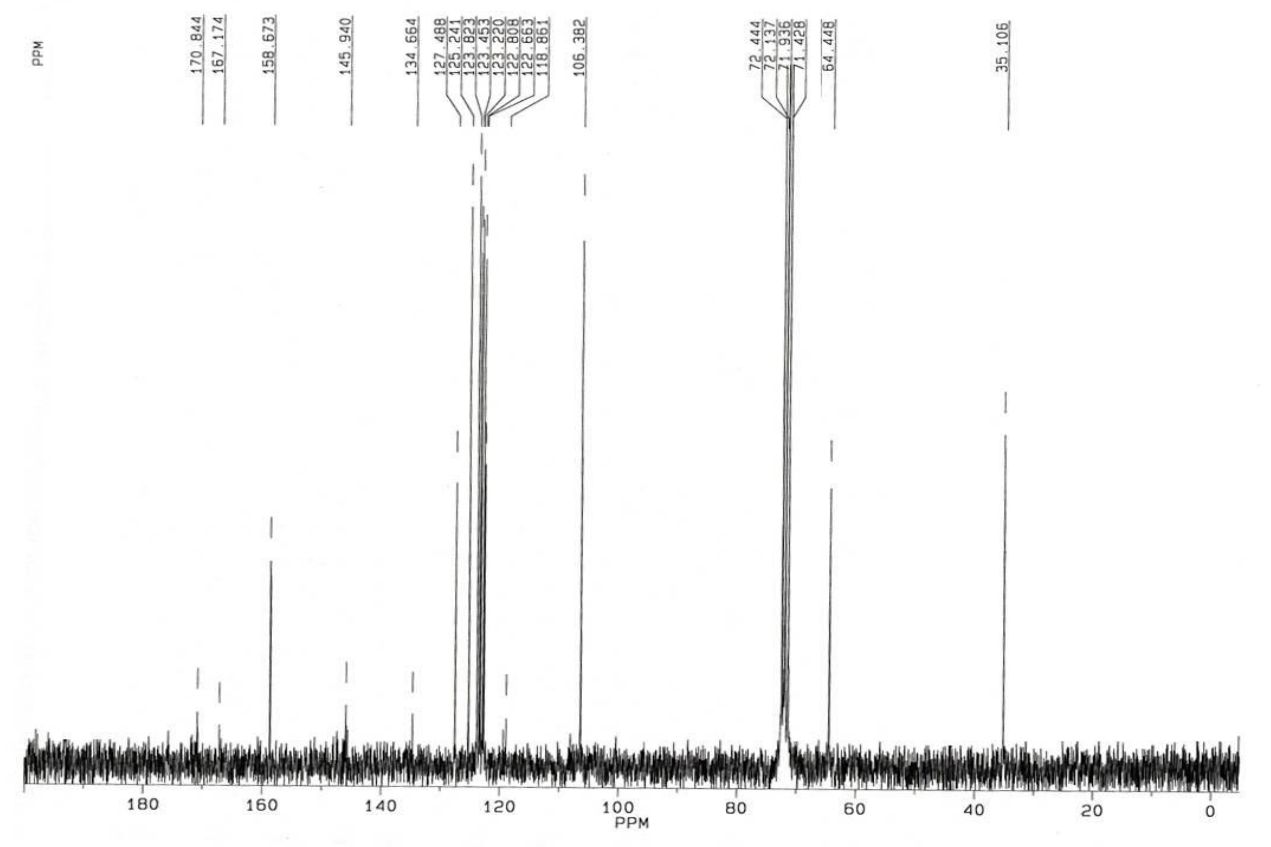


Figure S20 ^{13}C NMR (62.5 MHz, $CDCl_3$) spectrum of compound **4i**.

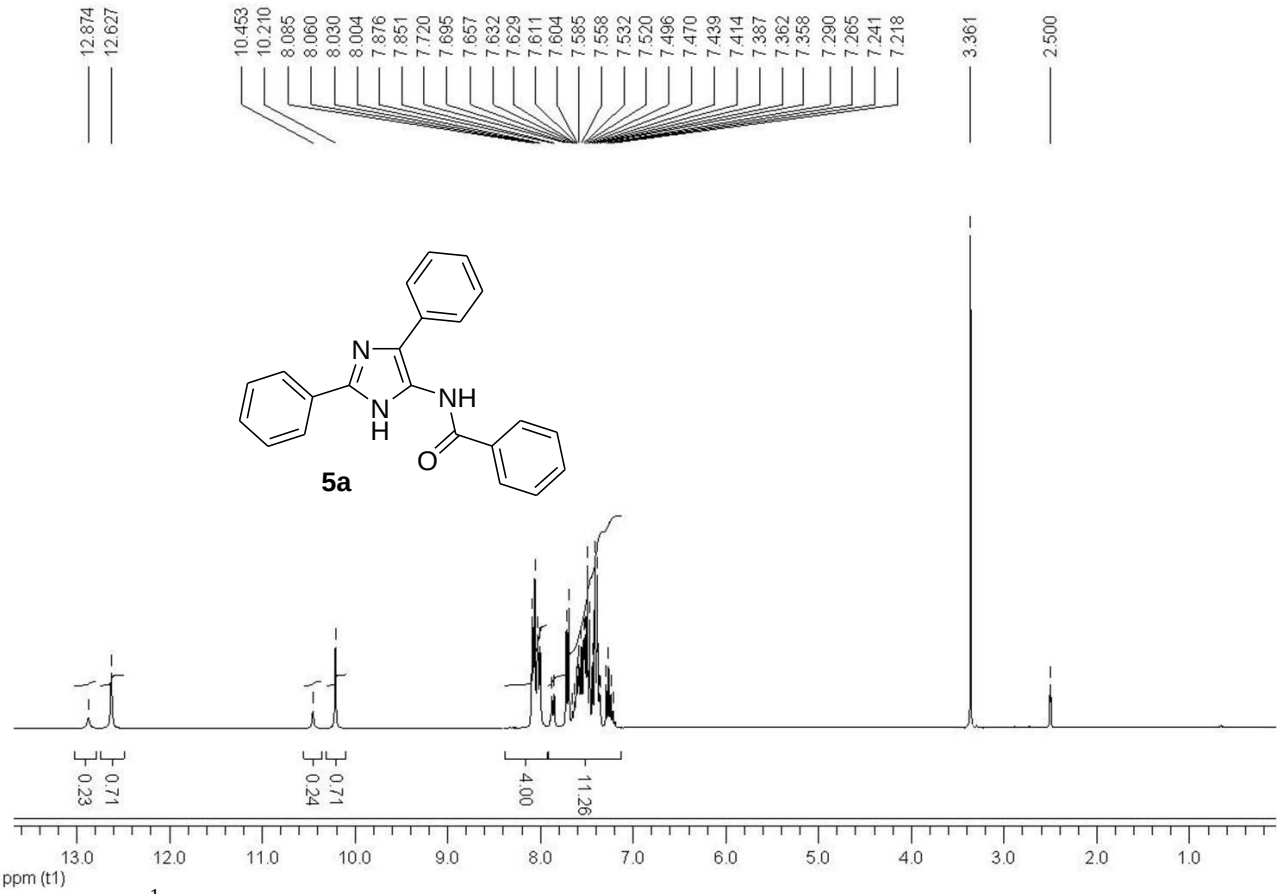


Figure S21 ^{1}H NMR (300 MHz, DMSO-d_6) spectrum of compound **5a**.

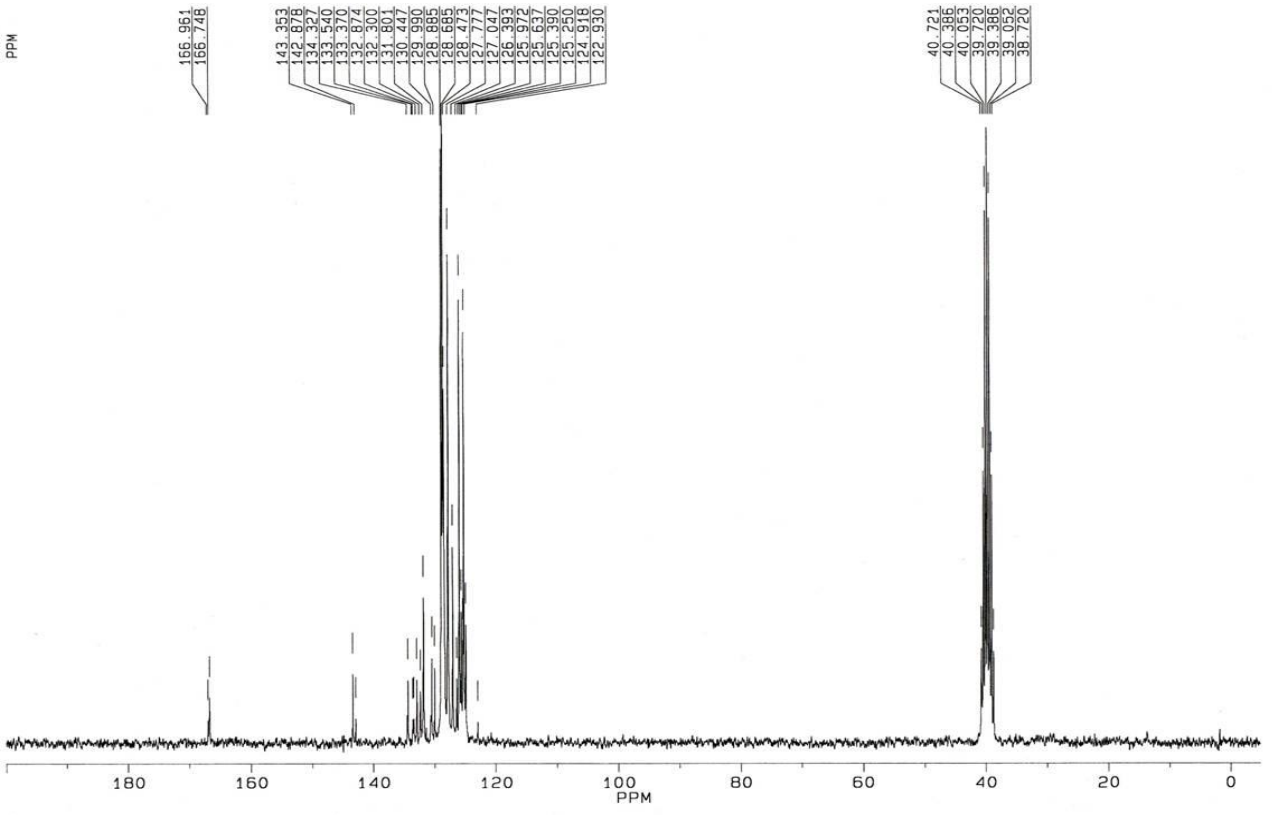


Figure S22 ^{13}C NMR (62.5 MHz, DMSO-d_6) spectrum of compound **5a**.

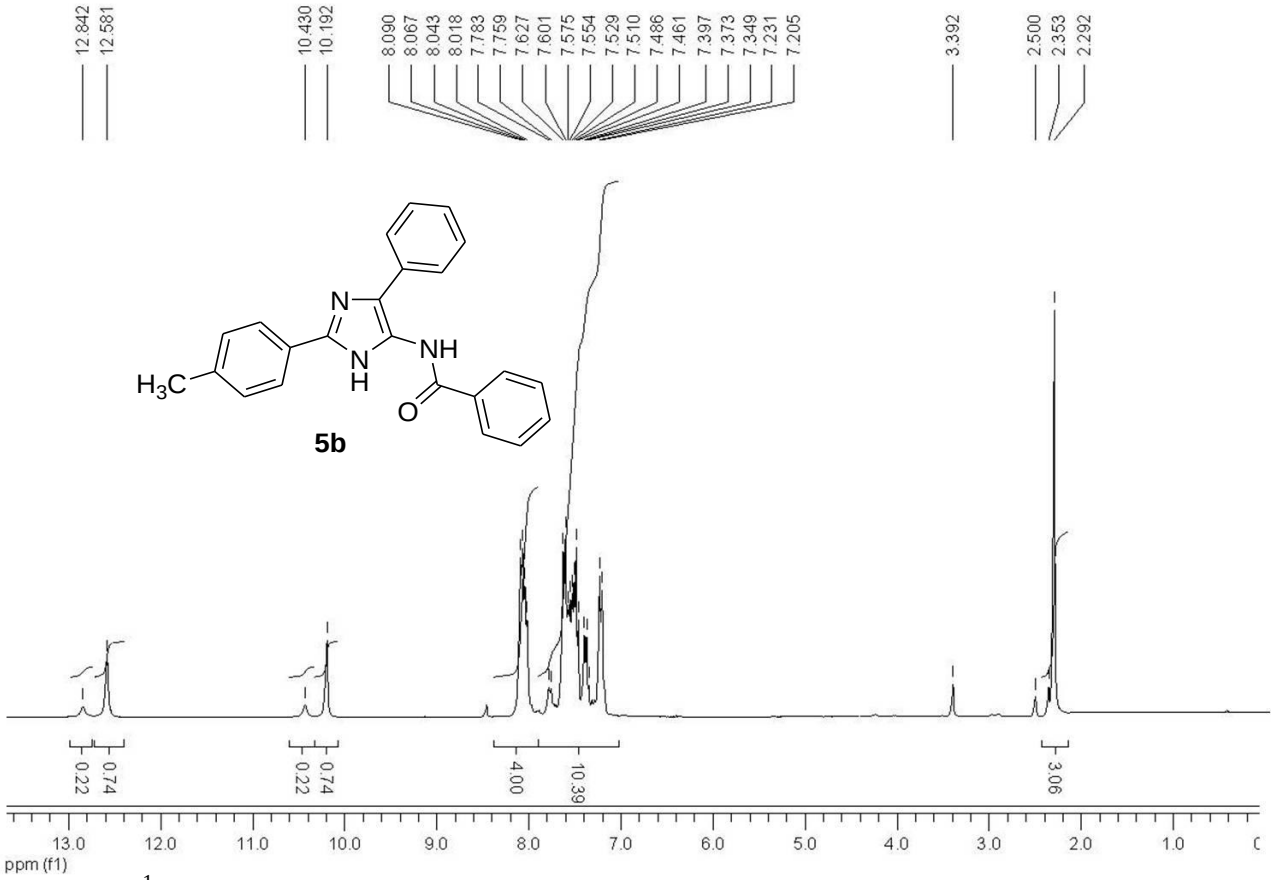


Figure S23 ^{1}H NMR (300 MHz, DMSO-d_6) spectrum of compound **5b**.

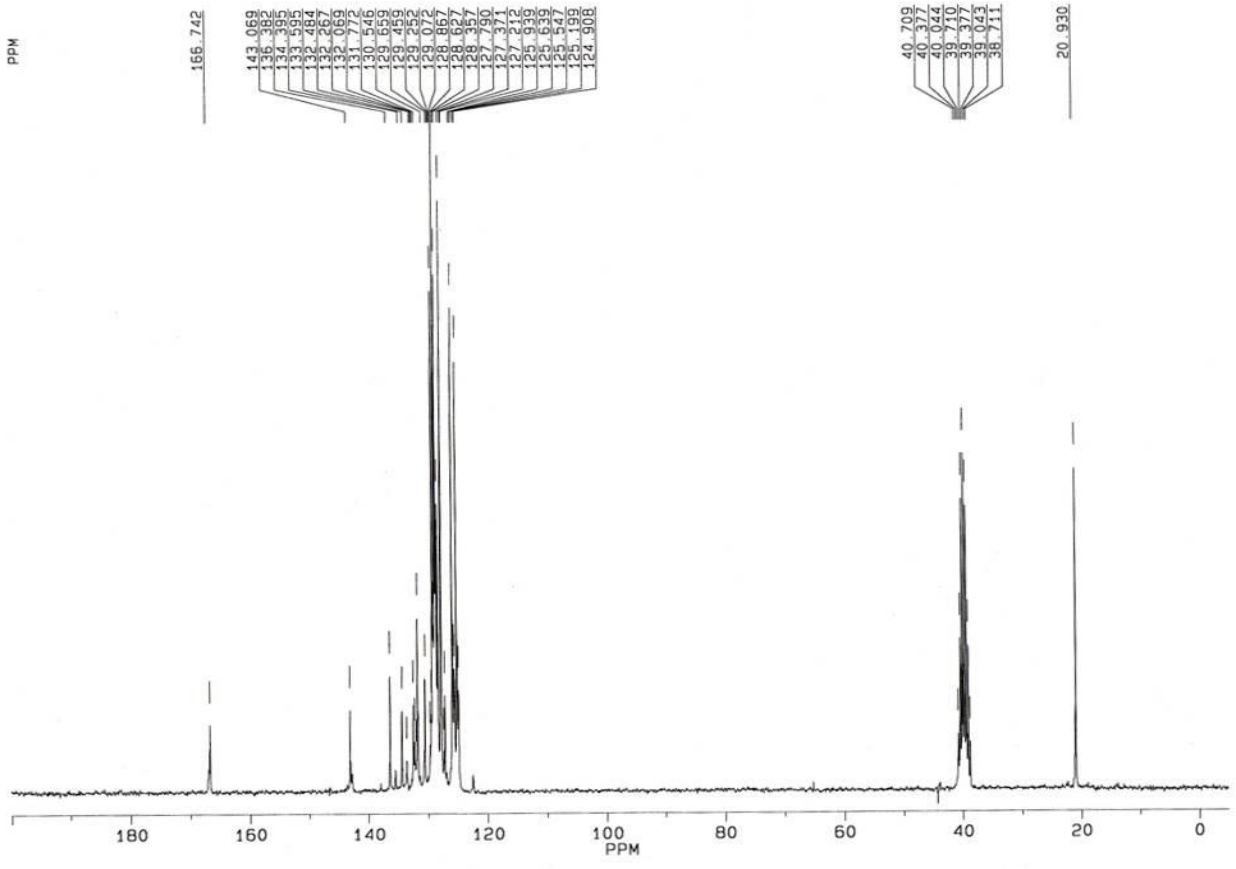


Figure S24 ^{13}C NMR (62.5 MHz, DMSO-d_6) spectrum of compound **5b**.

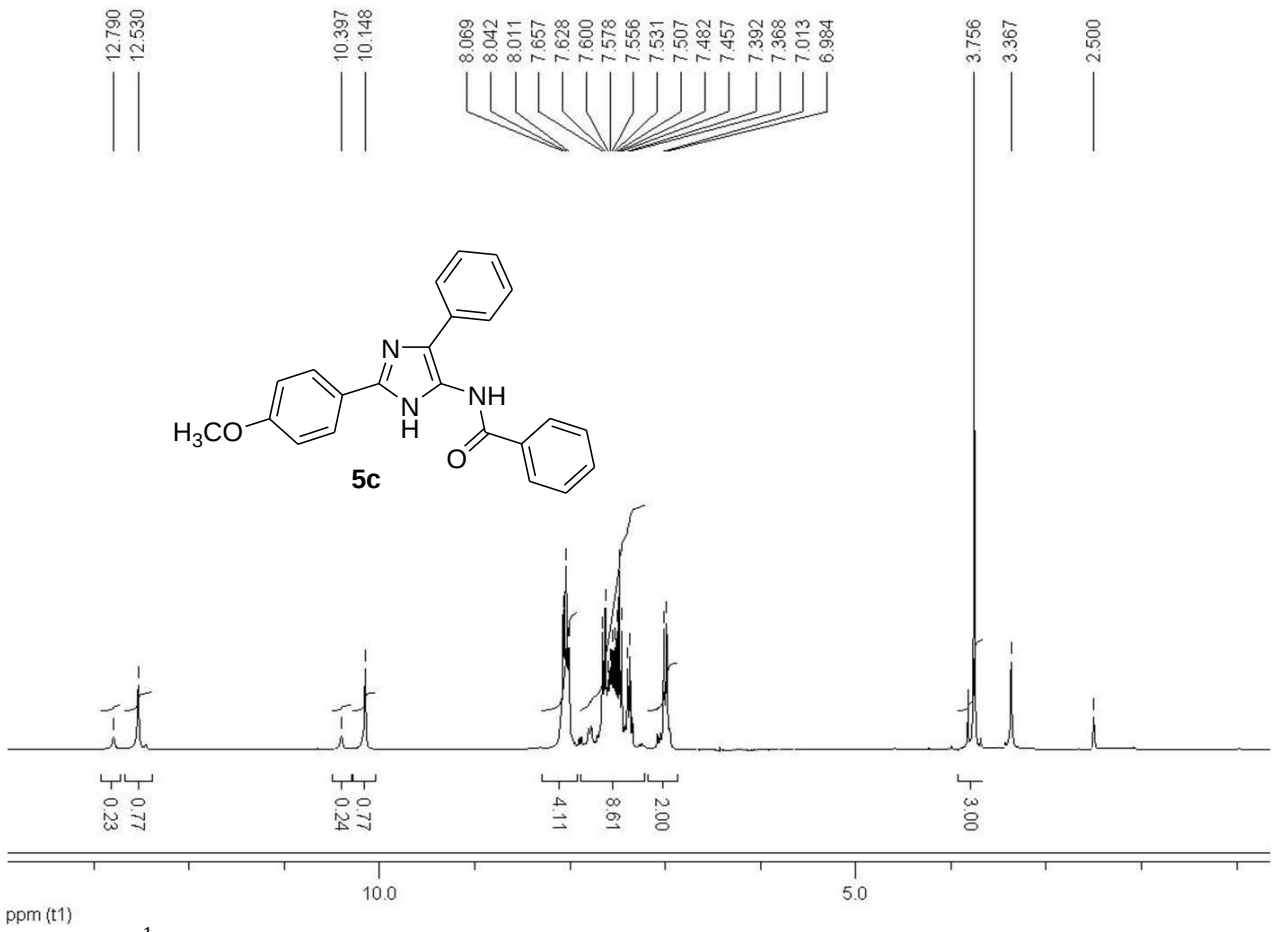


Figure S25 ^{1}H NMR (300 MHz, DMSO-d_6) spectrum of compound **5c**.

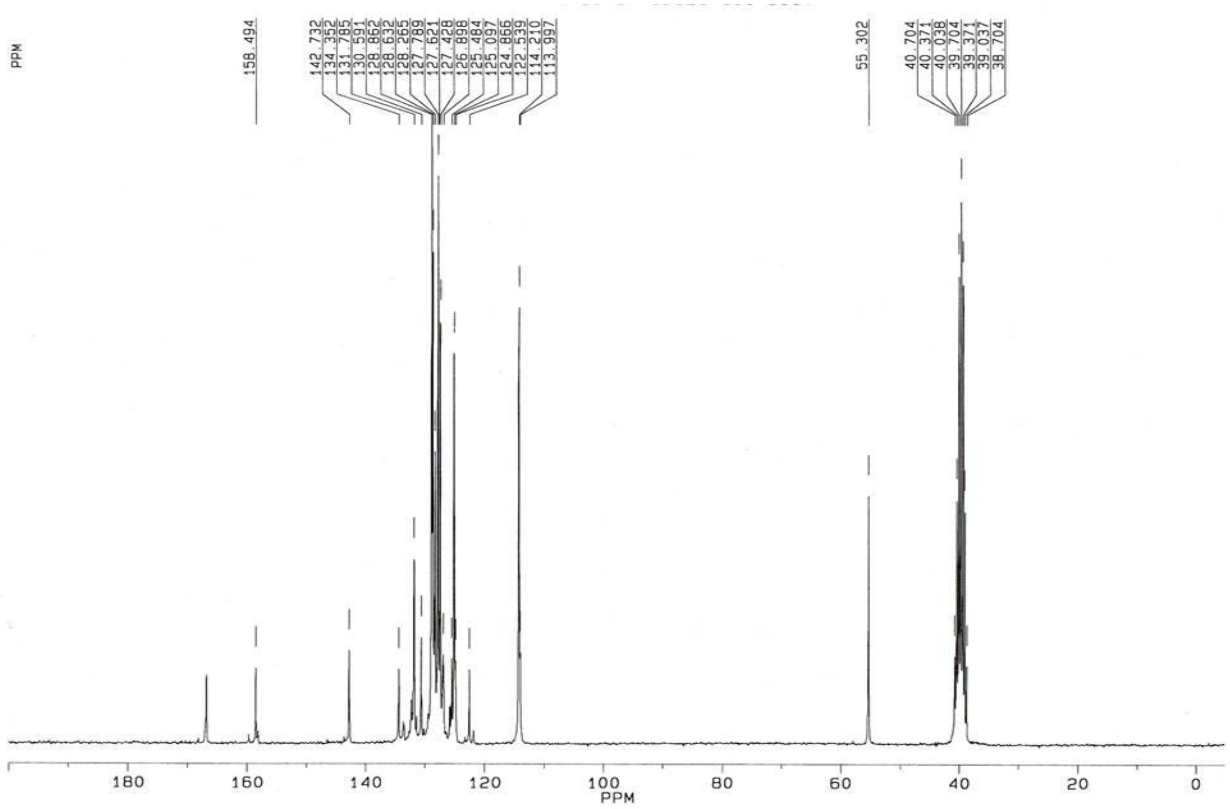


Figure S26 ^{13}C NMR (62.5 MHz, DMSO-d_6) spectrum of compound **5c**.

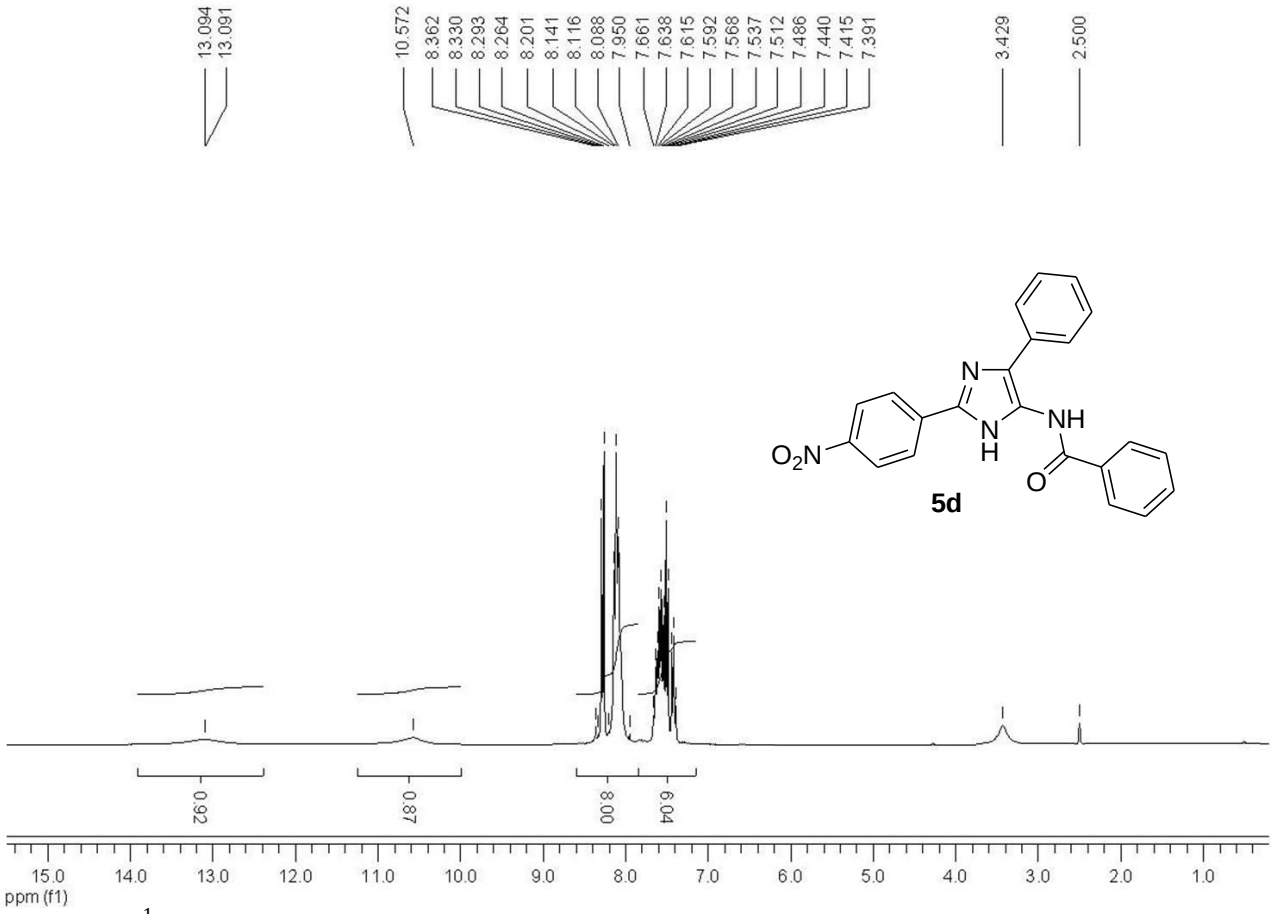


Figure S27 ^{1}H NMR (300 MHz, DMSO-d_6) spectrum of compound **5d**.

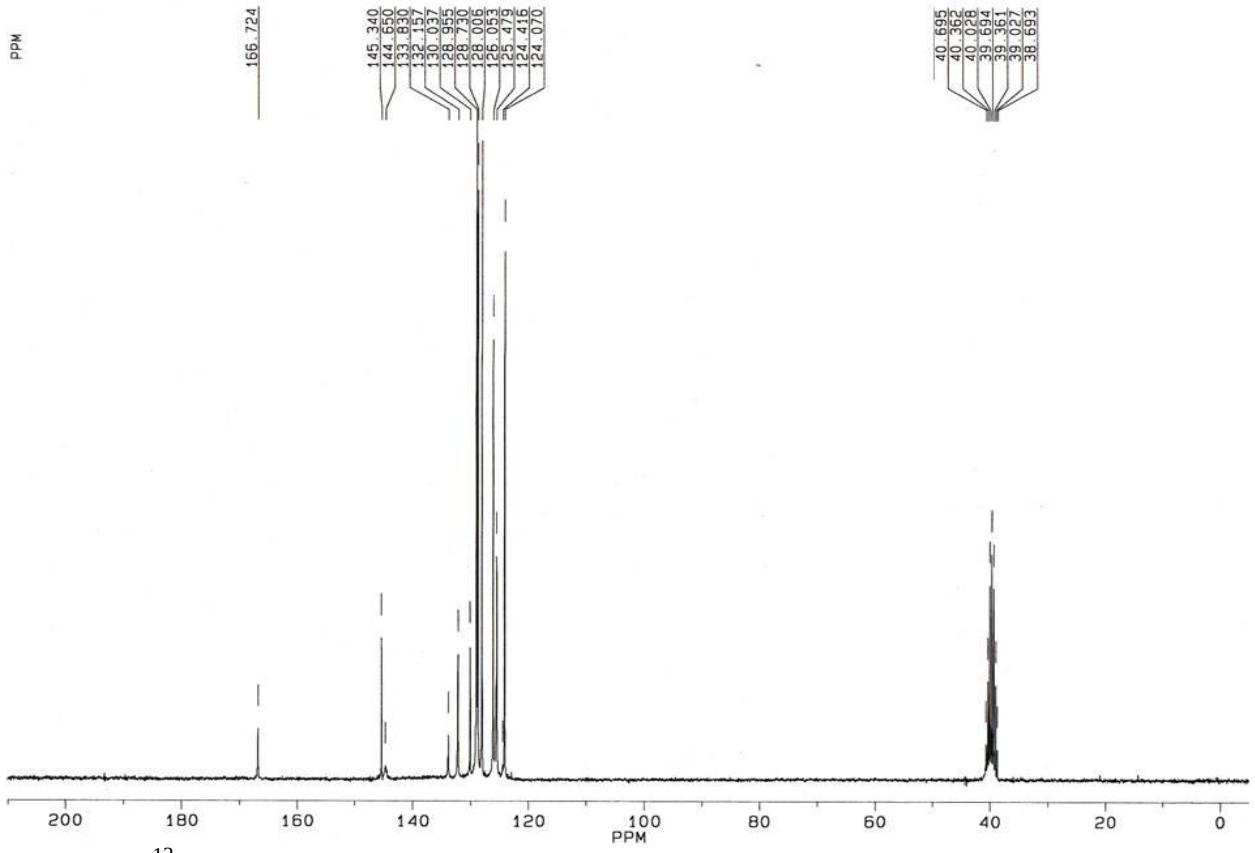


Figure S28 ^{13}C NMR (62.5 MHz, DMSO-d_6) spectrum of compound **5d**.

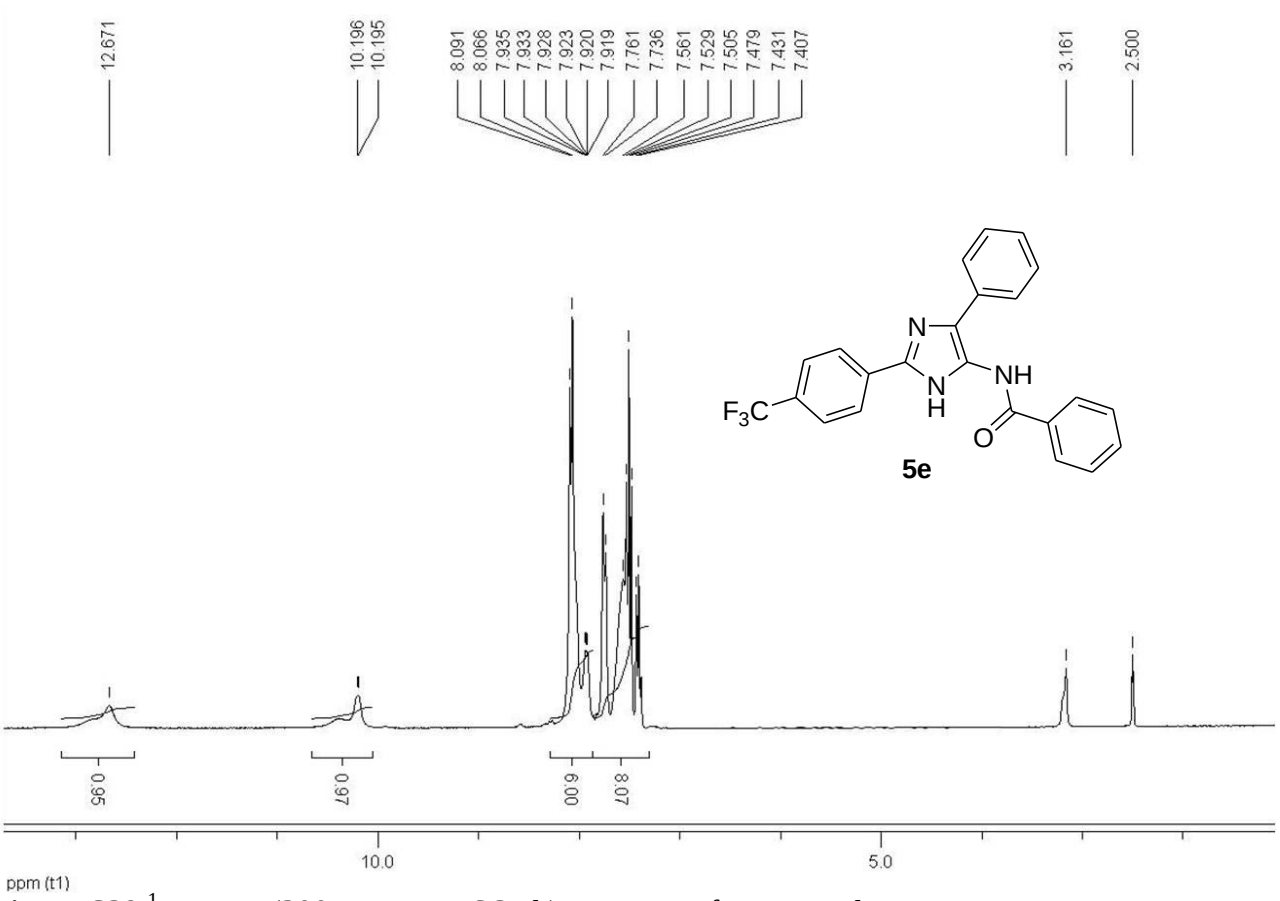


Figure S29 ^{1}H NMR (300 MHz, DMSO-d_6) spectrum of compound **5e**.

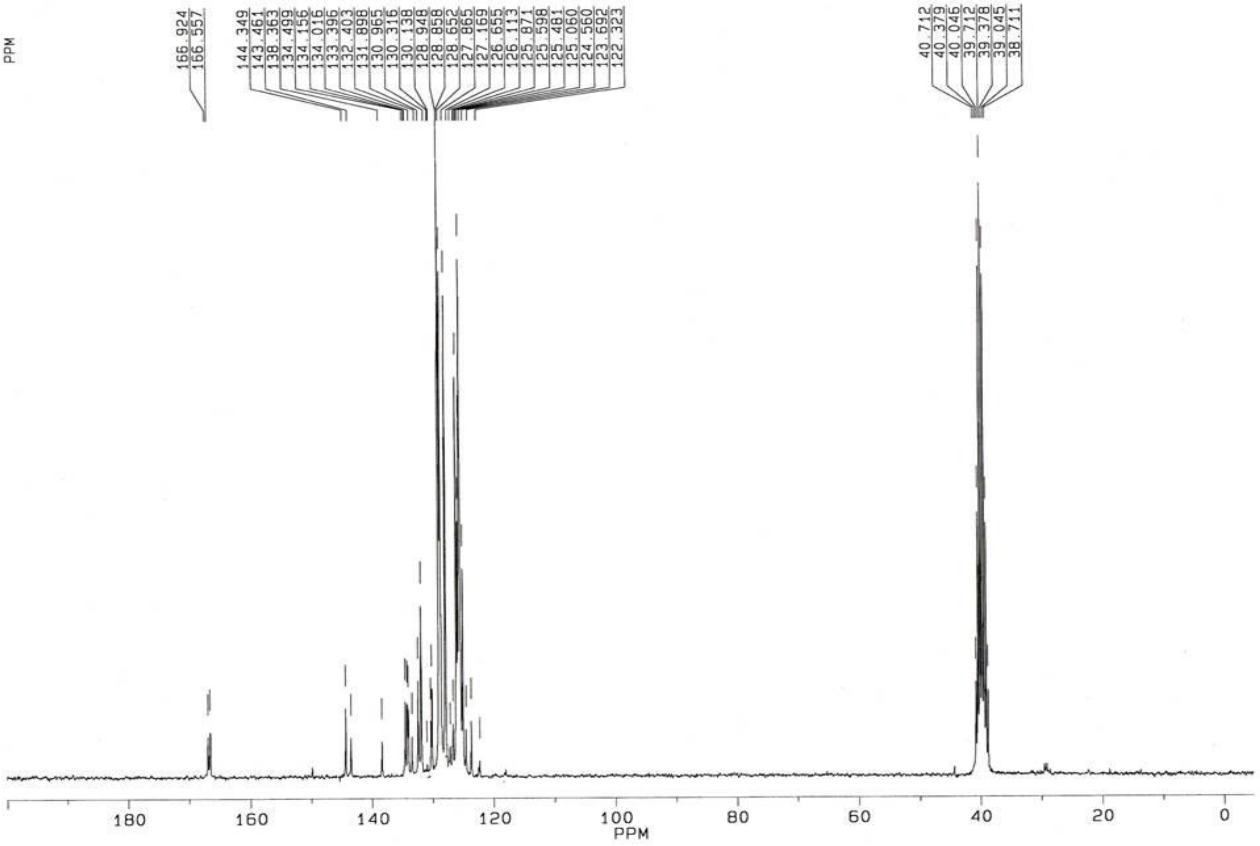


Figure S30 ^{13}C NMR (62.5 MHz, DMSO-d_6) spectrum of compound **5e**.

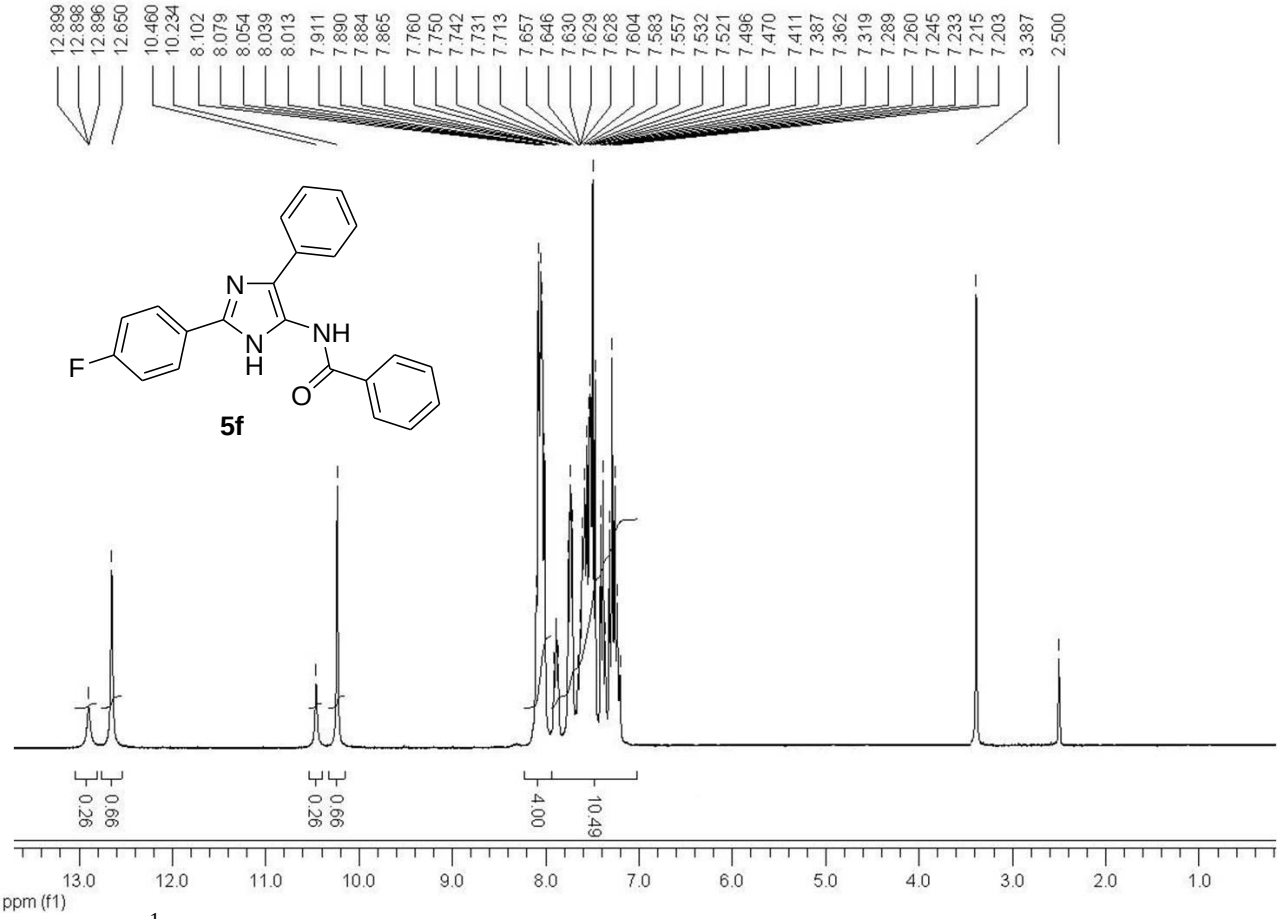


Figure S31 ^{1}H NMR (300 MHz, DMSO-d_6) spectrum of compound **5f**.

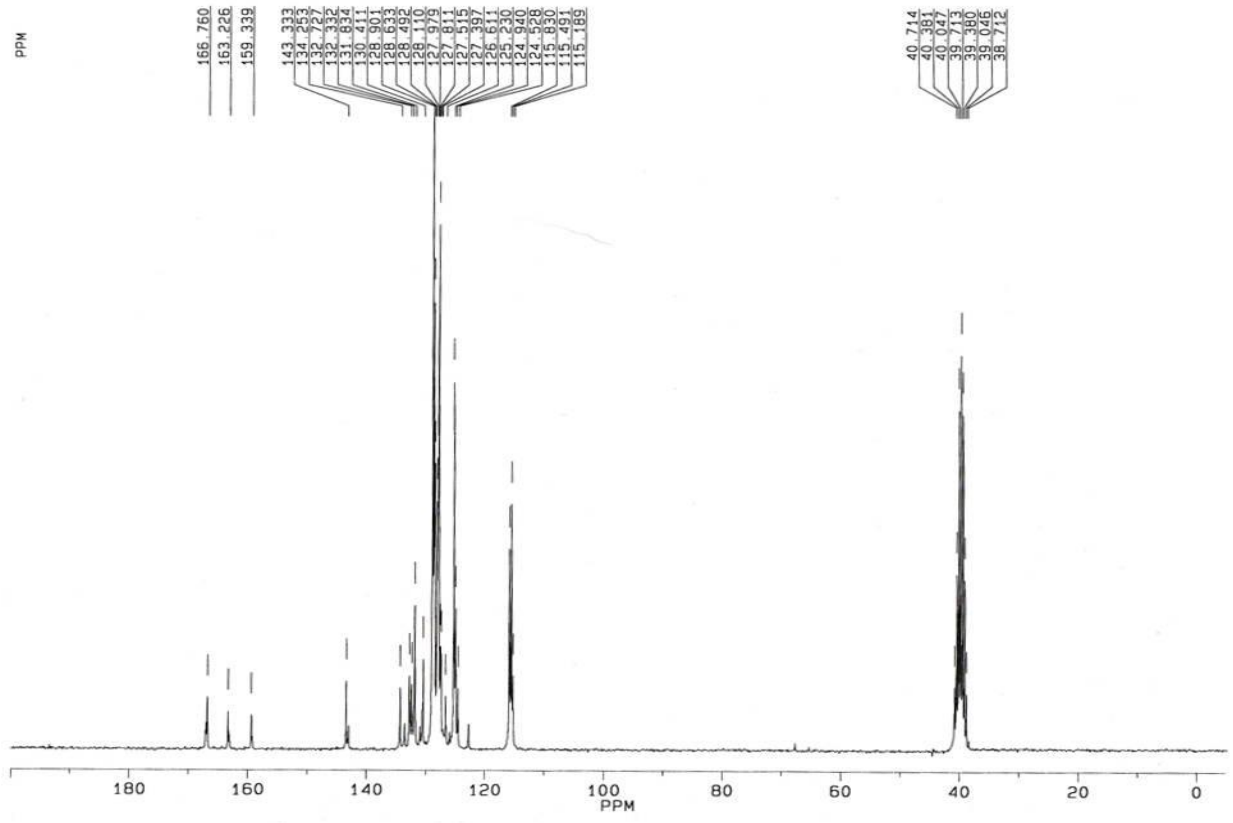


Figure S32 ^{13}C NMR (62.5 MHz, DMSO-d_6) spectrum of compound **5f**.

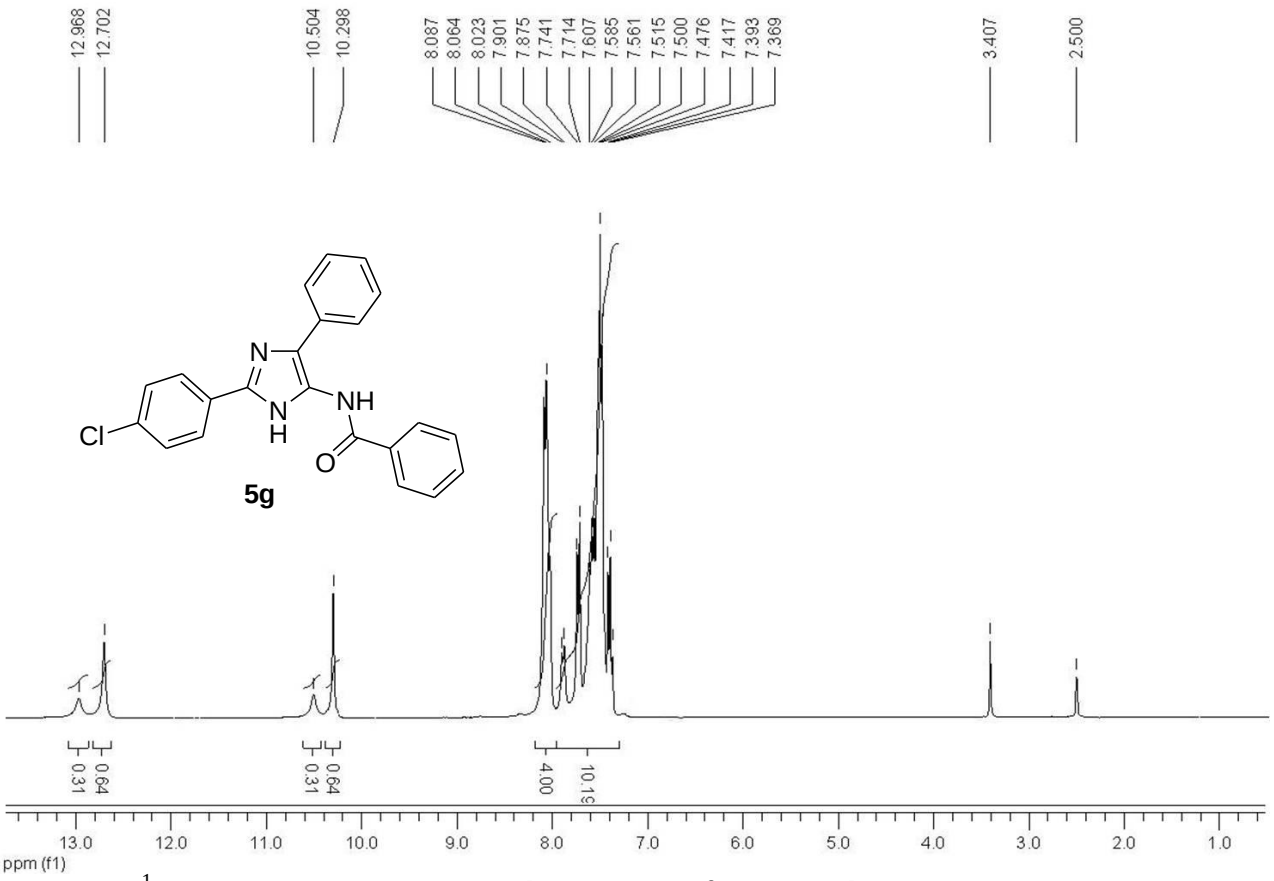


Figure S33 ^{1}H NMR (300 MHz, DMSO-d_6) spectrum of compound **5g**.

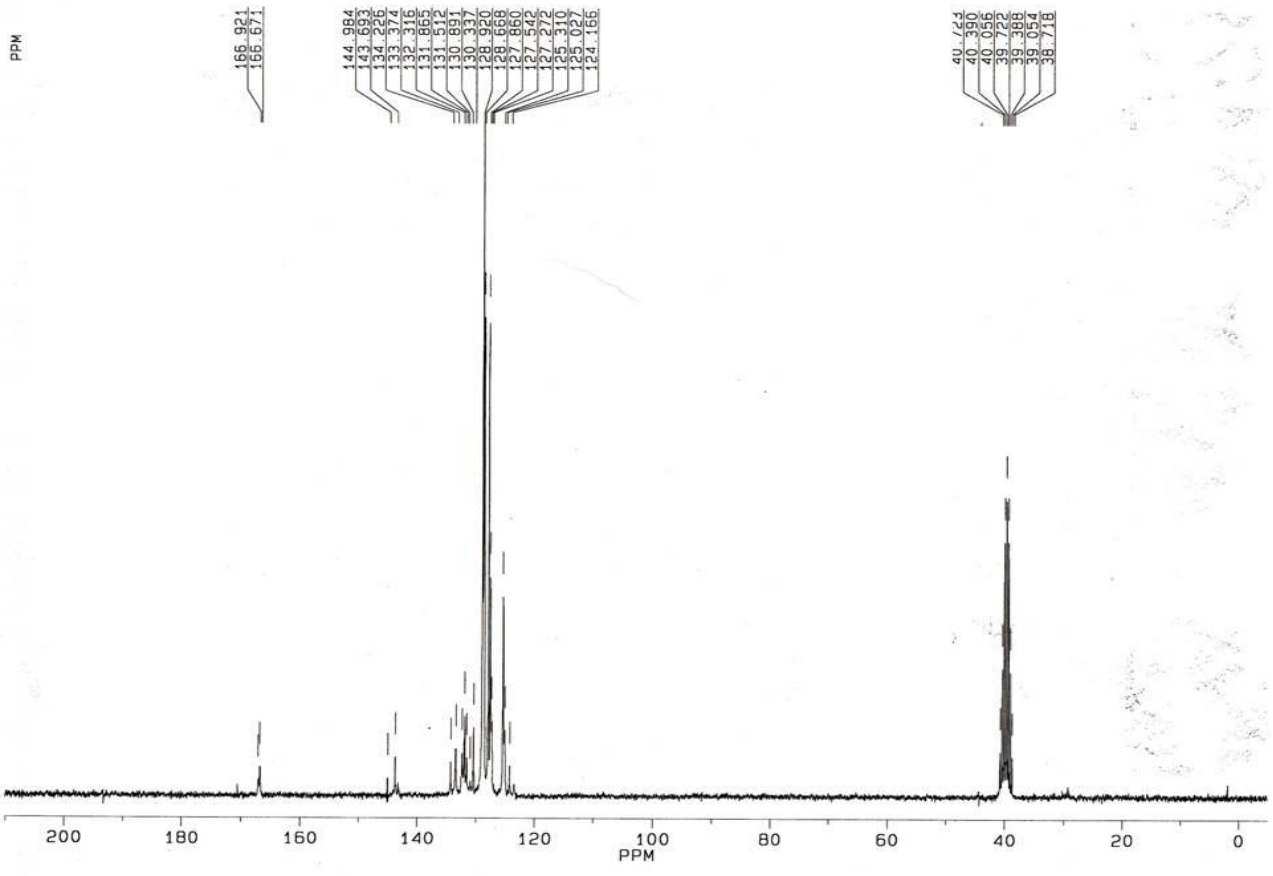


Figure S34 ^{13}C NMR (62.5 MHz, DMSO-d_6) spectrum of compound **5g**.

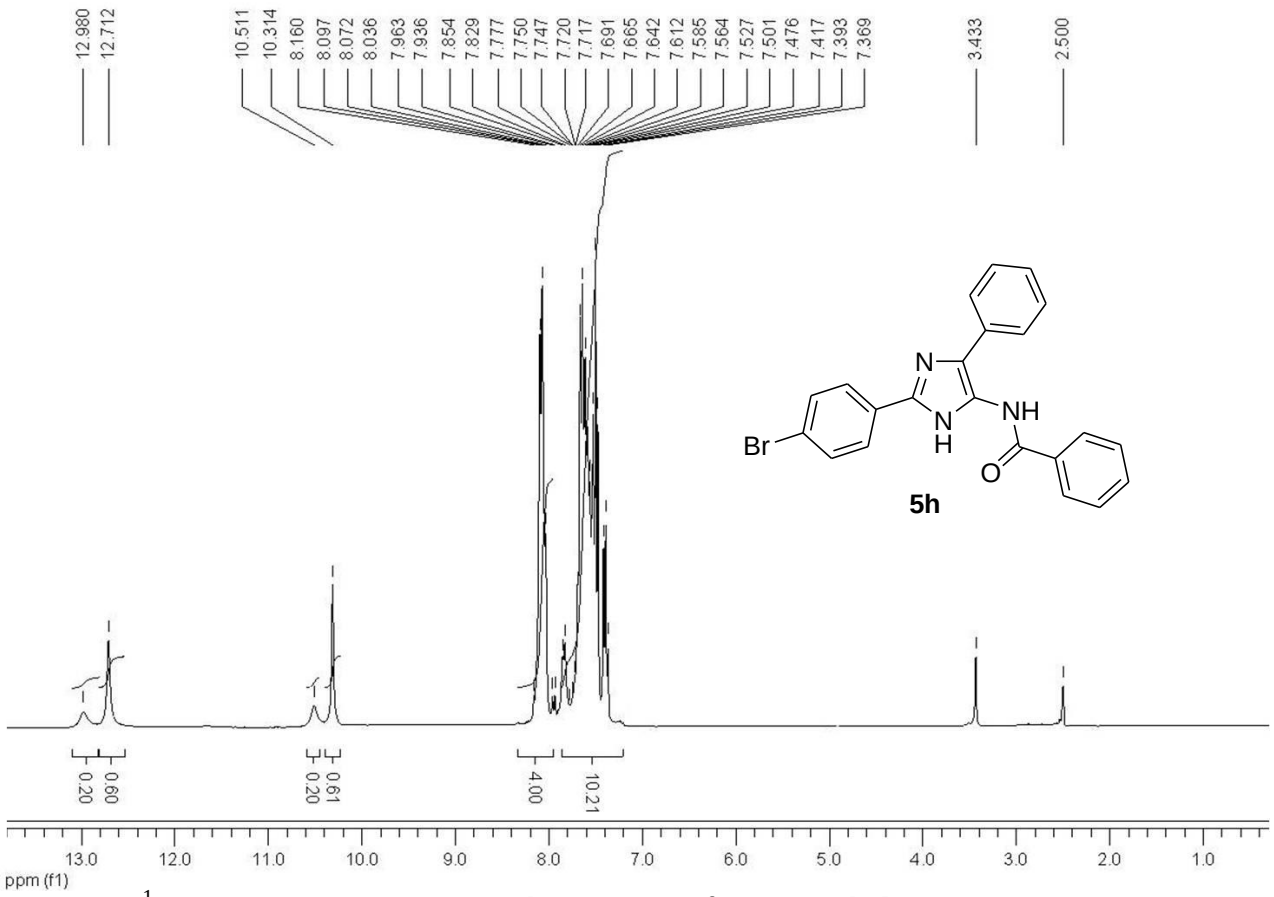


Figure S35 ^{1}H NMR (300 MHz, DMSO-d_6) spectrum of compound **5h**.

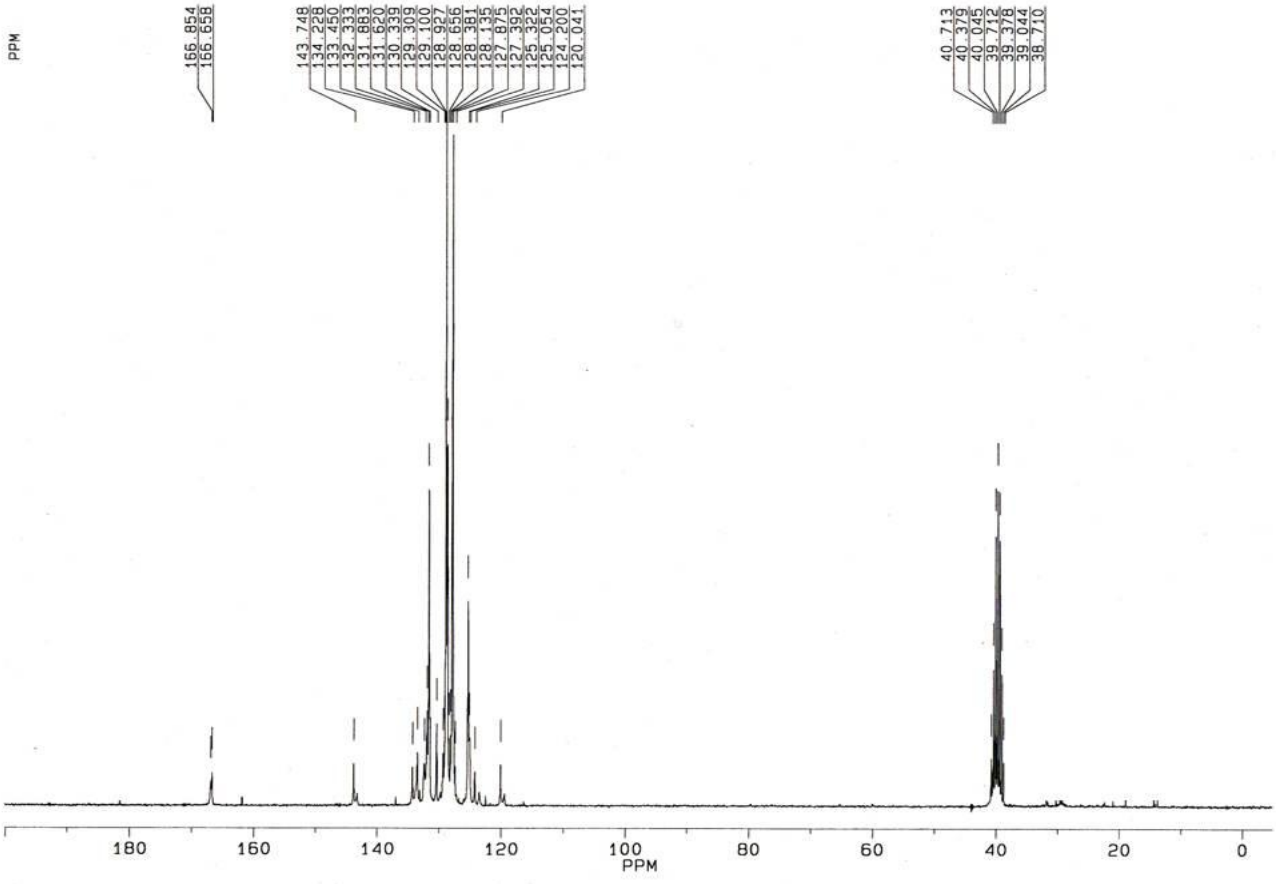


Figure S36 ^{13}C NMR (62.5 MHz, DMSO-d_6) spectrum of compound **5h**.

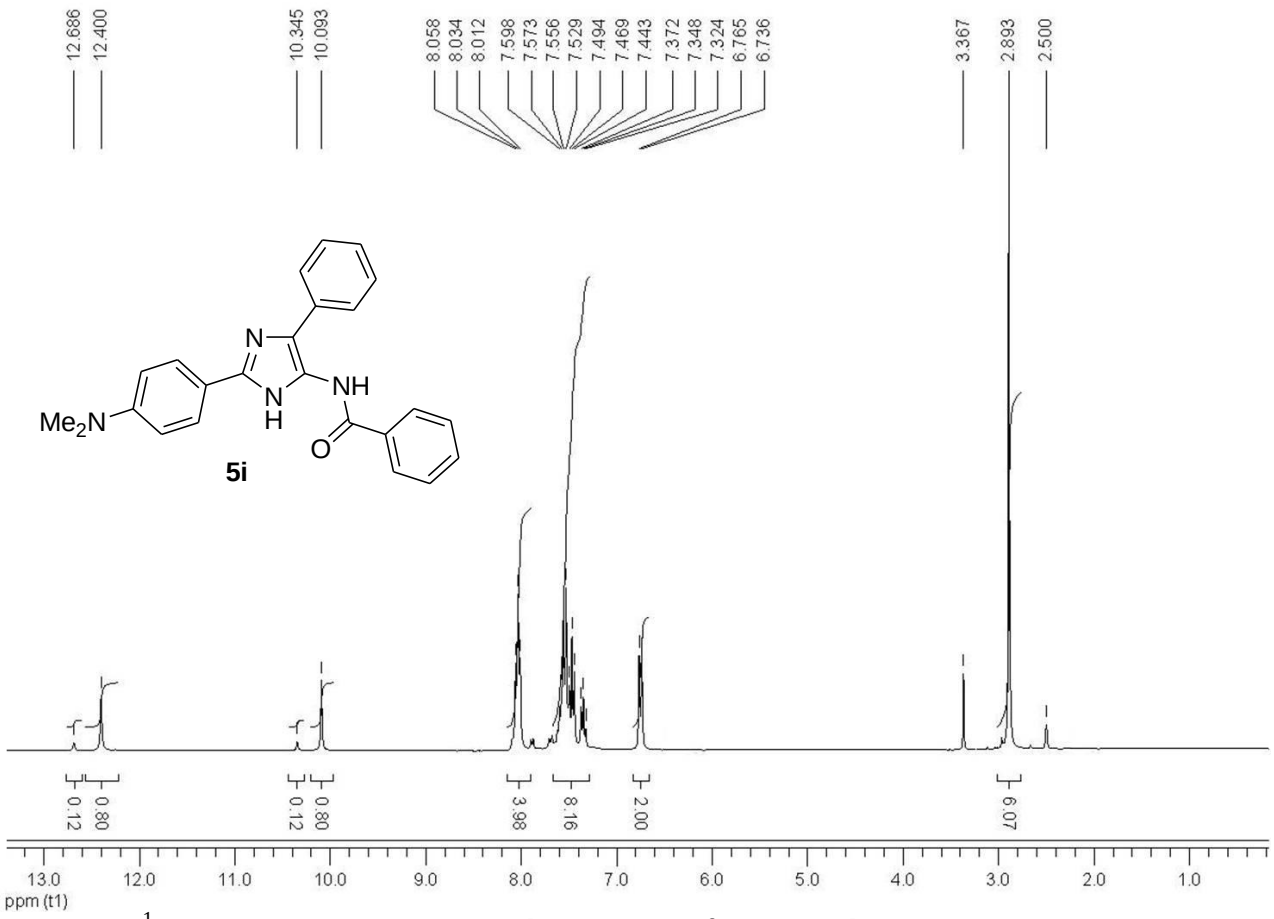


Figure S37 ^{1}H NMR (300 MHz, DMSO-d_6) spectrum of compound **5i**.

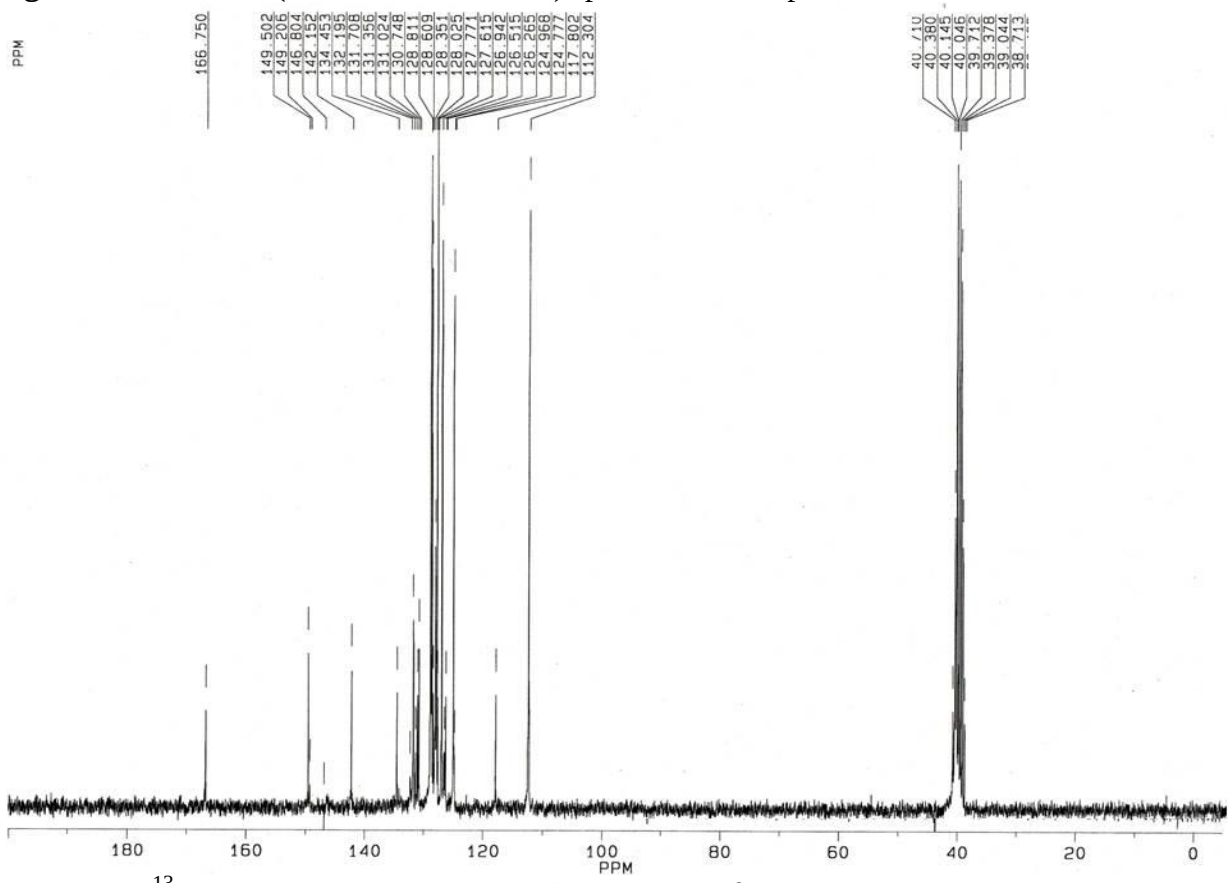


Figure S38 ^{13}C NMR (62.5 MHz, DMSO-d_6) spectrum of compound **5i**.