

## Supporting Information for

# One-pot Solvent-free Synthesis of Quinolines by C-H Activation / C-C Bond Formation Catalyzed by Recyclable Iron(III) Triflate

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### General information

All reagents were purchased from commercial suppliers and used without further purification. Infrared (IR) spectra were taken on a FT-IR-Tensor 27 spectrometer in KBr pellets and reported in  $\text{cm}^{-1}$ . The NMR spectra were recorded on a Bruker DRX 400 ( $^1\text{H}$ : 400 MHz,  $^{13}\text{C}$ : 100 MHz), chemical shifts ( $\delta$ ) are expressed in ppm relative to TMS as internal standard, and  $\text{CDCl}_3$  and  $\text{DMSO-}d_6$  were used as solvent. High-resolution mass spectra (HRMS) were obtained on a Varian IonSpec QFT-MS spectrometer with the technique of electrospray ionization. X-Ray crystallographic analysis was performed with a Rigaku Saturn diffractometer. Melting points were determined in open capillaries and are uncorrected.

### General experimental procedure

To a 5 mL flask was sequentially added  $\text{Fe}(\text{OTf})_3$  (25.1 mg, 0.05 mmol), benzaldehyde (0.104 mL, 1.0 mmol), aniline (0.096 mL, 1.05 mmol), and phenylacetylene (0.168 mL, 1.5 mmol) under an air atmosphere. The reaction vessel was placed in an oil bath at  $100\text{ }^\circ\text{C}$ , and then the mixture was stirred until the substrates have been consumed completely. The reaction system was cooled to room temperature and diluted with dichloromethane, and then washed with cold water ( $3 \times 10$  mL). The organic phase was separated, and the aqueous layer was washed with dichloromethane ( $3 \times 10$  mL). Concentration of the combined organic layer afforded the crude product, which was further purified by flash chromatography on silica gel (eluant: petroleum ether/AcOEt = 30:1, v/v). The catalyst was recovered from the aqueous layer via evaporation of the water, and dried at  $70\text{ }^\circ\text{C}$  for 2 h to give pure  $\text{Fe}(\text{OTf})_3$  in 92% recovery. The recovered catalyst was reused for the next run in the same way.

### Characterization of products:

Melting points,  $^1\text{H}$  NMR,  $^{13}\text{C}$  NMR, IR and Mass spectra of formerly unknown compounds are listed.

#### 2-(4-fluorophenyl)-6-methyl-4-phenylquinoline (Table 4, entry 2)

White solid

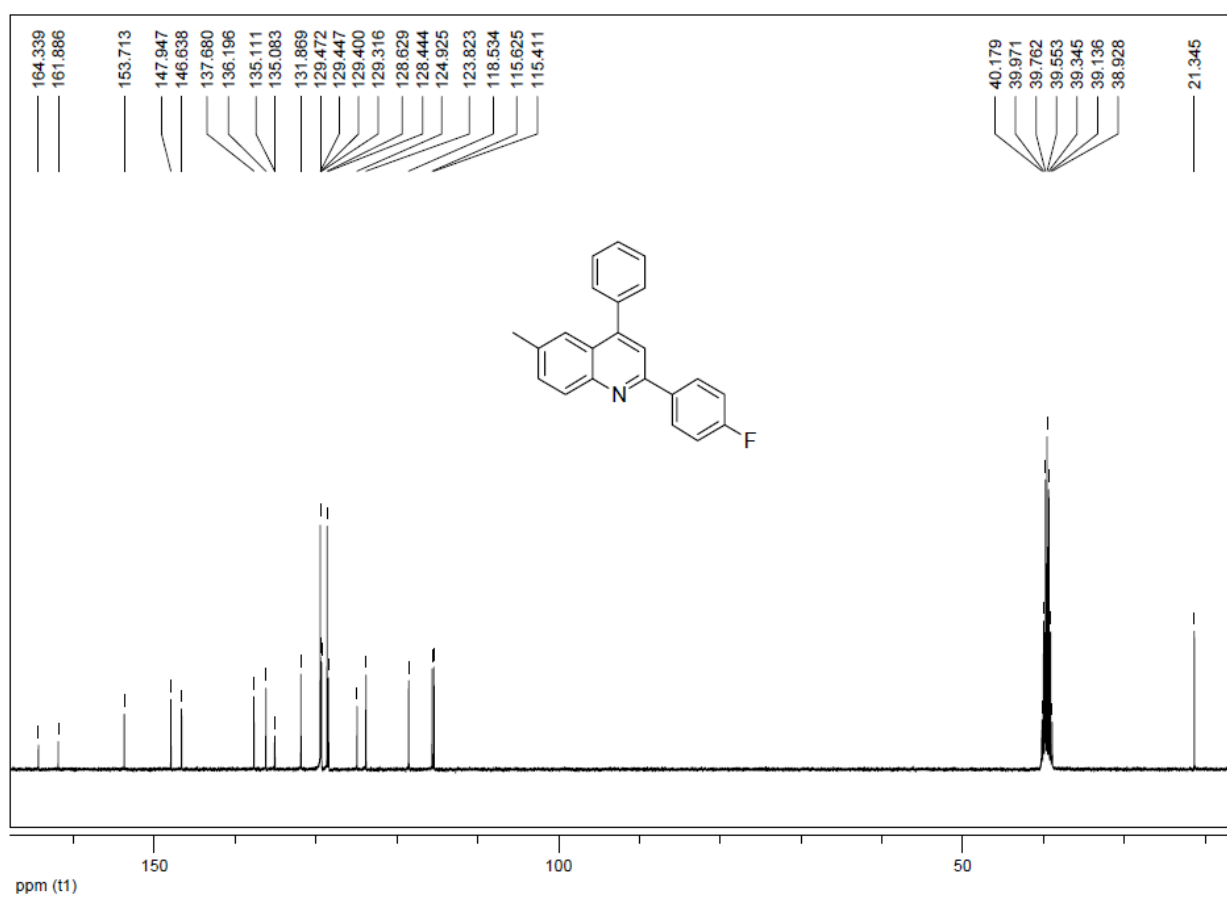
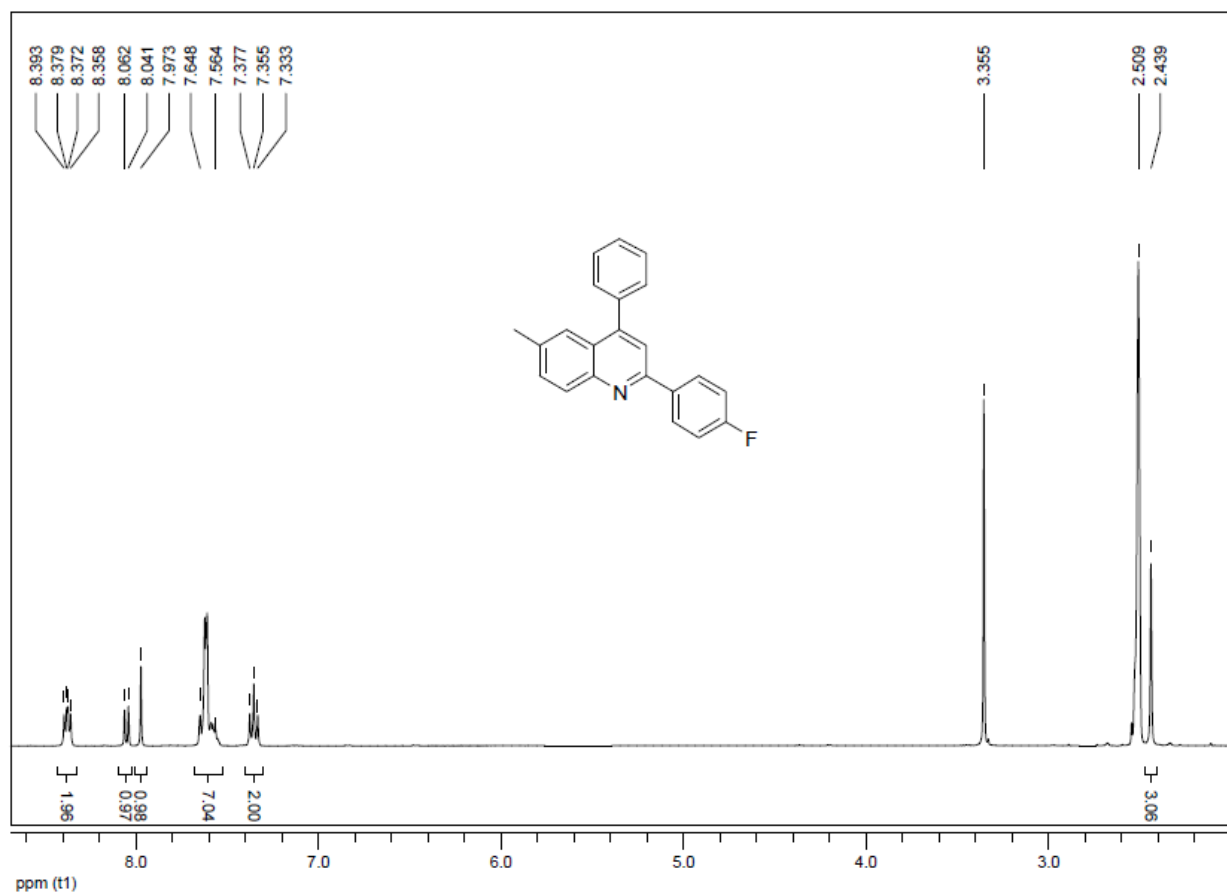
M.P:  $108.0\text{-}109.3\text{ }^\circ\text{C}$

$^1\text{H}$  NMR (400 MHz,  $\text{DMSO-}d_6$ ) ( $\delta$ , ppm): 8.38 (t, 2H,  $J = 5.6$  Hz), 8.05 (d, 1H,  $J = 8.4$  Hz), 7.97 (s, 1H), 7.65-7.56 (m, 7H), 7.36 (t, 2H,  $J = 8.8$  Hz), 2.44 (s, 3H).

$^{13}\text{C}$  NMR (100 MHz,  $\text{DMSO-}d_6$ ) ( $\delta$ , ppm): 163.1 (q,  $J = 246.8$  Hz), 153.7, 147.9, 146.6, 137.7, 136.2, 135.1 (q,  $J = 2.8$  Hz), 131.9, 129.5, 129.4 (q,  $J = 8.5$  Hz), 129.3, 128.6, 128.4, 124.9, 123.8, 118.5, 115.5 (q,  $J = 21.5$  Hz).

IR (KBr,  $\nu$ ,  $\text{cm}^{-1}$ ): 3057, 1587, 1489, 1353, 1226, 1157, 846, 703, 550.

HRMS (ESI):  $m/z$  calcd for: 314.1345  $[\text{M}+\text{H}]^+$ , found: 314.1320.



## 2-(3,4-dichlorophenyl)-6-methyl-4-phenylquinoline (Table 4, entry 5)

Yellow solid

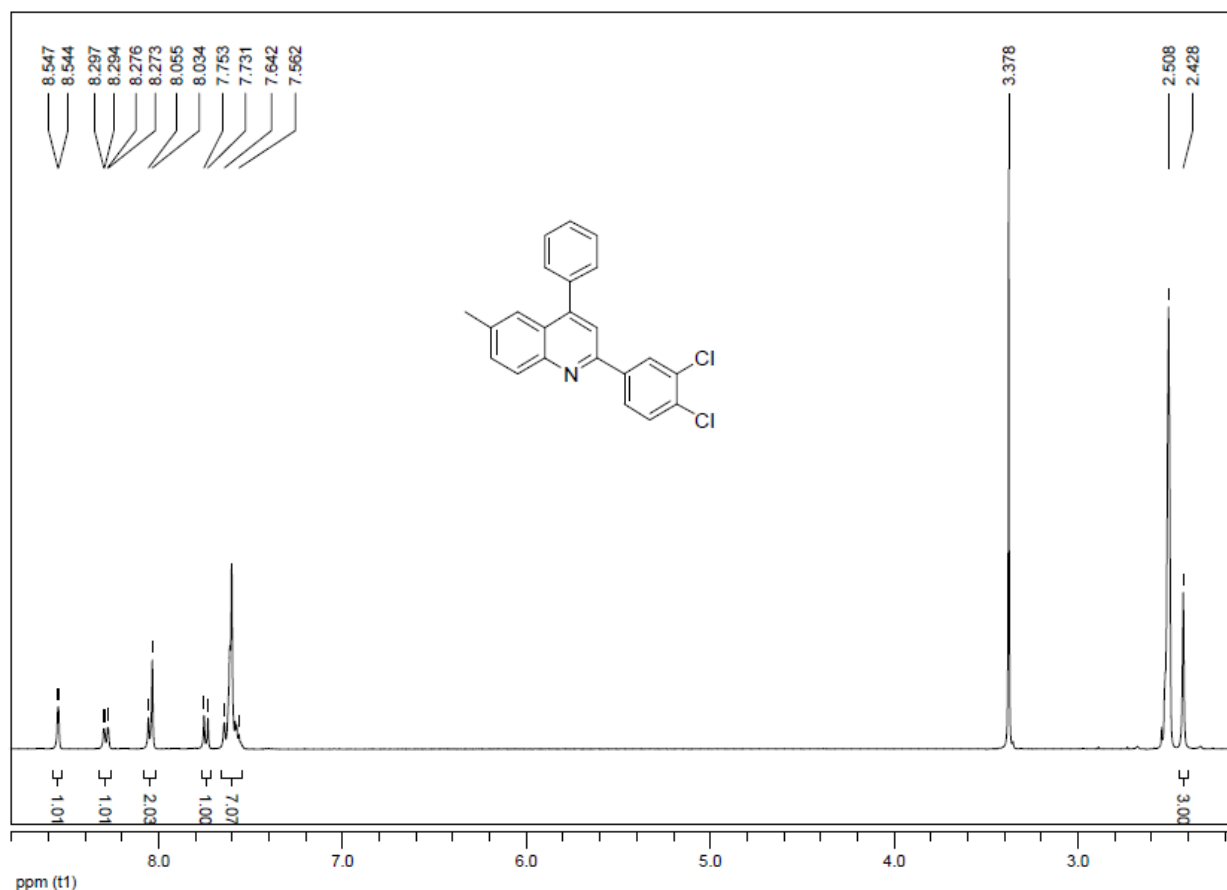
M.P:141.8-143.1 °C

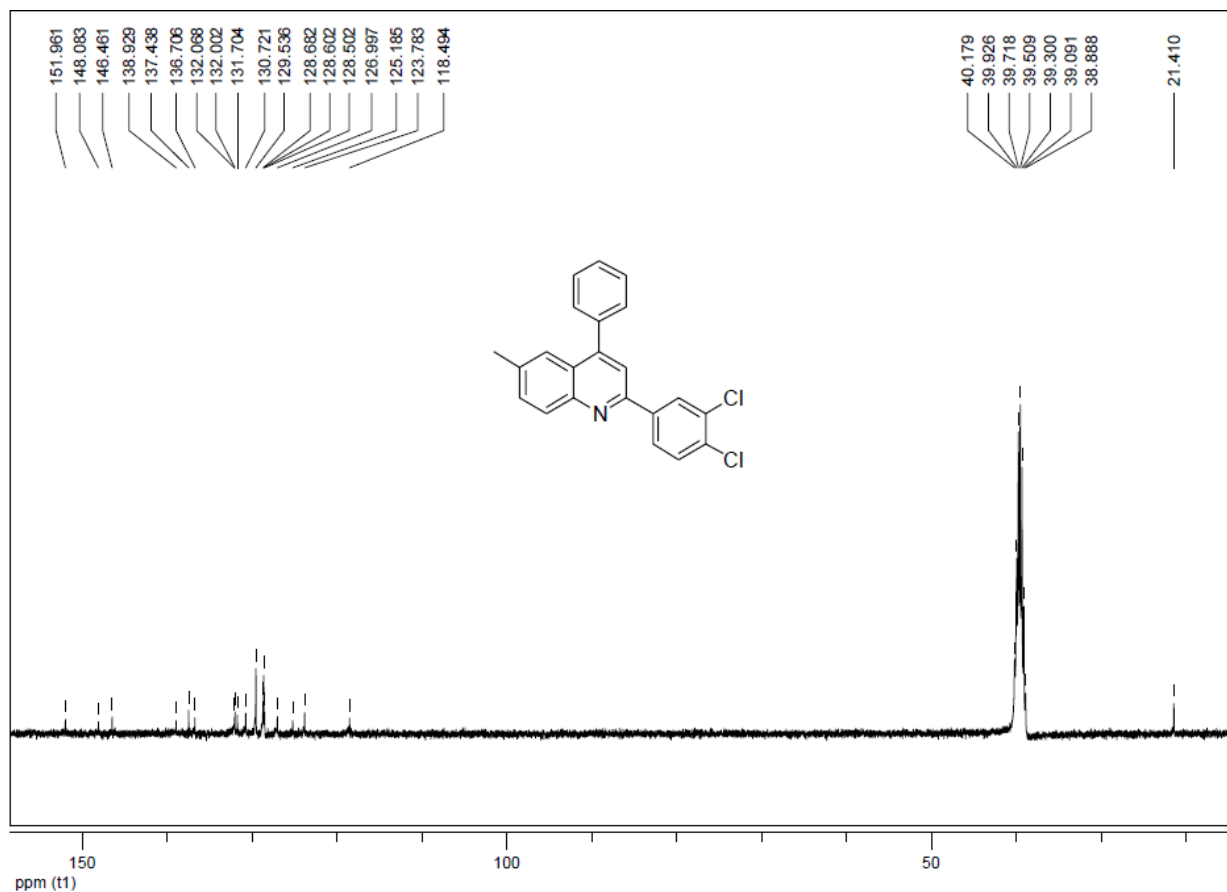
<sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) (δ, ppm): 8.54 (s, 1H), 8.29 (d, 1H, *J* = 8.4 Hz), 8.04 (d, 2H, *J* = 8.4 Hz), 7.74 (d, 1H, *J* = 8.8 Hz), 7.64-7.56 (m, 7H), 2.43 (s, 3H).

<sup>13</sup>C NMR (100 MHz, DMSO-*d*<sub>6</sub>) (δ, ppm): 151.9, 148.0, 146.4, 138.9, 137.4, 136.7, 132.1, 132.0, 131.7, 130.7, 129.5, 128.7, 128.6, 128.5, 126.9, 125.1, 123.7, 118.4.

IR (KBr, ν, cm<sup>-1</sup>): 3059, 2910, 1588, 1454, 1221, 1027, 821, 699, 567.

HRMS (ESI): *m/z* calcd for: 364.0660 [M+H]<sup>+</sup>, found: 364.0639.





### 6-methyl-4-phenyl-2-p-tolylquinoline (Table 4, entry 6)

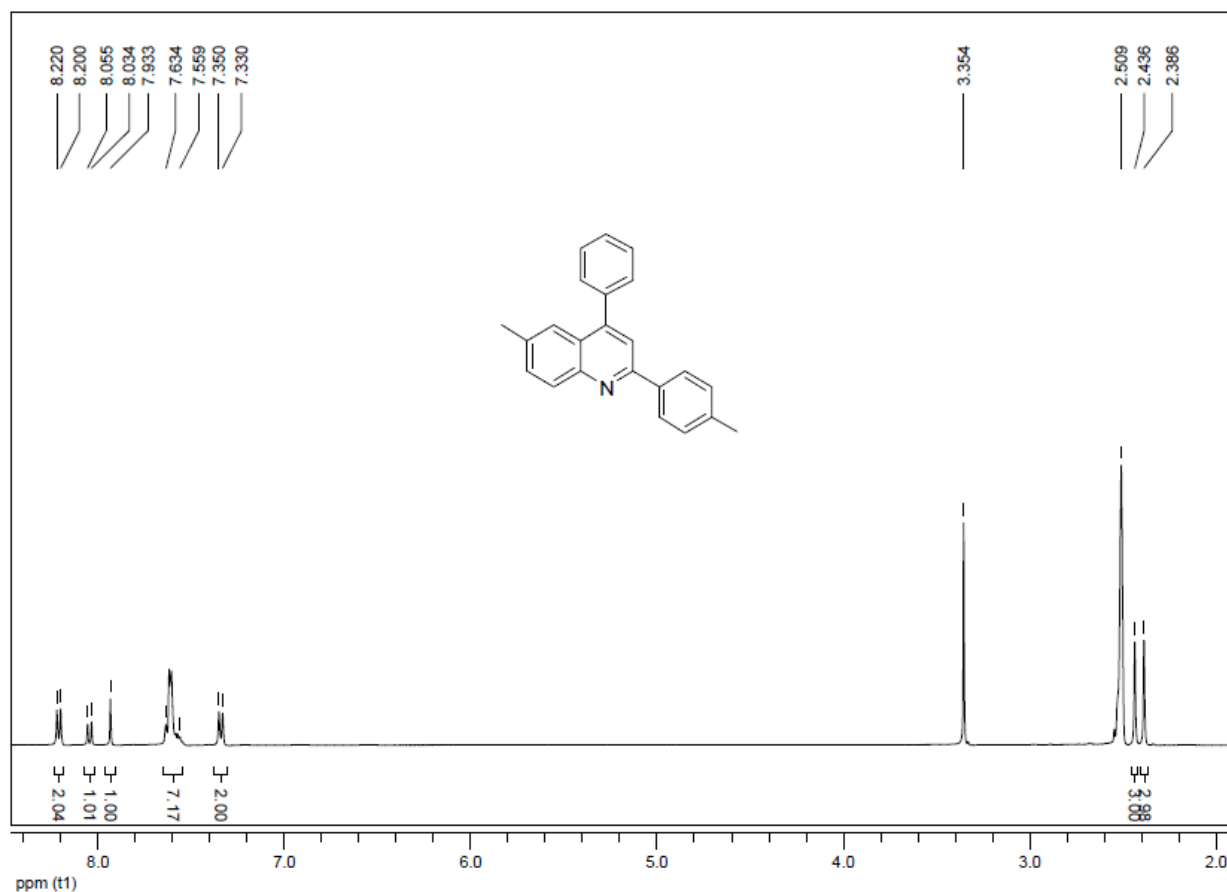
Yellow solid

M.P: 119.6-121.2 °C

<sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) (δ, ppm): 8.21 (d, 2H, *J* = 8.0 Hz), 8.04 (d, 1H, *J* = 8.4 Hz), 7.93 (s, 1H), 7.63-7.56 (m, 7H), 7.34 (d, 2H, *J* = 8.0 Hz), 2.44 (s, 3H), 2.39 (s, 3H).

IR (KBr, ν, cm<sup>-1</sup>): 3057, 2916, 1487, 1355, 1182, 1019, 702, 549.

HRMS (ESI): *m/z* calcd for: 310.1596 [M+H]<sup>+</sup>, found: 310.1595.



**2-(3,4-dimethoxyphenyl)-6-methyl-4-phenylquinoline (Table 4, entry 7)**

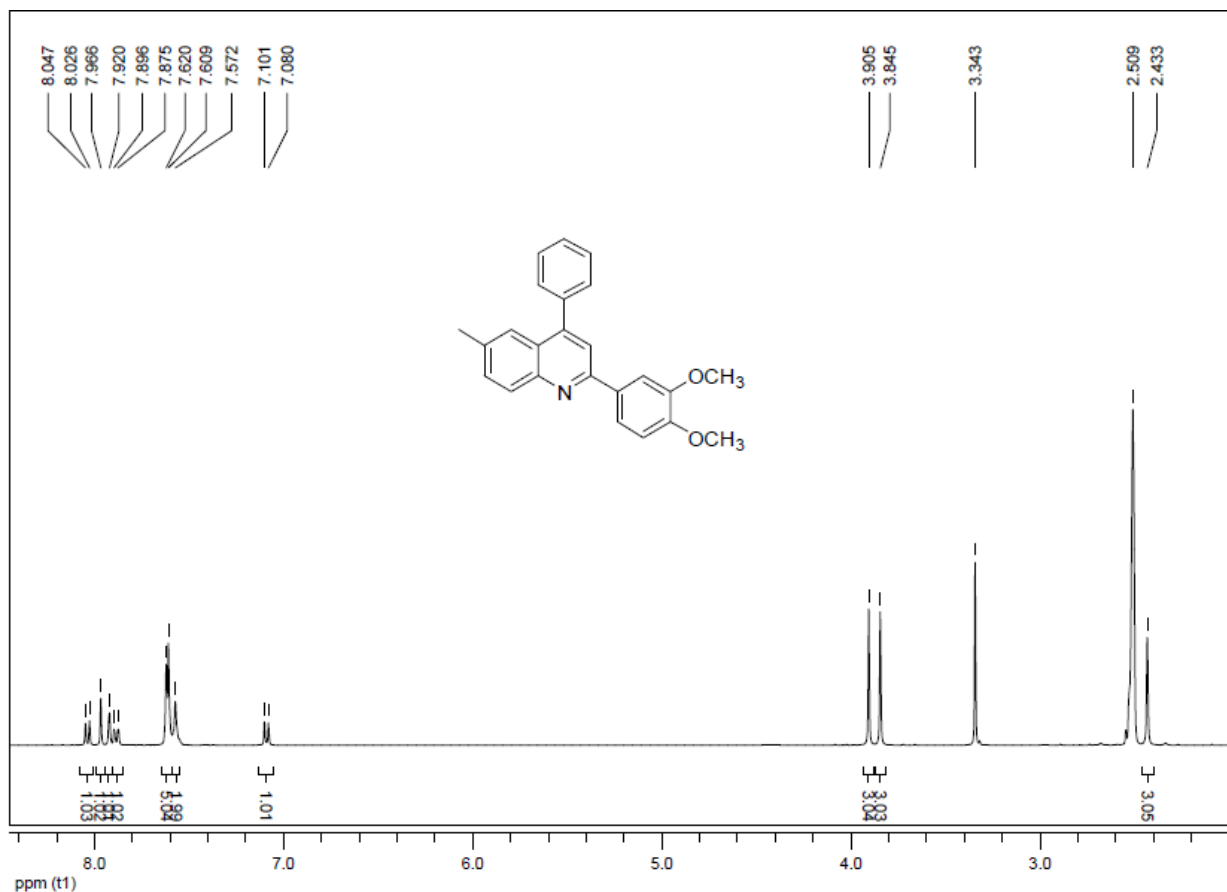
White solid

M.P: 151.4-152.8 °C

<sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) (δ, ppm): 8.04 (d, 1H, *J* = 8.4 Hz), 7.97 (s, 1H), 7.92 (s, 1H), 7.89 (d, 1H, *J* = 8.4 Hz), 7.61 (d, 5H, *J* = 4.4 Hz), 7.57 (s, 2H), 7.09 (d, 1H, *J* = 8.4 Hz), 3.91 (s, 3H), 3.85 (s, 3H), 2.43 (s, 3H).

IR (KBr, ν, cm<sup>-1</sup>): 2965, 2837, 1587, 1342, 1019, 827, 700, 578.

HRMS (ESI): *m/z* calcd for: 356.1651 [M+H]<sup>+</sup>, found: 356.1620.



**6-methyl-4-phenyl-2-(thiophen-2-yl)quinoline (Table 4, entry 8)**

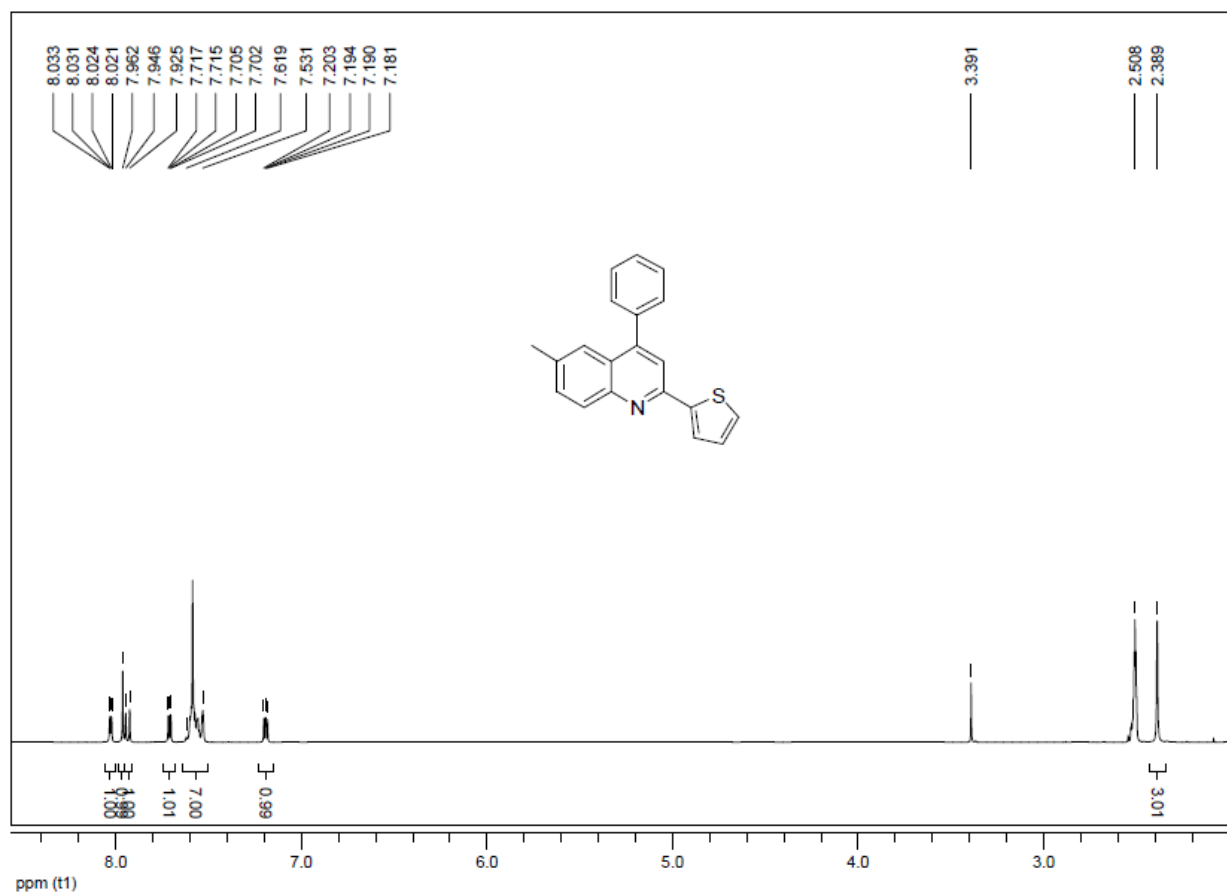
Pale yellow solid

M.P: 140.9-143.6 °C

<sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) (δ, ppm): 8.03 (d, 1H, *J* = 4.0 Hz), 7.96 (s, 1H), 7.94 (d, 1H, *J* = 8.4 Hz), 7.71 (d, 1H, *J* = 4.8 Hz), 7.62-7.53 (m, 7H), 7.19 (t, 1H, *J* = 4.4 Hz), 2.39 (s, 3H).

IR (KBr, ν, cm<sup>-1</sup>): 3064, 2914, 1586, 1436, 1356, 1236, 879, 702, 583.

HRMS (ESI): *m/z* calcd for: 302.1003 [M+H]<sup>+</sup>, found: 302.1023.



### 2-(4-chlorophenyl)-4-(4-methoxyphenyl)quinoline (Table 5, entry 3)

White solid

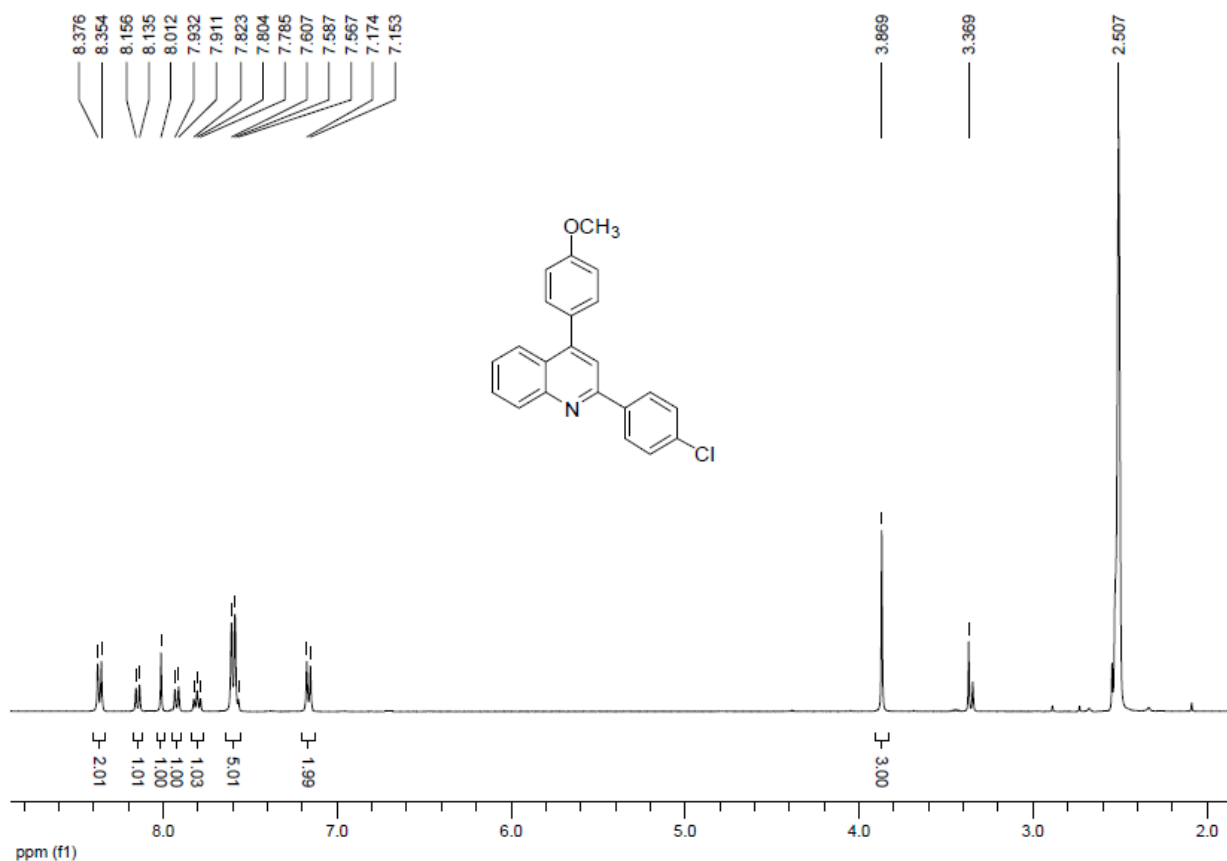
M.P: 99.3-100.5 °C

<sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) (δ, ppm): 8.36 (d, 2H, *J* = 8.8 Hz), 8.15 (d, 1H, *J* = 8.4 Hz), 8.01 (s, 1H), 7.92 (d, 1H, *J* = 8.4 Hz), 7.80 (t, 1H, *J* = 7.6 Hz), 7.59 (t, 5H, *J* = 8.0 Hz), 7.16 (d, 2H, *J* = 8.4 Hz), 3.87 (s, 3H).

IR (KBr, ν, cm<sup>-1</sup>): 3002, 2833, 1590, 1490, 1248, 1091, 824, 760, 589.

HRMS (ESI): *m/z* calcd for: 346.0999 [M+H]<sup>+</sup>, found: 346.0995.





**6-chloro-2-(4-chlorophenyl)-4-(4-fluorophenyl)quinoline (Table 5, entry 8)**

White solid

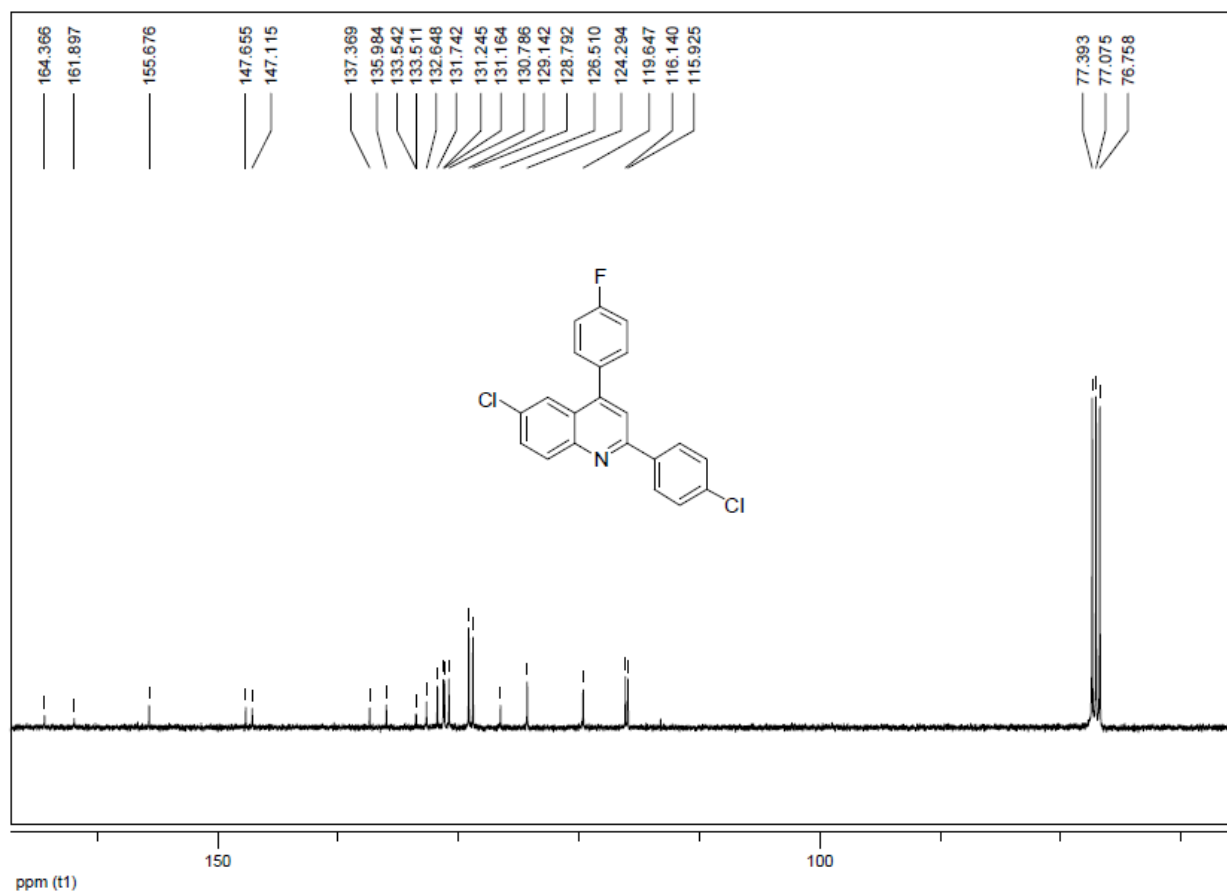
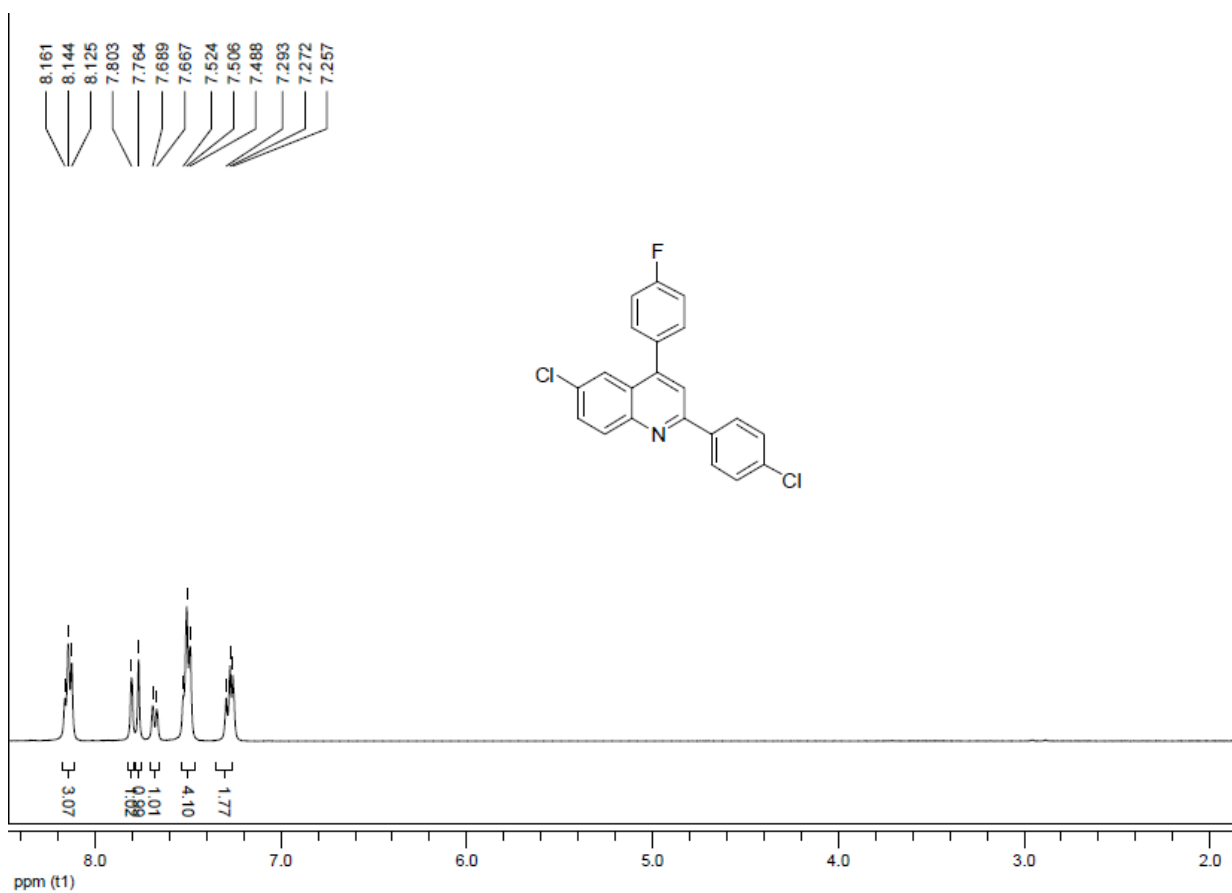
M.P: 175.6-176.1 °C

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) (δ, ppm): 8.14 (t, 3H, *J* = 7.6 Hz), 7.80 (s, 1H), 7.76 (s, 1H), 7.68 (d, 1H, *J* = 8.8 Hz), 7.50 (t, 4H, *J* = 7.2 Hz), 7.28 (d, 2H, *J* = 8.4 Hz).

<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) (δ, ppm): 163.1 (q, *J* = 248.4 Hz), 155.7, 147.7, 147.1, 137.4, 136.0, 133.5 (q, *J* = 3.1 Hz), 132.6, 131.7, 131.2 (q, *J* = 8.2 Hz), 130.8, 129.1, 128.8, 126.5, 124.3, 119.6, 116.0 (q, *J* = 21.6 Hz).

IR (KBr, ν, cm<sup>-1</sup>): 3044, 1605, 1486, 1237, 1079, 827, 558.

HRMS (ESI): *m/z* calcd for: 368.0409 [M+H]<sup>+</sup>, found: 368.0401.



All spectral data of known substances correspond to those given in the literature.

**4-phenyl-2-*p*-tolylquinoline**<sup>[1]</sup>

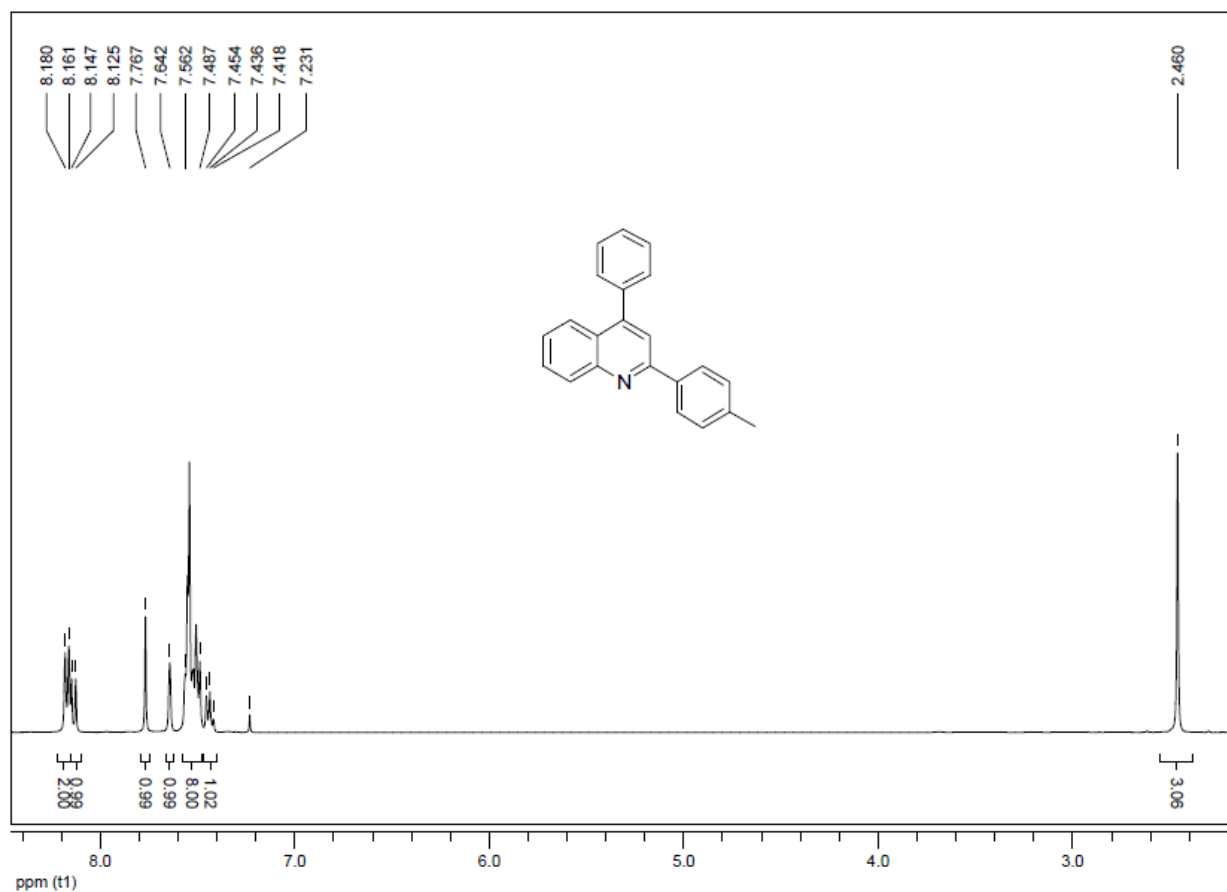
White solid

M.P: 99.7-102.1 °C

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) (δ, ppm): 8.17 (d, 2H, *J* = 7.6 Hz), 8.14 (d, 1H, *J* = 8.8 Hz), 7.77 (s, 1H), 7.64 (s, 1H), 7.56-7.49 (m, 8H), 7.44 (t, 1H, *J* = 7.2 Hz), 2.46 (s, 3H).

IR (KBr, ν, cm<sup>-1</sup>): 3052, 2911, 1588, 1544, 1358, 827, 758, 702, 590, 551.

HRMS (ESI): *m/z* calcd for: 296.1439 [M+H]<sup>+</sup>, found: 296.1451.



**2,4-diphenylquinoline** (Table 3, entry 1)<sup>[2]</sup>

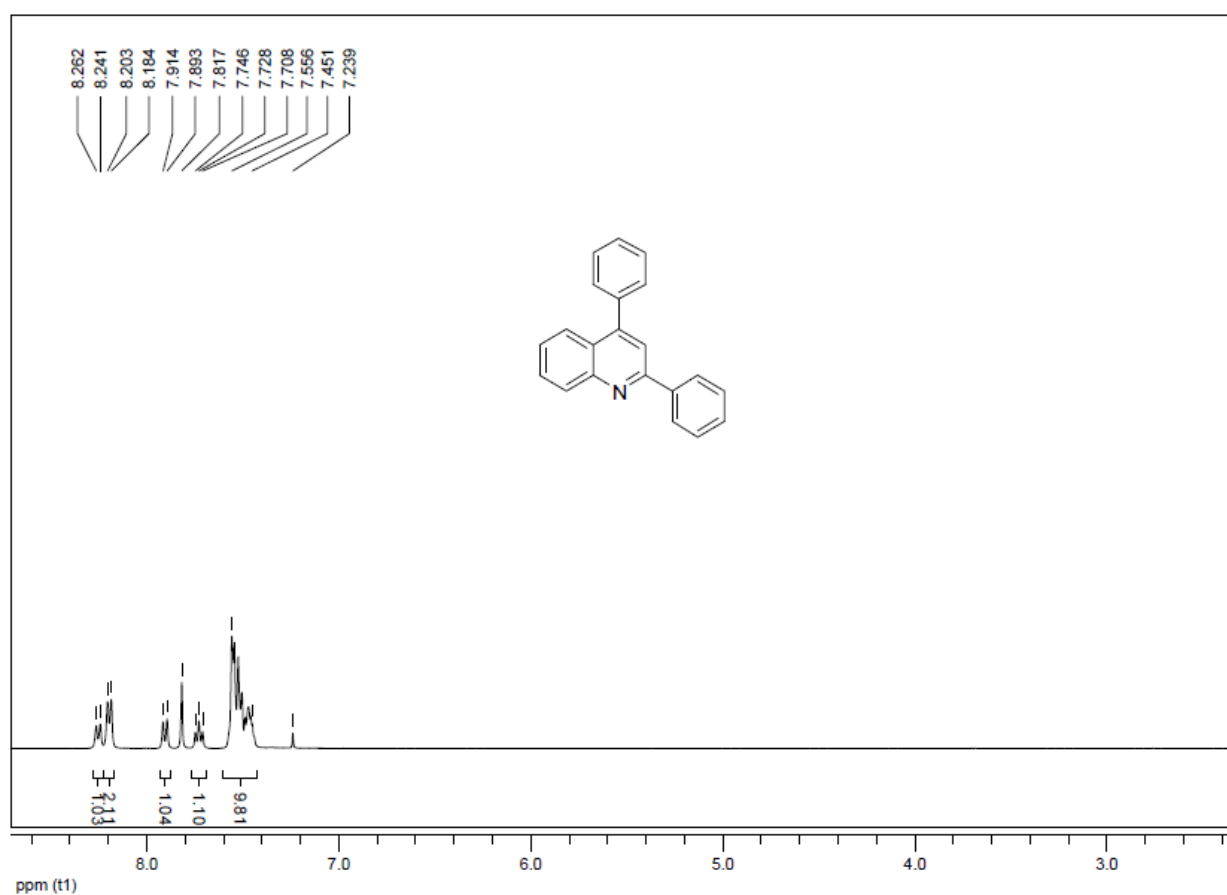
White solid

M.P: 107.2-108.6 °C

$^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) ( $\delta$ , ppm): 8.25 (d, 1H,  $J = 8.4$  Hz), 8.19 (d, 2H,  $J = 7.6$  Hz), 7.90 (d, 1H,  $J = 8.4$  Hz), 7.73 (t, 1H,  $J = 8.0$  Hz), 7.56-7.45 (m, 10H).

IR (KBr,  $\nu$ ,  $\text{cm}^{-1}$ ): 3052, 1588, 1488, 1356, 1028, 889, 701, 589.

HRMS (ESI):  $m/z$  calcd for: 304.1102  $[\text{M}+\text{Na}]^+$ , found: 304.1084.



**6-methoxy-2,4-diphenylquinoline (Table 3, entry 2)** <sup>[3]</sup>

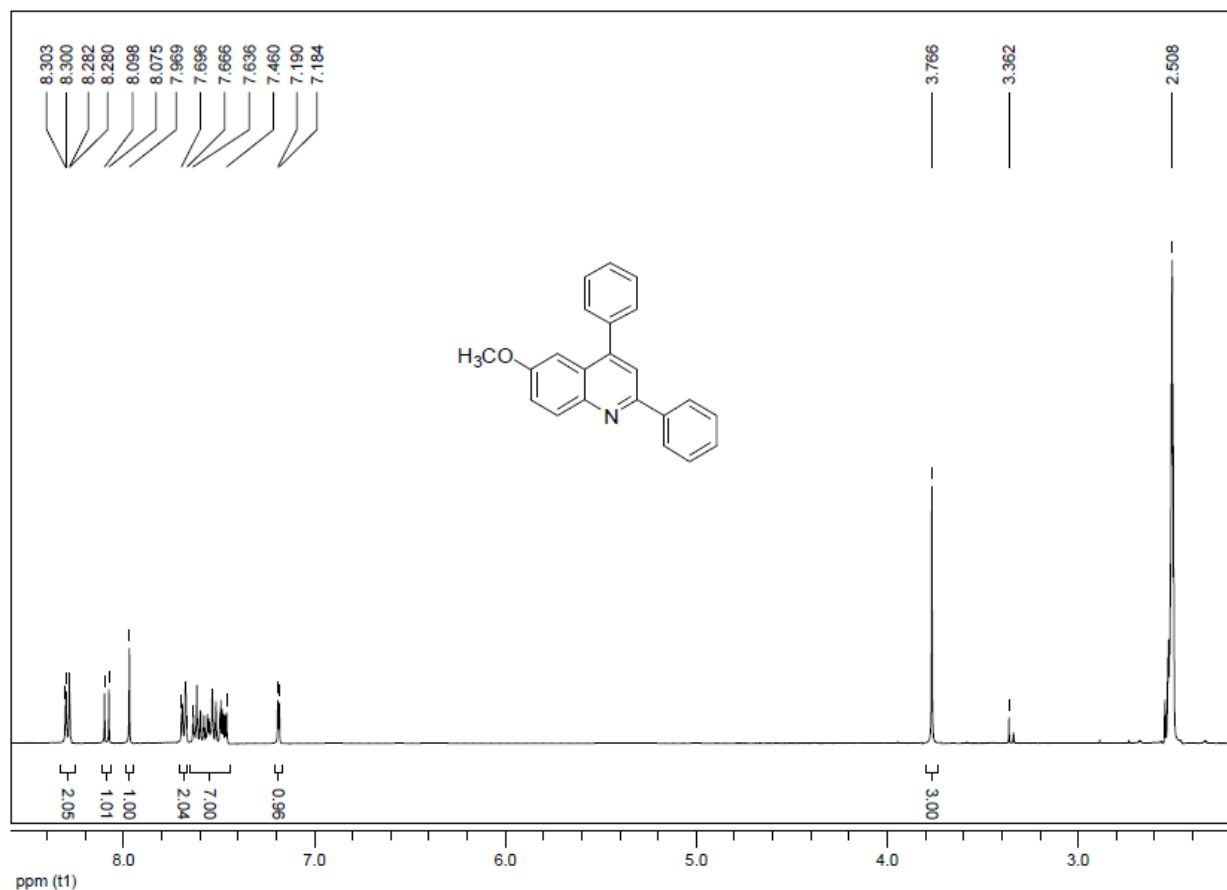
Pale orange solid

M.P: 116.0-117.1 °C

$^1\text{H}$  NMR (400 MHz,  $\text{DMSO-}d_6$ ) ( $\delta$ , ppm): 8.29 (d, 2H,  $J = 8.0$  Hz), 8.09 (d, 1H,  $J = 9.2$  Hz), 7.97 (s, 1H), 7.70-7.67 (m, 2H), 7.64-7.46 (m, 7H), 7.19 (d, 1H,  $J = 2.4$  Hz), 3.77 (s, 3H).

IR (KBr,  $\nu$ ,  $\text{cm}^{-1}$ ): 2958, 1617, 1488, 1234, 1026, 835, 695, 587.

HRMS (ESI):  $m/z$  calcd for: 312.1388  $[\text{M}+\text{H}]^+$ , found: 312.1363.



**6-chloro-2,4-diphenylquinoline (Table 3, entry 3)** <sup>[4]</sup>

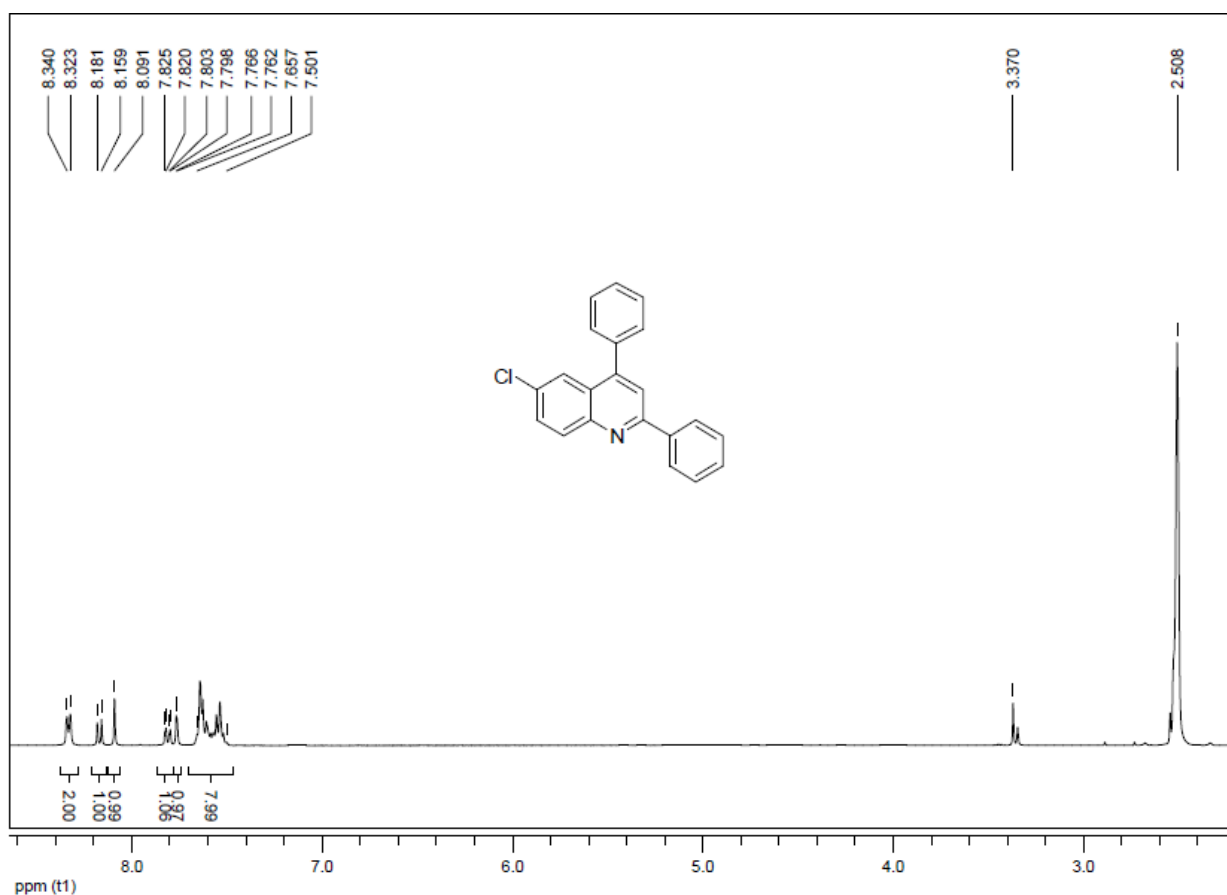
White solid

M.P: 124.4-125.3 °C

$^1\text{H}$  NMR (400 MHz,  $\text{DMSO-}d_6$ ) ( $\delta$ , ppm): 8.33 (d, 2H,  $J = 6.8$  Hz), 8.17 (d, 1H,  $J = 8.8$  Hz), 8.09 (s, 1H), 7.81 (d, 1H,  $J = 8.8$  Hz), 7.76 (s, 1H), 7.66-7.50 (m, 8H).

IR (KBr,  $\nu$ ,  $\text{cm}^{-1}$ ): 3056, 1588, 1483, 1357, 1152, 884, 780, 700, 546.

HRMS (ESI):  $m/z$  calcd for: 338.0712  $[\text{M}+\text{Na}]^+$ , found: 338.0682.



**6-bromo-2,4-diphenylquinoline (Table 3, entry 4)** <sup>[5]</sup>

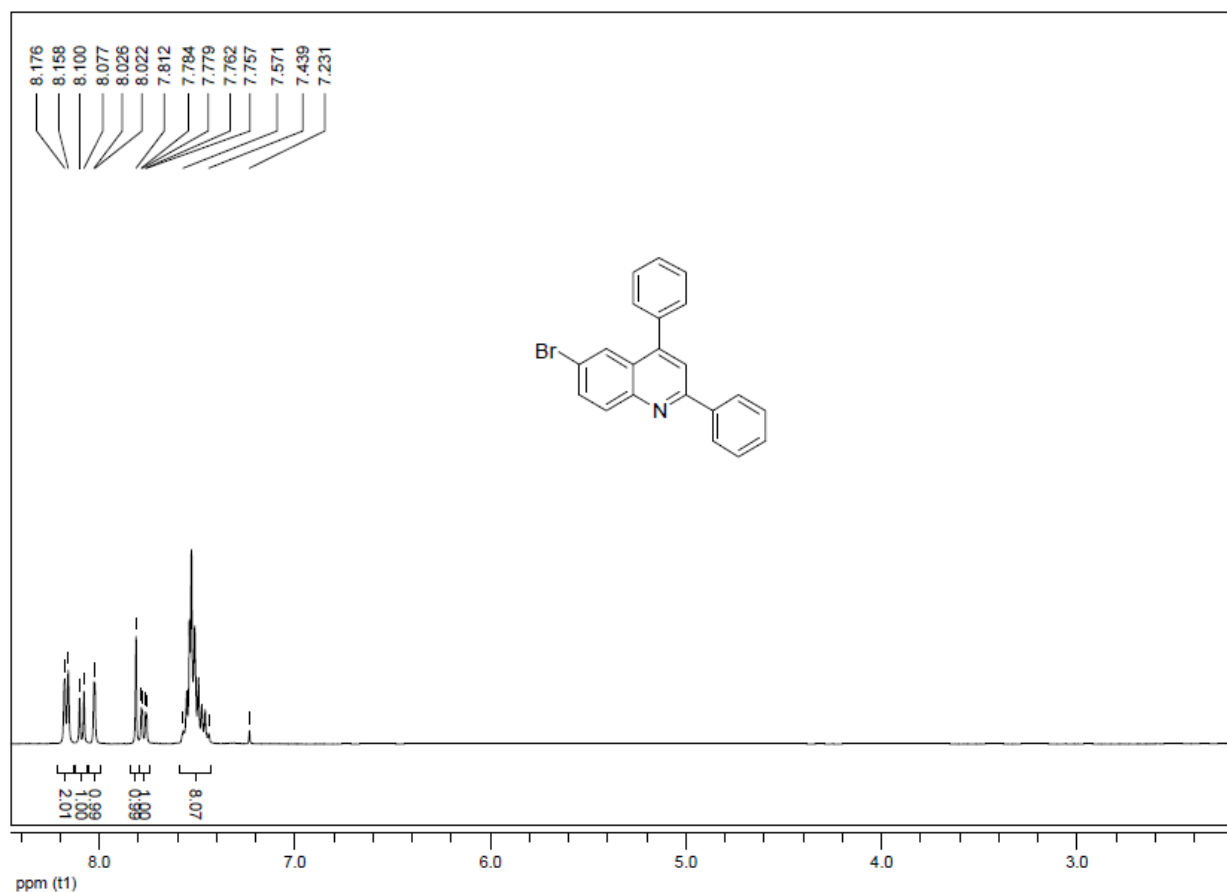
White solid

M.P: 148.2-149.6 °C

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) (δ, ppm): 8.17 (d, 2H, *J* = 7.2 Hz), 8.09 (d, 1H, *J* = 9.2 Hz), 8.02 (s, 1H), 7.81 (s, 1H), 7.77 (d, 1H, *J* = 8.8 Hz), 7.57-7.44 (m, 8H).

IR (KBr, ν, cm<sup>-1</sup>): 3055, 1587, 1480, 1356, 1150, 891, 779, 542.

HRMS (ESI): *m/z* calcd for: 360.0388 [M+H]<sup>+</sup>, found: 360.0369.



**6-nitro-2,4-diphenylquinoline (Table 3, entry 5)**<sup>[6]</sup>

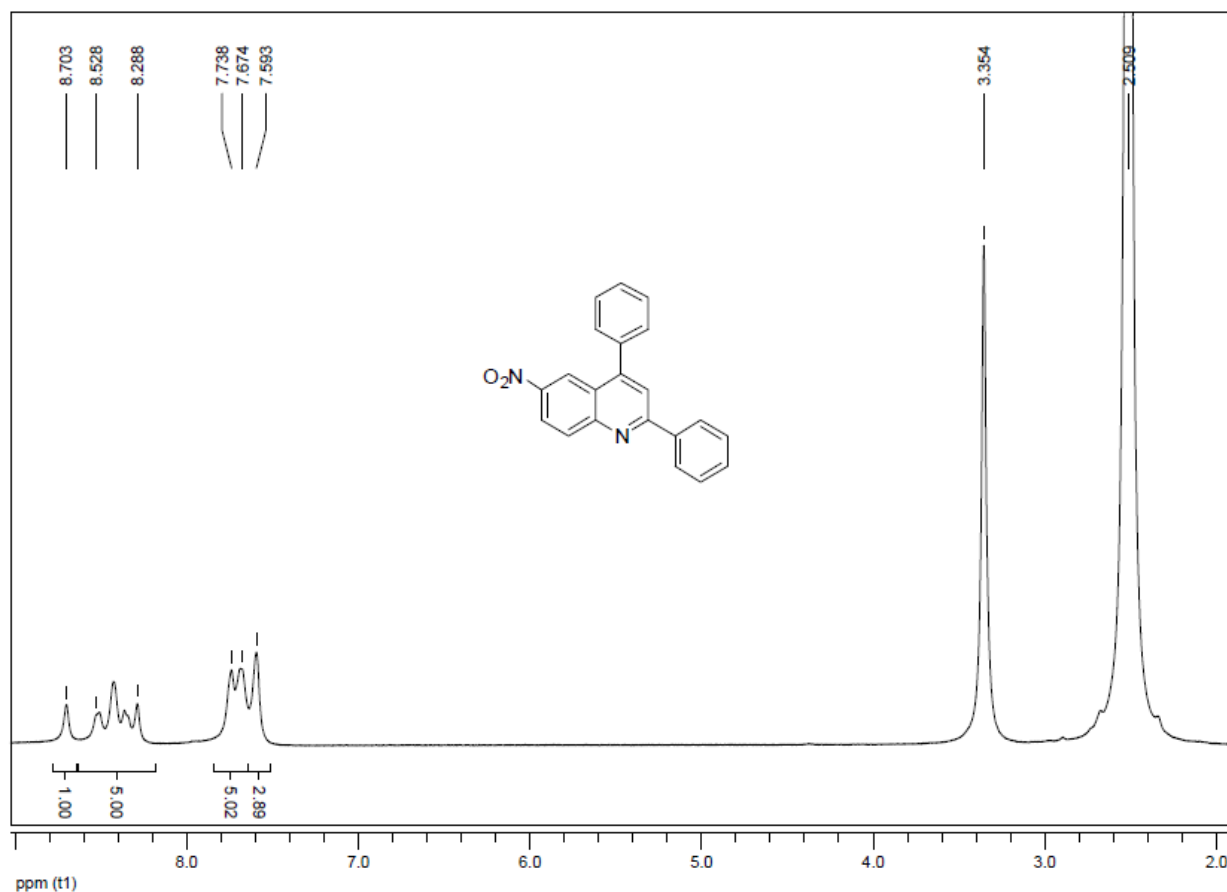
Yellow solid

M.P: 256.5-258.2 °C

<sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) (δ, ppm): 8.70 (s, 1H), 8.53-8.29 (m, 5H), 7.74-7.67 (m, 5H), 7.59 (s, 3H).

IR (KBr, ν, cm<sup>-1</sup>): 3650, 3055, 1594, 1486, 1230, 1084, 847, 752, 685, 589.

HRMS (ESI): m/z calcd for: 327.1134 [M+H]<sup>+</sup>, found: 327.1134.



**8-chloro-2,4-diphenylquinoline (Table 3, entry 6)**<sup>[7]</sup>

White solid

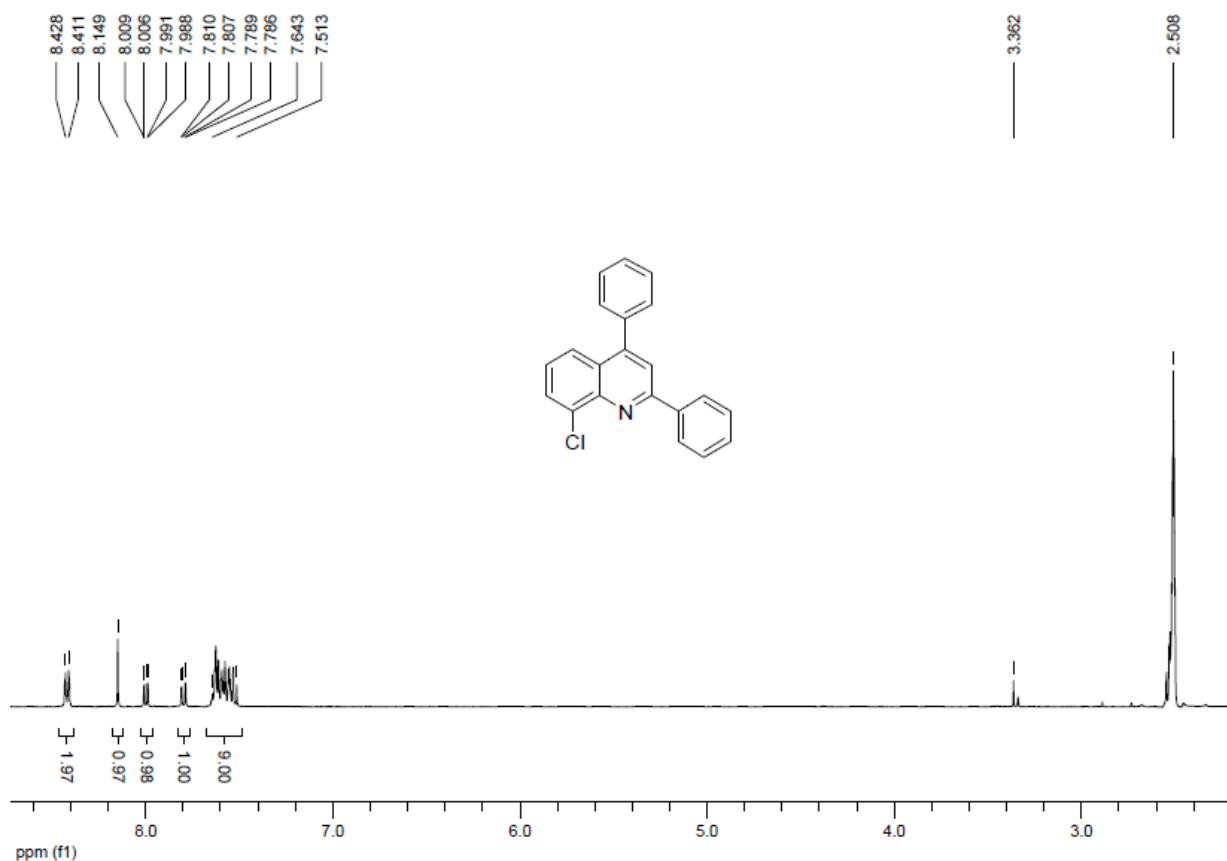
M.P: 114.3-116.3 °C

<sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) (δ, ppm): 8.42 (d, 2H, *J* = 6.8 Hz), 8.15 (s, 1H), 8.00 (d, 1H, *J* = 7.2 Hz), 7.80 (d, 1H, *J* = 8.4 Hz), 7.64-7.51 (m, 9H).

IR (KBr, ν, cm<sup>-1</sup>): 3039, 2840, 1883, 1592, 1490, 1245, 1027, 774, 687, 584.

HRMS (ESI): *m/z* calcd for: 316.0893 [M+H]<sup>+</sup>, found: 316.0871.





**1,3-diphenylbenzo[f]quinoline (Table 3, entry 7) <sup>[8]</sup>**

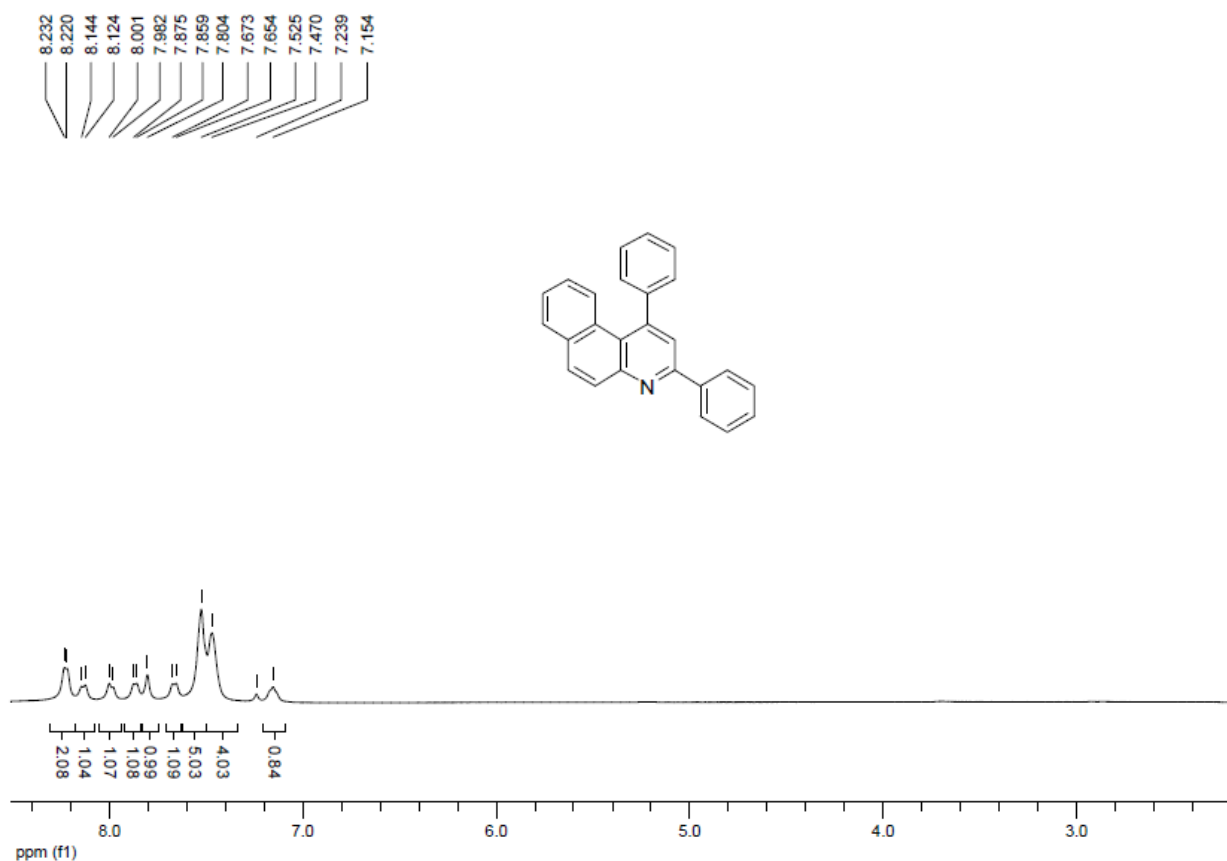
White solid

M.P: 142.9-143.8 °C

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) (δ, ppm): 8.22 (d, 2H, *J* = 4.8 Hz), 8.13 (d, 1H, *J* = 8.0 Hz), 7.99 (d, 1H, *J* = 7.6 Hz), 7.87 (d, 1H, *J* = 6.4 Hz), 7.80 (s, 1H), 7.66 (d, 1H, *J* = 7.6 Hz), 7.53 (s, 5H), 7.47 (s, 4H), 7.15 (s, 1H).

IR (KBr, ν, cm<sup>-1</sup>): 3056, 3028, 1580, 1543, 1476, 1360, 1256, 1027, 834, 697, 593, 526.

HRMS (ESI): *m/z* calcd for: 332.1439 [M+H]<sup>+</sup>, found: 332.1420.



**2,4-diphenylbenzo[h]quinoline (Table 3, entry 8)<sup>[9]</sup>**

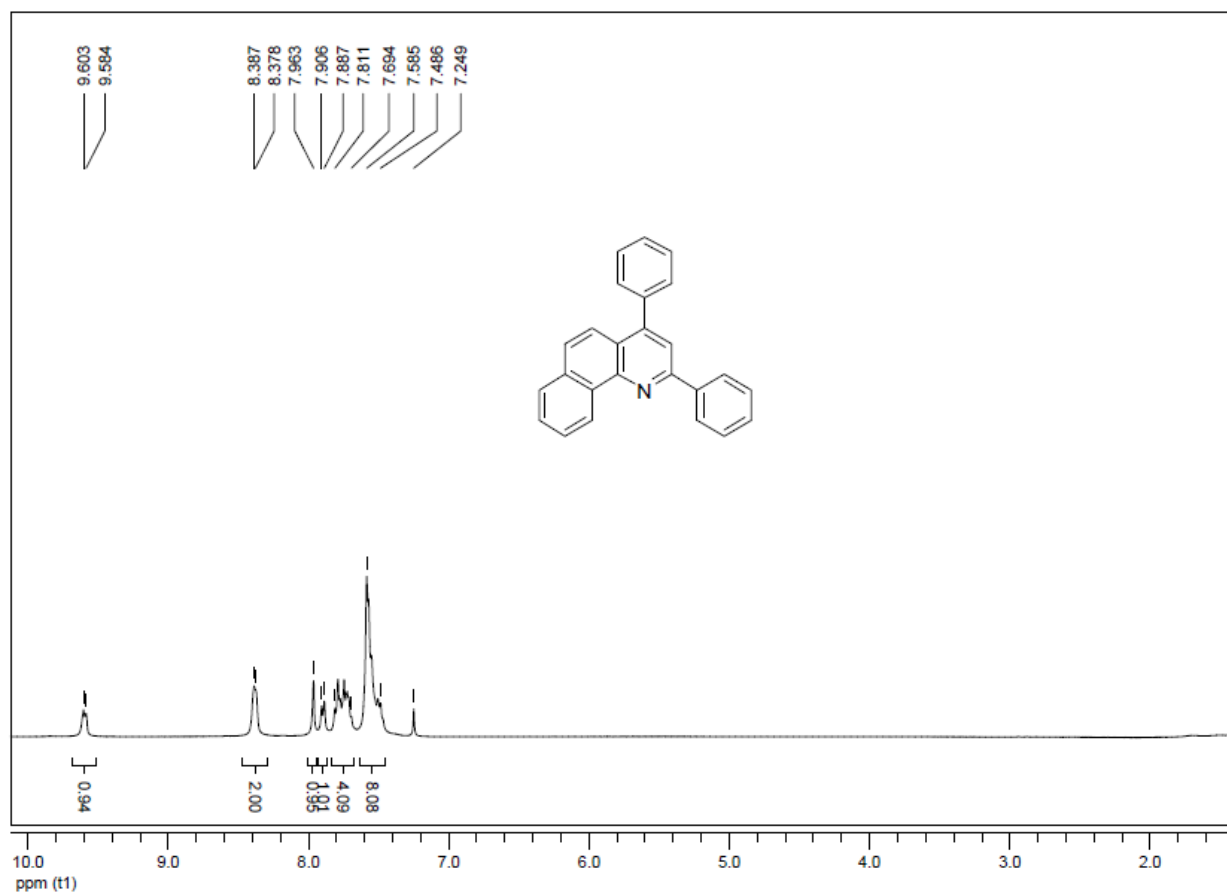
White solid

M.P: 160.2-161.9 °C

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) ( $\delta$ , ppm): 9.59 (d, 1H,  $J = 7.6$  Hz), 8.39 (s, 2H), 7.96 (s, 1H), 7.90 (d, 1H,  $J = 7.6$  Hz), 7.81-7.69 (m, 4H), 7.59-7.49 (m, 8H).

IR (KBr,  $\nu$ , cm<sup>-1</sup>): 3032, 2920, 2850, 1957, 1581, 1482, 1024, 833, 698, 600.

HRMS (ESI):  $m/z$  calcd for: 332.1439 [M+H]<sup>+</sup>, found: 332.1428.



**6-methyl-2,4-diphenylquinoline (Table 4, entry 1)**<sup>[10]</sup>

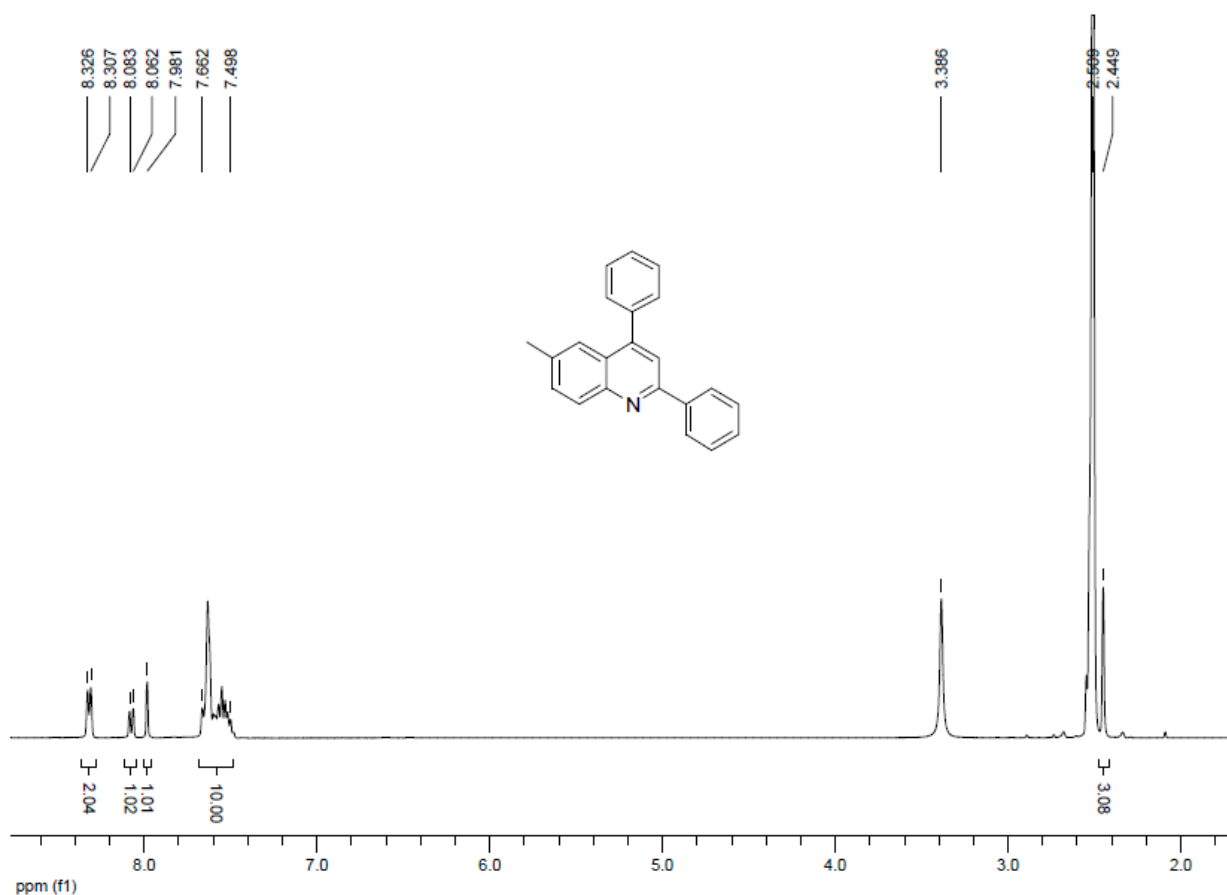
White solid

M.P: 121.4-124.4 °C

<sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) (δ, ppm): 8.32 (d, 2H, *J* = 7.6 Hz), 8.07 (d, 1H, *J* = 8.4 Hz), 7.98 (s, 1H), 7.66-7.50 (m, 10H), 2.45 (s, 3H).

IR (KBr, ν, cm<sup>-1</sup>): 3651, 3052, 3035, 1587, 1544, 1489, 1357, 827, 757, 701, 551.

HRMS (ESI): *m/z* calcd for: 296.1439 [M+H]<sup>+</sup>, found: 296.1433.



**2-(4-chlorophenyl)-6-methyl-4-phenylquinoline (Table 4, entry 3)**<sup>[11]</sup>

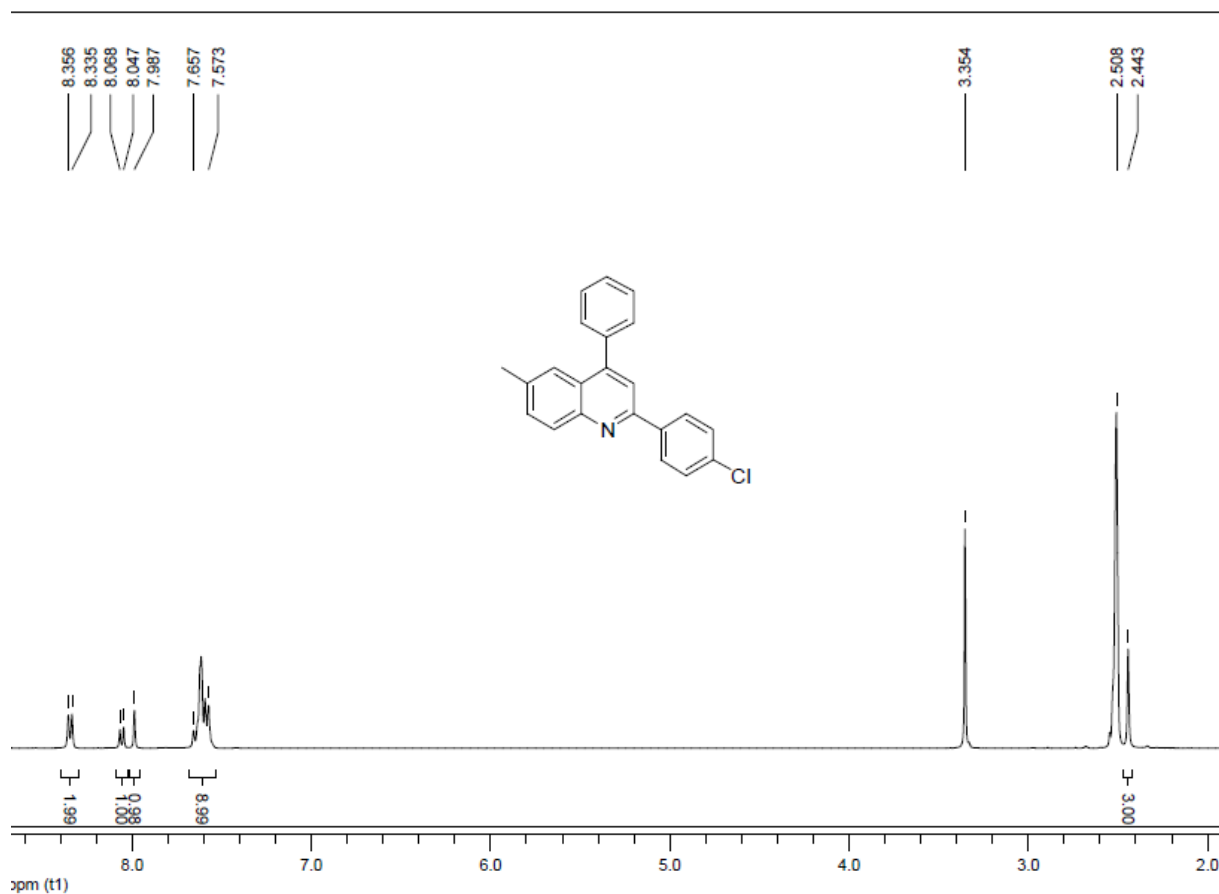
Yellow solid

M.P: 129.7-131.7 °C

<sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>): 8.35 (d, 2H, *J* = 8.4 Hz), 8.06 (d, 1H, *J* = 8.4 Hz), 7.99 (s, 1H), 7.66-7.57 (m, 9H), 2.44 (s, 3H).

IR (KBr,  $\nu$ , cm<sup>-1</sup>): 3052, 2909, 1587, 1488, 1090, 1012, 827, 700, 546.

HRMS (ESI): *m/z* calcd for: 330.1050 [M+H]<sup>+</sup>, found: 330.1026.



**2-(4-bromophenyl)-6-methyl-4-phenylquinoline (Table 4, entry 4)**<sup>[12]</sup>

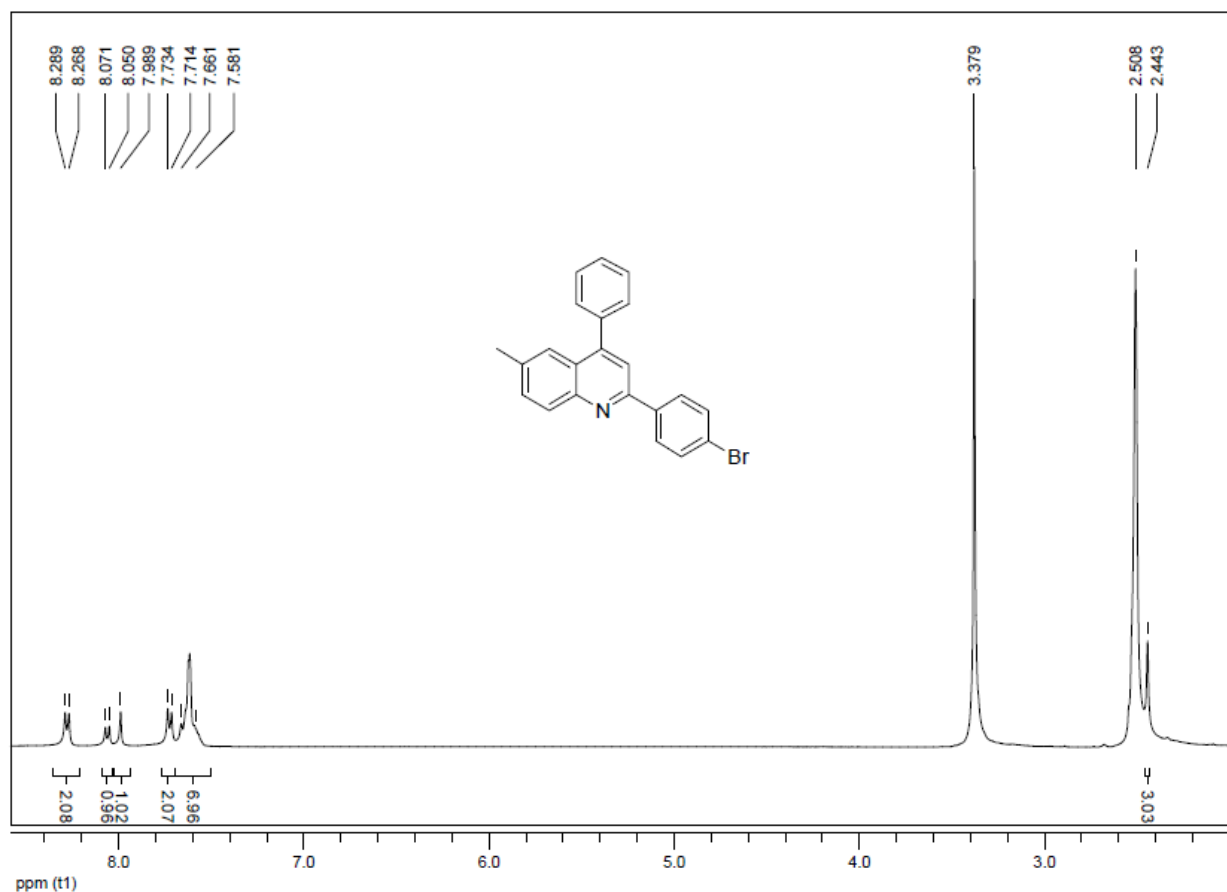
Yellow solid

M.P: 142.1-144.5 °C

<sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) (δ, ppm): 8.28 (d, 2H, *J* = 8.4 Hz), 8.06 (d, 1H, *J* = 8.4 Hz), 7.99 (s, 1H), 7.72 (d, 2H, *J* = 8.0 Hz), 7.66-7.58 (m, 7H), 2.44 (s, 3H).

IR (KBr, ν, cm<sup>-1</sup>): 3050, 2909, 1587, 1487, 1073, 1007, 825, 700, 546.

HRMS (ESI): *m/z* calcd for: 374.0544 [M+H]<sup>+</sup>, found: 374.0521.



**4-(4-methoxyphenyl)-2-phenylquinoline (Table 5, entry 1)** <sup>[13]</sup>

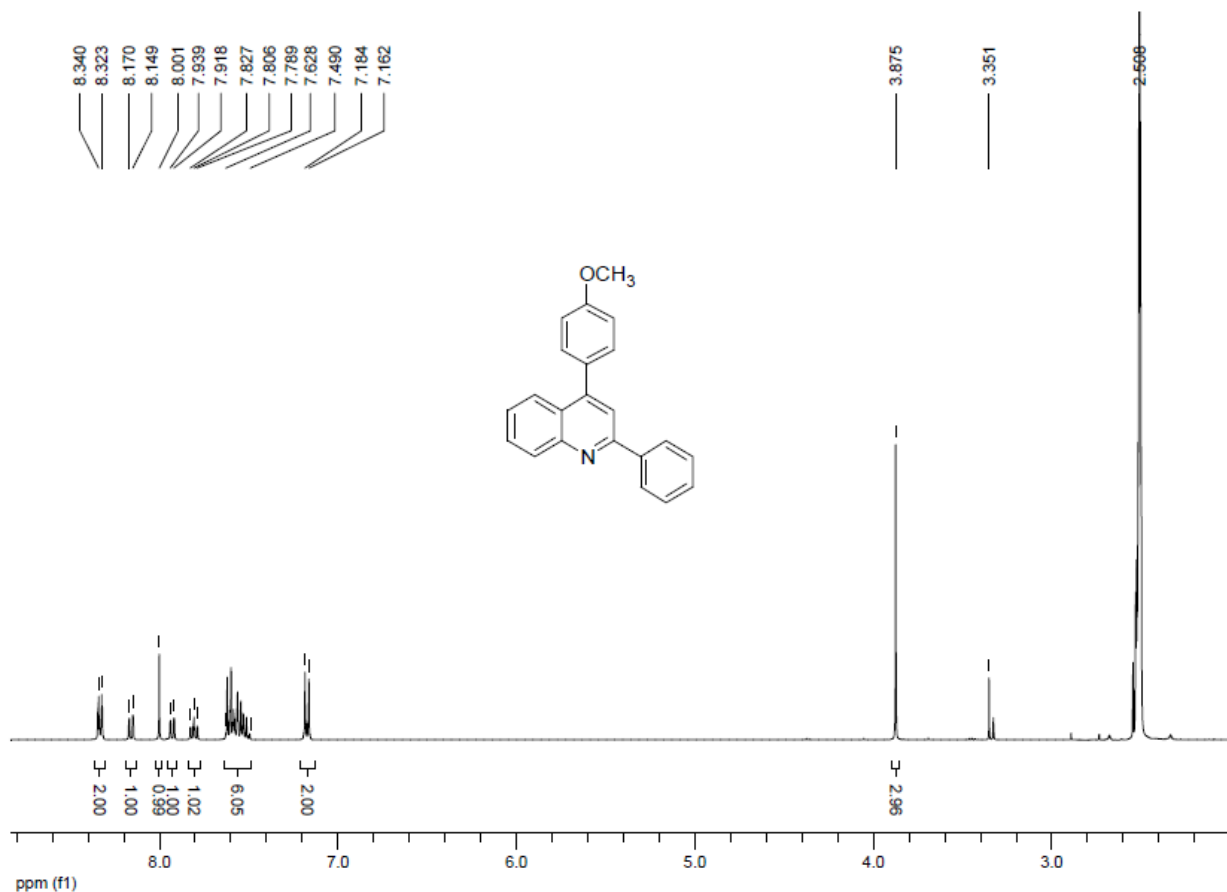
Pale yellow solid

M.P: 96.6-97.4 °C

<sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) (δ, ppm): 8.33 (d, 2H, *J* = 6.8 Hz), 8.16 (d, 1H, *J* = 8.4 Hz), 8.00 (s, 1H), 7.93 (d, 1H, *J* = 8.4 Hz), 7.81 (t, 1H, *J* = 8.4 Hz), 7.63-7.50 (m, 6H), 7.17 (d, 2H, *J* = 8.8 Hz), 3.88 (s, 3H).

IR (KBr, ν, cm<sup>-1</sup>): 3063, 2837, 1608, 1515, 1292, 1026, 885, 684, 571.

HRMS (ESI): *m/z* calcd for: 334.1208 [M+Na]<sup>+</sup>, found: 334.1194.



**6-chloro-4-(4-methoxyphenyl)-2-phenylquinoline (Table 5, entry 2)**<sup>[14]</sup>

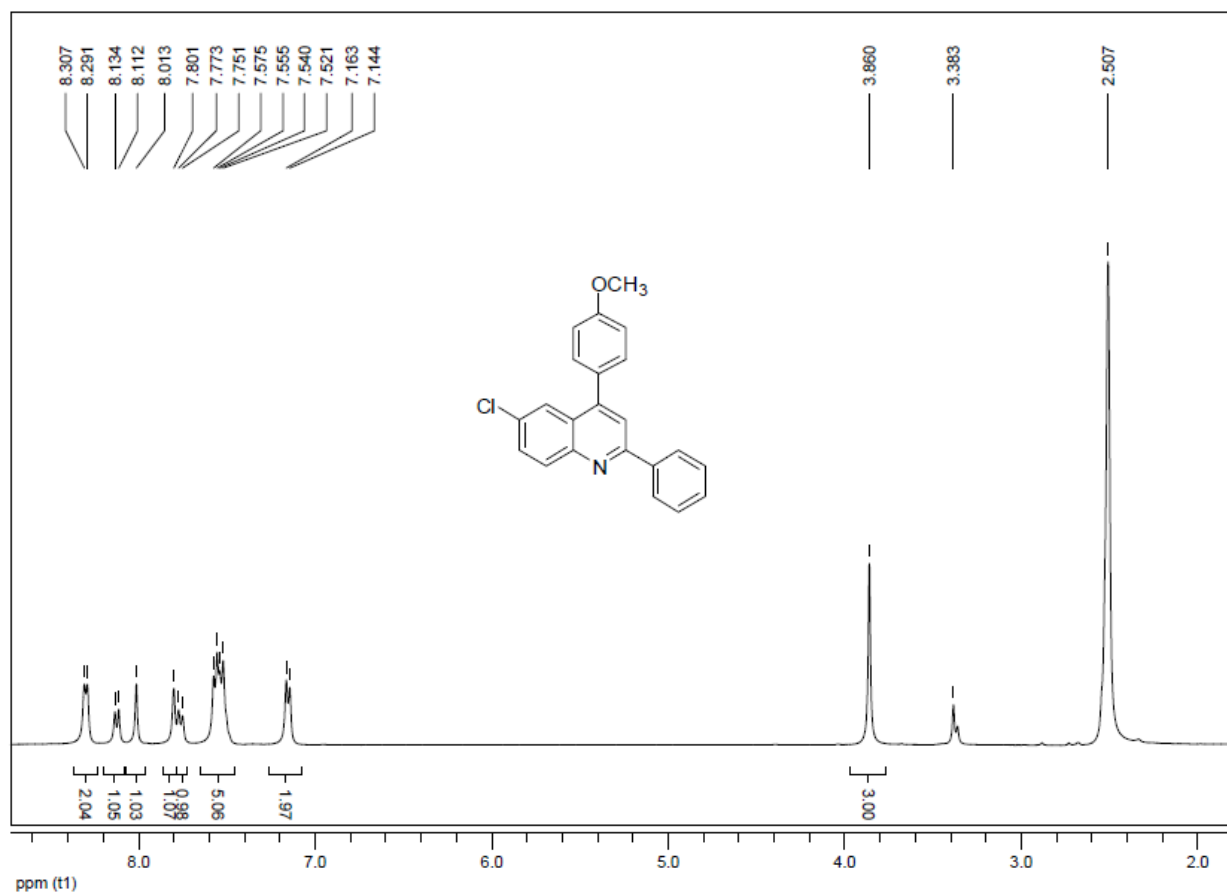
White solid

M.P: 132.3-133.2 °C

<sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) (δ, ppm): 8.30 (d, 2H, *J* = 6.4 Hz), 8.12 (d, 1H, *J* = 8.8 Hz), 8.01 (s, 1H), 7.80 (s, 1H), 7.76 (d, 1H, *J* = 8.8 Hz), 7.55 (q, 5H, *J* = 8.0 Hz), 7.15 (d, 2H, *J* = 7.6 Hz), 3.86 (s, 3H).

IR (KBr, ν, cm<sup>-1</sup>): 3010, 2837, 1590, 1515, 1152, 1026, 822, 684, 587.

HRMS (ESI): *m/z* calcd for: 346.0999 [M+H]<sup>+</sup>, found: 346.0990.



**6-chloro-2-(4-chlorophenyl)-4-(4-methoxyphenyl)quinoline (Table 5, entry 4)**<sup>[15]</sup>

White solid

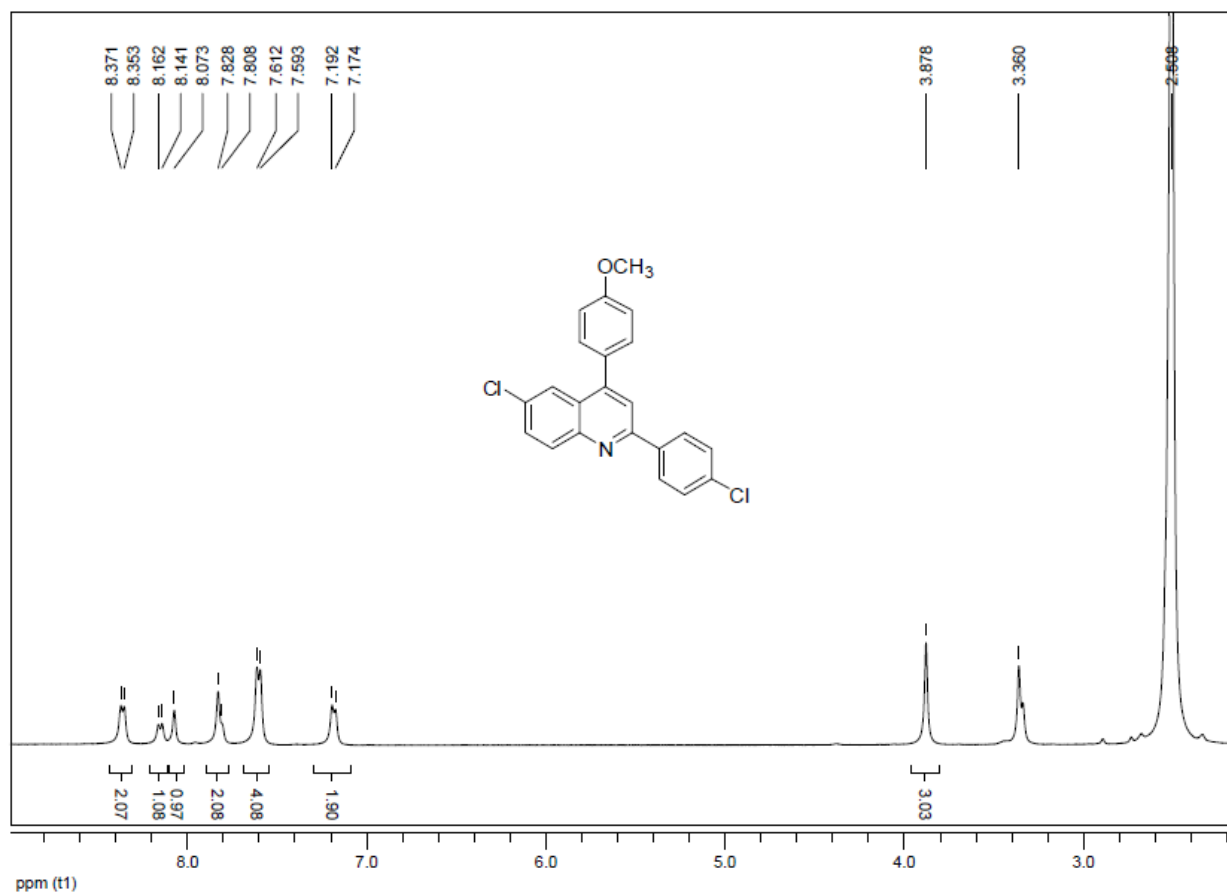
M.P: 156.7-159.0 °C

<sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) (δ, ppm): 8.36 (d, 2H, *J* = 7.2 Hz), 8.15 (d, 1H, *J* = 8.4 Hz), 8.07 (s, 1H), 7.82 (d, 2H, *J* = 8.0 Hz), 7.61 (d, 4H, *J* = 7.6 Hz), 7.18 (d, 2H, *J* = 7.2 Hz), 3.88 (s, 3H).

IR (KBr, ν, cm<sup>-1</sup>): 3051, 2836, 1613, 1485, 1258, 1173, 1035, 822, 546.

HRMS (ESI): *m/z* calcd for: 380.0609 [M+H]<sup>+</sup>, found: 380.0605.





**4-(4-fluorophenyl)-2-phenylquinoline (Table 5, entry 5)**<sup>[16]</sup>

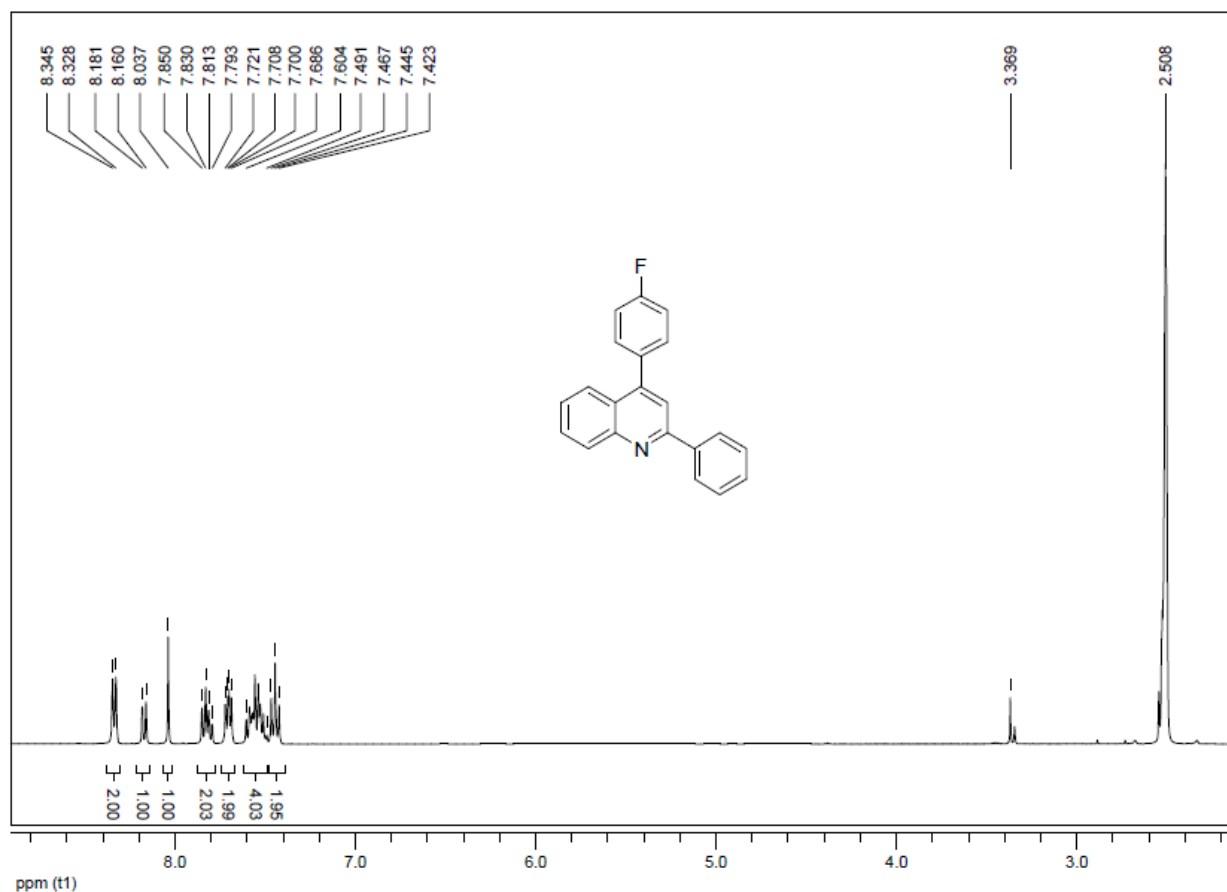
Pale yellow solid

M.P: 80.0-81.5 °C

<sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) (δ, ppm): 8.34 (d, 2H, *J* = 6.8 Hz), 8.17 (d, 1H, *J* = 8.4 Hz), 8.04 (s, 1H), 7.82 (q, 2H, *J* = 8.0 Hz), 7.70 (q, 2H, *J* = 5.6 Hz), 7.60-7.49 (m, 4H), 7.45 (t, 2H, *J* = 8.8 Hz).

IR (KBr, ν, cm<sup>-1</sup>): 3054, 1900, 1608, 1513, 1356, 1156, 840, 577, 542.

HRMS (ESI): *m/z* calcd for: 300.1189 [M+H]<sup>+</sup>, found: 300.1199.



**6-chloro-4-(4-fluorophenyl)-2-phenylquinoline (Table 5, entry 6)**<sup>[17]</sup>

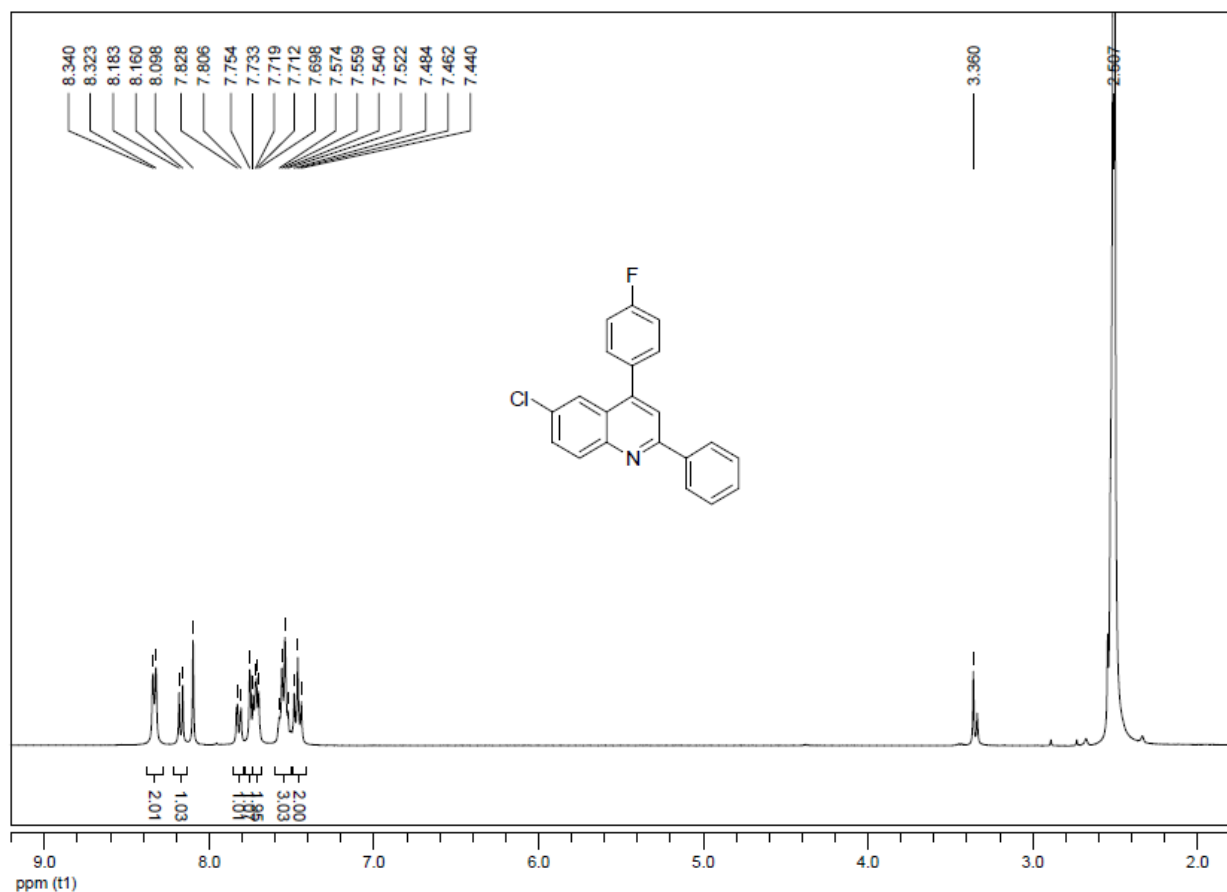
Pale yellow solid

M.P: 126.3-128.2 °C

<sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) (δ, ppm): 8.33 (d, 2H, *J* = 6.8 Hz), 8.17 (d, 1H, *J* = 9.2 Hz), 8.10 (s, 1H), 7.82 (d, 1H, *J* = 8.8 Hz), 7.75 (s, 1H), 7.71 (q, 2H, *J* = 5.6 Hz), 7.55 (q, 3H, *J* = 7.2 Hz), 7.46 (t, 2H, *J* = 8.8 Hz).

IR (KBr, ν, cm<sup>-1</sup>): 3055, 1605, 1510, 1231, 886, 685, 556, 547.

HRMS (ESI): *m/z* calcd for: 334.0799 [M+H]<sup>+</sup>, found: 334.0799.



**2-(4-chlorophenyl)-4-(4-fluorophenyl)quinoline (Table 5, entry 7)** <sup>[18]</sup>

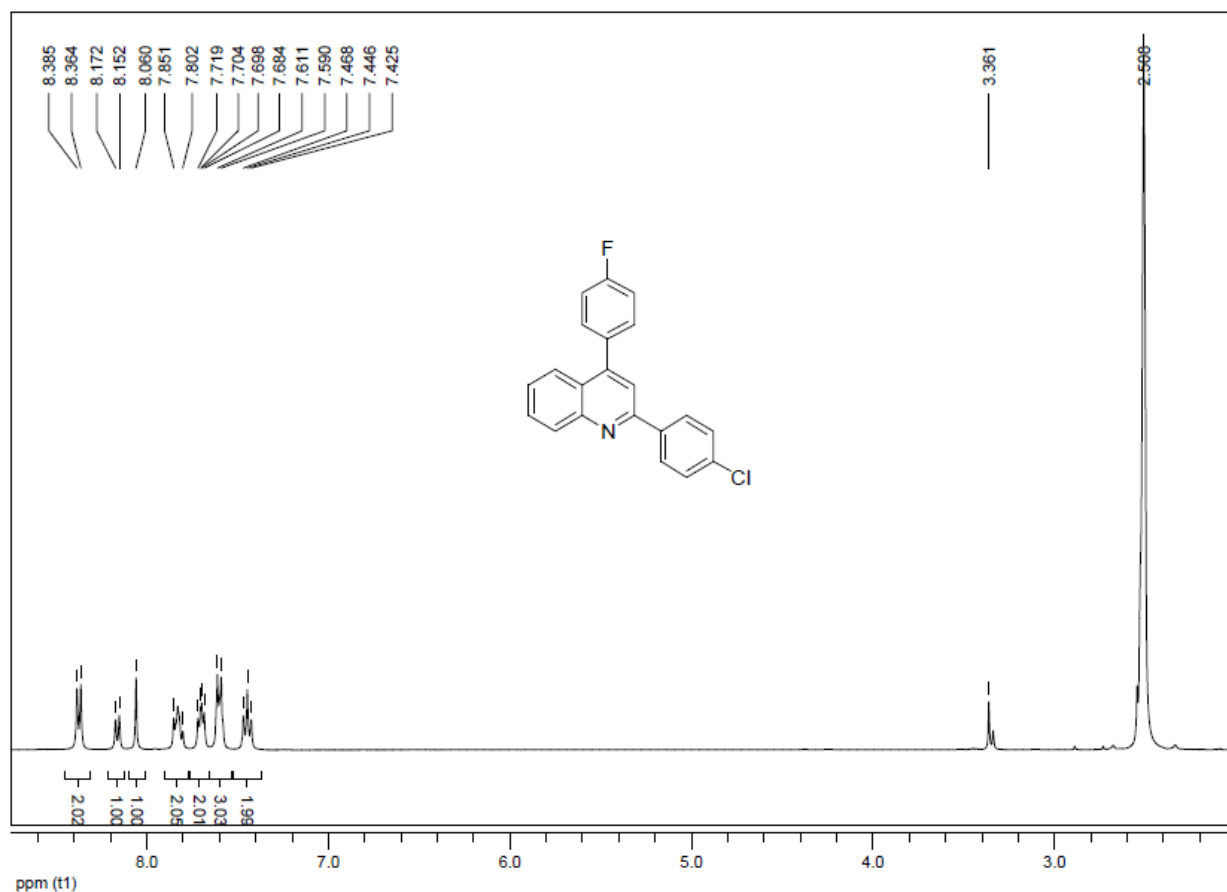
White solid

M.P: 97.6-98.8 °C

<sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) (δ, ppm): 8.37 (d, 2H, *J* = 8.4 Hz), 8.16 (d, 1H, *J* = 8.0 Hz), 8.06 (s, 1H), 7.85-7.80 (m, 2H), 7.70 (q, 2H, *J* = 6.0 Hz), 7.61 (d, 3H, *J* = 8.4 Hz), 7.45 (t, 2H, *J* = 8.8 Hz).

IR (KBr, ν, cm<sup>-1</sup>): 3043, 1604, 1491, 1222, 1091, 830, 758, 554.

HRMS (ESI): *m/z* calcd for: 334.0799 [M+H]<sup>+</sup>, found: 334.0818.



**2-(4-chlorophenyl)-4-phenylquinoline (Table 5, entry 9)**<sup>[19]</sup>

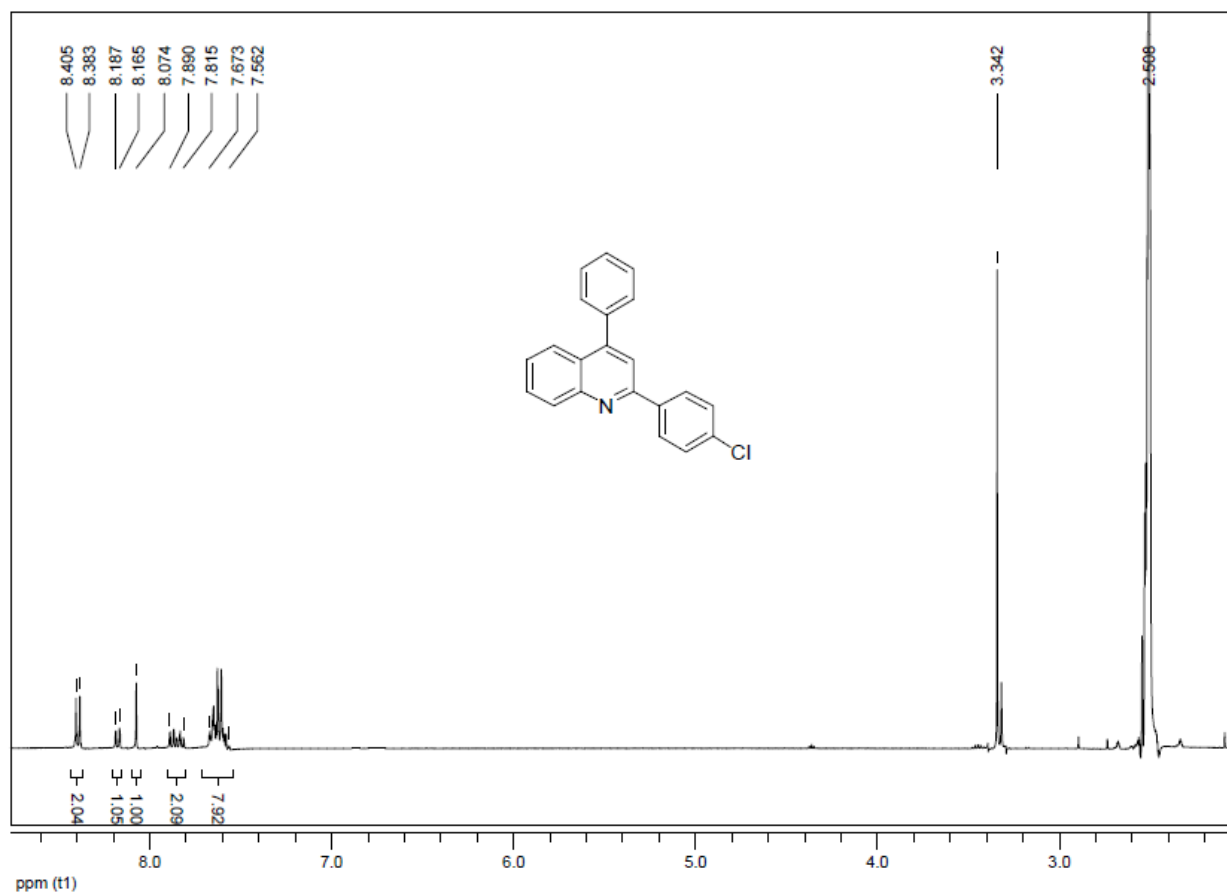
White solid

M.P: 104.1-105.6 °C

<sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) (δ, ppm): 8.39 (d, 2H, *J* = 8.8 Hz), 8.18 (d, 1H, *J* = 8.8 Hz), 8.07 (s, 1H), 7.89-7.82 (m, 2H), 7.67-7.56 (m, 8H).

IR (KBr, ν, cm<sup>-1</sup>): 3054, 1592, 1487, 1356, 1094, 831, 698, 581.

HRMS (ESI): *m/z* calcd for: 316.0893 [M+H]<sup>+</sup>, found: 316.0928.



**2-(4-phenylquinolin-2-yl)phenol (Table 5, entry 10)**<sup>[20]</sup>

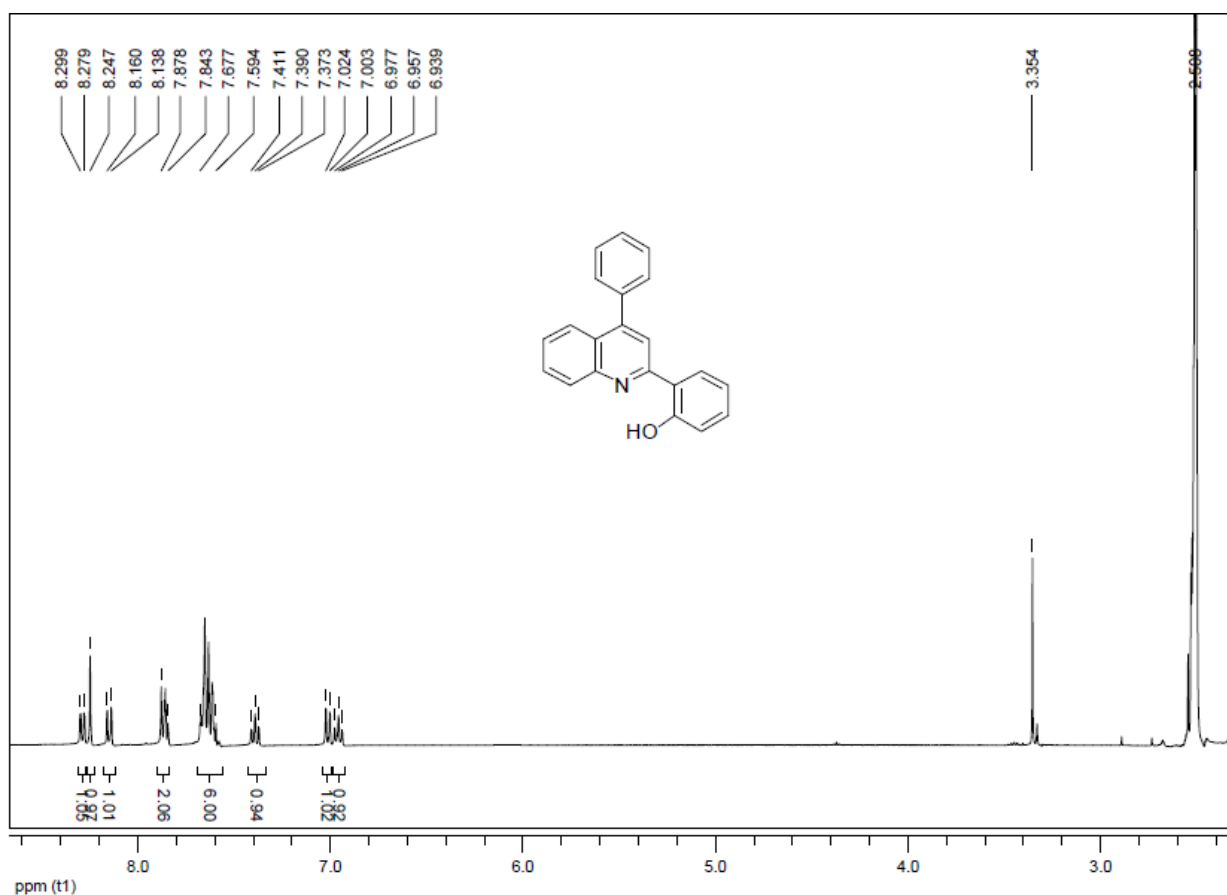
Pale orange solid

M.P: 167.0-168.8 °C

<sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) (δ, ppm): 8.29 (d, 1H, *J* = 8.0 Hz), 8.25 (s, 1H), 8.15 (d, 1H, *J* = 8.8 Hz), 7.88-7.84 (m, 2H), 7.68-7.59 (m, 6H), 7.39 (t, 1H, *J* = 8.4 Hz), 7.01 (q, 1H, *J* = 8.4 Hz), 6.96 (t, 1H, *J* = 8.0 Hz).

IR (KBr, ν, cm<sup>-1</sup>): 3056, 1605, 1589, 1401, 1214, 874, 767, 705, 596.

HRMS (ESI): *m/z* calcd for: 320.1051 [M+H]<sup>+</sup>, found: 320.1035.



**6-chloro-2-(4-chlorophenyl)-4-phenylquinoline (Table 5, entry 11)** <sup>[21]</sup>

White solid

M.P: 157.9-159.3 °C

<sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) ( $\delta$ , ppm): 8.36 (d, 2H,  $J = 8.4$  Hz), 8.16 (d, 1H,  $J = 9.2$  Hz), 8.11 (s, 1H), 7.81 (d, 1H,  $J = 9.2$  Hz), 7.76 (s, 1H), 7.63 (d, 4H,  $J = 3.6$  Hz), 7.61 (s, 2H), 7.58 (s, 1H).

IR (KBr,  $\nu$ , cm<sup>-1</sup>): 3045, 1910, 1588, 1484, 1356, 1076, 829, 699, 545.

HRMS (ESI):  $m/z$  calcd for: 350.0503 [M+H]<sup>+</sup>, found: 350.0542.



- [20] D. Garella; A. Barge; D. Upadhyaya; Z. Rodriguez; G. Palmisano; G. Cravotto, *Synth. Commun.*, 2010, **40**, 120.
- [21] S. S. Palimkar; S. A. Siddiqui; T. Daniel; R. J. Lahoti; K. V. Srinivasan, *J. Org. Chem.*, 2003, **68**, 9371.