

# Electronic Supplementary Information

**“On water” catalyst-free, column chromatography-free and atom economical protocol for highly diastereoselective synthesis of a novel class of 3-substituted, 3-hydroxy-2-oxindole scaffolds at room temperature**

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## General Information

All materials used in this study were obtained from commercial supplier and used without further purification as received. All reactions were carried out in an open atmosphere of air. All  $^1\text{H}$  and  $^{13}\text{C}$  NMR spectra were recorded in DMSO  $d_6$  on Avance 300 MHz/Inova 500 MHz spectrometers. Chemical shifts ( $\delta$ ) are reported in parts per million (ppm) relative to either residual TMS ( $^1\text{H}$ :  $\delta$  0.00 ppm,  $^{13}\text{C}$ :  $\delta$  00.00 ppm) or DMSO  $d_6$  ( $^1\text{H}$ :  $\delta$  2.50 ppm,  $^{13}\text{C}$ :  $\delta$  39.43 ppm) as an internal reference. The number of protons ( $n$ ) for a given resonance is indicated by  $n\text{H}$ . Coupling constants ( $J$ ) are reported in Hertz (Hz). Peak multiplicity is indicated as follows: s—singlet, d—doublet, t—triplet, q—quartet, br—broad, m—multiplet, dd—doublet of doublet dt—triplet of doublet and br s —broad singlet. Melting points were measured on a BUCHI melting point machine. IR spectra were recorded on Thermo Nicolet FT/IR-5700 spectrometer. Mass spectra were recorded using Waters mass spectrometers. High resolution mass spectrums (HRMS) were recorded using Applied Bio-Sciences HRMS spectrometer at national center for mass spectroscopy-IICT.

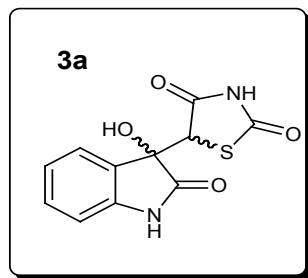
### **General procedure for synthesis of 3-(thiazolidinedione derivatives) substituted, 3-hydroxy-2-oxindole frameworks:**

Mixture of isatin **1(a-n)** (1.0 mmol) and thiazolidinedione derivatives **2(a-c)** (1 mmol) was stirred in 5 mL tap water at room temperature for stipulated time (12 h). The progress of the reaction was monitored by TLC as well as by the visualization of the change of color of the reaction mixture from red (at the begning of the reaction) to white (at the end of the reaction). The obtained thick white precipitate was filtered and dried to afford the desired product **3(a-x)** in very good yield and purity. All products **3(a-x)** were characterized by NMR, Mass and IR spectroscopic techniques.

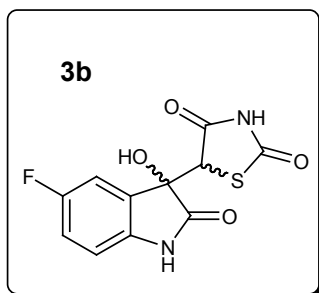
### **General procedure for synthesis of 3-(oxindole derivatives) substituted, 3-hydroxy-2-oxindole frameworks:**

Mixture of isatin **1(a-i)** (1.0 mmol) and oxindole derivatives **4(a-c)** (1 mmol) was stirred in 5 mL tap water at room temperature for stipulated time (24 h). The progress of reaction was monitored by TLC as well as by the visualisation of the change of colour of reaction mixture from red (at the begning of the reaction) to white (at the end of the reaction). The obtained thick white precipitate was filtered and dried to afford the desired product **5(a-t)** in very good yield and purity. All products **3(a-x)** were characterized by NMR, Mass and IR spectroscopic techniques.

### Spectral data for synthesized compounds (3a-3x) :

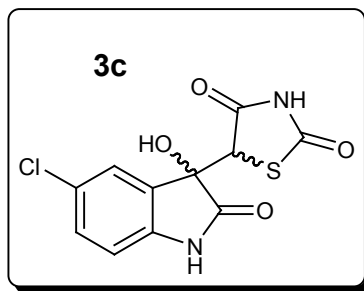


**5-(3-hydroxy-2-oxoindolin-3-yl)thiazolidine-2,4-dione (3a**, Table 2, entry 1): Yield: 98 %, dr 100:00, Time, 12 h, White solid, mp 164-166 °C.  $^1\text{H}$  NMR (300 MHz,  $\text{CDCl}_3+\text{DMSO } d_6$ ):  $\delta$  11.46 (br s, 1H), 10.20 (s, 1H), 7.57 (d,  $J=7.4$  Hz, 1H), 7.16 (t,  $J=7.7$  Hz, 1H), 6.87 (t,  $J=7.6$  Hz, 1H), 6.78 (d,  $J=7.7$  Hz, 1H), 6.59 (s, 1H), 4.94 (s, 1H) ppm.  $^{13}\text{C}$  NMR (75 MHz,  $\text{CDCl}_3+\text{DMSO } d_6$ ):  $\delta$  175.8, 171.2, 170.9, 141.8, 129.7, 126.2, 123.9, 121.4, 109.8, 74.4, 57.7 ppm. IR (KBr)  $\nu=3217, 2758, 1695, 1621, 1472, 1327, 1190, 1113, 754 \text{ cm}^{-1}$ . MS (ESI)  $m/z$  265  $[\text{M}+\text{H}]^+$ . HRMS (ESI):  $m/z$  calcd. for  $\text{C}_{11}\text{H}_8\text{O}_4\text{N}_2\text{SNa}$   $[\text{M}+\text{Na}]^+=287.00970$ , found 287.00995.

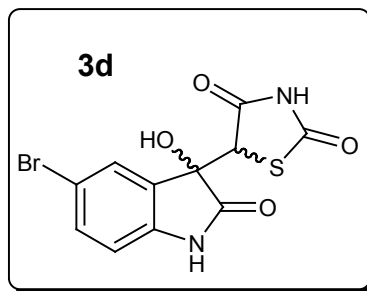


**5-(5-fluoro-3-hydroxy-2-oxoindolin-3-yl)thiazolidine-2,4-dione (3b**, Table 2, entry 2): Yield 99 %, dr 100:00, Time 12 h, White solid, mp 194-196 °C.  $^1\text{H}$  NMR (300 MHz,  $\text{DMSO } d_6$ ):  $\delta$  11.89 (br s, 1H), 10.55 (s, 1H), 7.34 (dd,  $J=8.1, 2.5$  Hz, 1H), 7.05 (dt,  $J=9.1, 2.8$  Hz, 1H), 7.01 (s, 1H), 6.84-6.79 (m, 1H), 5.01 (s, 1H) ppm.  $^{13}\text{C}$  NMR (75 MHz,  $\text{DMSO } d_6$ ):  $\delta$  175.5, 173.9, 171.8, 159.1, 156.0, 138.8, 128.9, 128.8, 116.9, 116.6, 111.9, 111.6, 111.0, 110.9, 74.7, 58.6 ppm. IR (KBr)  $\nu=3381, 3306, 3189, 2924, 1766, 1724, 1677, 1485, 1322,$

1199, 1143, 1081, 738  $\text{cm}^{-1}$ . MS (ESI)  $m/z$  305  $[\text{M}+\text{Na}]^+$ . HRMS (ESI):  $m/z$  calcd. for  $\text{C}_{11}\text{H}_7\text{O}_4\text{N}_2\text{FNa}$   $[\text{M}+\text{Na}]^+=305.00028$ , found 305.00032.

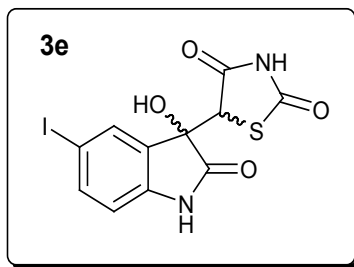


**5-(5-chloro-3-hydroxy-2-oxoindolin-3-yl)thiazolidine-2,4-dione (3c**, Table 2, entry 3): Yield: 98 %, dr 100:00, Time, 12 h, White solid, mp 120-122  $^{\circ}\text{C}$ .  $^1\text{H}$  NMR (300 MHz,  $\text{DMSO } d_6$ ):  $\delta$  11.72 (br s, 1H), 10.49 (s, 1H), 7.62 (s, 1H), 7.25 (s, 1H), 7.06-6.74 (m, 2H), 5.05 (s, 1H) ppm.  $^{13}\text{C}$  NMR (125 MHz,  $\text{DMSO } d_6$ ):  $\delta$  175.3, 174.0, 171.6, 141.6, 130.3, 129.3, 125.7, 124.2, 111.6, 74.7, 58.2, ppm. IR (KBr)  $\nu=3585, 3399, 3318, 3110, 3046, 2928, 2767, 1736, 1689, 1618, 1479, 1322, 1173, 1123, 1093, 830, 726, 568 \text{ cm}^{-1}$ . MS (ESI)  $m/z$  316  $[\text{M}+\text{NH}_4]^+$ . HRMS (ESI):  $m/z$  calcd. For  $\text{C}_{11}\text{H}_{11}\text{O}_4\text{N}_3\text{ClS}$   $[\text{M}+\text{NH}_4]^+=316.01588$ , found 316.01601.

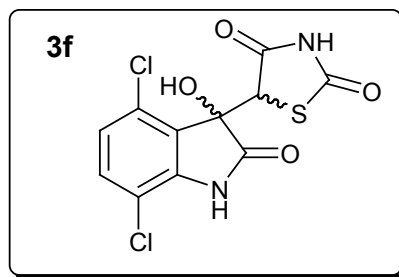


**5-(5-bromo-3-hydroxy-2-oxoindolin-3-yl)thiazolidine-2,4-dione (3d**, Table 2, entry 4): Yield: 98 %, dr 100:00, Time, 12 h, White solid, mp 174-176  $^{\circ}\text{C}$ .  $^1\text{H}$  NMR (300 MHz,  $\text{CDCl}_3+\text{DMSO } d_6$ ):  $\delta$  11.58 (br s, 1H), 10.37 (s, 1H), 7.75 (s, 1H), 7.36 (s, 1H), 6.99-6.40 (m, 2H), 5.03 (s, 1H) ppm.  $^{13}\text{C}$  NMR (75 MHz,  $\text{CDCl}_3+\text{DMSO } d_6$ ):  $\delta$  175.4, 171.4, 171.0, 141.9, 132.6, 129.3, 127.0, 113.0, 111.7, 74.3, 58.4 ppm. IR (KBr)  $\nu=3303, 3177, 3111, 2911, 1767, 1730, 1667, 1619, 1450, 1369, 1337, 1175, 1154, 1078, 712, 559 \text{ cm}^{-1}$ . MS

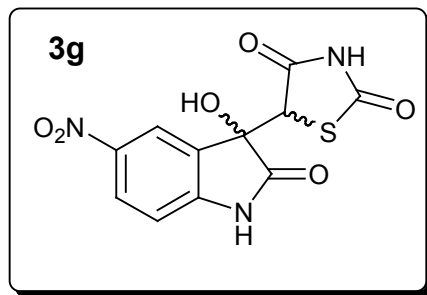
(ESI)  $m/z$  360  $[M+NH_4]^+$ . HRMS (ESI):  $m/z$  calcd. for  $C_{11}H_{11}O_4N_3BrS$   $[M+NH_4]^+$  = 359.96536, found 359.96549.



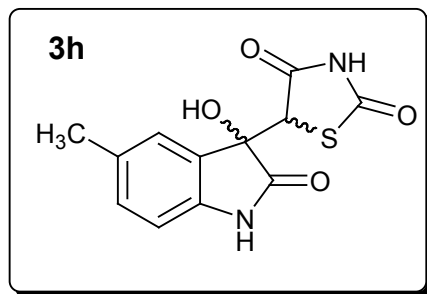
**5-(3-hydroxy-5-iodo-2-oxoindolin-3-yl)thiazolidine-2,4-dione (3e, Table 2, entry 5):** Yield: 99 %, dr 100:00, Time, 12h, White solid, mp 188-190 °C.  $^1H$  NMR (300 MHz,  $CDCl_3$ +DMSO  $d_6$ ):  $\delta$  11.60 (br s, 1H), 10.27 (s, 1H), 7.91 (d,  $J$ =1.5 Hz, 1H), 7.56 (dd,  $J$ =8.5, 1.8 Hz, 1H), 6.70 (s, 1H), 6.67 (s, 1H), 5.01 (s, 1H) ppm.  $^{13}C$  NMR (75 MHz,  $CDCl_3$ +DMSO  $d_6$ ):  $\delta$  175.3, 171.5, 171.2, 142.5, 138.6, 132.6, 129.8, 112.7, 83.7, 74.1, 58.5 ppm. IR (KBr)  $\nu$ =3306, 3170, 3125, 30580, 2907, 2727, 1767, 1727, 1667, 1617, 1447, 1367, 1334, 1174, 1151, 1076, 709, 555  $cm^{-1}$ . MS (ESI)  $m/z$  413  $[M+Na]^+$ . HRMS (ESI):  $m/z$  calcd. For  $C_{11}H_7O_4N_2ISNa$   $[M+Na]^+$ =412.90634, found 412.90662.



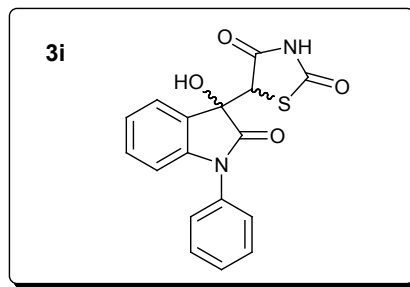
**5-(4,7-dichloro-3-hydroxy-2-oxoindolin-3-yl)thiazolidine-2,4-dione (3f, Table 2, entry 6):** Yield: 100 %, dr 100:00, Time, 12h, White solid, mp 194-196 °C.  $^1H$  NMR (300 MHz, DMSO  $d_6$ ):  $\delta$  10.97 (br s, 1H), 7.61 (s, 1H), 7.25 (d,  $J$ =8.4 Hz, 1H), 6.95 (d,  $J$ =8.4 Hz, 1H), 6.12 (s, 1H), 5.27 (s, 1H) ppm.  $^{13}C$  NMR (75 MHz, DMSO  $d_6$ ):  $\delta$  174.1, 173.4, 169.4, 141.9, 141.8, 131.4, 129.2, 123.7, 113.9, 78.6, 50.5 ppm. IR (KBr)  $\nu$ =3416, 3365, 3307, 2930, 1765, 1747, 1672, 1616, 1306, 1150, 1082, 804, 698  $cm^{-1}$ . MS (ESI)  $m/z$  350  $[M+NH_4]^+$ . HRMS (ESI):  $m/z$  calcd. for  $C_{11}H_{10}O_4N_3Cl_2S$   $[M+NH_4]^+$  = 349.97691, found 349.97704.



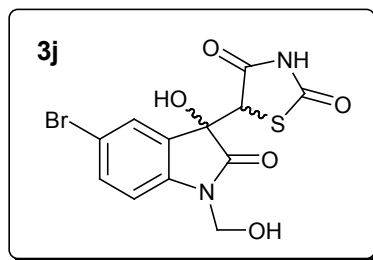
**5-(3-hydroxy-5-nitro-2-oxoindolin-3-yl)thiazolidine-2,4-dione (3g)**, Table 2, entry 7): Yield 99 %, dr 100:00, Time 12 h, White solid, mp 196-198 °C.  $^1\text{H}$  NMR (300 MHz,  $\text{CDCl}_3+\text{DMSO } d_6$ ):  $\delta$  11.53 (br s, 1H), 10.91 (s, 1H), 8.50 (d,  $J=1.8$  Hz, 1H), 8.21 (dd,  $J=8.4, 1.8$  Hz, 1H), 6.99 (d,  $J=8.4$  Hz, 1H), 6.89 (br s, 1H), 5.10 (s, 1H) ppm.  $^{13}\text{C}$  NMR (75 MHz,  $\text{CDCl}_3+\text{DMSO } d_6$ ):  $\delta$  175.0, 170.1, 169.5, 147.7, 140.7, 126.5, 125.8, 118.7, 108.8, 72.6, 57.1 ppm. IR (KBr)  $\nu=3365, 3286, 1750, 1679, 1627, 1530, 1340, 1110, 721, 674$   $\text{cm}^{-1}$ . MS (ESI)  $m/z$  327  $[\text{M}+\text{NH}_4]^+$ . HRMS (ESI):  $m/z$  calcd.  $\text{C}_{11}\text{H}_{11}\text{O}_6\text{N}_4\text{S}[\text{M}+\text{NH}_4]^+=327.03993$ , found 327.04004.



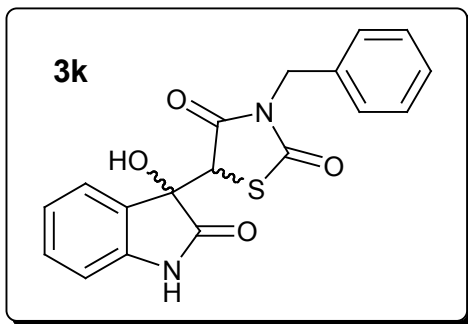
**5-(3-hydroxy-5-methyl-2-oxoindolin-3-yl)thiazolidine-2,4-dione (3h)**, Table 2, entry 8): Yield 93 %, dr 100:00, Time 12 h, Grey white solid, mp 206-208 °C.  $^1\text{H}$  NMR (300 MHz,  $\text{CDCl}_3+\text{DMSO } d_6$ ):  $\delta$  11.59 (br s, 1H), 10.10 (s, 1H), 7.45 (s, 1H), 7.05 (d,  $J=8.1$  Hz, 1H), 6.75 (d,  $J=7.7$  Hz, 1H), 6.49 (br s, 1H), 5.00 (s, 1H), 2.28 (m, 2H) ppm.  $^{13}\text{C}$  NMR (75 MHz,  $\text{CDCl}_3+\text{DMSO } d_6$ ):  $\delta$  174.5, 170.1, 169.9, 138.7, 128.9, 128.8, 125.7, 123.4, 108.2, 73.0, 57.1, 19.2 ppm. IR (KBr)  $\nu=3361, 3309, 3183, 3099, 2913, 1765, 1719, 1668, 1628, 1494, 1369, 1341, 1144, 1082, 805, 731, 552$   $\text{cm}^{-1}$ . MS (ESI)  $m/z$  296  $[\text{M}+\text{NH}_4]^+$ . HRMS (ESI):  $m/z$  calcd. for  $\text{C}_{12}\text{H}_{14}\text{O}_4\text{N}_3\text{S}[\text{M}+\text{H}]^+=296.07050$ , found 296.07069.



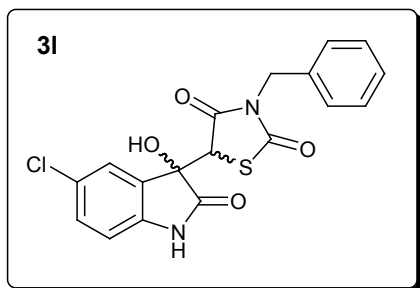
**5-(3-hydroxy-2-oxo-1-phenylindolin-3-yl) thiazolidine-2,4-dione (3i**, Table 2, entry 9): Yield 99 %, dr 100:00, Time 12 h, White solid, mp 176-178 °C. <sup>1</sup>H NMR (300 MHz, CDCl<sub>3</sub>+DMSO d<sub>6</sub>): δ 7.80 (d, *J*= 7.3 Hz, 1H), 7.61-7.37 (m, 5H), 7.28 (t, *J*= 7.7 Hz, 1H), 7.08 (t, *J*= 7.7 Hz, 1H), 7.01 (br s, 1H), 6.73 (d, *J*= 8.1 Hz, 1H), 5.2 (s, 1H ), 4.71 (br s, 1H) ppm. <sup>13</sup>C NMR (75 MHz, CDCl<sub>3</sub>+DMSO d<sub>6</sub>): δ 174.1, 171.4, 171.1, 143.7, 133.5, 130.0, 129.0, 127.8, 126.2, 125.6, 124.3, 122.7, 109.1, 74.4, 58.7 ppm. IR (KBr) ν=3289, 3060, 2904, 2796, 1752, 1713, 1682, 1610, 1502, 1464, 1382, 1330, 1163, 1085, 758, 699, 635 cm<sup>-1</sup>. MS (ESI) *m/z* 363 [M+Na]<sup>+</sup>. HRMS (ESI): *m/z* calcd. for C<sub>17</sub>H<sub>12</sub>O<sub>4</sub>N<sub>2</sub>SNa [M+Na]<sup>+</sup>=363.04100, found 363.04083.



**5-(5-bromo-3-hydroxy-1-(hydroxymethyl)-2-oxoindolin-3-yl)thiazolidine-2,4-dione (3j**, Table 2, entry 10): Yield 92 %, dr 100:00, Time 12 h, White solid, mp 170-172 °C. <sup>1</sup>H NMR (300 MHz, CDCl<sub>3</sub>+DMSO d<sub>6</sub>): δ 11.66 (br s, 1H), 7.82 (s, 1H), 7.47 (d, *J*=8.1 Hz, 1H), 7.04 (d, *J*=8.1 Hz, 1H), 6.89 (br s, 1H), 5.95 (br s, 1H), 5.36-5.10 (m, 2H), 5.07 (s, 1H ) ppm. <sup>13</sup>C NMR (75 MHz, CDCl<sub>3</sub>+DMSO d<sub>6</sub>): δ 173.7, 171.3, 171.0, 142.0, 132.9, 128.3, 127.2, 114.5, 111.7, 74.3, 63.3, 58.5 ppm. IR (KBr) ν=3539, 3391, 3287, 3066, 2964, 2893, 1734, 1693, 1610, 1484, 1420, 1340, 1262, 1155, 1032, 820, 645, 538 cm<sup>-1</sup>. MS (ESI) *m/z* 392 [M+NH<sub>4</sub>]<sup>+</sup>. HRMS (ESI): *m/z* calcd. for C<sub>12</sub>H<sub>13</sub>O<sub>5</sub>N<sub>3</sub>BrS [M+NH<sub>4</sub>]<sup>+</sup>= 391.97388, found 391.97407.

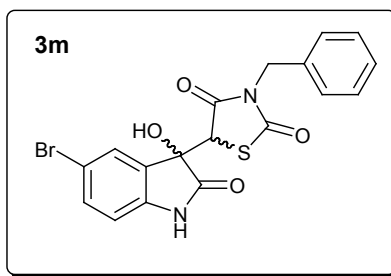


**3-benzyl-5-(3-hydroxy-2-oxoindolin-3-yl)thiazolidine-2,4-dione (3k, Table 2, entry 11):** Yield 96 %, dr 100:00, Time, 12 h, Light orange solid, mp 96-98 °C.  $^1\text{H}$  NMR (300 MHz,  $\text{CDCl}_3+\text{DMSO } d_6$ ):  $\delta$  10.38 (s, 1H), 7.55 (d,  $J=7.6$  Hz, 1H), 7.24 (t,  $J=7.4$  Hz, 1H), 7.18-7.02 (m, 3H), 6.86 (s, 1H), 6.84-6.81 (m, 2H), 6.69 (d,  $J=7.2$  Hz, 2H), 5.10 (s, 1H), 4.56-4.40 (m, 2H) ppm.  $^{13}\text{C}$  NMR (75 MHz,  $\text{DMSO } d_6$ ):  $\delta$  176.0, 170.5, 169.5, 142.4, 134.3, 130.1, 128.2, 128.0, 126.9, 126.3, 124.4, 121.5, 110.0, 74.5, 57.2, 43.9 ppm. IR (KBr)  $\nu=3292$ , 1720, 1684, 16212, 1386, 1340, 1150, 1078, 966, 756, 699, 618  $\text{cm}^{-1}$ . MS (ESI)  $m/z$  377  $[\text{M}+\text{Na}]^+$ . HRMS (ESI):  $m/z$  calcd. for  $\text{C}_{18}\text{H}_{14}\text{O}_4\text{N}_2\text{SNa}$   $[\text{M}+\text{Na}]^+=377.05665$ , found 377.05661.

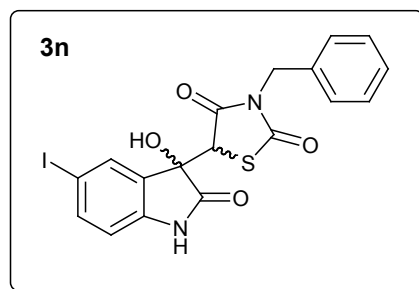


**3-benzyl-5-(5-chloro-3-hydroxy-2-oxoindolin-3-yl)thiazolidine-2,4-dione (3l, Table 2, entry 12):** Yield 97 %, dr 100:00, Time, 12 h, Light orange solid, mp 150-152 °C.  $^1\text{H}$  NMR (500 MHz,  $\text{CDCl}_3+\text{DMSO } d_6$ ):  $\delta$  10.39 (s, 1H), 7.49 (s, 1H), 7.36-7.28 (m, 1H), 7.20-7.13 (m, 3H), 6.90 (d,  $J=6.3$  Hz, 1H), 6.82 (s, 1H), 6.80 (s, 1H), 6.74 (s, 1H), 5.08 (s, 1H), 4.60-4.45 (m, 2H) ppm.  $^{13}\text{C}$  NMR (75 MHz,  $\text{CDCl}_3+\text{DMSO } d_6$ ):  $\delta$  175.7, 170.7, 169.7, 141.5, 134.7, 130.4, 128.6, 128.3, 127.8, 127.2, 126.2, 125.8, 124.5, 111.6, 74.5, 57.3, 44.0 ppm. IR (KBr)  $\nu=3196$ , 1715, 1689, 1620, 1385, 1335, 1178, 1153, 823, 699  $\text{cm}^{-1}$ . MS (ESI)  $m/z$  406  $[\text{M}+\text{NH}_4]^+$ . HRMS (ESI):  $m/z$  calcd. for  $\text{C}_{18}\text{H}_{17}\text{O}_4\text{N}_3\text{ClS}$   $[\text{M}+\text{Na}]^+=406.06283$ , found 406.06304.

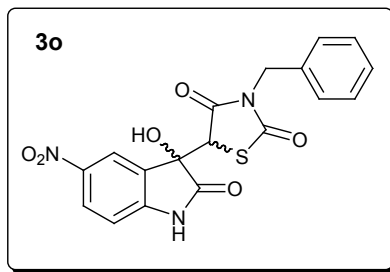




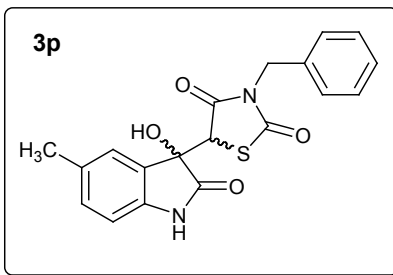
**3-benzyl-5-(5-bromo-3-hydroxy-2-oxoindolin-3-yl)thiazolidine-2,4-dione (3m, Table 2, entry 13):** Yield 98 %, dr 100:00, Time, 12 h, Light orange solid, mp 146-148 °C. <sup>1</sup>H NMR (300 MHz, CDCl<sub>3</sub>+DMSO d<sub>6</sub>): δ 10.28 (s, 1H), 7.63 (s, 1H), 7.42 (s, 1H), 7.29 (d, *J*=8.1 Hz, 1H), 7.22-7.14 (m, 2H), 6.85 (d, *J*=7.6 Hz, 2H), 6.81 (s, 1H), 6.70 (d, *J*=8.3 Hz, 1H), 5.08 (s, 1H), 4.62-4.44 (m, 2H) ppm. <sup>13</sup>C NMR (75 MHz, DMSO d<sub>6</sub>): δ 175.5, 170.2, 169.2, 141.6, 134.1, 132.8, 128.4, 128.1, 127.2, 127.1, 126.4, 113.5, 111.6, 74.5, 56.9, 43.9 ppm. IR (KBr) ν=3333, 1714, 1677, 1617, 1385, 1334, 1148, 1083, 1026, 820, 700 cm<sup>-1</sup>. MS (ESI) *m/z* 455 [M+Na]<sup>+</sup>. HRMS (ESI): *m/z* calcd. for C<sub>18</sub>H<sub>13</sub>O<sub>4</sub>N<sub>2</sub>BrSNa[M+Na]<sup>+</sup>=454.96716, found 454.96719.



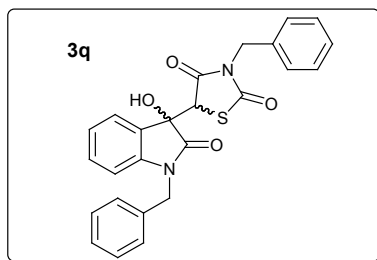
**3-benzyl-5-(3-hydroxy-5-iodo-2-oxoindolin-3-yl)thiazolidine-2,4-dione (3n, Table 2, entry 14):** Yield 99 %, dr 100:00, Time, 12 h, White solid, mp 148-150 °C. <sup>1</sup>H NMR (300 MHz, DMSO d<sub>6</sub>) δ 10.51 (s, 1H), 7.79 (s, 1H), 7.49 (d, *J*=7.9 Hz, 1H), 7.29-7.07 (m, 3H), 7.01 (s, 1H), 6.82-6.68 (m, 2H), 6.61 (d, *J*=8.3 Hz, 1H), 5.08 (s, 1H), 4.51 (s, 2H) ppm. <sup>13</sup>C NMR (75 MHz, DMSO d<sub>6</sub>): δ 175.3, 170.3, 169.3, 142.2, 138.7, 134.3, 132.8, 128.3, 127.0, 126.2, 126.1, 112.2, 83.9, 74.3, 57.1, 44.0 ppm. IR (KBr) ν=3381, 3246, 1716, 1677, 1612, 1385, 1332, 819, 771 cm<sup>-1</sup>. MS (ESI) *m/z* 498 [M+NH<sub>4</sub>]<sup>+</sup>. HRMS (ESI): *m/z* calcd. for C<sub>18</sub>H<sub>17</sub>O<sub>4</sub>N<sub>3</sub>IS=[M+NH<sub>4</sub>]<sup>+</sup>=497.99790, found 497.99884.



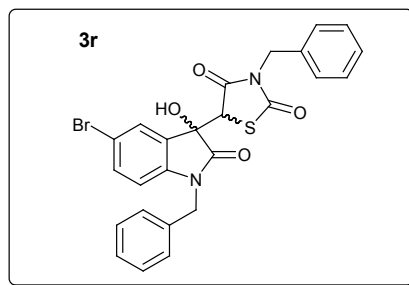
**3-benzyl-5-(3-hydroxy-5-nitro-2-oxoindolin-3-yl)thiazolidine-2,4-dione (3o, Table 2, entry 15):** Yield 99 %, dr 100:00, Time 12 h, Pale yellow solid, mp 176-178 °C. <sup>1</sup>H NMR (500 MHz, CDCl<sub>3</sub>+DMSO d<sub>6</sub>): δ 11.08 (s, 1H), 8.21 (d, *J*=2.2 Hz, 1H), 8.03 (dd, *J*=8.8, 2.2 Hz, 1H), 7.20 (s, 1H), 7.14-7.09 (m, 1H), 7.02 (t, *J*=7.7 Hz, 2H), 6.91-6.76 (m, 3H), 5.11 (s, 1H), 4.52-4.42 (m, 2H) ppm. <sup>13</sup>C NMR (75 MHz, CDCl<sub>3</sub>+DMSO d<sub>6</sub>): δ 176.2, 170.1, 169.4, 148.9, 141.6, 134.3, 127.8, 127.4, 127.3, 127.1, 127.0, 119.7, 109.8, 73.8, 56.8, 44.0 ppm. IR (KBr) ν=3285, 2941, 1731, 1682, 1625, 1525, 1396, 1342, 1304, 1110, 1076, 702, 611 cm<sup>-1</sup>. MS (ESI) *m/z* 417 [M+NH<sub>4</sub>]<sup>+</sup>. HRMS (ESI): *m/z* calcd. for C<sub>18</sub>H<sub>17</sub>O<sub>6</sub>N<sub>4</sub>S [M+NH<sub>4</sub>]<sup>+</sup>= 417.08688, found 417.08703.



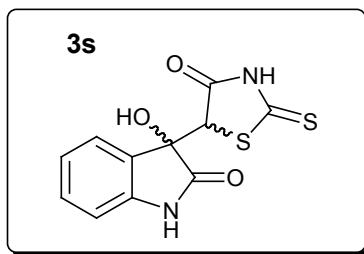
**3-benzyl-5-(3-hydroxy-5-methyl-2-oxoindolin-3-yl)thiazolidine-2,4-dione (3p, Table 2, entry 16):** Yield 91 %, dr 100:00, Time 12 h, Brown solid, mp 310-312 °C. <sup>1</sup>H NMR (300 MHz, DMSO d<sub>6</sub>): δ 10.18 (s, 1H), 7.53-6.75 (m, 8H), 5.01 (s, 1H), 4.76 (s, 1H), 4.60-4.43 (m, 2H), 2.14 (s, 3H) ppm. δ 174.5, 171.5, 170.1, 138.7, 129.0, 128.8, 127.8, 127.0, 126.9, 126.7, 126.6, 123.4, 108.2, 74.4, 58.2, 43.6, 20.1 ppm. IR (KBr) ν=3259, 2925, 1737, 1684, 1628, 1494, 1386, 1338, 1152, 1101, 964, 782, 699, 621 cm<sup>-1</sup>. MS (ESI) *m/z* 391 [M+Na]<sup>+</sup>. HRMS (ESI): *m/z* calcd. For C<sub>19</sub>H<sub>16</sub>O<sub>4</sub>N<sub>2</sub>SNa [M+Na]<sup>+</sup>=391.07230, found 391.07202.



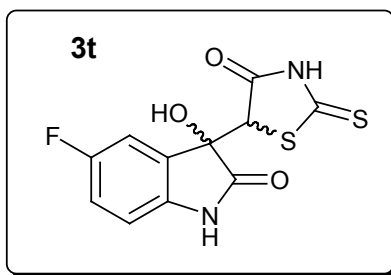
**3-benzyl-5-(1-benzyl-3-hydroxy-2-oxoindolin-3-yl)thiazolidine-2,4-dione (3q, Table 2, entry 17):** Yield 88 %, dr 100:00, Time 12 h, Pale yellow viscous oil.  $^1\text{H}$  NMR (300 MHz,  $\text{CDCl}_3+\text{DMSO } d_6$ ):  $\delta$  7.57 (d,  $J=7.3$  Hz, 1H), 7.39 (d,  $J=7.0$  Hz, 2H), 7.35-7.18 (m, 6H), 7.10-7.00 (m, 2H), 6.85 (t,  $J=7.7$  Hz, 1H), 6.65 (d,  $J=7.7$  Hz, 2H), 6.62 (s, 1H), 5.23 (s, 1H), 4.67 (s, 2H), 4.1 (s, 2H) ppm.  $^{13}\text{C}$  NMR (75 MHz,  $\text{CDCl}_3+\text{DMSO } d_6$ ):  $\delta$  174.5, 171.0, 169.5, 143.0, 135.2, 134.3, 128.1, 127.9, 127.8, 127.4, 126.9, 126.6, 124.2, 122.1, 109.2, 74.1, 57.1, 44.3, 33.5 ppm. IR (KBr)  $\nu=3145, 1716, 1611, 1388, 1102, 898, 742 \text{ cm}^{-1}$ . MS (ESI)  $m/z$  444  $[\text{M}]^+$ . HRMS (ESI):  $m/z$  calcd. for  $\text{C}_{25}\text{H}_{20}\text{O}_4\text{N}_2\text{S}[\text{M}]^+=444.11438$ , found 444.11451



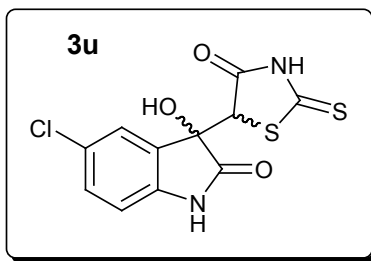
**3-benzyl-5-(1-benzyl-5-bromo-3-hydroxy-2-oxoindolin-3-yl)thiazolidine-2,4-dione (3r, Table 2, entry 18):** Yield 90 %, dr 100:00, Time 12 h, White solid, mp 164-166 °C.  $^1\text{H}$  NMR (300 MHz,  $\text{CDCl}_3+\text{DMSO } d_6$ ):  $\delta$  7.66 (s, 1H), 7.43-7.31 (m, 6H), 7.19-7.08 (m, 4H), 6.86 (d,  $J=5.9$  Hz, 2H), 6.39 (d,  $J=8.1$  Hz, 1H), 5.17 (s, 1H), 4.91 (s, 2H), 4.53 (s, 2H) ppm.  $^{13}\text{C}$  NMR (75 MHz,  $\text{CDCl}_3+\text{DMSO } d_6$ ):  $\delta$  174.8, 170.6, 169.7, 142.4, 134.8, 134.3, 133.3, 128.7, 128.6, 128.5, 127.7, 127.6, 127.3, 115.2, 111.1, 74.8, 57.1, 44.7, 33.8 ppm. IR (KBr)  $\nu=3328, 2927, 1718, 1678, 1612, 1430, 1334, 1150, 1080, 698 \text{ cm}^{-1}$ . MS (ESI)  $m/z$  542  $[\text{M}+\text{NH}_4]^+$ . HRMS (ESI):  $m/z$  calcd. For  $\text{C}_{25}\text{H}_{23}\text{O}_4\text{N}_3\text{BrS} [\text{M}+\text{NH}_4]^+=542.05722$ , found 542.05736.



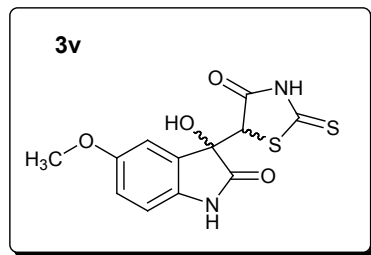
**3-hydroxy-3-(4-oxo-2-thioxothiazolidin-5-yl)indolin-2-one (3s, Table 2, entry 19):** Yield 98 %, dr 100:00, Time, 12 h, White solid, mp 328-330 °C. <sup>1</sup>H NMR (300 MHz, DMSO d<sub>6</sub>): δ 12.97 (br s, 1H), 10.60 (s, 1H), 7.48 (d, *J*=7.4 Hz, 1H), 7.27 (d, *J*=7.7 Hz, 1H), 6.98 (s, 1H), 6.95 (t, *J*=7.4 Hz, 1H), 6.83 (d, *J*=7.7 Hz, 1H), 5.20 (s, 1H) ppm. <sup>13</sup>C NMR (75 MHz, DMSO d<sub>6</sub>): δ 203.5, 175.8, 174.2, 142.7, 130.7, 127.4, 124.3, 122.0, 110.3, 74.8, 62.0 ppm. IR (KBr) ν=3363, 3170, 3082, 2949, 2887, 1708, 1616, 1455, 1227, 1179, 1084, 758, 667, 550 cm<sup>-1</sup>. MS (ESI) *m/z* 303 [M+Na]<sup>+</sup>. HRMS (ESI): *m/z* calcd. for C<sub>11</sub>H<sub>8</sub>O<sub>3</sub>N<sub>2</sub>S<sub>2</sub>Na[M+Na]<sup>+</sup>=302.98685, found 302.98663.



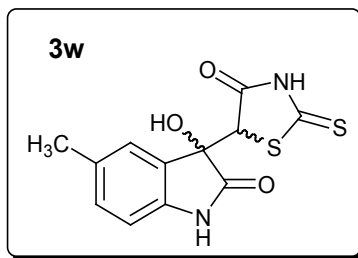
**5-fluoro-3-hydroxy-3-(4-oxo-2-thioxothiazolidin-5-yl)indolin-2-one (3t, Table 2, entry 20):** Yield 99 %, dr 100:00, Time 12 h, White solid, mp 184-186 °C. <sup>1</sup>H NMR (300 MHz, DMSO d<sub>6</sub>): δ 13.04 (br s, 1H), 10.65 (s, 1H), 7.28-7.24 (m, 1H), 7.18-7.14 (m, 1H), 7.13 (s, 1H), 6.86-6.22 (m, 1H), 5.21 (s, 1H) ppm. <sup>13</sup>C NMR (75 MHz, DMSO d<sub>6</sub>): δ 203.3, 175.5, 173.9, 159.1, 156.0, 138.8, 129.0, 128.8, 116.9, 116.6, 111.9, 111.6, 111.0, 110.9, 74.7, 61.6 ppm. IR (KBr) ν=3241, 3064, 2950, 2950, 2881, 1702, 1487, 1455, 1313, 1220, 1189, 1083, 824, 782, 665, 581, 512 cm<sup>-1</sup>. MS (ESI) *m/z* 376 [M+H]<sup>+</sup>. HRMS (ESI): *m/z* calcd. for C<sub>11</sub>H<sub>7</sub>O<sub>3</sub>N<sub>2</sub>FS<sub>2</sub>Na[M+Na]<sup>+</sup>=320.97743, found 320.97757.



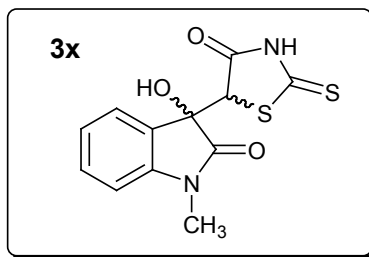
**5-chloro-3-hydroxy-3-(4-oxo-2-thioxothiazolidin-5-yl)indolin-2-one (3u, Table 2, entry 21):** Yield 98 %, dr 100:00, Time 12 h, Pale yellow solid, mp 176-178 °C.  $^1\text{H}$  NMR (500 MHz, DMSO  $d_6$ ):  $\delta$  13.08 (br s, 1H), 10.45 (s, 1H), 7.46 (s, 1H), 7.33 (d,  $J=6.5$  Hz, 1H), 7.14 (s, 1H), 6.86 (d,  $J=7.3$  Hz, 1H), 5.19 (s, 1H) ppm.  $^{13}\text{C}$  NMR (125 MHz, DMSO  $d_6$ ):  $\delta$  205.2, 176.6, 175.3, 141.6, 130.3, 129.3, 125.7, 124.2, 111.7, 74.7, 61.6 ppm. IR (KBr)  $\nu=3263, 3162, 3076, 2871, 1778, 1703, 1615, 1446, 1234, 1183, 1082, 883, 823, 682, 512$   $\text{cm}^{-1}$ . MS (ESI)  $m/z$  314  $[\text{M}]^+$ . HRMS (ESI):  $m/z$  calcd. for  $\text{C}_{11}\text{H}_7\text{O}_3\text{N}_2\text{ClS}_2[\text{M}+\text{H}]^+=313.95866$ , found 313.95873.



**3-hydroxy-5-methoxy-3-(4-oxo-2-thioxothiazolidin-5-yl)indolin-2-one (3v, Table 2, entry 22):** Yield 99 %, dr 100:00, Time 12 h, White solid, mp 140-142 °C.  $^1\text{H}$  NMR (500 MHz, DMSO  $d_6$ ):  $\delta$  13.07 (br s, 1H), 10.42 (s, 1H), 7.11 (d,  $J=1.8$  Hz, 1H), 6.99 (s, 1H), 6.84 (dd,  $J=8.3, 1.8$  Hz, 1H), 6.75 (d,  $J=8.4$  Hz, 1H), 5.15 (s, 1H), 4.25 (s, 3H) ppm.  $^{13}\text{C}$  NMR (125 MHz, DMSO  $d_6$ ):  $\delta$  200.2, 176.6, 174.0, 153.6, 135.7, 128.3, 115.1, 110.7, 110.5, 74.8, 61.8, 55.4 ppm. IR (KBr)  $\nu=3255, 3163, 3086, 2960, 1778, 1703, 1609, 1494, 1451, 1230, 1187, 1082, 817, 682, 512$   $\text{cm}^{-1}$ . MS (ESI)  $m/z$  333  $[\text{M}+\text{Na}]^+$ . HRMS (ESI):  $m/z$  calcd. for  $\text{C}_{12}\text{H}_{10}\text{O}_4\text{N}_2\text{S}_2\text{Na}[\text{M}+\text{Na}]^+=332.99742$ , found 332.99734.

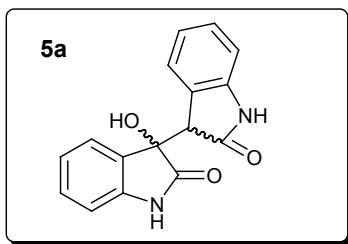


**3-hydroxy-5-methyl-3-(4-oxo-2-thioxothiazolidin-5-yl)indolin-2-one (3w, Table 2, entry 23):** Yield 96 %, dr 100:00, Time 12 h, Grey white solid, mp 344-346 °C. <sup>1</sup>H NMR (300 MHz, DMSO d<sub>6</sub>): δ 12.97 (br s, 1H), 10.51 (s, 1H), 7.30 (s, 1H), 7.07 (d, *J*=7.7 Hz, 1H), 6.93 (s, 1H), 6.72 (d, *J*=7.9 Hz, 1H), 5.16 (s, 1H), 2.21 (s, 3H) ppm. <sup>13</sup>C NMR (75 MHz, DMSO d<sub>6</sub>): δ 202.6, 175.8, 174.0, 140.2, 130.7, 130.5, 127.4, 124.7, 109.8, 74.7, 61.8, 20.7 ppm. IR (KBr) ν=3257, 3070, 2884, 1708, 1490, 1454, 1226, 1082, 822 cm<sup>-1</sup>. MS (ESI) *m/z* 317 [M+ Na]<sup>+</sup>. HRMS (ESI): *m/z* calcd. For C<sub>12</sub>H<sub>10</sub>O<sub>3</sub>N<sub>2</sub>S<sub>2</sub>Na[M+Na]<sup>+</sup>=317.00250, found 317.00244.

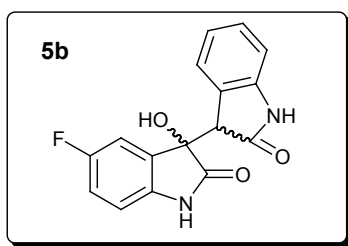


**3-hydroxy-1-methyl-3-(4-oxo-2-thioxothiazolidin-5-yl)indolin-2-one (3x, Table 2, entry 24):** Yield 99 %, dr 100:00, Time 12 h, White solid, mp 116-118 °C. <sup>1</sup>H NMR (300 MHz, DMSO d<sub>6</sub>): δ 13.12 (br s, 1H), 7.53 (d, *J*=7.8 Hz, 1H), 7.38 (d, *J*=7.8 Hz, 1H), 7.10-6.98 (m, 3H), 5.24 (s, 1H), 3.14 (s, 3H) ppm. <sup>13</sup>C NMR (75 MHz, DMSO d<sub>6</sub>): δ 205.1, 176.6, 174.0, 144.0, 130.6, 126.6, 123.7, 122.4, 108.8, 74.2, 62.0, 26.1 ppm. IR (KBr) ν=3171, 3078, 2960, 2915, 2868, 1694, 1617, 1443, 1381, 1443, 1235, 1183, 1080, 820, 684 cm<sup>-1</sup>. MS (ESI) *m/z* 317 [M+Na]<sup>+</sup>. HRMS (ESI): *m/z* calcd. For C<sub>12</sub>H<sub>10</sub>O<sub>3</sub>N<sub>2</sub>S<sub>2</sub>Na[M+Na]<sup>+</sup>=317.00250, found 317.00231.

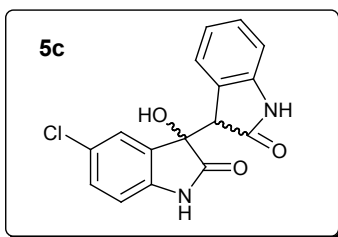
## Spectral data for synthesized compounds (5a-5t) :



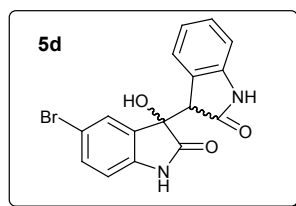
**3-hydroxy-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (3a, Table 3, entry 1):** Yield: 99 %, inseparable mixtures of diastereomers, dr 96:04, Time, 24 h White solid, mp >350 °C. <sup>1</sup>H NMR (500 MHz, CDCl<sub>3</sub>+DMSO d<sub>6</sub>): δ 10.14 (s, 1H), 10.11 (s, 1H), 7.21-7.09 (m, 3H), 6.88 (d, *J*=6.9 Hz, 1H), 6.81-6.69 (m, 3H), 6.55 (br s, 1H), 6.34 (br s, 1H), 3.97 (s, 1H) ppm. <sup>13</sup>C NMR (75 MHz, CDCl<sub>3</sub>+DMSO d<sub>6</sub>): δ 177.0, 174.3, 143.2, 142.5, 129.3, 128.1, 126.1, 125.4, 123.7, 120.9, 109.4, 108.9, 75.5, 51.2 ppm. IR (KBr) ν=3334, 3253, 3063, 1731, 1687, 1623, 1470, 1343, 1221, 1114, 1089, 744, 673, 643 cm<sup>-1</sup>. MS (ESI) *m/z* 303 [M+Na]<sup>+</sup>. HRMS (ESI): *m/z* calcd. for C<sub>16</sub>H<sub>12</sub>O<sub>3</sub>N<sub>2</sub>Na [M+Na]<sup>+</sup>= 303.07456, found 303.07442.



**5-fluoro-3-hydroxy-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5b, Table 3, entry 2):** Yield: 99 %, inseparable mixtures of diastereomers, dr 95:05, Time, 24 h White solid, mp >350 °C. <sup>1</sup>H NMR (300 MHz, DMSO d<sub>6</sub>): δ 10.37 (s, 1H), 10.21 (s, 1H), 7.50 (d, *J*=7.3 Hz, 1H), 7.27 (t, *J*=7.2 Hz, 1H), 7.01 (t, *J*=7.0 Hz, 1H), 6.93 (d, *J*=6.6 Hz, 1H), 6.79(d, *J*=8.5 Hz, 2H), 6.70 (d, *J*=6.8 Hz, 1H), 5.90 (br s, 1H), 4.03 (s, 1H) ppm. <sup>13</sup>C NMR (75 MHz, DMSO d<sub>6</sub>): δ 177.0, 173.9, 158.8, 155.6, 143.3, 138.8, 129.7, 129.8, 128.5, 126.3, 125.3, 121.1, 115.8, 115.5, 111.3, 111.0, 110.3, 110.2, 109.0, 75.7, 51.2 ppm. IR (KBr) ν=3318, 3245, 3068, 2892, 2829, 1726, 1688, 1622, 1488, 1471, 1342, 1266, 1228, 1196, 1097, 817, 749, 673, 589 cm<sup>-1</sup>. MS (ESI) *m/z* 321 [M+Na]<sup>+</sup>. HRMS (ESI): *m/z* calcd. for C<sub>16</sub>H<sub>11</sub>O<sub>3</sub>N<sub>2</sub>FNa [M+Na]<sup>+</sup>=321.06459, found 321.06442.

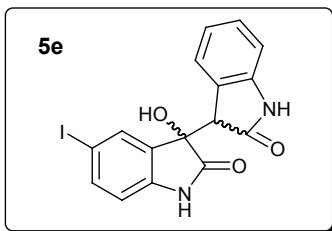


**5-chloro-3-hydroxy-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5c, Table 3, entry 3):** Yield: 98 %, inseparable mixtures of diastereomers, dr 95:05, Time, 24 h White solid, mp >350 °C. <sup>1</sup>H NMR (300 MHz, DMSO d<sub>6</sub>): δ 10.50 (s, 1H), 10.22 (s, 1H), 7.52 (d, *J*=7.3 Hz, 1H), 7.29 (t, *J*=7.7 Hz, 1H), 7.16 (dd, *J*=8.4, 2.2 Hz, 1H), 7.03 (d, *J*=7.3 Hz, 1H), 6.87-6.67 (m, 3H), 6.04 (s, 1H), 4.01 (s, 1H) ppm. <sup>13</sup>C NMR (75 MHz, DMSO d<sub>6</sub>): δ 176.7, 173.8, 143.3, 141.5, 130.1, 129.2, 128.5, 126.4, 125.3, 124.9, 123.7, 121.1, 111.0, 109.0, 75.5, 51.3 ppm. IR (KBr) ν=3312, 3260, 1725, 1686, 1620, 1471, 1446, 1340, 1199, 1167, 1098, 818, 746, 668 cm<sup>-1</sup>. MS (ESI) *m/z* 337 [M+Na]<sup>+</sup>. HRMS (ESI): *m/z* calcd. For C<sub>16</sub>H<sub>11</sub>O<sub>3</sub>N<sub>2</sub>ClNa [M+Na]<sup>+</sup>=337.03504, found 337.03574.

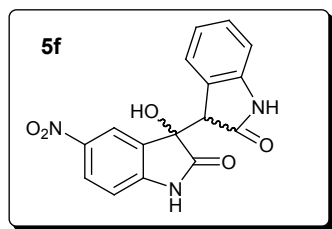


**5-bromo-3-hydroxy-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5d, Table 3, entry 4):** Yield: 99 %, inseparable mixtures of diastereomers, dr 96:04, Time, 24 h White solid, mp >350 °C. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>+DMSO d<sub>6</sub>): δ 10.40 (s, 1H), 10.15 (s, 1H), 7.43 (d, *J*=5.5 Hz, 1H), 7.30-7.19 (m, 2H), 7.98 (t, *J*=7.3 Hz, 1H), 6.98 (d, *J*=7.3 Hz, 1H), 6.71 (d, *J*=8.3 Hz, 1H), 6.60 (s, 1H), 6.32 (br s, 1H), 3.99 (s, 1H) ppm. <sup>13</sup>C NMR (75 MHz, CDCl<sub>3</sub>+DMSO d<sub>6</sub>): δ 174.9, 172.0, 141.2, 139.8, 128.3, 127.4, 126.7, 124.6, 123.5, 123.1, 121.9, 119.3, 109.1, 107.2, 73.7, 49.5 ppm. IR (KBr) ν=3278, 1727, 1685, 1620, 1472, 1340, 1220, 1166, 1099, 818, 750, 666 cm<sup>-1</sup>. MS (ESI) *m/z* 381 [M+Na]<sup>+</sup>. HRMS (ESI): *m/z* calcd. for C<sub>16</sub>H<sub>11</sub>O<sub>3</sub>N<sub>2</sub>BrNa [M+Na]<sup>+</sup>=380.98507, found 380.98541.

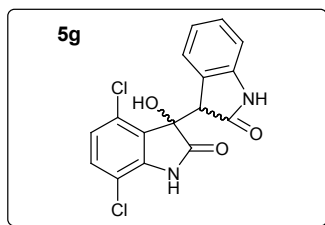




**3-hydroxy-5-iodo-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5e)**, Table 3, entry 5): Yield: 99 %, inseparable mixtures of diastereomers, dr 95:05, Time, 24 h White solid, mp >350 °C. <sup>1</sup>H NMR (500 MHz, CDCl<sub>3</sub>+DMSO d<sub>6</sub>): δ 10.31 (s, 1H), 10.12 (s, 1H), 7.41 (d, *J*=7.9 Hz, 1H), 7.34 (d, *J*=4.0 Hz, 1H), 7.22 (t, *J*=7.9 Hz, 1H), 7.95 (t, *J*=6.9 Hz, 1H), 6.79 (d, *J*=7.9 Hz, 1H), 6.60 (d, *J*=8.9 Hz, 1H), 6.57 (br s, 1H), 6.51 (s, 1H), 3.97 (s, 1H) ppm. <sup>13</sup>C NMR (75 MHz, CDCl<sub>3</sub>+DMSO d<sub>6</sub>): δ 175.2, 172.9, 141.8, 141.1, 136.5, 131.2, 129.3, 127.0, 124.8, 123.6, 119.8, 110.6, 107.7, 82.0, 74.3, 49.9 ppm. IR (KBr) ν=3321, 3249, 3068, 1737, 1688, 1618, 1469, 1442, 1344, 1199, 1167, 1091, 815, 749, 674, 645 cm<sup>-1</sup>. MS (ESI) *m/z* 429 [M+Na]<sup>+</sup>. HRMS (ESI): *m/z* calcd. For C<sub>16</sub>H<sub>11</sub>O<sub>3</sub>N<sub>2</sub>INa [M+Na]<sup>+</sup>=428.97120, found 428.97135.

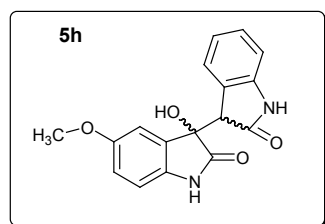


**3-hydroxy-5-nitro-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5f)**, Table 3, entry 6): Yield: 99 %, inseparable mixtures of diastereomers, dr 95:05, Time, 24 h White solid, mp >350 °C. <sup>1</sup>H NMR (500 MHz, CDCl<sub>3</sub>+DMSO d<sub>6</sub>): δ 10.91 (br s, 1H), 10.04 (s, 1H), 8.06 (d, *J*=8.0 Hz, 1H), 7.52 (d, *J*=6.0 Hz, 1H), 7.26 (t, *J*=6.0 Hz, 1H), 7.11 (s, 1H), 7.02 (t, *J*=8.0 Hz, 1H), 6.91 (d, *J*=9.0 Hz, 1H), 6.78 (d, *J*=8.0 Hz, 1H), 6.75 (s, 1H), 4.08 (s, 1H) ppm. <sup>13</sup>C NMR (75 MHz, CDCl<sub>3</sub>): δ 177.4, 173.6, 149.0, 141.4, 128.7, 128.5, 126.4, 128.3, 124.6, 121.2, 119.2, 109.4, 109.1, 75.0, 51.4 ppm. IR (KBr) ν=3453, 3364, 3184, 2880, 1745, 1693, 1626, 1515, 1470, 1335, 1212, 1107, 1087, 979, 756, 648 cm<sup>-1</sup>. MS (ESI) *m/z* 326 [M+H]<sup>+</sup>. HRMS (ESI): *m/z* calcd. for C<sub>16</sub>H<sub>12</sub>O<sub>5</sub>N<sub>3</sub>[M+H]<sup>+</sup>= 326.07770, found 326.07781.



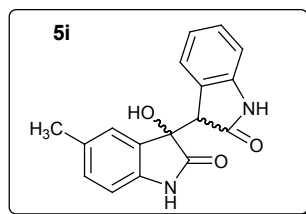
**4,7-dichloro-3-hydroxy-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5g, Table 3, entry 7):**

Yield: 99 %, inseparable mixtures of diastereomers, dr 98:02, Time, 24 h White solid, mp 182-184 °C. <sup>1</sup>H NMR (300 MHz, DMSO d<sub>6</sub>): δ 10.78 (s, 1H), 10.58 (br s, 1H), 7.29 (d, *J*=8.9 Hz, 1H), 7.12 (t, *J*=6.9 Hz, 1H), 7.03 (d, *J*=8.9 Hz, 1H), 6.85 (d, *J*=7.9 Hz, 1H), 6.71 (t, *J*=7.9 Hz, 1H), 6.46 (s, 1H), 6.04 (br, s 1H), 4.37 (s, 1H) ppm. <sup>13</sup>C NMR (75 MHz, DMSO d<sub>6</sub>): δ 176.0, 175.3, 143.1, 142.1, 131.3, 129.5, 128.5, 127.5, 126.5, 123.8, 123.3, 121.2, 113.2, 109.6, 76.8, 48.4 ppm. IR (KBr) ν=3176, 3065, 1738, 1688, 1614, 1470, 1413, 1312, 1166, 1098, 807, 751, 674, 641 cm<sup>-1</sup>. MS (ESI) *m/z* 371 [M+Na]<sup>+</sup>. HRMS (ESI): *m/z* calcd. C<sub>16</sub>H<sub>10</sub>O<sub>3</sub>N<sub>2</sub>Cl<sub>2</sub>Na[M+Na]<sup>+</sup>=370.99607, found 370.99631.

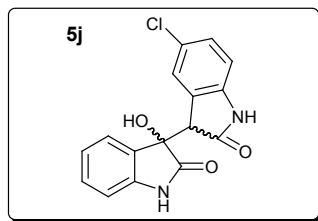


**3-hydroxy-5-methoxy-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5h, Table 3, entry 8):**

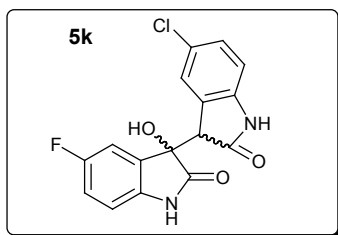
Yield 99 %, inseparable mixtures of diastereomers, dr 98:02, Time 24 h, White solid, mp 236-238 °C. <sup>1</sup>H NMR (300 MHz, DMSO d<sub>6</sub>): δ 10.21 (s, 1H), 10.19 (s, 1H), 7.51 (d, *J*=7.0 Hz, 1H), 7.27 (t, *J*=7.6 Hz, 1H), 7.02 (t, *J*=7.6 Hz, 1H), 6.79 (d, *J*=7.7 Hz, 1H), 6.73-6.66 (m, 2H), 6.60 (s, 1H), 5.77 (br s, 1H), 4.01 (s, 1H), 3.41 (s, 3H) ppm. <sup>13</sup>C NMR (75 MHz, DMSO d<sub>6</sub>): δ 177.1, 174.3, 154.3, 143.5, 135.9, 129.4, 128.6, 126.6, 125.8, 121.3, 114.3, 110.8, 110.1, 109.2, 76.0, 55.1, 51.5 ppm. IR (KBr) ν=3288, 3066, 2998, 2940, 2891, 2835, 1723, 1617, 1469, 1434, 1337, 1291, 1201, 1152, 1093, 1039, 858, 823, 744, 669, 581 cm<sup>-1</sup>. MS (ESI) *m/z* 333 [M+Na]<sup>+</sup>. HRMS (ESI): *m/z* calcd. for C<sub>17</sub>H<sub>14</sub>O<sub>4</sub> N<sub>2</sub>Na [M+Na]<sup>+</sup>=333.08458, found 333.08368.



**3-hydroxy-5-methyl-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5i)**, Table 3, entry 9): Yield: 96 %, inseparable mixtures of diastereomers, dr 95:05, Time, 24 h White solid, mp >350 °C. <sup>1</sup>H NMR (300 MHz, DMSO d<sub>6</sub>): δ 10.23 (s, 1H), 10.20 (s, 1H), 10.43 (d, *J*=6.3 Hz, 1H), 7.26 (t, *J*=7.4 Hz, 1H), 7.04-6.88 (m, 2H), 6.77 (d, *J*=7.4 Hz, 1H), 6.64 (d, *J*=7.7 Hz, 1H), 6.51 (s, 1H), 6.01 (br s, 1H), 3.98 (s, 1H), 1.96 (s, 3H) ppm. <sup>13</sup>C NMR (75 MHz, DMSO d<sub>6</sub>): δ 177.1, 174.4, 143.4, 140.3, 129.9, 129.8, 128.5, 128.4, 126.4, 125.9, 124.6, 121.2, 109.3, 109.0, 75.8, 51.3, 20.6 ppm. IR (KBr) ν=3320, 1729, 1691, 1624, 1480, 1339, 1209, 1143, 1096, 817, 747, 674 cm<sup>-1</sup>. MS (ESI) *m/z* 317 [M+Na]<sup>+</sup>. HRMS (ESI): *m/z* calcd. for C<sub>17</sub>H<sub>14</sub>O<sub>3</sub>N<sub>2</sub>Na [M+Na]<sup>+</sup>=317.08966, found 317.08960.

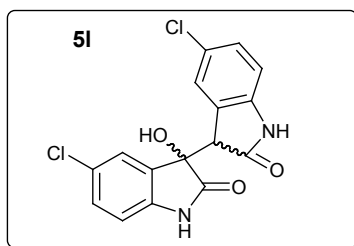


**5'-chloro-3-hydroxy-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5j)**, Table 3, entry 10): Yield: 98 %, inseparable mixtures of diastereomers, dr 97:03, Time, 24 h White solid, mp >350 °C. <sup>1</sup>H NMR (300 MHz, DMSO d<sub>6</sub>): δ 10.39 (s, 1H), 10.29 (s, 1H), 7.57 (s, 1H), 7.32 (dd, *J*=8.07, 1.8 Hz, 1H), 7.13 (td, *J*=7.7, 1.1 Hz, 1H), 6.80-6.72 (m, 2H), 6.69 (d, *J*=7.3 Hz, 1H), 6.66 (s, 1H), 6.16 (d, *J*=7.3 Hz, 1H), 4.04 (s, 1H) ppm. <sup>13</sup>C NMR (75 MHz, DMSO d<sub>6</sub>): δ 176.9, 173.7, 142.7, 142.3, 129.8, 128.3, 128.0, 126.4, 125.2, 123.5, 121.2, 110.4, 109.8, 75.4, 51.7 ppm. IR (KBr) ν=3321, 3266, 3105, 3059, 2854, 1731, 1693, 1621, 1473, 1444, 1333, 1197, 1165, 1115, 1089, 820, 735, 656, 611, 561 cm<sup>-1</sup>. MS (ESI) *m/z* 337 [M+Na]<sup>+</sup>. HRMS (ESI): *m/z* calcd. for C<sub>16</sub>H<sub>11</sub>O<sub>3</sub>N<sub>2</sub>ClNa [M+Na]<sup>+</sup>=337.03504, found 337.03477.



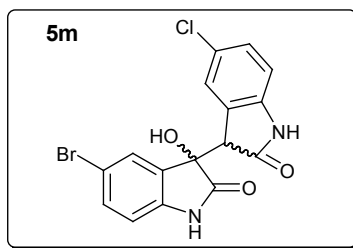
**5'-chloro-5-fluoro-3-hydroxy-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5k, Table 3, entry 11):**

Yield: 99 %, inseparable mixtures of diastereomers, dr 96:04, Time, 24 h White solid, mp >350 °C. <sup>1</sup>H NMR (300 MHz, DMSO *d*<sub>6</sub>): δ 10.47 (s, 1H), 10.36 (s, 1H), 7.53 (s, 1H), 7.36 (dd, *J*=8.3, 2.3 Hz, 1H), 7.01 (td, *J*=9.1, 3.0 Hz, 1H), 6.85 (s, 1H), 6.82-6.74 (m, 2H), 5.82 (dd, *J*=7.6, 2.3 Hz, 1H), 4.05 (s, 1H) ppm. <sup>13</sup>C NMR (75 MHz, DMSO *d*<sub>6</sub>): δ 176.8, 173.5, 158.8, 155.7, 142.3, 138.9, 129.5, 129.4, 128.5, 127.6, 126.5, 125.3, 116.3, 116.0, 111.1, 110.7, 110.6, 110.5, 75.5, 51.6 ppm. IR (KBr)  $\nu$ =3323, 3260, 3059, 2854, 1729, 1694, 1621, 1475, 1330, 1269, 1195, 1146, 1113, 821, 617 cm<sup>-1</sup>. MS (ESI) *m/z* 355 [M+Na]<sup>+</sup>. HRMS (ESI): *m/z* calcd. for C<sub>16</sub>H<sub>10</sub>O<sub>3</sub>N<sub>2</sub>ClFNa[M+H]<sup>+</sup>= 355.02617, found 355.02632.



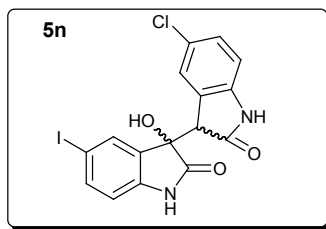
**5,5'-dichloro-3-hydroxy-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5l, Table 3, entry 12):** Yield:

98 %, inseparable mixtures of diastereomers, dr 98:02, Time, 24 h White solid, mp >350 °C. <sup>1</sup>H NMR (300 MHz, CDCl<sub>3</sub>+DMSO *d*<sub>6</sub>): δ 10.54 (br s, 1H), 10.33 (s, 1H), 7.54 (s, 1H), 7.32 (dd, *J*=7.4, 1.9 Hz, 1H), 7.17 (dd, *J*=8.3, 2.0 Hz, 1H), 6.89-6.66 (m, 3H), 6.04 (s, 1H), 4.04 (s, 1H) ppm. <sup>13</sup>C NMR (75 MHz, CDCl<sub>3</sub>+DMSO *d*<sub>6</sub>): δ 174.9, 172.0, 141.5, 139.7, 128.7, 127.4, 126.7, 124.6, 123.5, 123.1, 121.9, 119.3, 109.2, 107.2, 73.7, 49.5 ppm. IR (KBr)  $\nu$ =3317, 3263, 2853, 1732, 1694, 1621, 1475, 1450, 1329, 1197, 1166, 822, 764, 618, 562 cm<sup>-1</sup>. MS (ESI) *m/z* 371 [M+Na]<sup>+</sup>. HRMS (ESI): *m/z* calcd. for C<sub>16</sub>H<sub>10</sub>O<sub>3</sub>N<sub>2</sub>Cl<sub>2</sub>Na [M+Na]<sup>+</sup>=370.99607, found 370.99625.



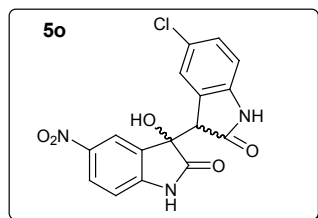
**5-bromo-5'-chloro-3-hydroxy-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5m, Table 3, entry 13):**

Yield: 98 %, inseparable mixtures of diastereomers, dr 97:03, Time, 24 h White solid, mp >350 °C. <sup>1</sup>H NMR (300 MHz, CDCl<sub>3</sub>+DMSO d<sub>6</sub>): δ 10.57 (s, 1H), 10.35 (s, 1H), 7.56 (s, 1H), 7.32 (td, *J*=7.4, 1.7 Hz, 2H), 6.85 (s, 1H), 6.84 (d, *J*=8.3 Hz, 1H), 6.75 (d, *J*=8.3 Hz, 1H), 6.19(s, 1H), 4.08 (s, 1H) ppm. <sup>13</sup>C NMR (75 MHz, CDCl<sub>3</sub>+DMSO d<sub>6</sub>): δ 176.5, 173.4, 142.2, 142.0, 132.3, 130.1, 128.4, 127.3, 126.5, 126.4, 125.5, 112.7, 111.7, 110.3, 75.3, 51.6 ppm. IR (KBr) ν=3264, 1733, 1695, 1619, 1475, 1445, 1327, 1197, 1165, 1197, 816, 617 cm<sup>-1</sup>. MS (ESI) *m/z* 417 [M+Na]<sup>+</sup>. HRMS (ESI): *m/z* calcd. for C<sub>16</sub>H<sub>10</sub>O<sub>3</sub>N<sub>2</sub>BrClNa[M+Na]<sup>+</sup>= 416.94406, found 416.94384.



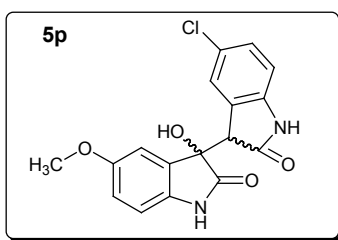
**5'-chloro-3-hydroxy-5-iodo-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5n, Table 3, entry 14):**

Yield: 99 %, inseparable mixtures of diastereomers, dr 96:04, Time, 24 h White solid, mp >350 °C. <sup>1</sup>H NMR (300 MHz, DMSO d<sub>6</sub>) δ 11.21 (s, 1H), 10.36 (s, 1H), 8.14 (dd, *J*= 8.4, 2.2 Hz, 1H), 7.63 (s, 1H), 7.40 (dd, *J*= 8.4, 1.9 Hz, 1H), 7.11 (s, 1H), 6.99 (d, *J*=8.4 Hz, 1H), 6.88 (d, *J*= 2.5 Hz, 1H), 6.80 (d, *J*= 8.1 Hz, 1H), 4.14 (s, 1H) ppm. <sup>13</sup>C NMR (75 MHz, DMSO d<sub>6</sub>): δ 176.1, 173.4, 142.4, 142.3, 138.1, 132.1, 130.5, 128.4, 127.6, 126.4, 125.2, 112.2, 110.3, 83.6, 75.2, 51.6 ppm. IR (KBr) ν=3285, 3058, 2856, 1732, 1694, 1617, 1473, 1445, 1326, 1196, 1167, 816, 760, 657, 617, 560 cm<sup>-1</sup>. MS (ESI) *m/z* 440 [M]<sup>+</sup>. HRMS (ESI): *m/z* calcd. for C<sub>16</sub>H<sub>10</sub>O<sub>3</sub>N<sub>2</sub> ClI[M+H]<sup>+</sup>= 439.94246, found 439.94261.



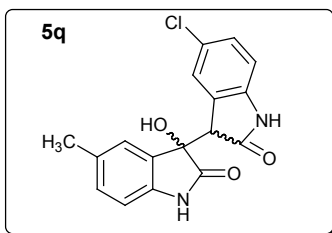
**5'-chloro-3-hydroxy-5-nitro-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5o, Table 3, entry 15):**

Yield: 99 %, inseparable mixtures of diastereomers, dr 97:03, Time, 24 h White solid, mp >350 °C. <sup>1</sup>H NMR (300 MHz, CDCl<sub>3</sub>+DMSO d<sub>6</sub>): δ 10.55 (s, 1H), 10.36 (s, 1H), 7.54 (s, 1H), 7.47 (dd, *J*=8.1, 1.8 Hz, 1H), 7.38 (dd, *J*=8.4, 1.8 Hz, 1H), 6.87-6.80 (m, 2H), 6.63 (d, *J*=8.1, Hz, 1H), 6.30 (d, *J*=1.5 Hz, 1H), 4.03 (s, 1H) ppm. <sup>13</sup>C NMR (75 MHz, CDCl<sub>3</sub>+DMSO d<sub>6</sub>): δ 176.0, 172.2, 147.6, 140.0, 127.3, 127.1, 125.0, 124.9, 123.2, 119.8, 117.8, 108.0, 107.7, 73.5, 49.9 ppm. IR (KBr) ν=3493, 3389, 3229, 1746, 1699, 1624, 1519, 1476, 1338, 1310, 1167, 1111, 1091, 980, 906, 844, 622, 561 cm<sup>-1</sup>. MS (ESI) *m/z* 360 [M+H]<sup>+</sup>. HRMS (ESI): *m/z* calcd. for C<sub>16</sub>H<sub>11</sub>O<sub>5</sub>N<sub>3</sub>Cl[M+H]<sup>+</sup>= 360.03872, found 360.03896.



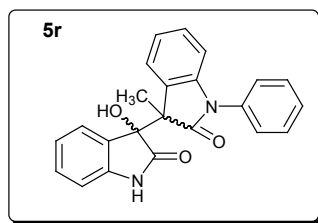
**5'-chloro-3-hydroxy-5-methoxy-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5p, Table 3, entry**

16): Yield: 99 %, inseparable mixtures of diastereomers, dr 97:03, Time, 24 h White solid, mp >350 °C. <sup>1</sup>H NMR (300 MHz, DMSO d<sub>6</sub>): δ 10.31 (s, 1H), 10.22 (s, 1H), 7.51 (s, 1H), 7.34 (d, *J*=8.3 Hz, 1H), 6.78 (d, *J*=8.3 Hz, 1H), 6.74-6.65 (m, 3H), 5.71 (s, 1H), 4.02 (s, 1H), 3.44 (s, 3H) ppm. <sup>13</sup>C NMR (75 MHz, DMSO d<sub>6</sub>): δ 176.9, 173.9, 154.3, 142.5, 135.9, 129.1, 128.4, 128.0, 126.5, 125.4, 114.2, 110.8, 110.5, 110.3, 75.8, 55.1, 51.8 ppm. IR (KBr) ν=3275, 2942, 1732, 1694, 1618, 1494, 1476, 1443, 1331, 1203, 1155, 1090, 819, 663 cm<sup>-1</sup>. MS (ESI) *m/z* 367 [M+ Na]<sup>+</sup>. HRMS (ESI): *m/z* calcd. For C<sub>17</sub>H<sub>13</sub>O<sub>4</sub>N<sub>2</sub>ClNa [M+Na]<sup>+</sup>=367.04561, found 367.04593.



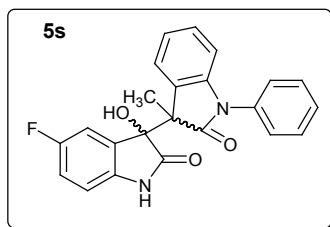
**5'-chloro-3-hydroxy-5-methyl-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5q, Table 3, entry 17):**

Yield: 94 %, inseparable mixtures of diastereomers, dr 96:04, Time 24 h, White solid, mp >350 °C. <sup>1</sup>H NMR (300 MHz, DMSO d<sub>6</sub>): δ 10.30 (br s, 2H), 7.48 (s, 1H), 7.34 (dd, *J*=8.3, 1.7 Hz, 1H), 6.95 (d, *J*=7.5 Hz, 1H), 6.78 (d, *J*=8.3 Hz, 1H), 6.65 (d, *J*=7.9 Hz, 1H), 6.62 (s 1H), 5.97 (s, 1 H), 4.02 (s, 1H), 1.98 (s, 3H) ppm. <sup>13</sup>C NMR (75 MHz, DMSO d<sub>6</sub>): δ 176.9, 173.8, 142.4, 140.2, 130.0, 129.9, 128.3, 128.1, 128.0, 126.4, 125.2, 124.3, 110.3, 109.5, 75.6, 51.6, 20.6 ppm. IR (KBr) ν=3272, 2921, 1732, 1695, 1622, 1475, 1329, 1200, 1147, 814, 618 cm<sup>-1</sup>. MS (ESI) *m/z* 351 [M+Na]<sup>+</sup>. HRMS (ESI): *m/z* calcd. For C<sub>17</sub>H<sub>13</sub>O<sub>3</sub>N<sub>2</sub>ClNa [M+Na]<sup>+</sup>=351.05069, found 351.05010.

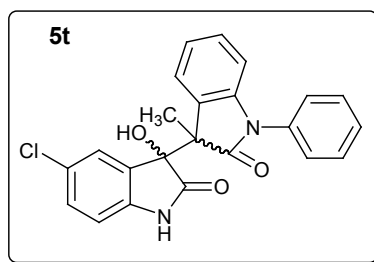


**3'-hydroxy-3-methyl-1-phenyl-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5r, Table 3, entry 18):**

Yield 99 %, inseparable mixtures of diastereomers, dr 97:03, Time 24 h, White solid, mp 158-160 °C. <sup>1</sup>H NMR (300 MHz, DMSO d<sub>6</sub>): δ 10.27 (s, 1H), 7.63-7.49 (m, 2H), 7.43-4.35 (m, 3H), 7.32-7.26 (m, 1H), 7.21-7.09 (m, 2H), 6.72 (d, *J*=7.6 Hz, 3H), 6.52 (d, *J*=7.7 Hz, 1H), 6.46 (s, 1H), 5.84 (br s, 1H), 1.73 (s, 3H) ppm. <sup>13</sup>C NMR (75 MHz, DMSO d<sub>6</sub>): δ 176.1, 175.4, 143.7, 141.3, 130.6, 130.2, 129.7, 129.4, 129.0, 128.3, 127.3, 126.5, 125.9, 124.7, 124.5, 122.8, 110.9, 108.6, 76.7, 53.5, 15.2 ppm. IR (KBr) ν=3215, 3047, 2930, 2880, 1733, 1690, 1614, 1501, 1466, 1375, 1328, 1197, 1111, 752, 699, 628, 596, 488 cm<sup>-1</sup>. MS (ESI) *m/z* 371 [M+H]<sup>+</sup>. HRMS (ESI): *m/z* calcd. For C<sub>23</sub>H<sub>19</sub>O<sub>3</sub>N<sub>2</sub> [M+H]<sup>+</sup>=371.13902, found 371.13917.



**5'-fluoro-3'-hydroxy-3-methyl-1-phenyl-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5s, Table 3, entry 19):** Yield 99 %, inseparable mixtures of diastereomers, dr 97:03, Time, 24 h, White solid, mp 194-196 °C.  $^1\text{H}$  NMR (300 MHz, DMSO  $d_6$ ):  $\delta$  10.34 (s, 1H), 7.67-7.49 (m, 1H), 7.46-7.32 (m, 4H), 7.19 (t,  $J=7.4$  Hz, 1H), 7.02 (dt,  $J=8.6, 2.6$  Hz, 1H), 6.84-6.69 (m, 4H), 6.59 (d,  $J=7.7$  Hz, 1H), 5.45 (br s, 1H), 1.74 (s, 3H) ppm.  $^{13}\text{C}$  NMR (75 MHz, DMSO  $d_6$ ):  $\delta$  176.1, 175.2, 158.4, 155.2, 143.4, 138.4, 133.8, 130.0, 129.4, 128.7, 128.1, 126.3, 125.6, 122.5, 115.8, 115.5, 111.8, 111.5, 110.0, 109.9, 108.3, 76.6, 53.7, 15.1 ppm. IR (KBr)  $\nu=3424, 3226, 2929, 2879, 1731, 1689, 1605, 1474, 1375, 1324, 1200, 755, 701, 629, 488$   $\text{cm}^{-1}$ . MS (ESI)  $m/z$  411  $[\text{M}+\text{Na}]^+$ . HRMS (ESI):  $m/z$  calcd. for  $\text{C}_{23}\text{H}_{17}\text{O}_3\text{N}_2\text{FNa}$   $[\text{M}+\text{Na}]^+=411.11154$ , found 411.11133.



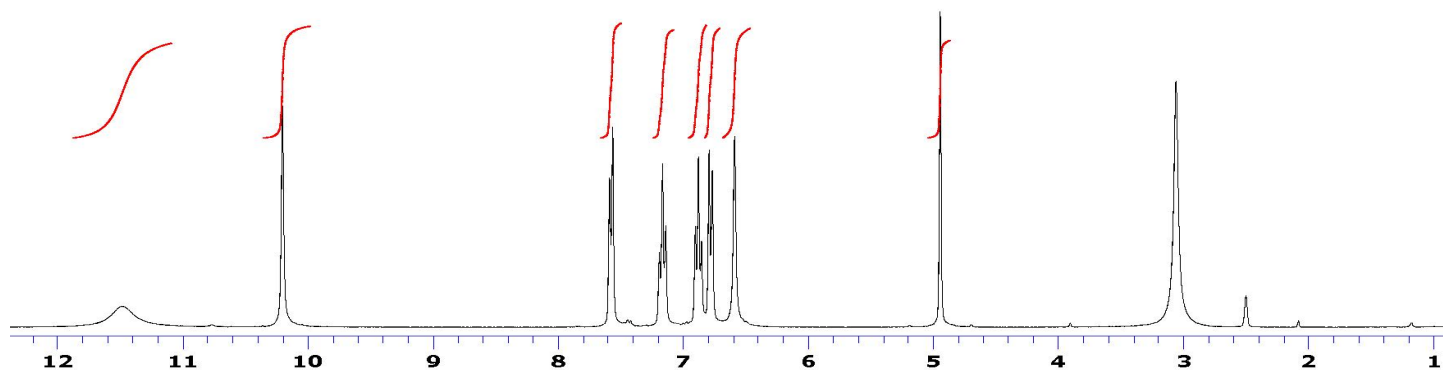
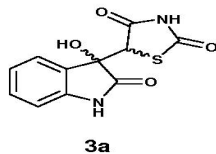
**5'-chloro-3'-hydroxy-3-methyl-1-phenyl-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5t, Table 3, entry 20):** Yield 99 %, inseparable mixtures of diastereomers, dr 97:03, Time 24 h, White solid, mp 178-180 °C.  $^1\text{H}$  NMR (300 MHz, DMSO  $d_6$ ):  $\delta$  10.43 (s, 1H), 7.64-7.55 (m, 1H), 7.46-7.35 (m, 4H), 7.22 (dd,  $J=8.3, 1.9$  Hz, 2H), 6.81-6.67 (m, 4H), 6.59 (d,  $J=7.9$  Hz, 1H), 5.60 (br s, 1H), 1.73 (m, 3H) ppm.  $^{13}\text{C}$  NMR (75 MHz, DMSO  $d_6$ ):  $\delta$  175.8, 175.1, 143.4, 141.1, 133.7, 130.3, 130.0, 129.4, 129.1, 128.7, 128.1, 126.3, 125.7, 124.4, 124.2, 122.5, 110.6, 108.3, 76.4, 53.8, 14.9 ppm. IR (KBr)  $\nu=3242, 2971, 2929, 2879, 1740, 1720, 1692, 1613, 1501, 1464, 1378, 1325, 1193, 1061, 835, 755, 701, 630, 487$   $\text{cm}^{-1}$ . MS (ESI)  $m/z$  405  $[\text{M}+\text{H}]^+$ . HRMS (ESI):  $m/z$  calcd. for  $\text{C}_{23}\text{H}_{18}\text{O}_3\text{N}_2\text{Cl}$   $[\text{M}+\text{H}]^+=405.10005$ , found 405.09984.



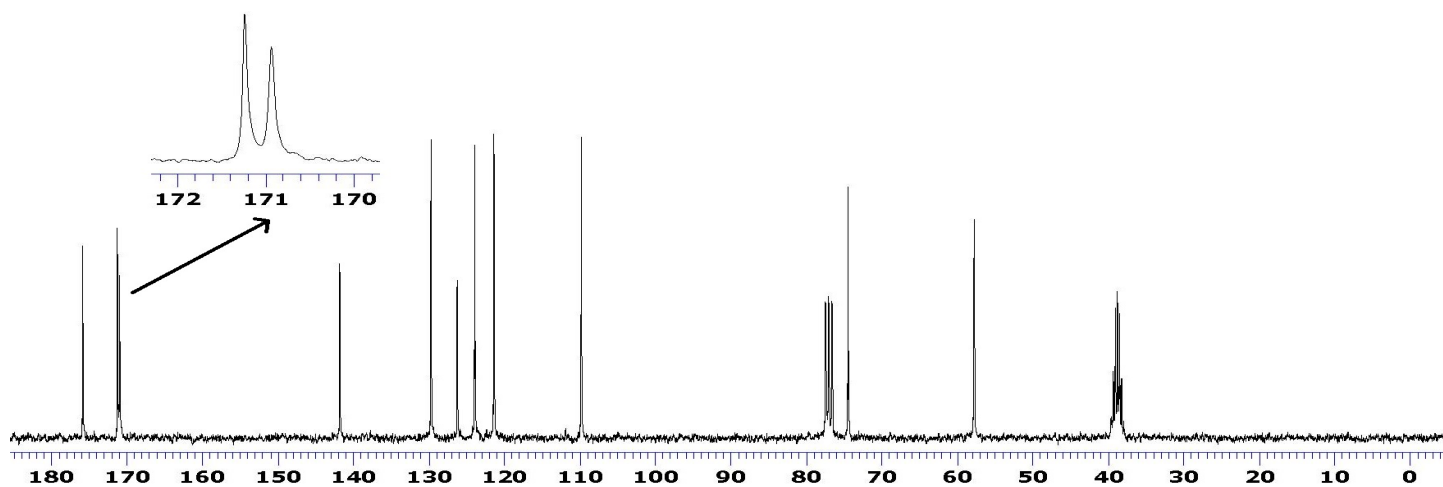
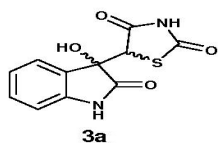
## $^1\text{H}$ and $^{13}\text{C}$ NMR Spectrum of the synthesized compounds (3a-3x):

5-(3-hydroxy-2-oxoindolin-3-yl)thiazolidine-2,4-dione (3a, dr 100:00, Table 2, entry 1)

$^1\text{H}$  NMR, 300 MHz,  $\text{CDCl}_3+\text{DMSO } d_6$

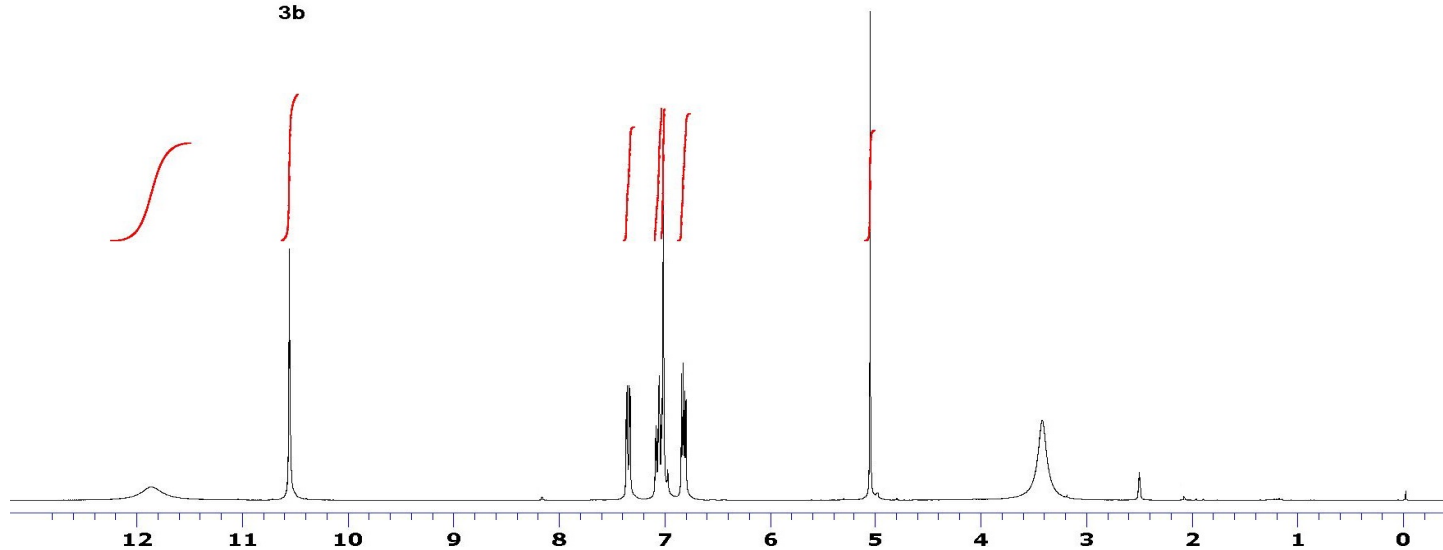
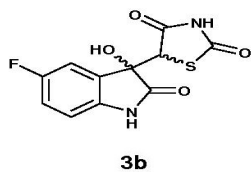


$^{13}\text{C}$  NMR, 75 MHz,  $\text{CDCl}_3+\text{DMSO } d_6$

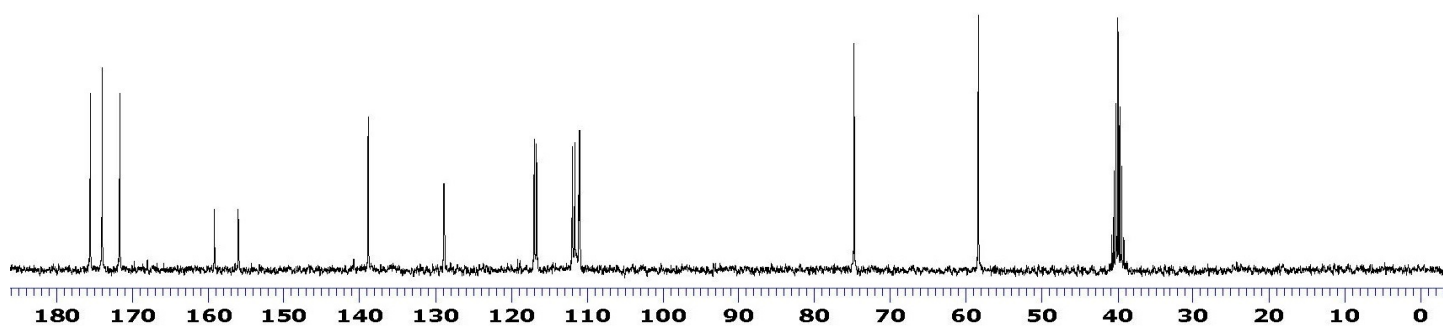
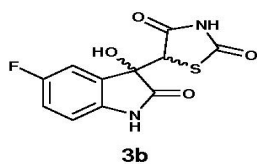


5-(5-fluoro-3-hydroxy-2-oxoindolin-3-yl)thiazolidine-2,4-dione (3b, dr 100:00, Table 2, entry 2)

$^1\text{H NMR}$ , 300 MHz,  $\text{DMSO } d_6$

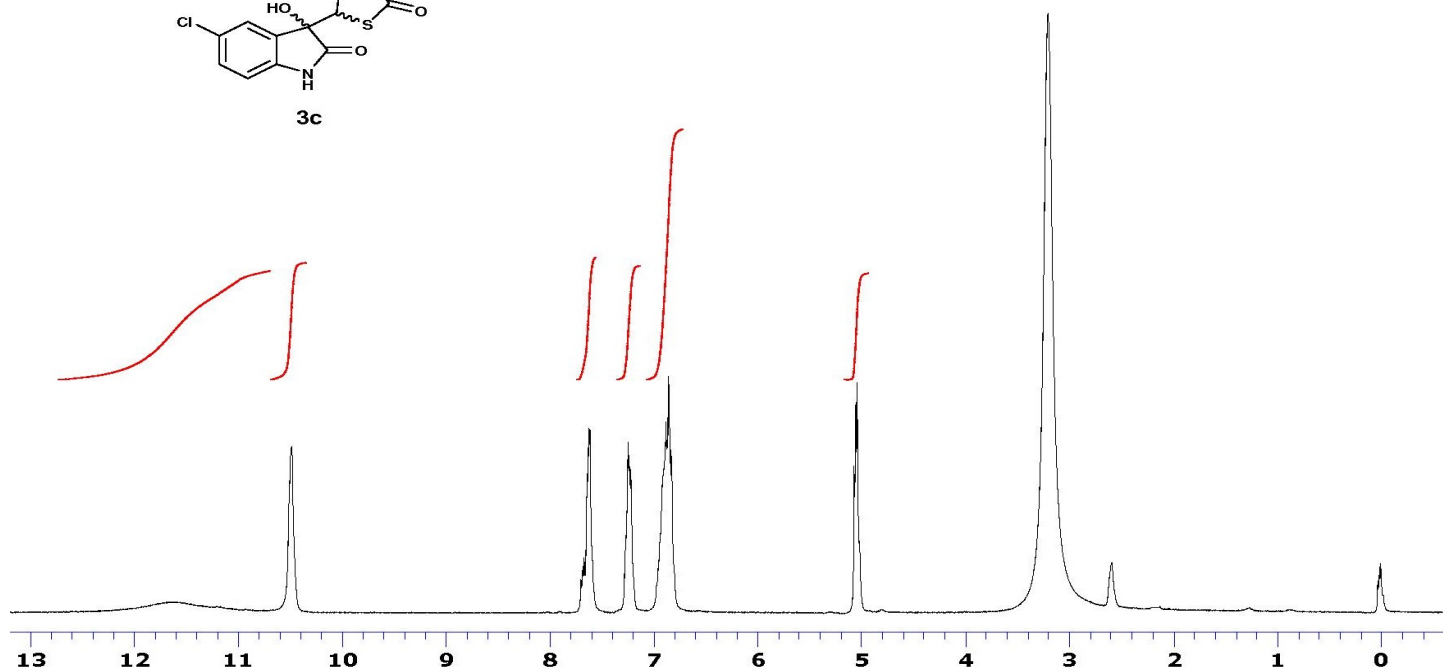
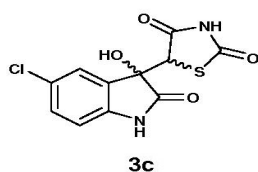


$^{13}\text{C NMR}$ , 75 MHz,  $\text{DMSO } d_6$

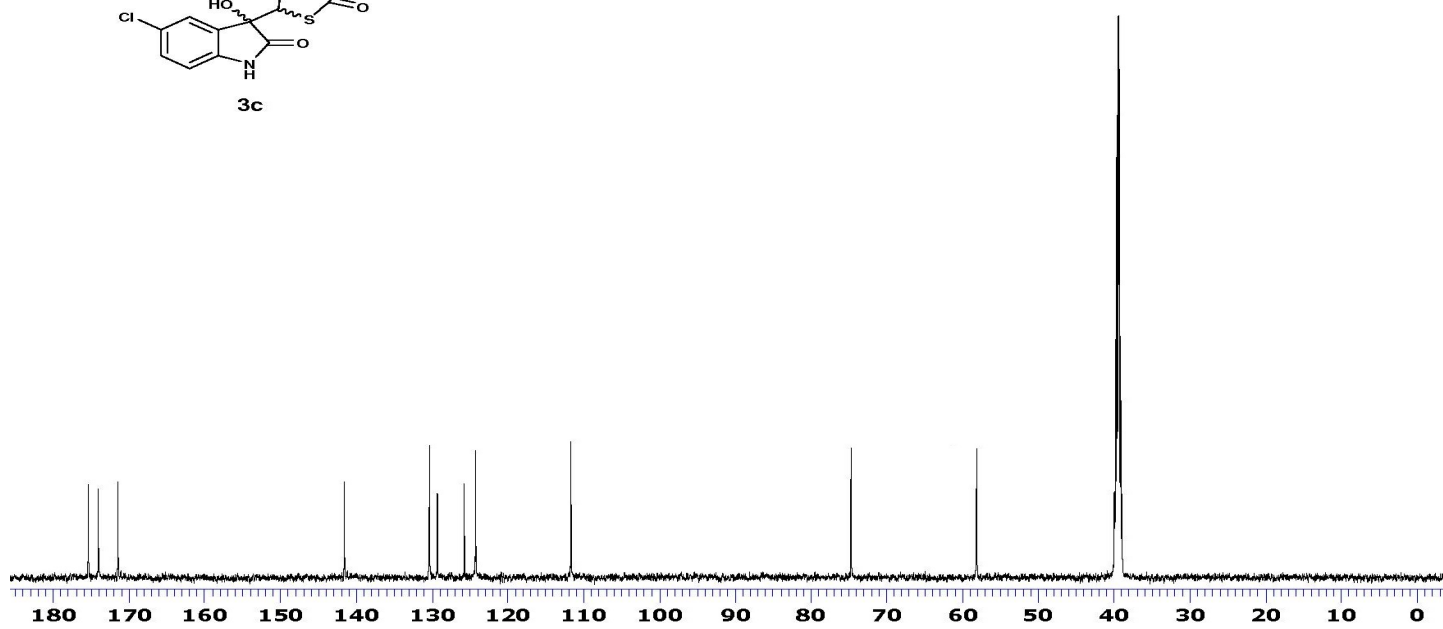
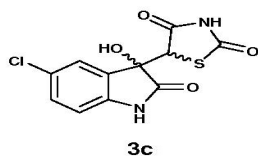


**5-(5-chloro-3-hydroxy-2-oxoindolin-3-yl)thiazolidine-2,4-dione (3c, dr 100:00, Table 2, entry 3)**

<sup>1</sup>H NMR, 300 MHz, DMSO *d*<sub>6</sub>

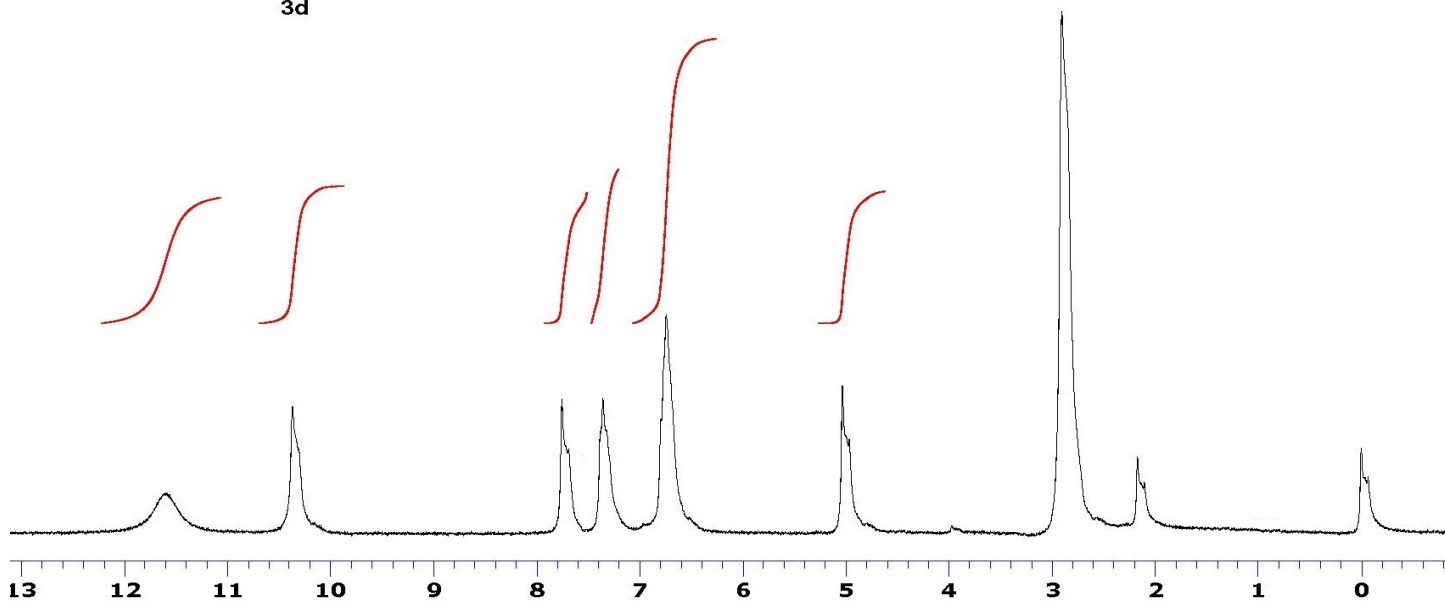
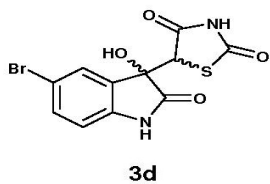


<sup>13</sup>C NMR, 125 MHz, DMSO *d*<sub>6</sub>

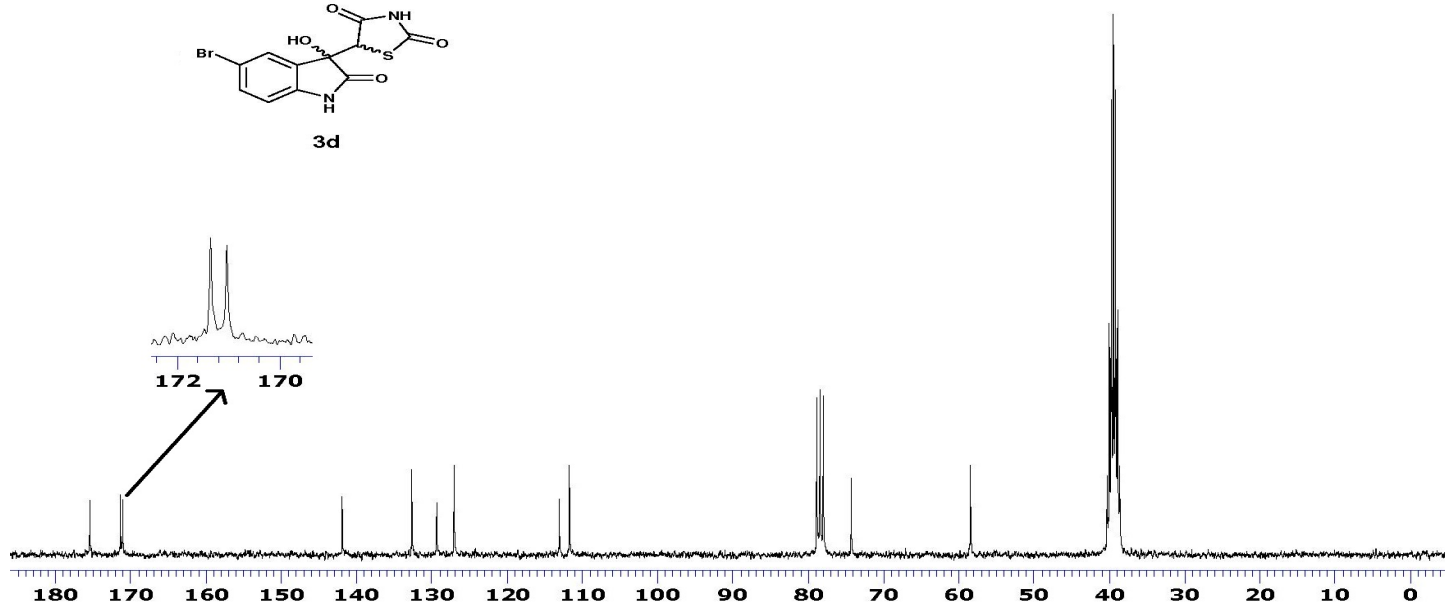
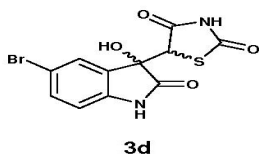


**5-(5-bromo-3-hydroxy-2-oxoindolin-3-yl)thiazolidine-2,4-dione (3d, dr 100:00, Table 2, entry 4)**

<sup>1</sup>H NMR, 300 MHz, CDCl<sub>3</sub>+DMSO *d*<sub>6</sub>

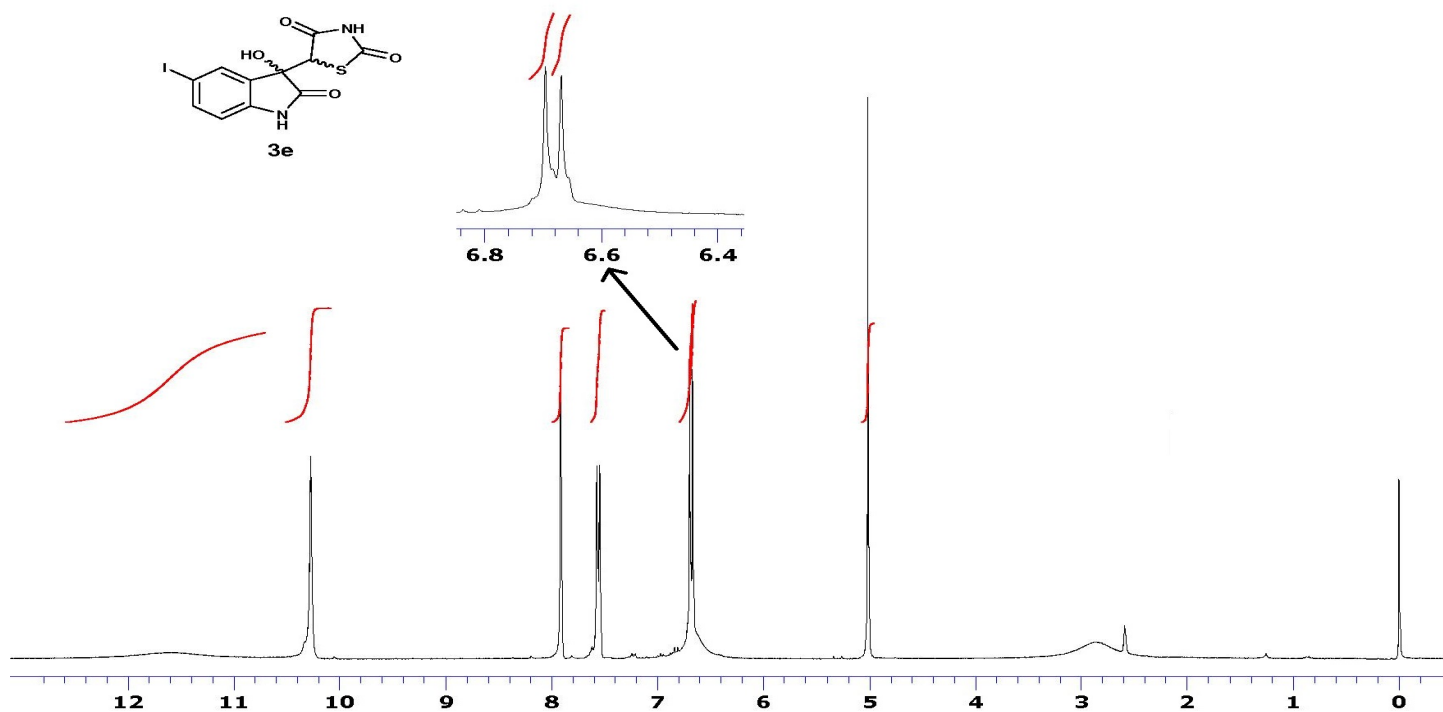


<sup>13</sup>C NMR, 75 MHz, CDCl<sub>3</sub>+DMSO *d*<sub>6</sub>

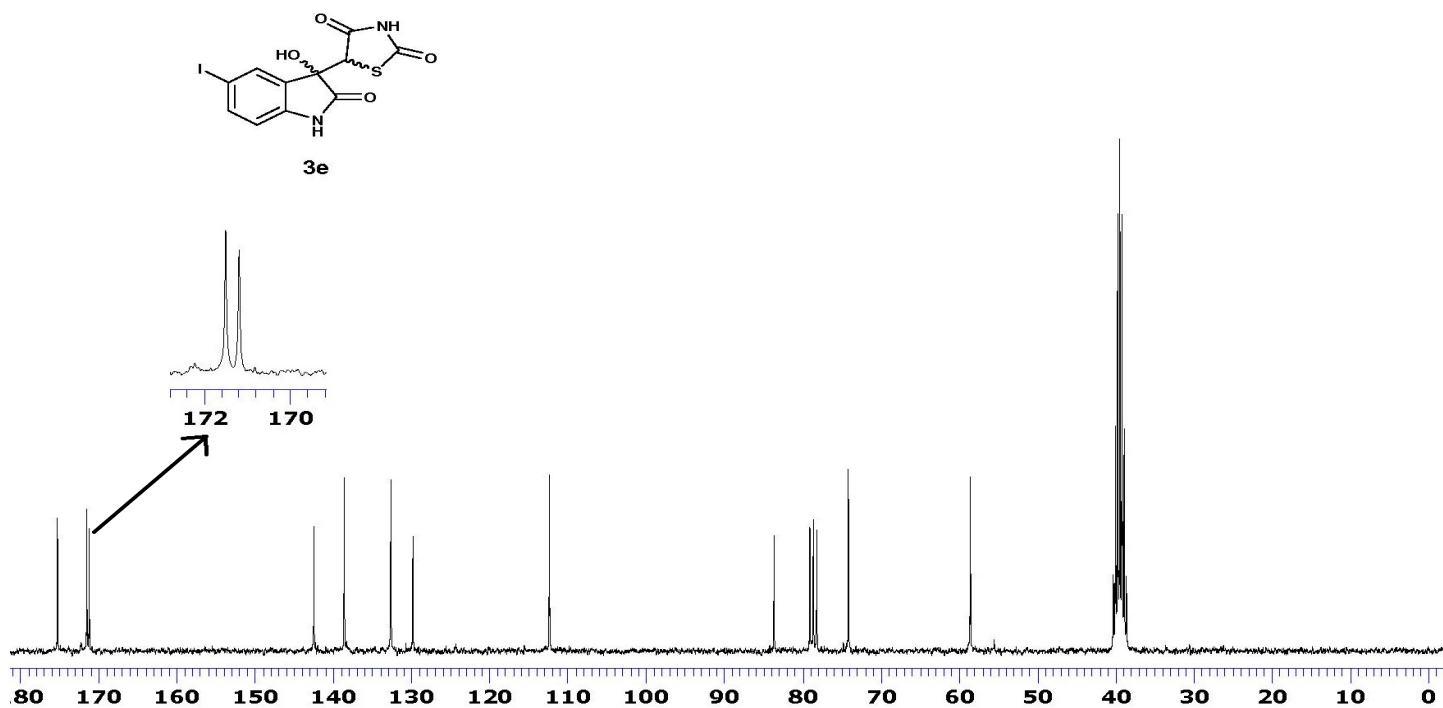


5-(3-hydroxy-5-iodo-2-oxoindolin-3-yl)thiazolidine-2,4-dione (3e, dr 100:00, Table 2, entry 5)

$^1\text{H NMR}$ , 300 MHz,  $\text{CDCl}_3+\text{DMSO } d_6$

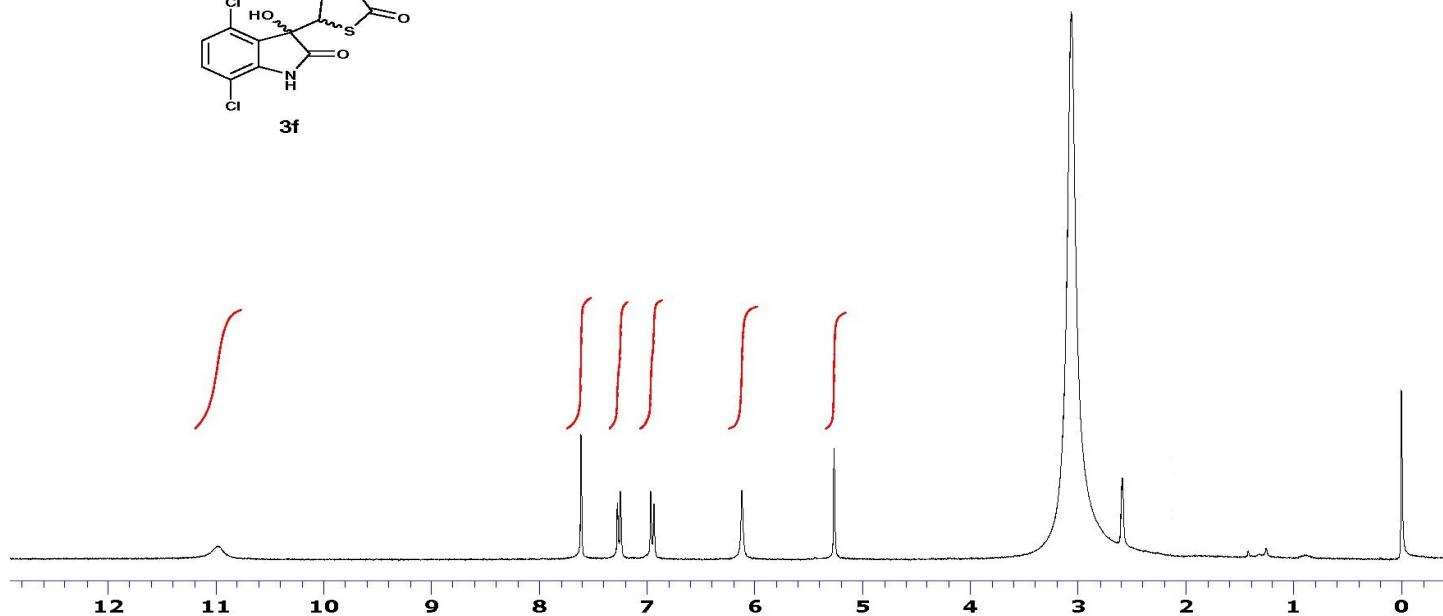
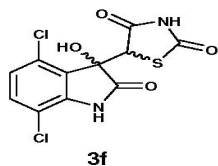


$^{13}\text{C NMR}$ , 75 MHz,  $\text{CDCl}_3+\text{DMSO } d_6$

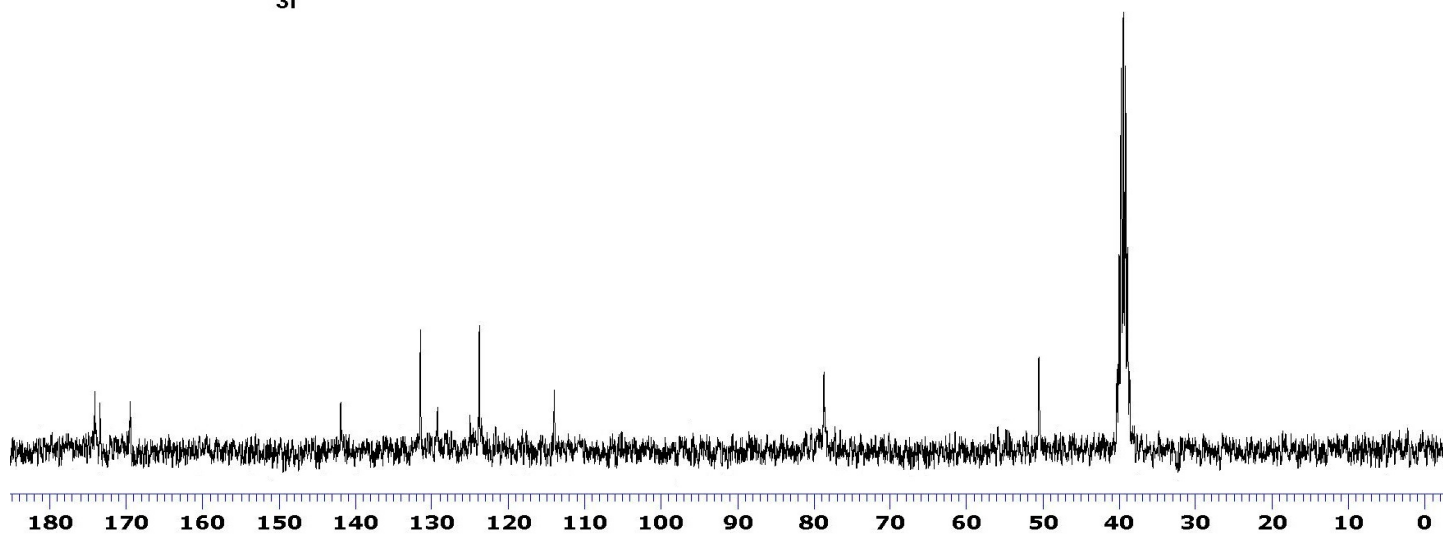
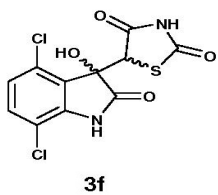


5-(4,7-dichloro-3-hydroxy-2-oxoindolin-3-yl)thiazolidine-2,4-dione (3f, dr 100:00, Table 2, entry 6)

$^1\text{H}$  NMR, 300 MHz,  $\text{DMSO } d_6$

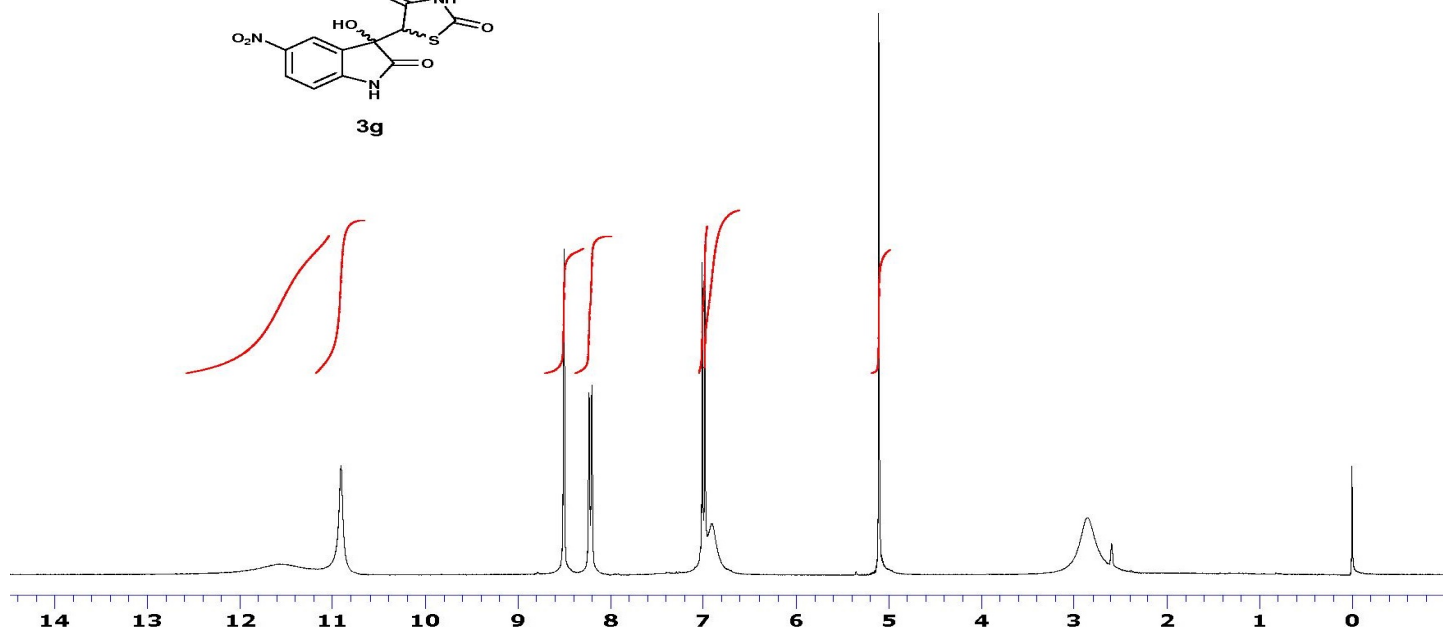
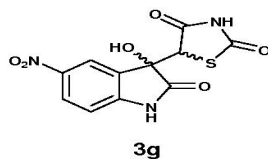


$^{13}\text{C}$  NMR, 75 MHz,  $\text{DMSO } d_6$

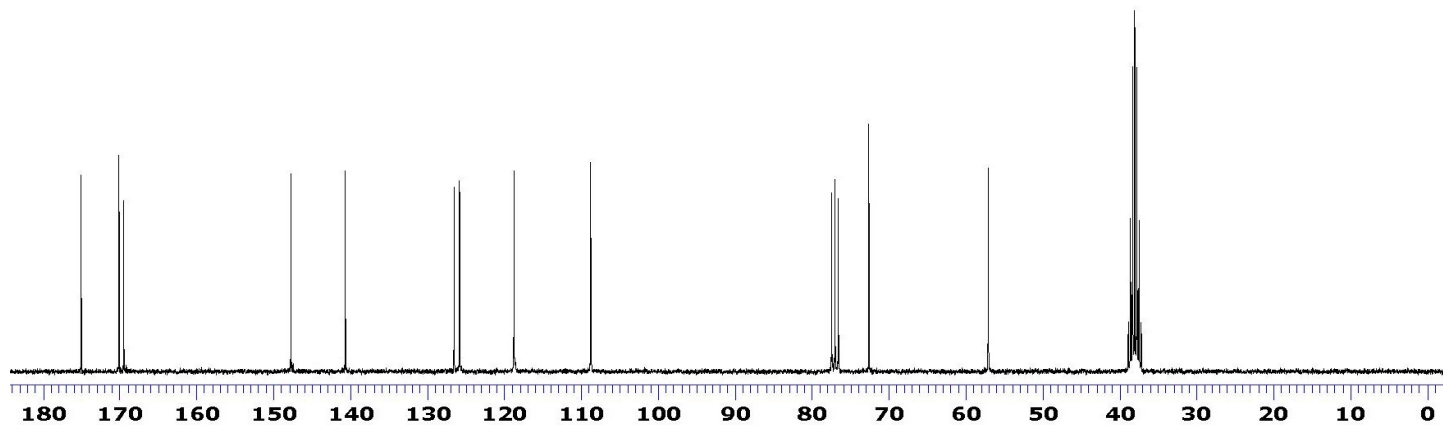
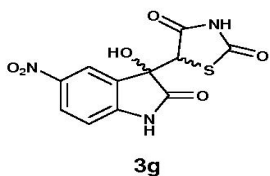


**5-(3-hydroxy-5-nitro-2-oxindolin-3-yl)thiazolidine-2,4-dione (3g, dr 100:00, Table 2, entry 7)**

<sup>1</sup>H NMR, 300 MHz, CDCl<sub>3</sub>+DMSO *d*<sub>6</sub>

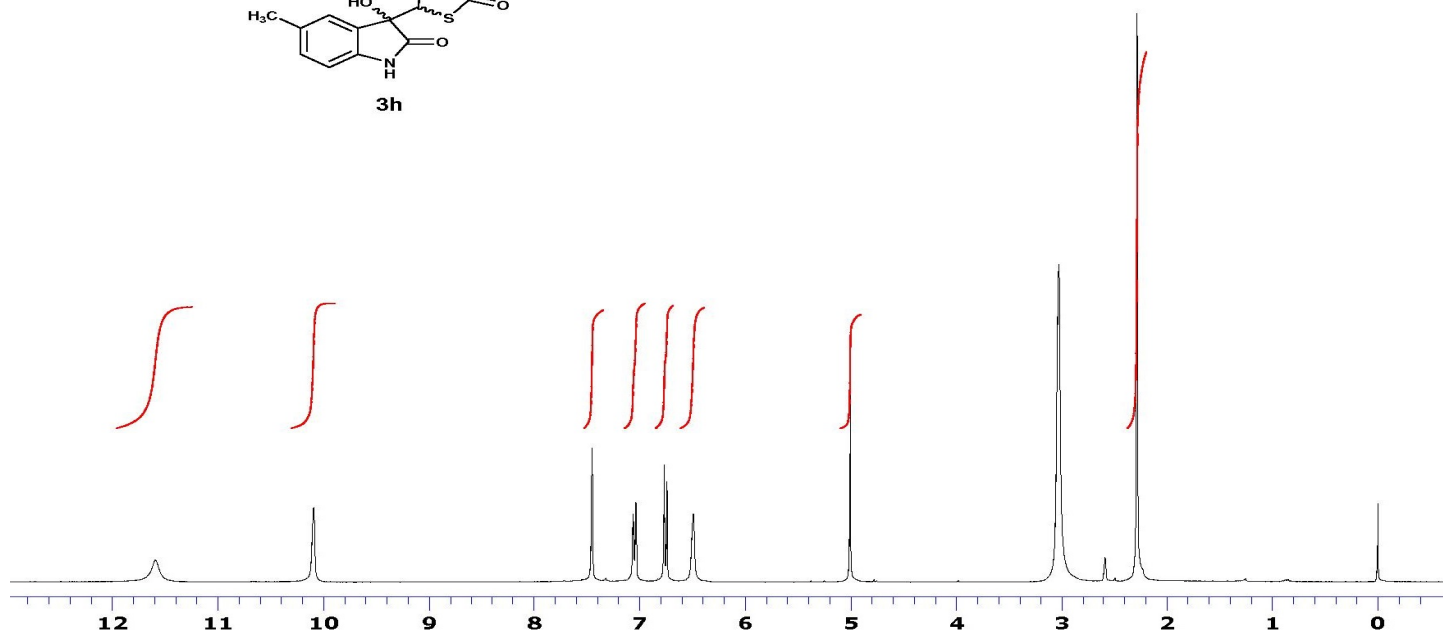
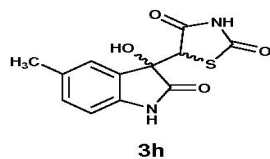


<sup>13</sup>C NMR, 75 MHz, CDCl<sub>3</sub>+DMSO *d*<sub>6</sub>

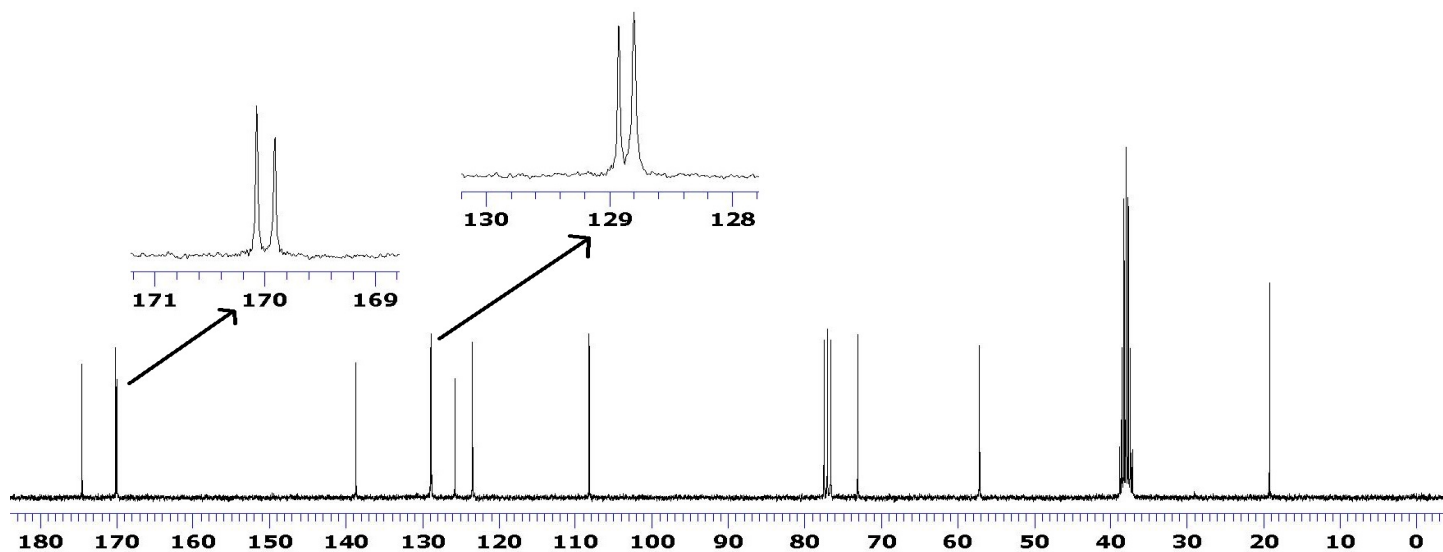
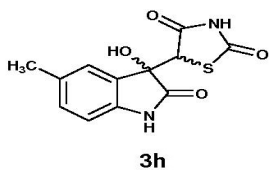


5-(3-hydroxy-5-methyl-2-oxindolin-3-yl)thiazolidine-2,4-dione (3h, dr 100:00, Table 2, entry 8)

$^1\text{H}$  NMR, 300 MHz,  $\text{CDCl}_3+\text{DMSO } d_6$



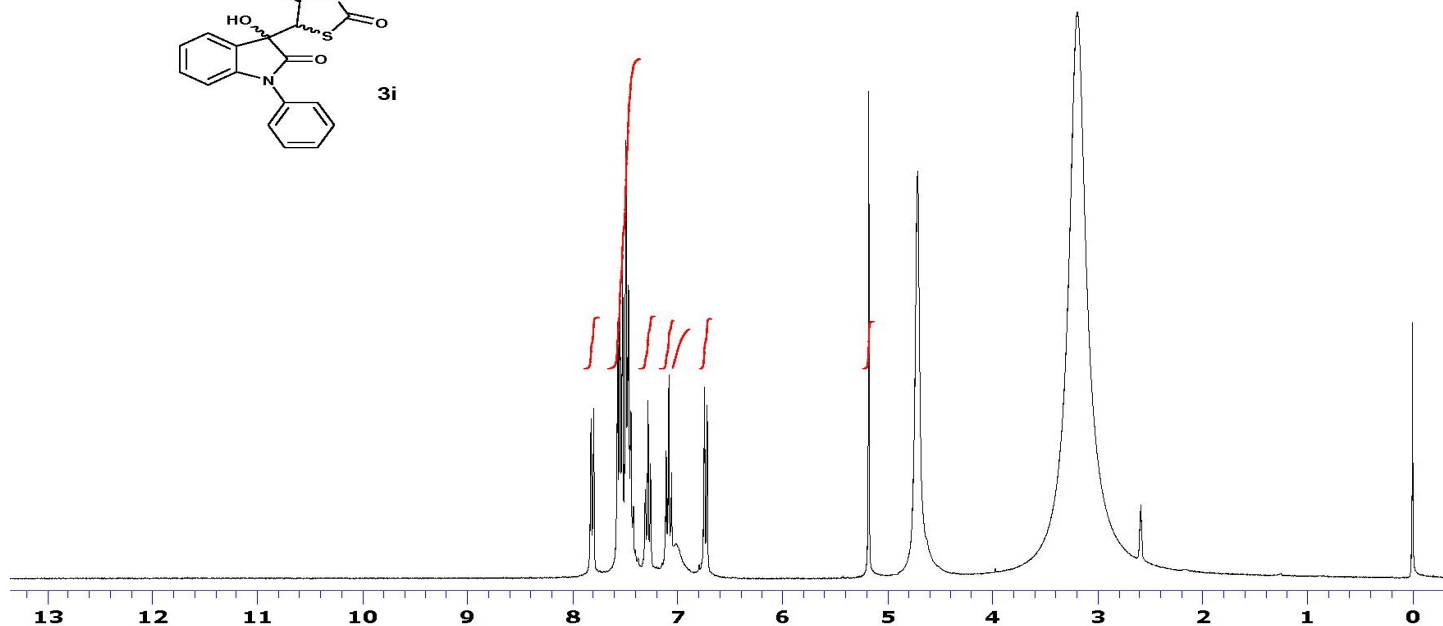
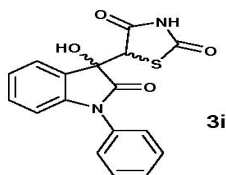
$^{13}\text{C}$  NMR, 75 MHz,  $\text{CDCl}_3+\text{DMSO } d_6$



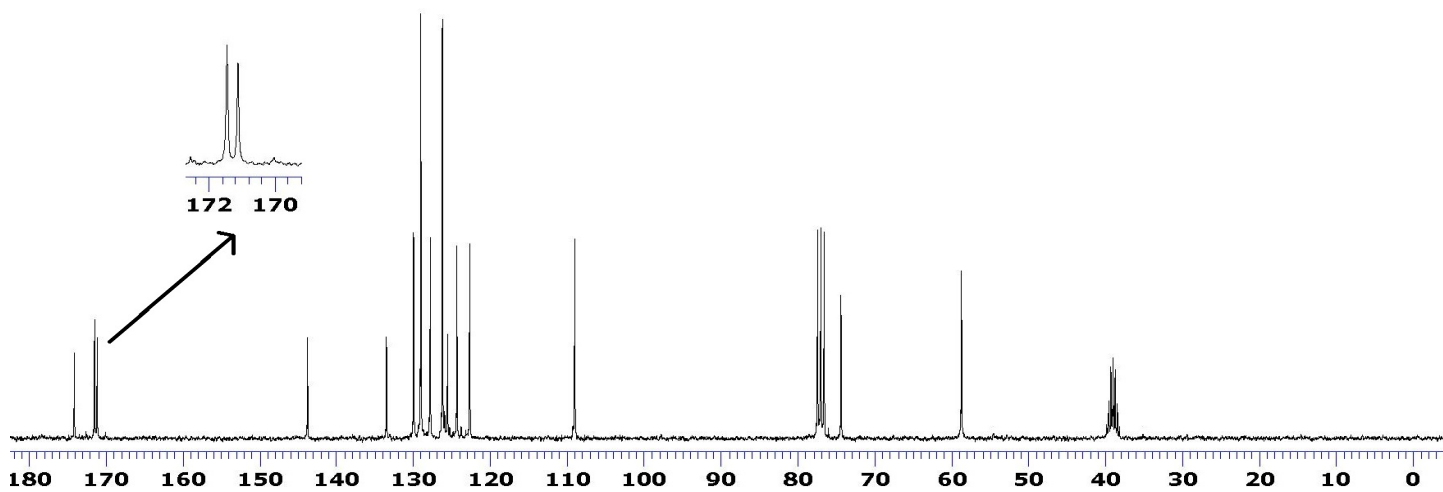
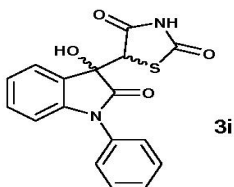


**5-(3-hydroxy-2-oxo-1-phenylindolin-3-yl) thiazolidine-2,4-dione (3i, dr 100:00, Table 2, entry 9)**

<sup>1</sup>H NMR, 300 MHz, CDCl<sub>3</sub>+DMSO *d*<sub>6</sub>

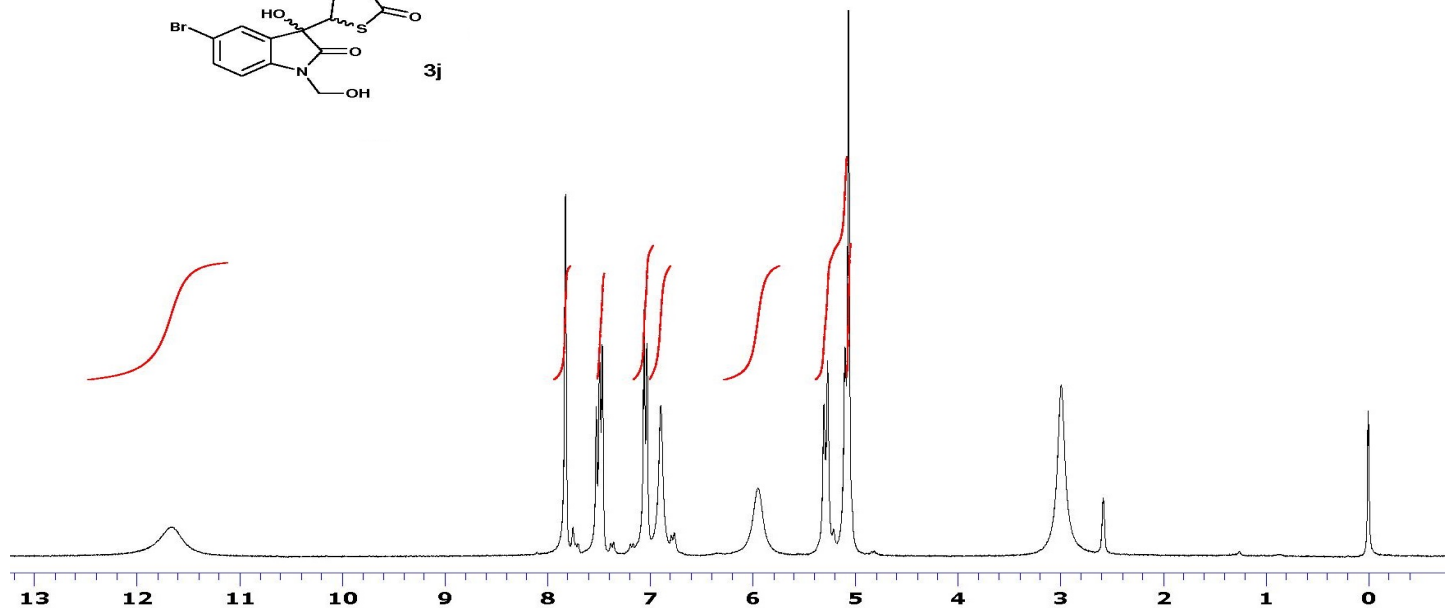
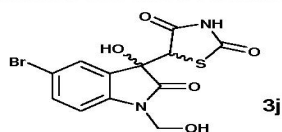


<sup>13</sup>C NMR, 75 MHz, CDCl<sub>3</sub>+DMSO *d*<sub>6</sub>

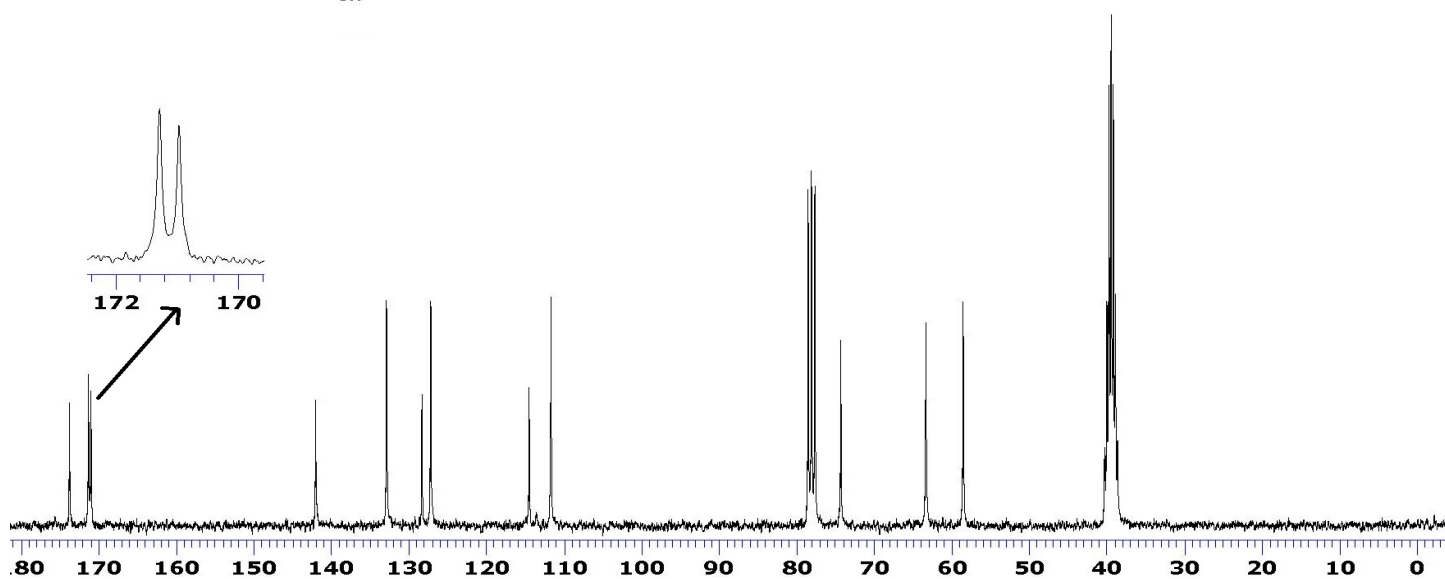
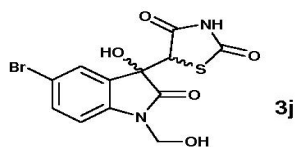


**5-(5-bromo-3-hydroxy-1-(hydroxymethyl)-2-oxoindolin-3-yl)thiazolidine-2,4-dione (3j, dr 100:00, Table 2, entry 10)**

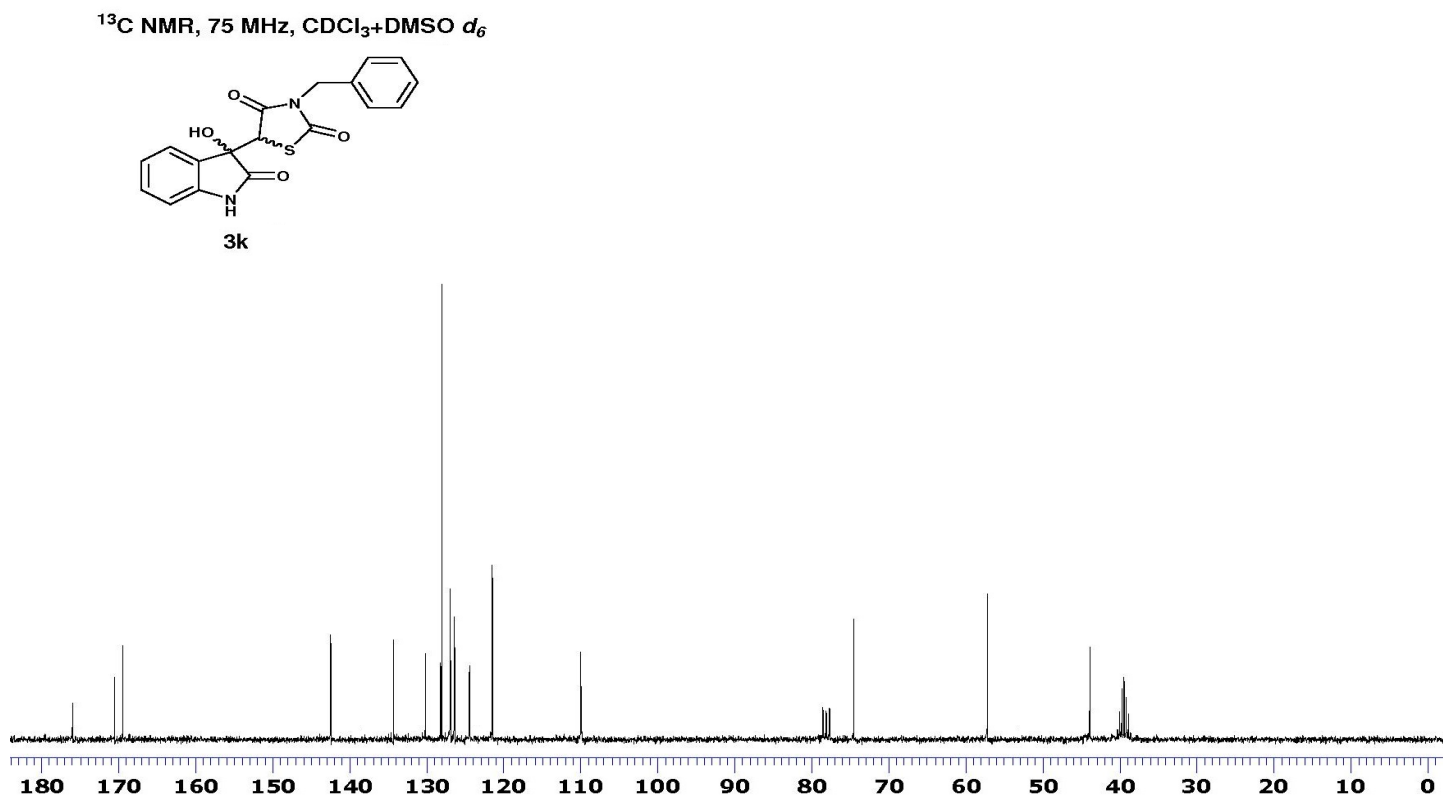
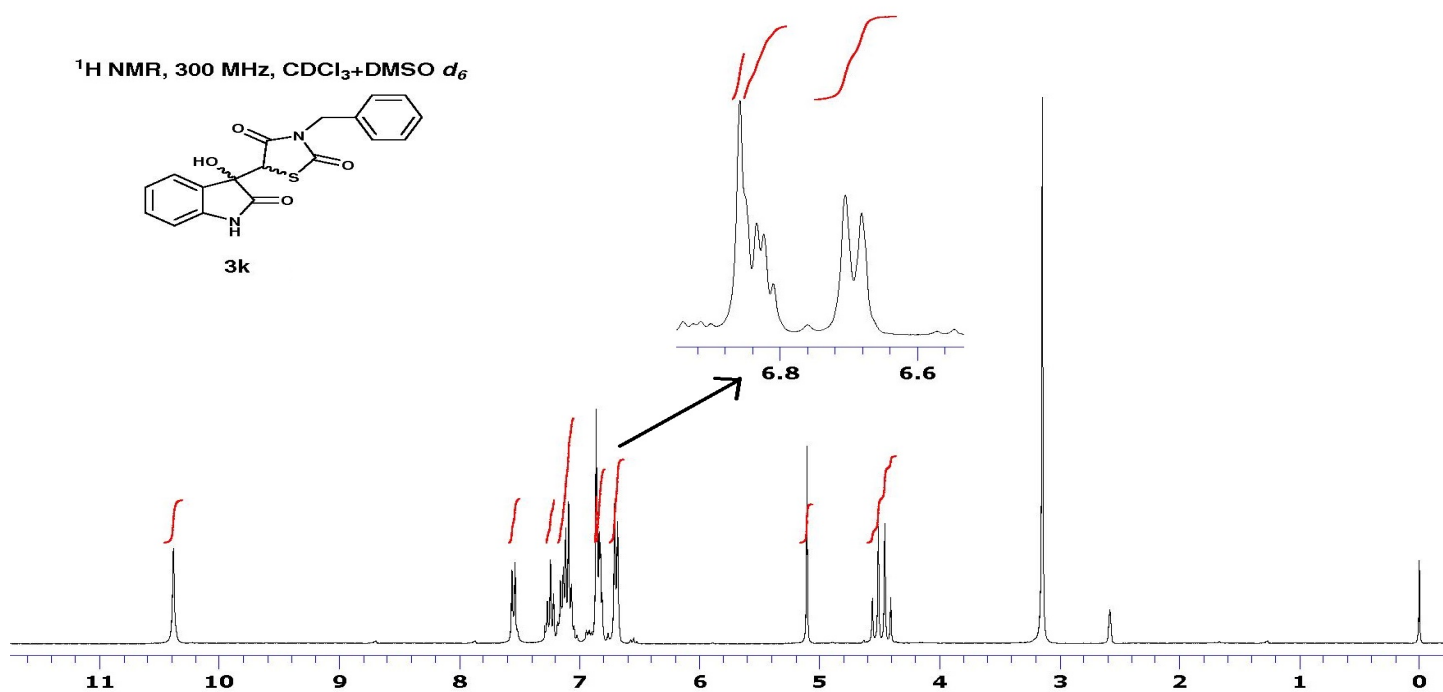
<sup>1</sup>H NMR, 300 MHz, CDCl<sub>3</sub>+DMSO *d*<sub>6</sub>



<sup>13</sup>C NMR, 75 MHz, CDCl<sub>3</sub>+DMSO *d*<sub>6</sub>

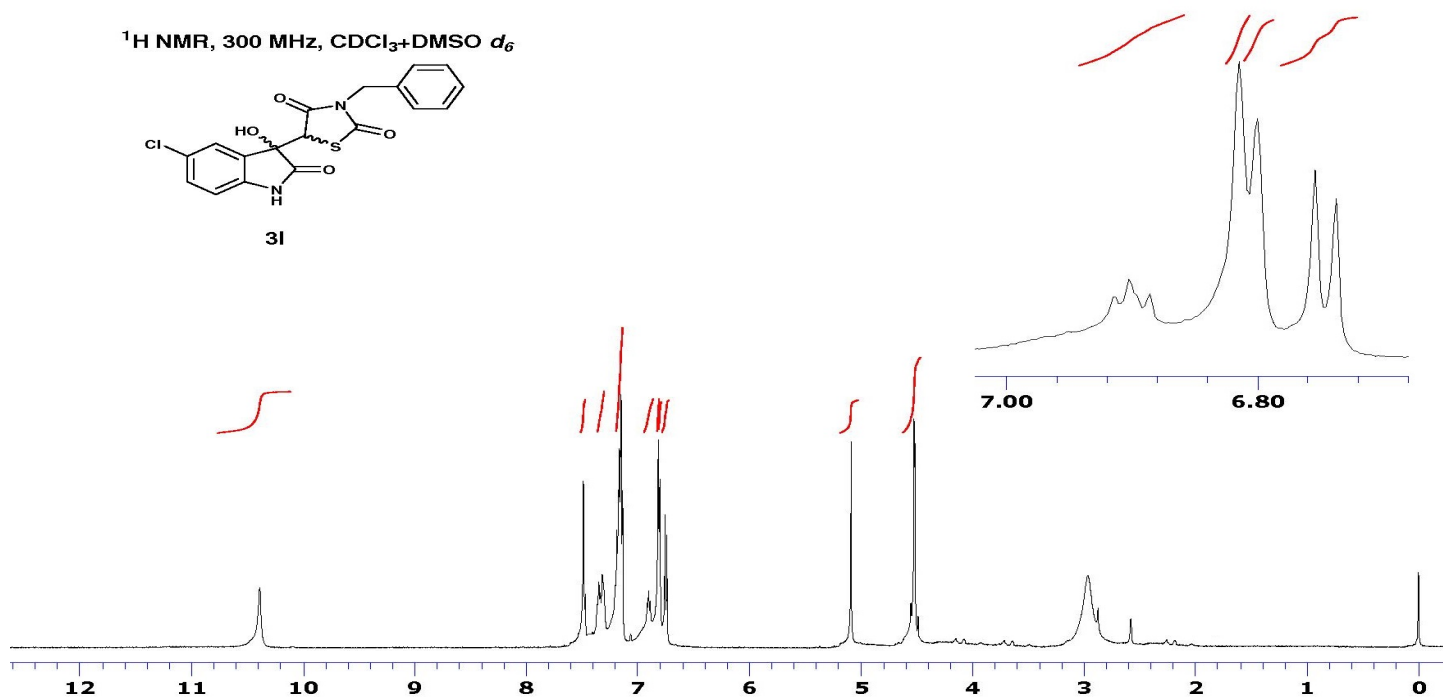
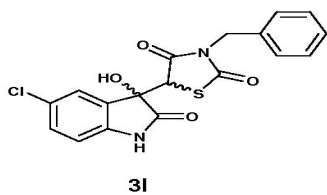


**3-benzyl-5-(3-hydroxy-2-oxoindolin-3-yl)thiazolidine-2,4-dione (3k, dr 100:00, Table 2, entry 11)**

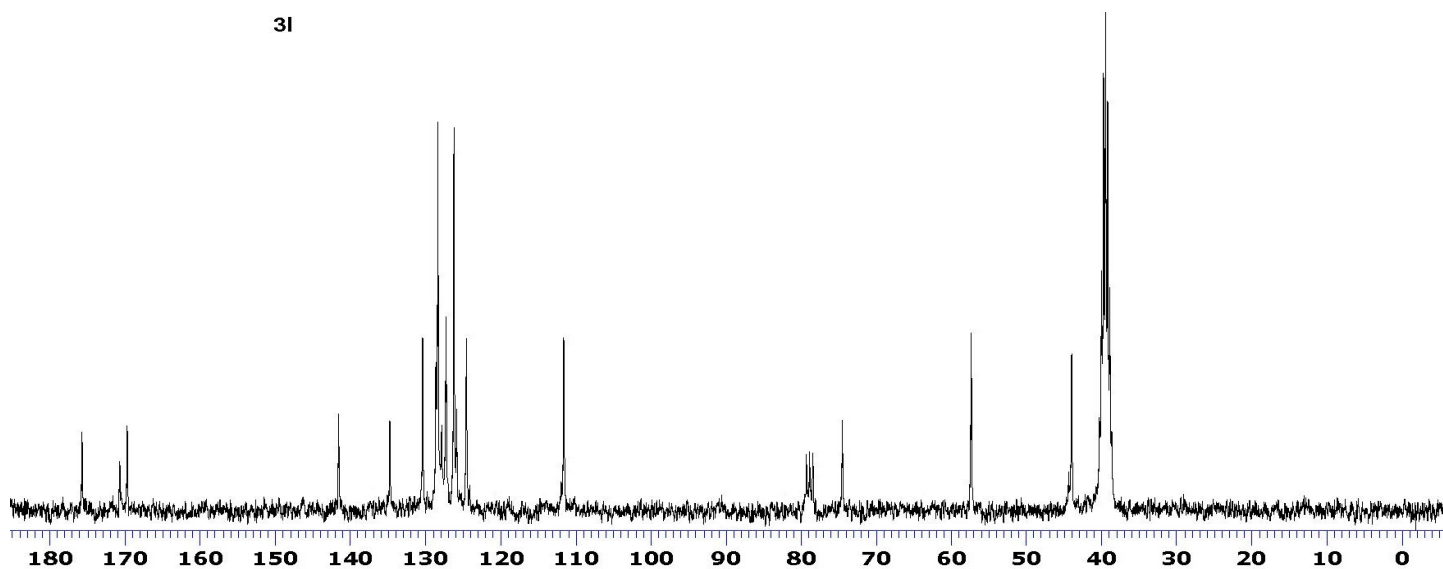
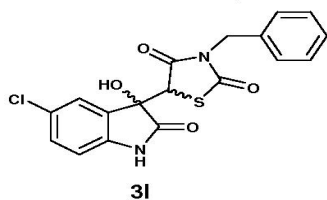


**3-benzyl-5-(5-chloro-3-hydroxy-2-oxindolin-3-yl)thiazolidine-2,4-dione (3I, dr 100:00, Table 2, entry 12)**

<sup>1</sup>H NMR, 300 MHz, CDCl<sub>3</sub>+DMSO *d*<sub>6</sub>

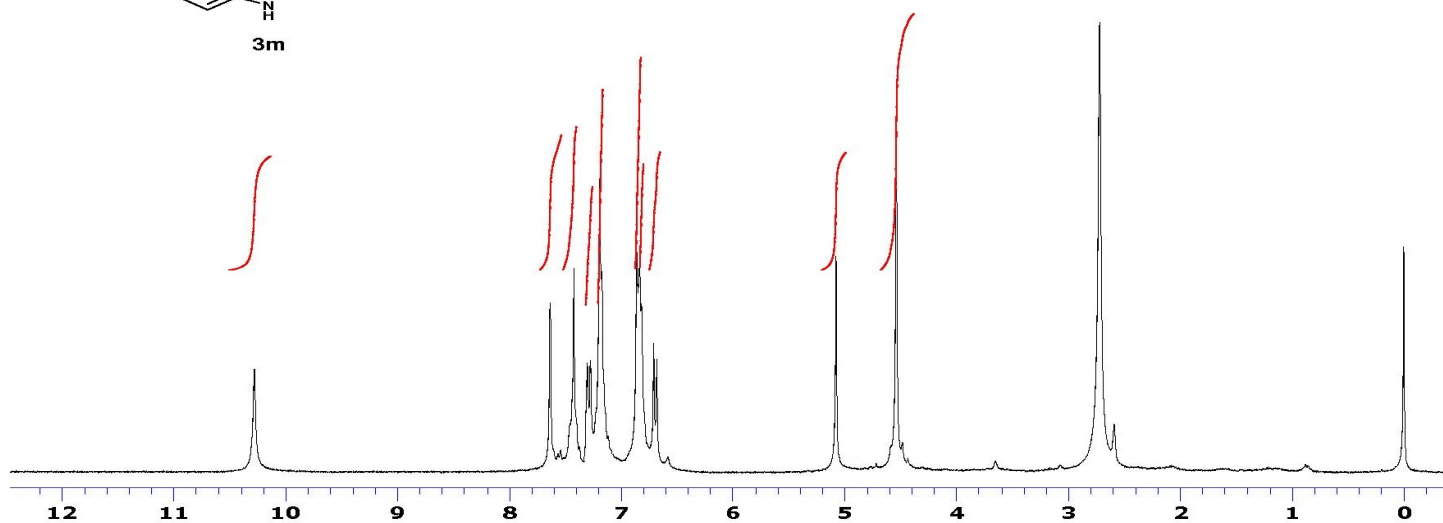
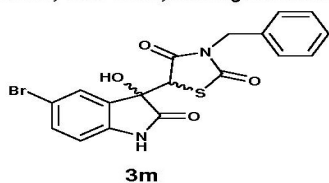


<sup>13</sup>C NMR, 75 MHz, CDCl<sub>3</sub>+DMSO *d*<sub>6</sub>

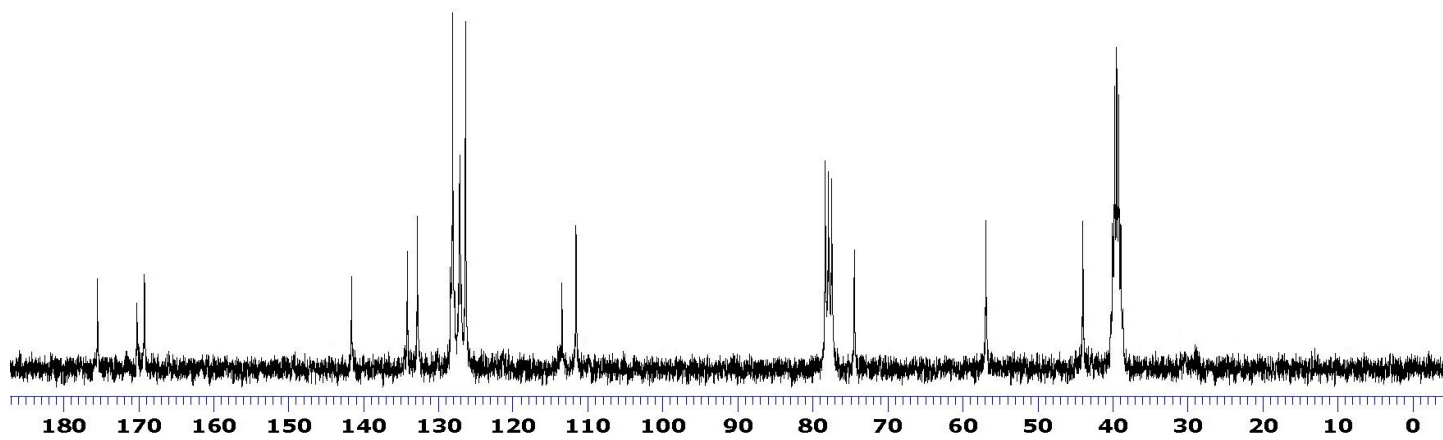
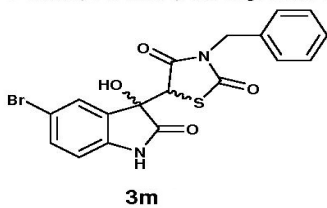


**3-benzyl-5-(5-bromo-3-hydroxy-2-oxoindolin-3-yl)thiazolidine-2,4-dione (3m, dr 100:00, Table 2, entry 13)**

<sup>1</sup>H NMR, 300 MHz, CDCl<sub>3</sub>+DMSO *d*<sub>6</sub>

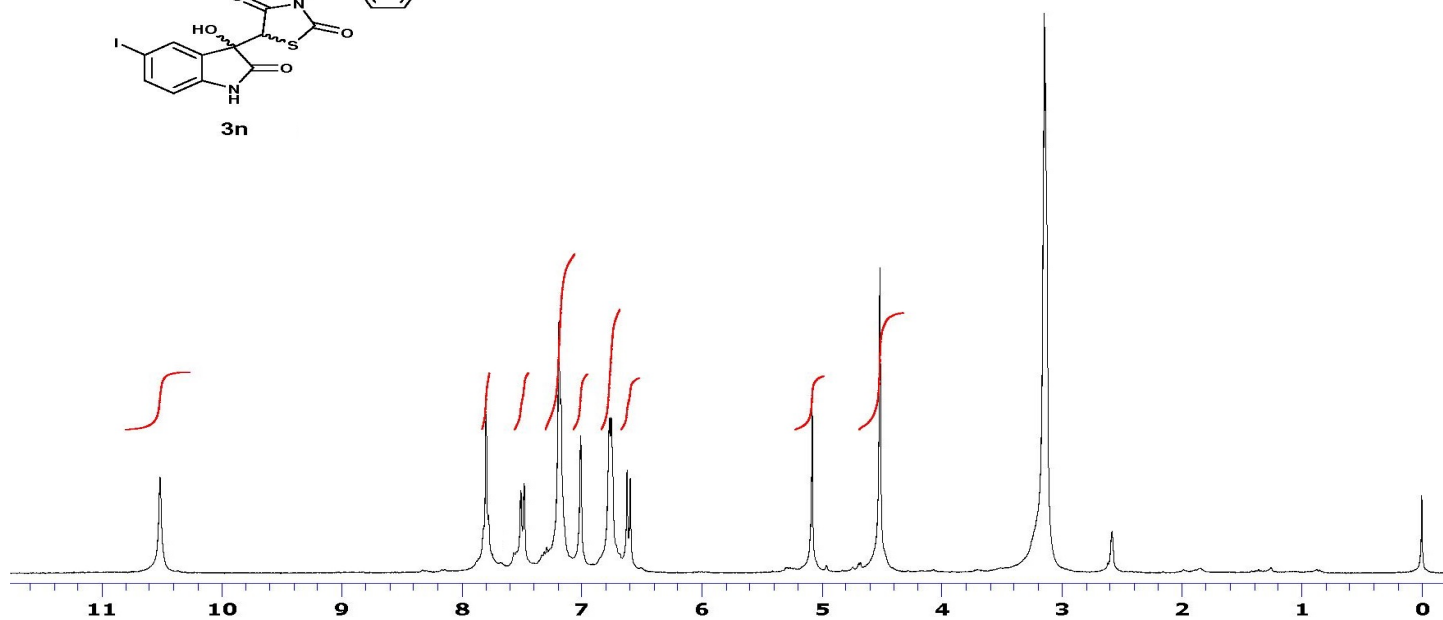
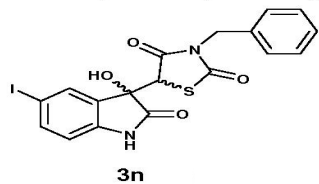


<sup>13</sup>C NMR, 75 MHz, CDCl<sub>3</sub>+DMSO *d*<sub>6</sub>

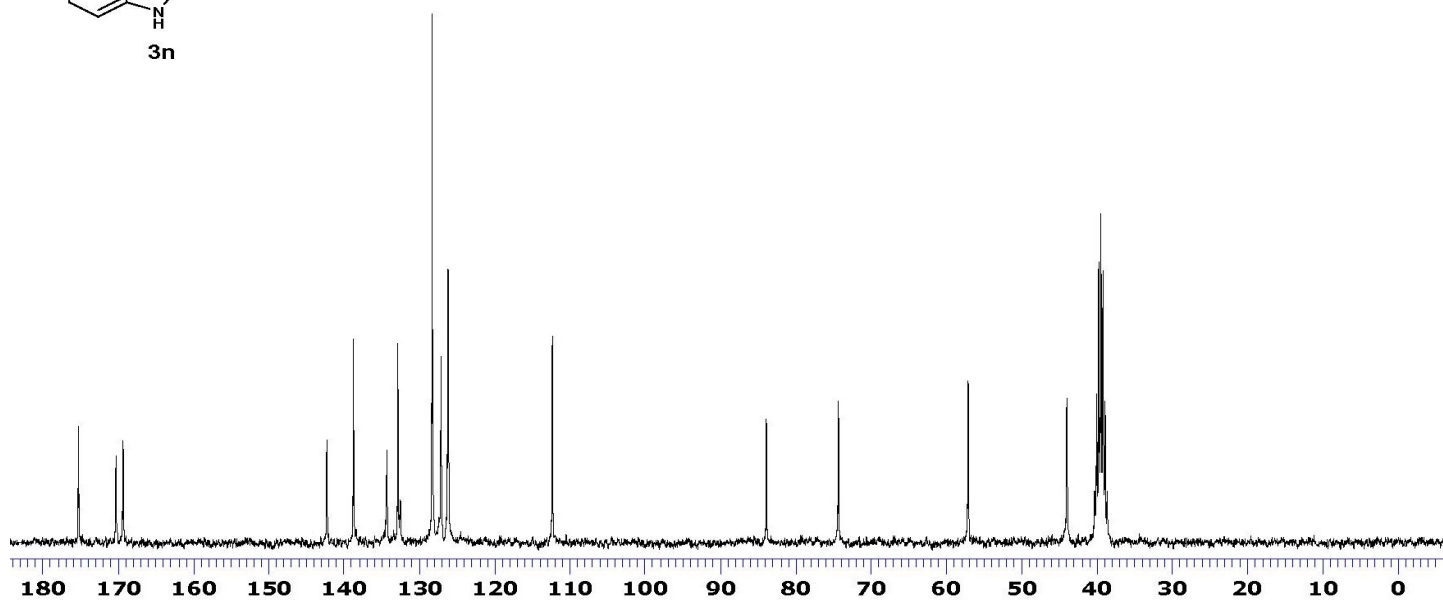
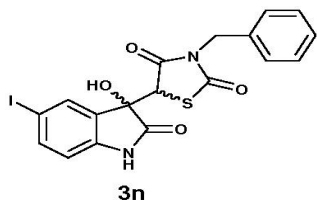


**3-benzyl-5-(3-hydroxy-5-iodo-2-oxoindolin-3-yl)thiazolidine-2,4-dione (3n, dr 100:00, Table 2, entry 14)**

<sup>1</sup>H NMR, 300 MHz, DMSO *d*<sub>6</sub>

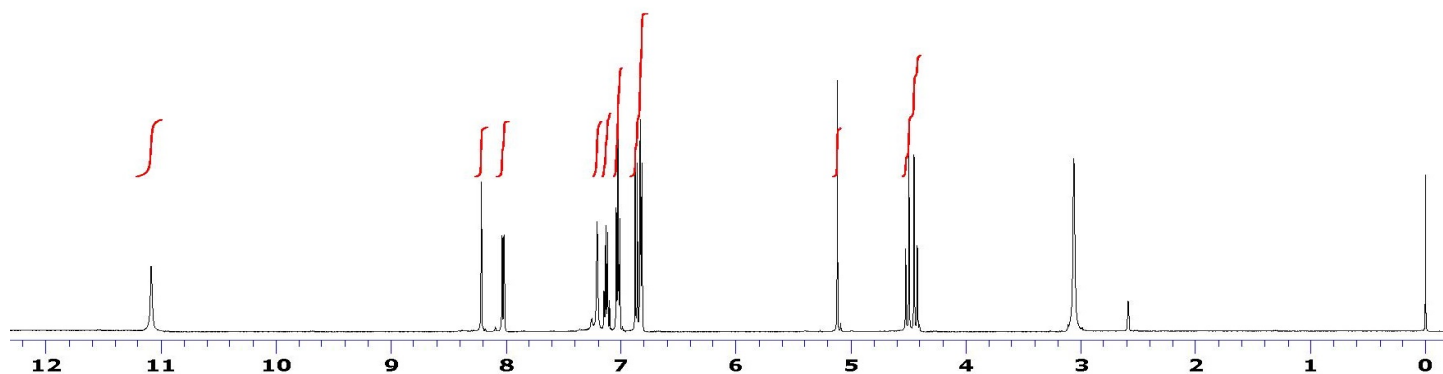
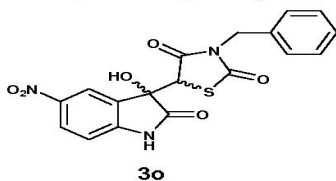


<sup>13</sup>C NMR, 75 MHz, DMSO *d*<sub>6</sub>

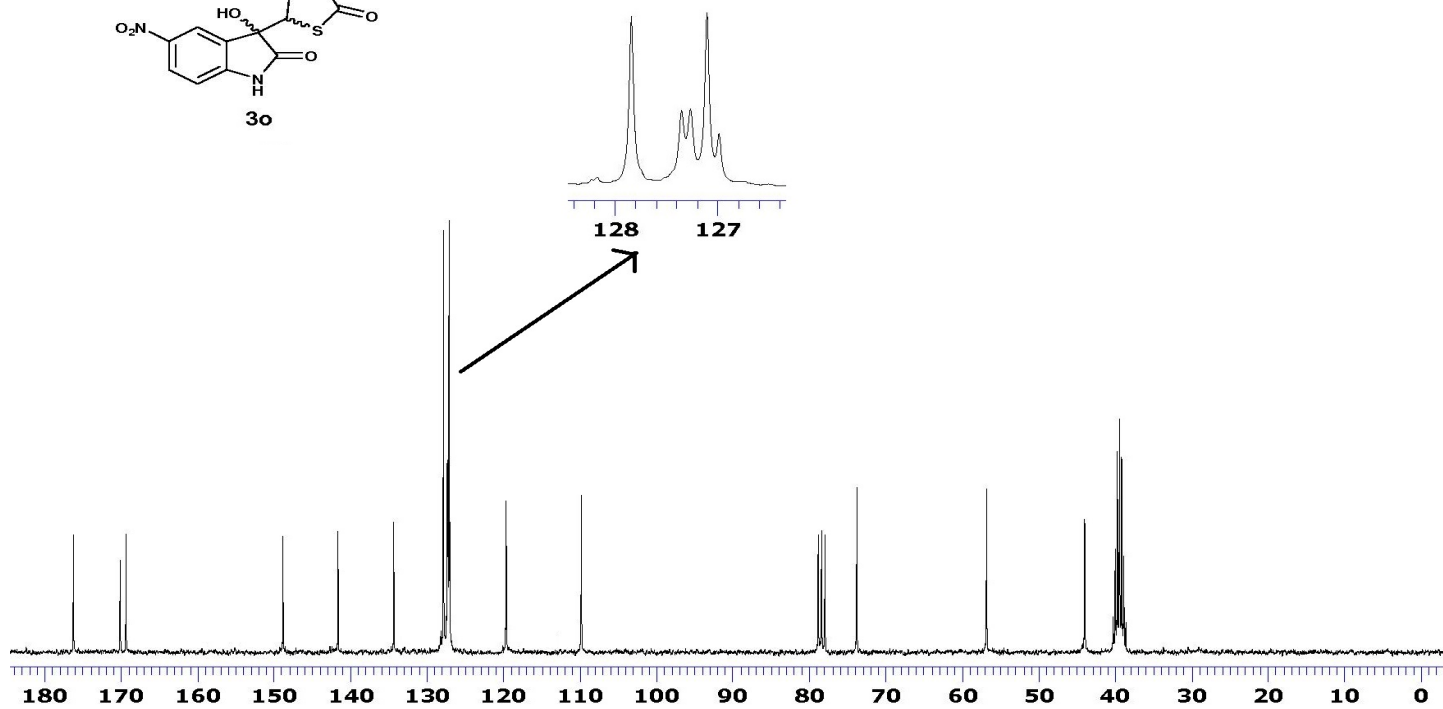
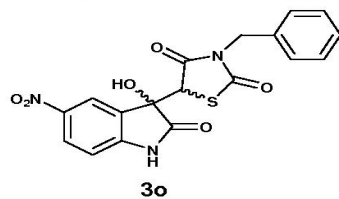


**3-benzyl-5-(3-hydroxy-5-nitro-2-oxindolin-3-yl)thiazolidine-2,4-dione (3o, dr 100:00, Table 2, entry 15)**

<sup>1</sup>H NMR, 500 MHz, CDCl<sub>3</sub>+DMSO *d*<sub>6</sub>

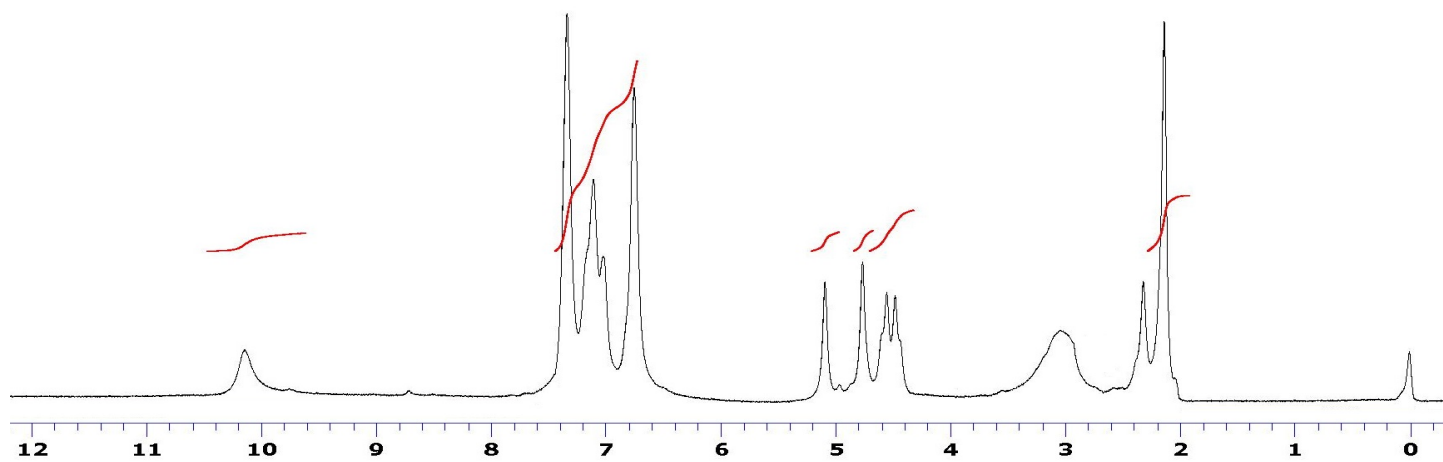
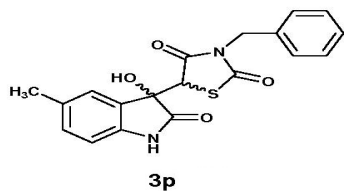


<sup>13</sup>C NMR, 75 MHz, CDCl<sub>3</sub>+DMSO *d*<sub>6</sub>

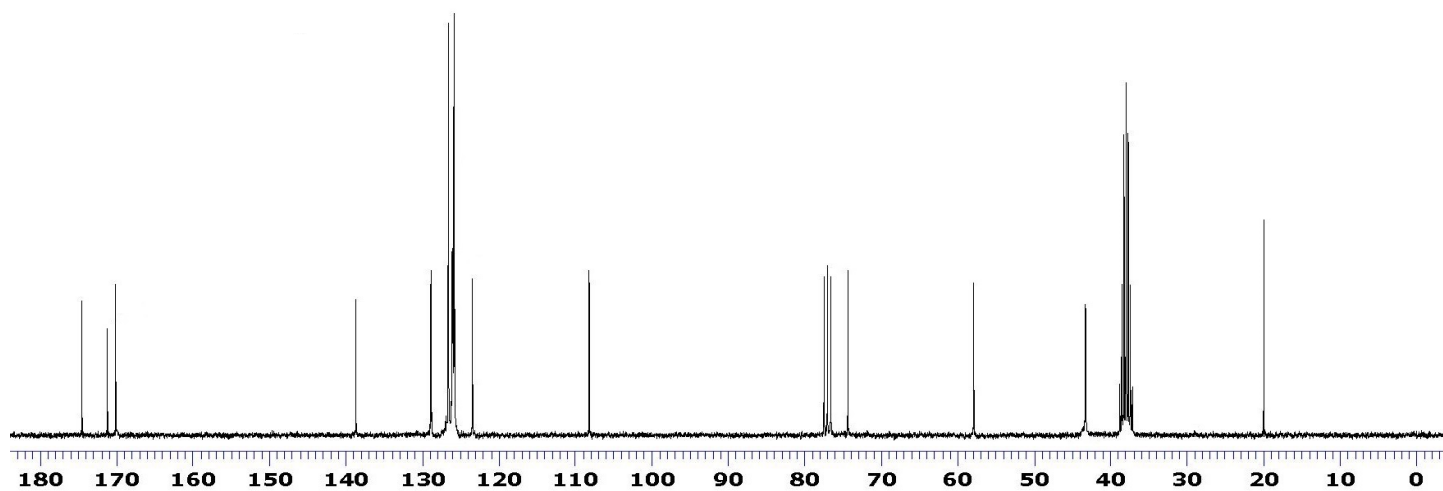
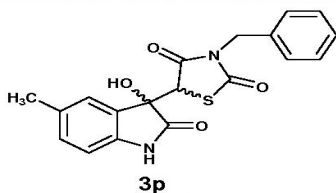


**3-benzyl-5-(3-hydroxy-5-methyl-2-oxindolin-3-yl)thiazolidine-2,4-dione (3p, dr 100:00, Table 2, entry 16)**

<sup>1</sup>H NMR, 300 MHz, DMSO *d*<sub>6</sub>

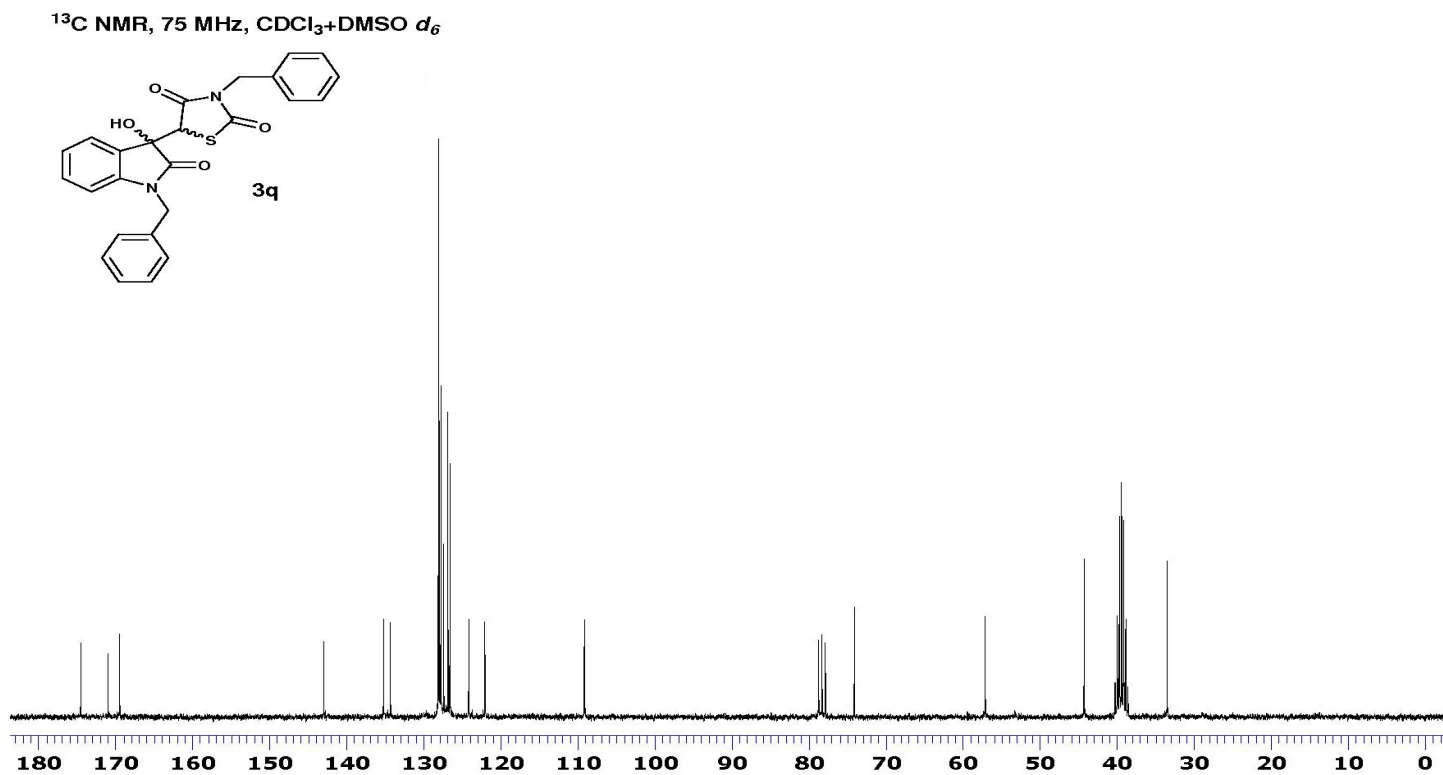
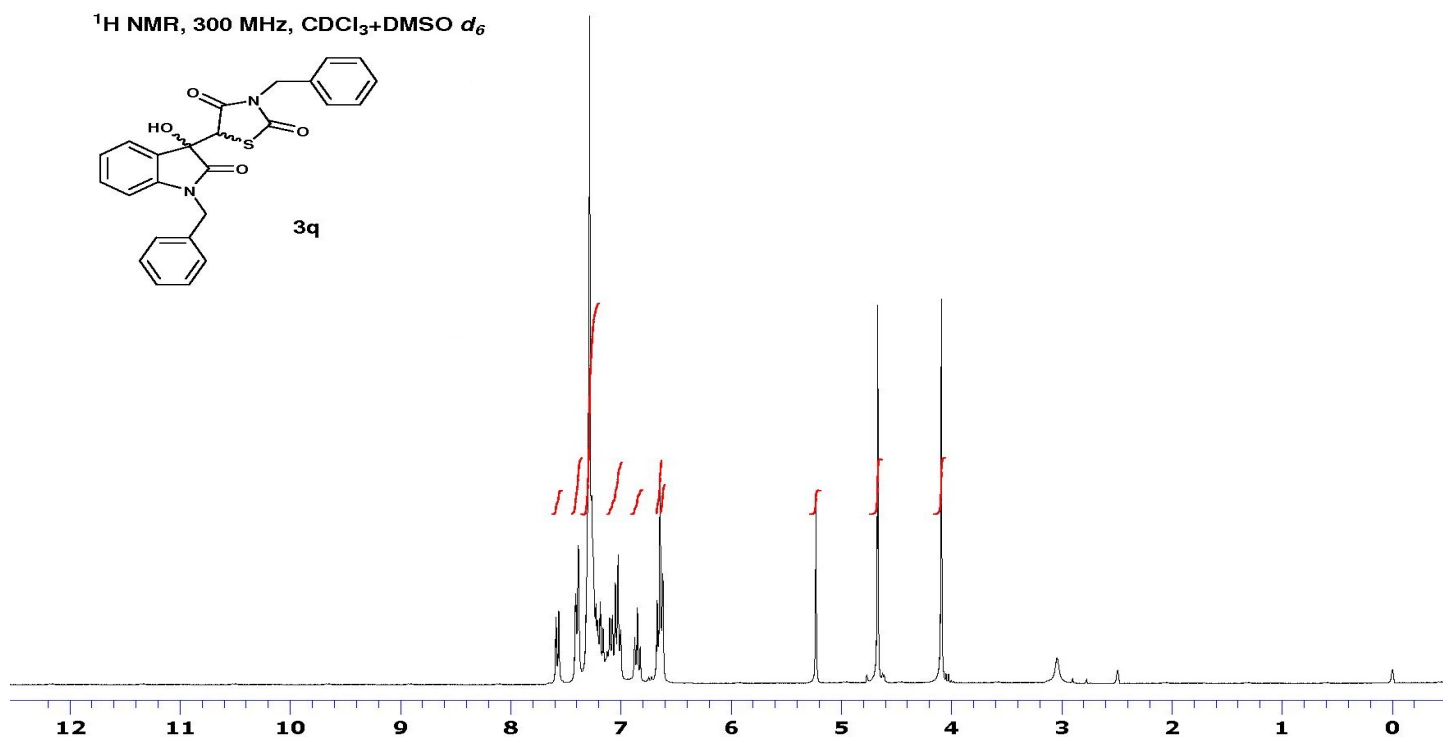


<sup>13</sup>C NMR, 75 MHz, CDCl<sub>3</sub>+DMSO *d*<sub>6</sub>



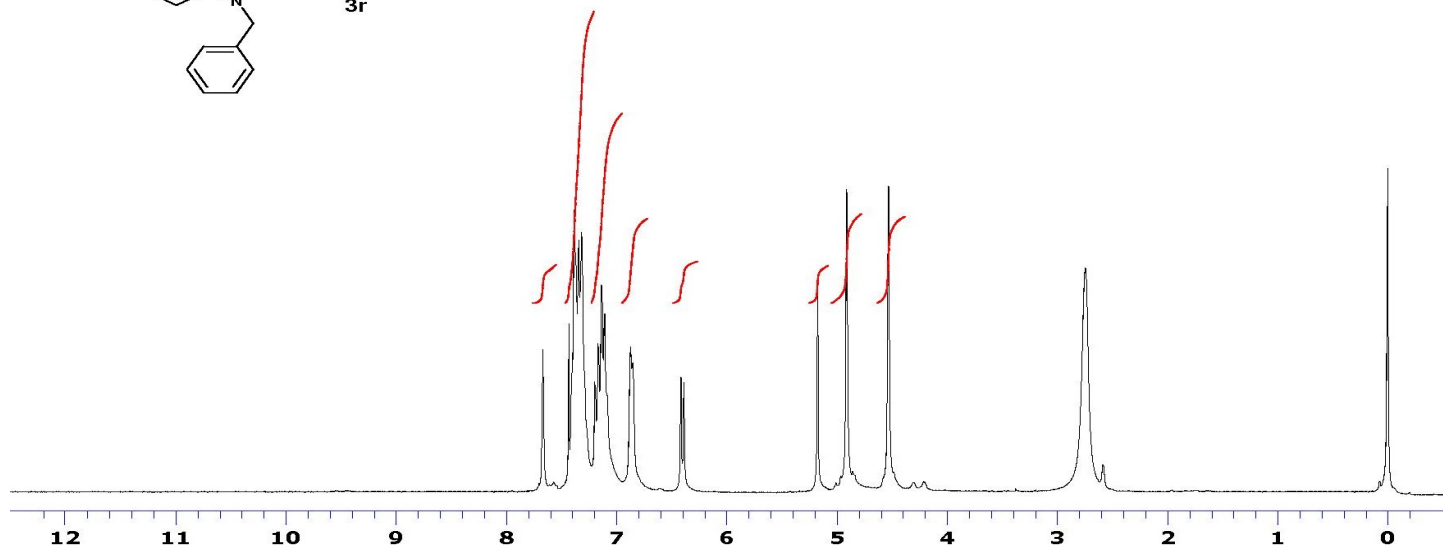
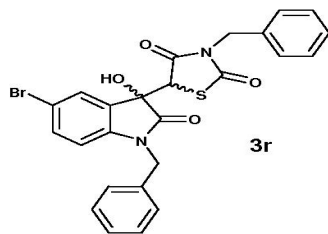


**3-benzyl-5-(1-benzyl-3-hydroxy-2-oxoindolin-3-yl)thiazolidine-2,4-dione (3q, dr 100:00, Table 2, entry 17)**

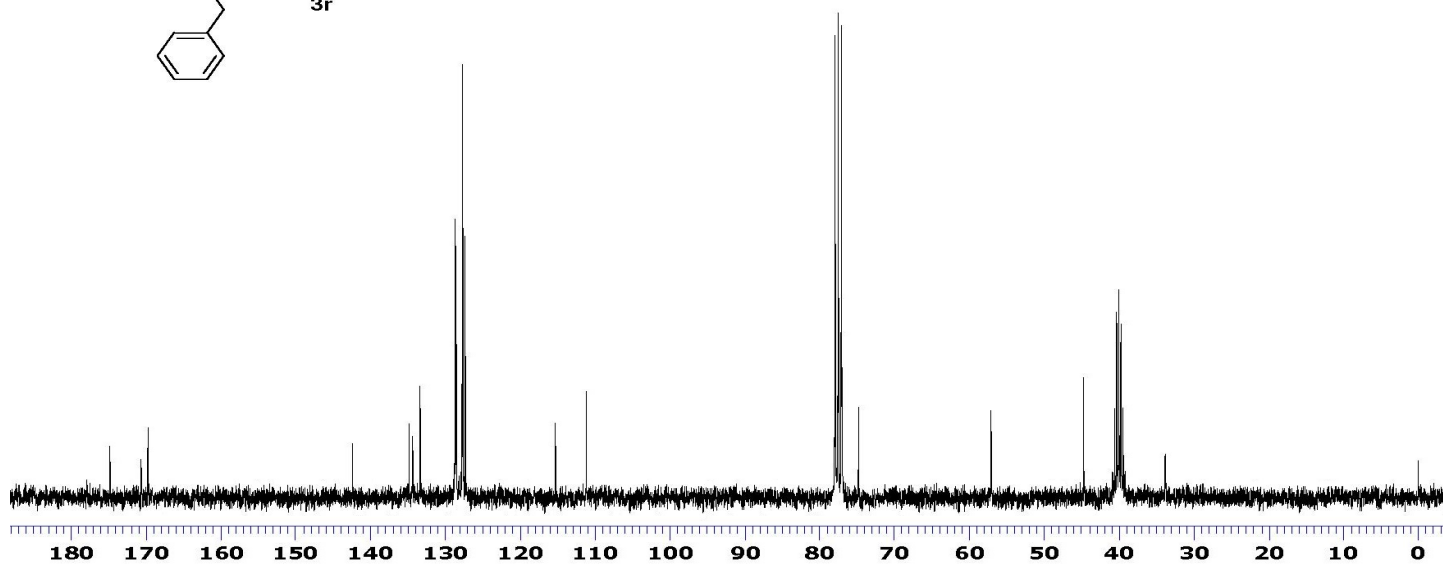
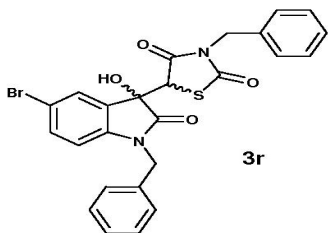


**3-benzyl-5-(1-benzyl-5-bromo-3-hydroxy-2-oxoindolin-3-yl)thiazolidine-2,4-dione (3r, dr 100:00, Table 2, entry 18)**

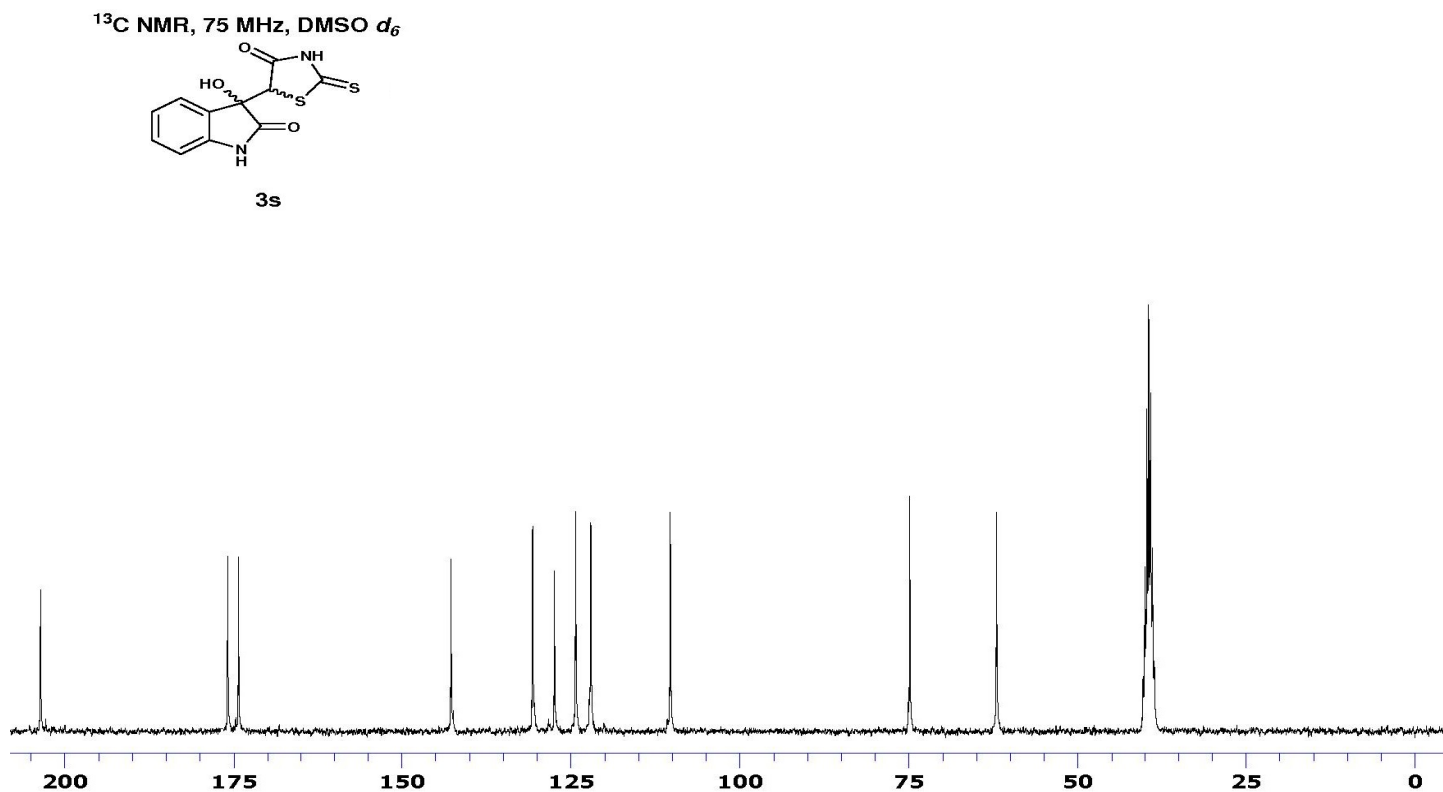
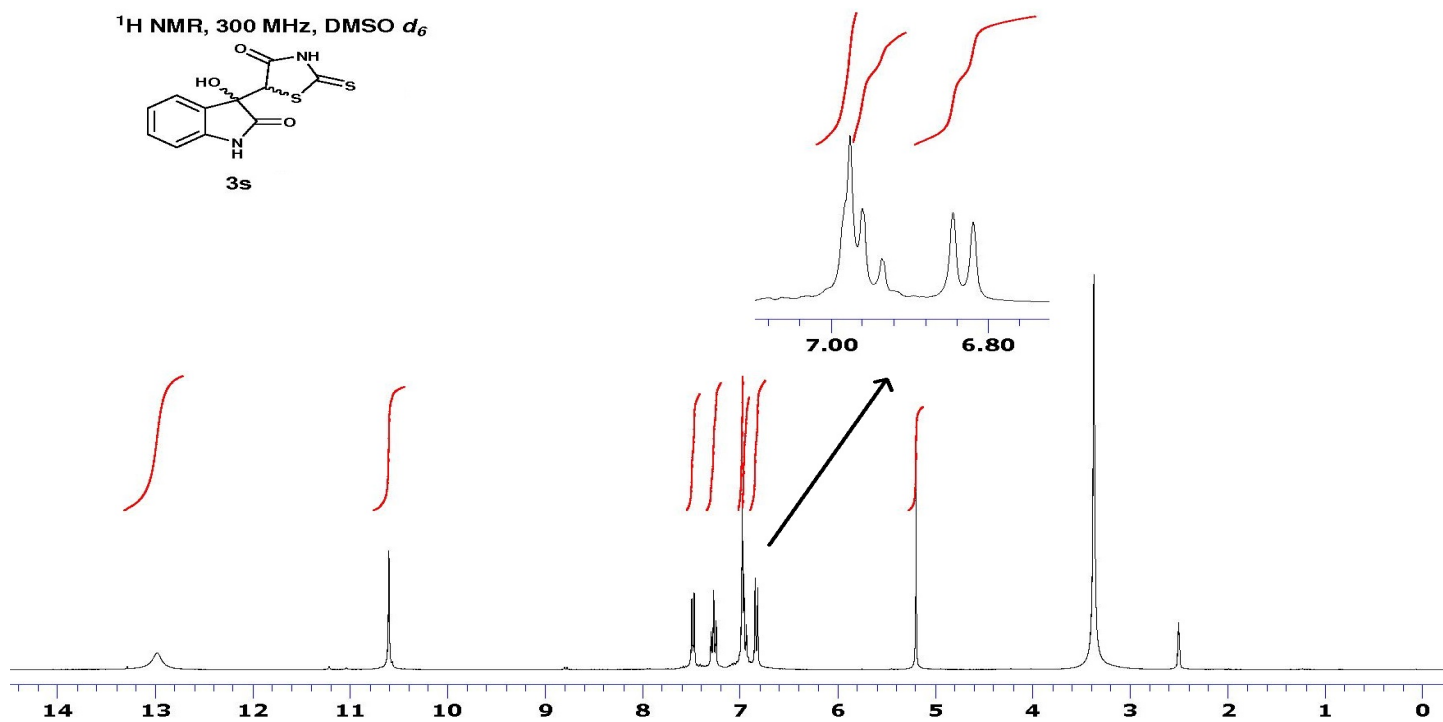
<sup>1</sup>H NMR, 300 MHz, CDCl<sub>3</sub>+DMSO *d*<sub>6</sub>



<sup>13</sup>C NMR, 75 MHz, CDCl<sub>3</sub>+DMSO *d*<sub>6</sub>

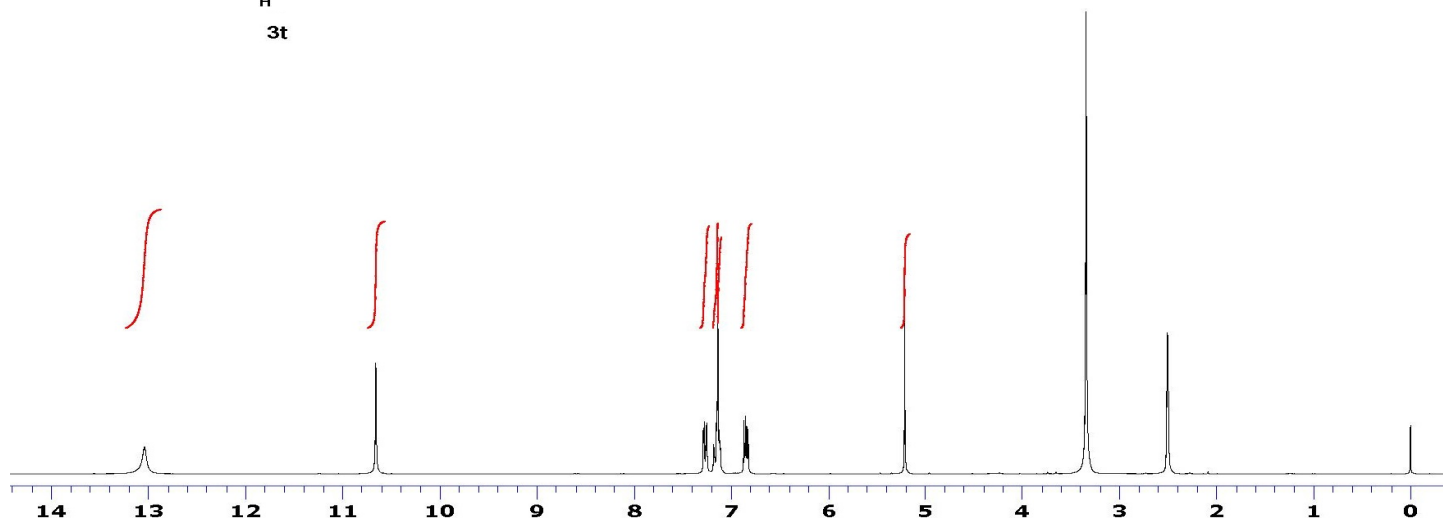
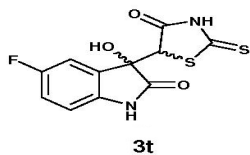


**3-hydroxy-3-(4-oxo-2-thioxothiazolidin-5-yl)indolin-2-one (3s, dr 100:00, Table 2, entry 19)**

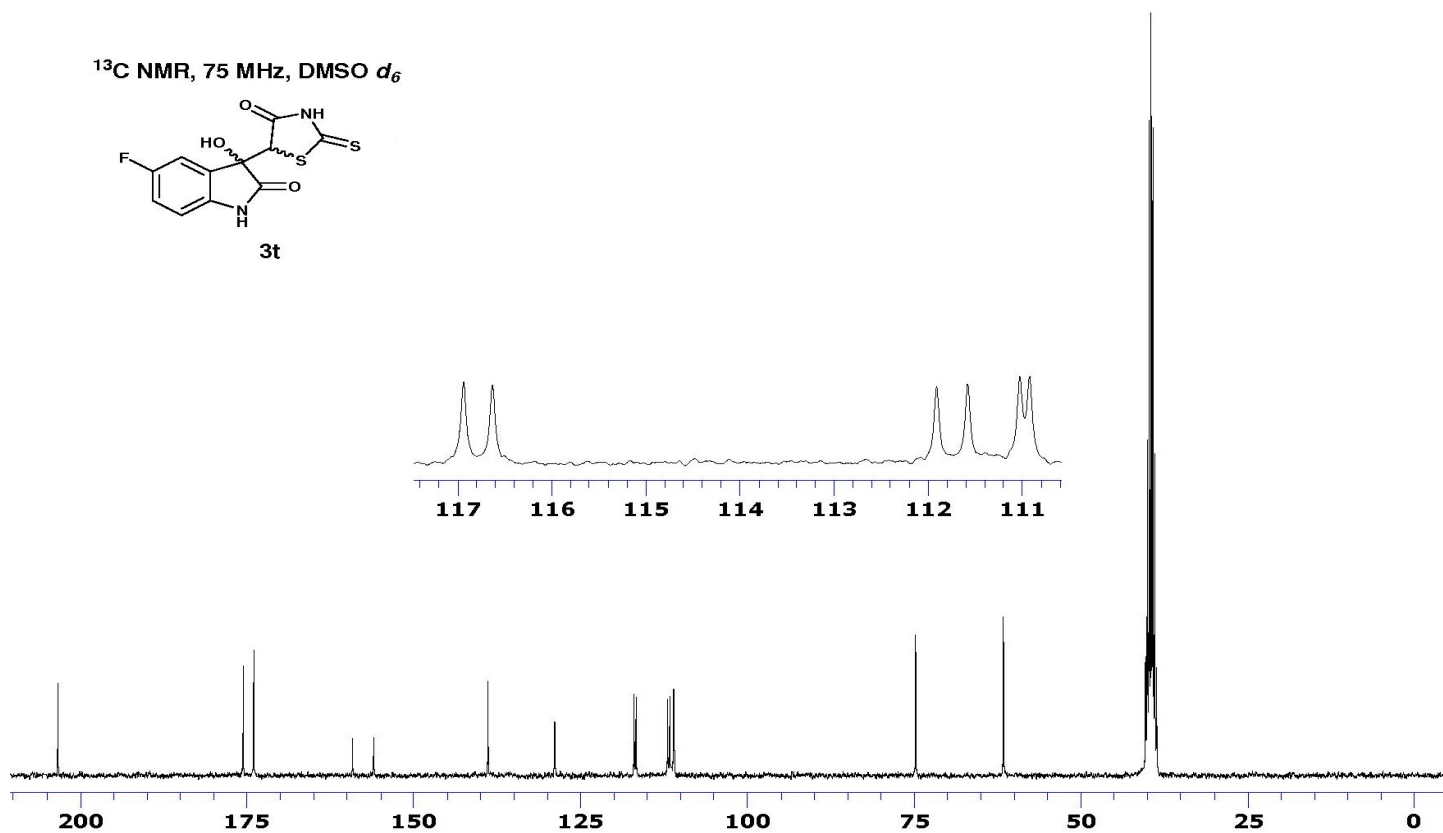
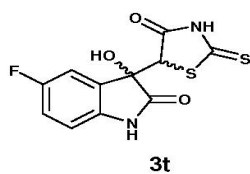


**5-fluoro-3-hydroxy-3-(4-oxo-2-thioxothiazolidin-5-yl)indolin-2-one (3t, dr 100:00, Table 2, entry 20)**

<sup>1</sup>H NMR, 300 MHz, DMSO *d*<sub>6</sub>

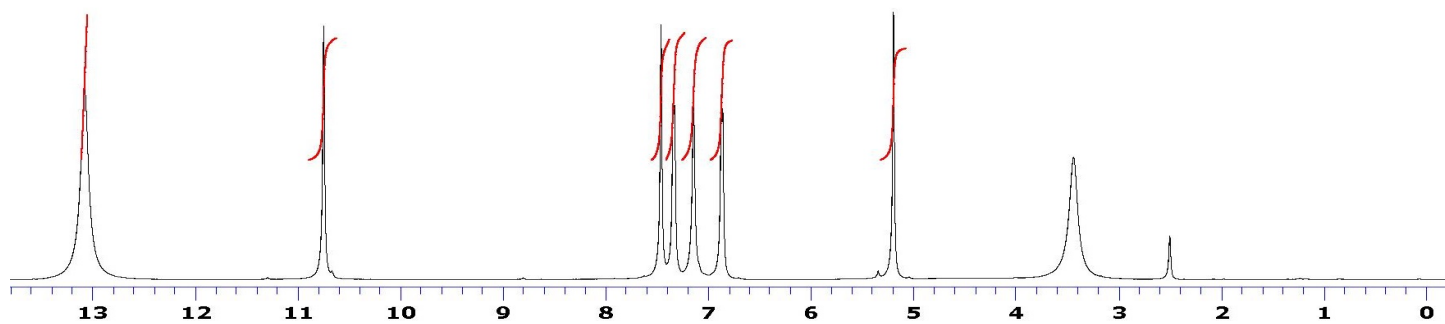
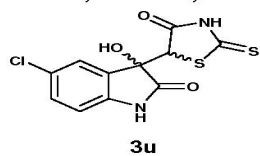


<sup>13</sup>C NMR, 75 MHz, DMSO *d*<sub>6</sub>

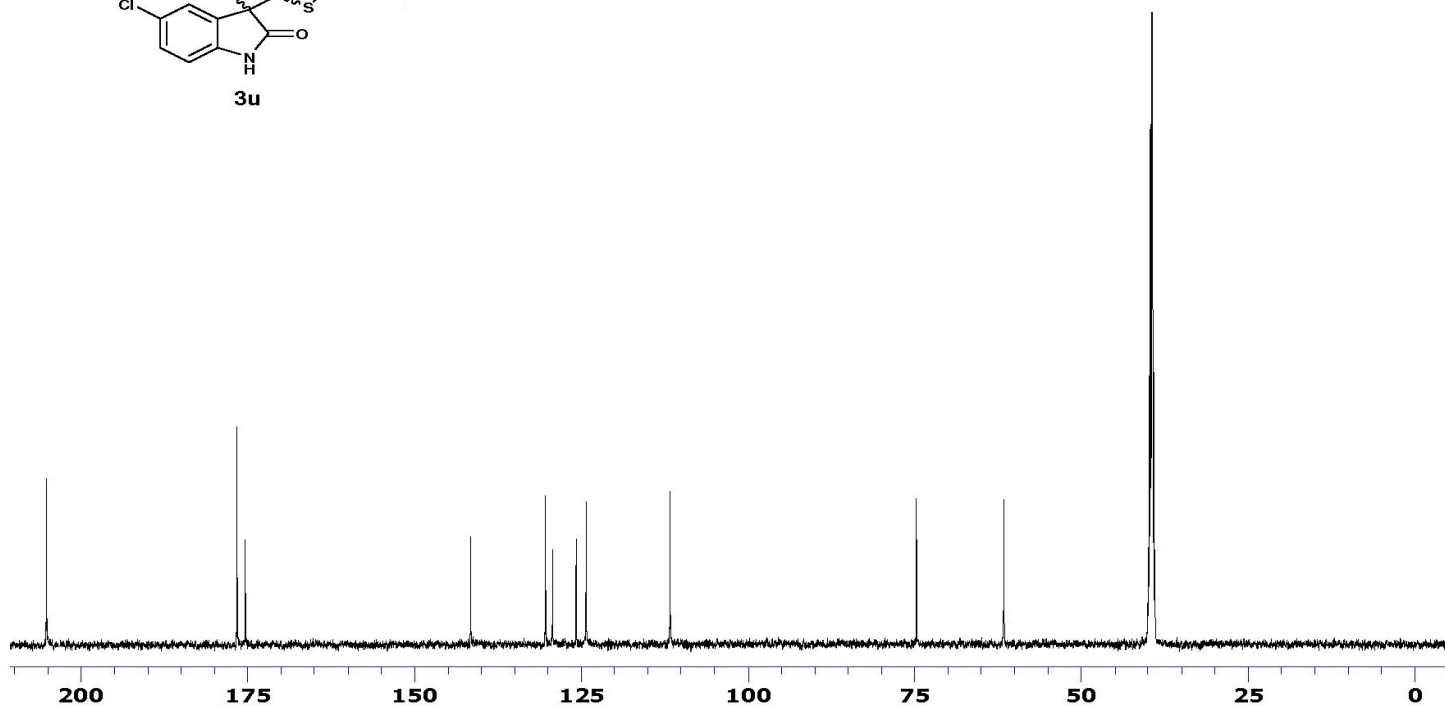
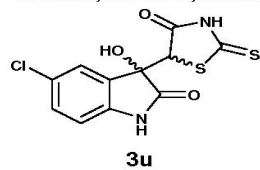


**5-chloro-3-hydroxy-3-(4-oxo-2-thioxothiazolidin-5-yl)indolin-2-one (3u, dr 100:00, Table 2, entry 21)**

<sup>1</sup>H NMR, 300 MHz, DMSO *d*<sub>6</sub>

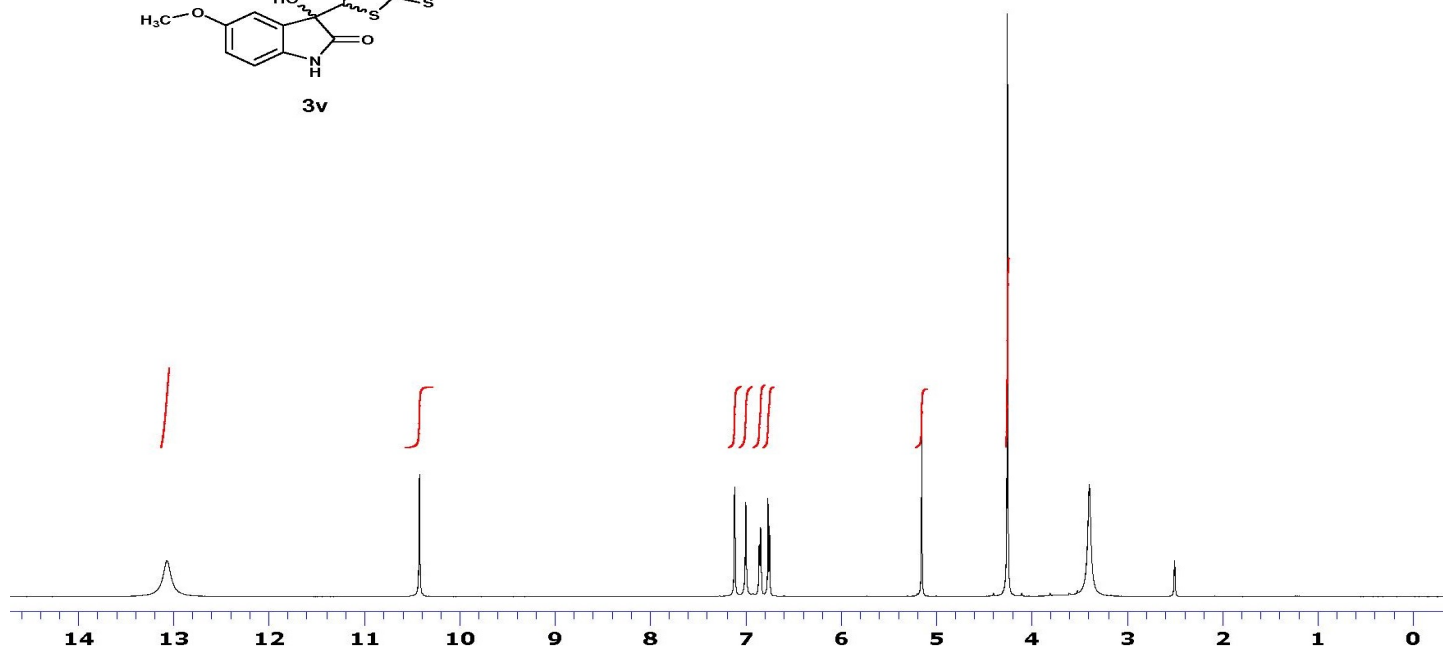
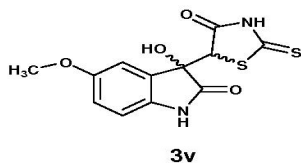


<sup>13</sup>C NMR, 75 MHz, DMSO *d*<sub>6</sub>

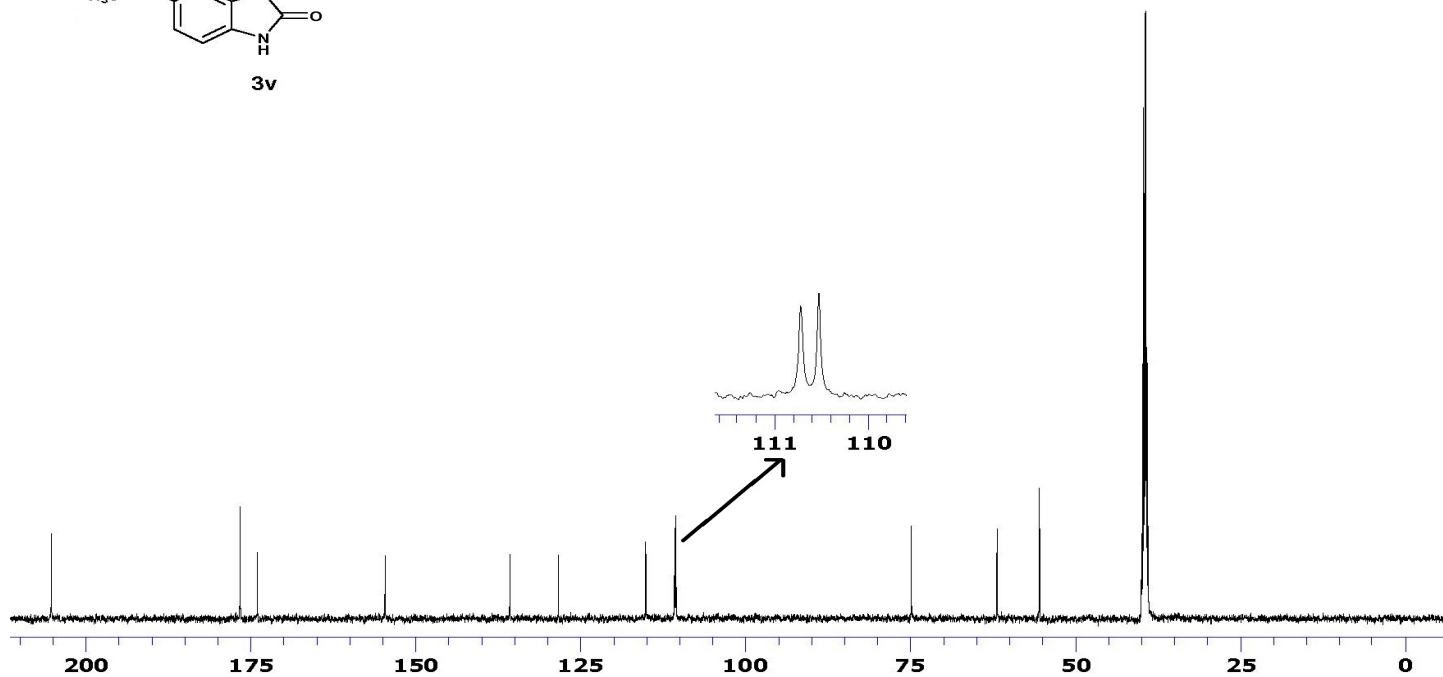
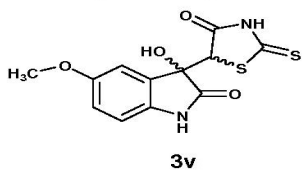


**3-hydroxy-5-methoxy-3-(4-oxo-2-thioxothiazolidin-5-yl)indolin-2-one (3v, dr 100:00, Table 2, entry 22)**

<sup>1</sup>H NMR, 500 MHz, DMSO *d*<sub>6</sub>

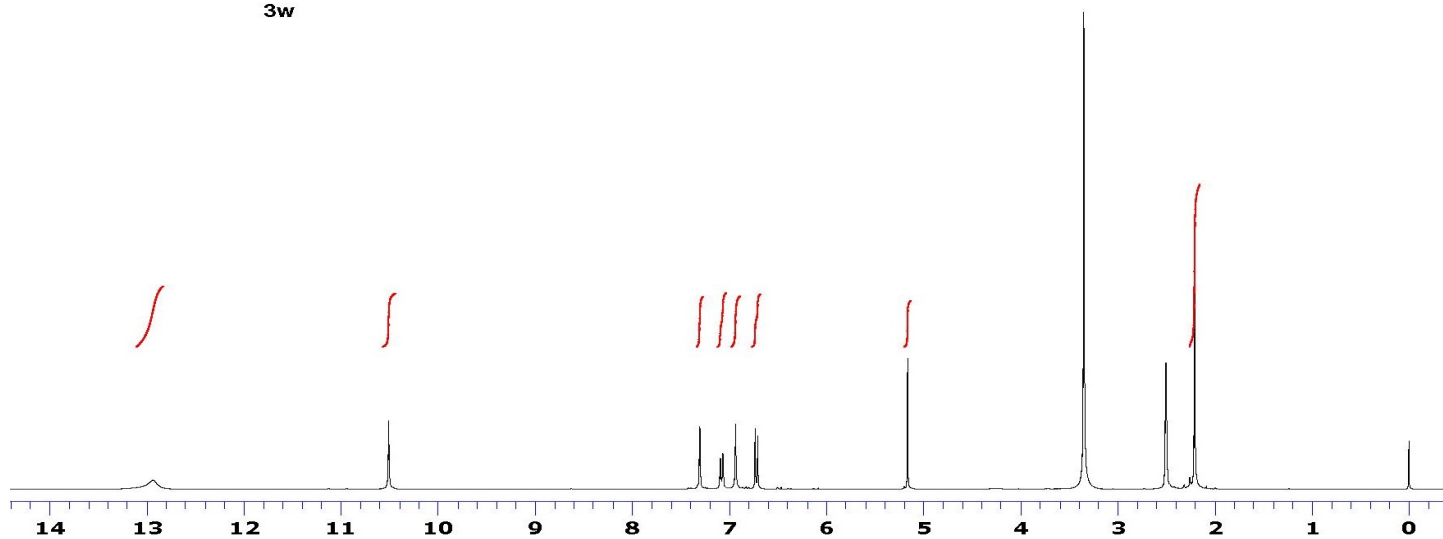
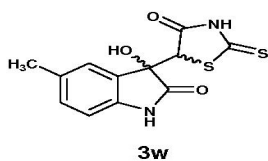


<sup>13</sup>C NMR, 125 MHz, DMSO *d*<sub>6</sub>

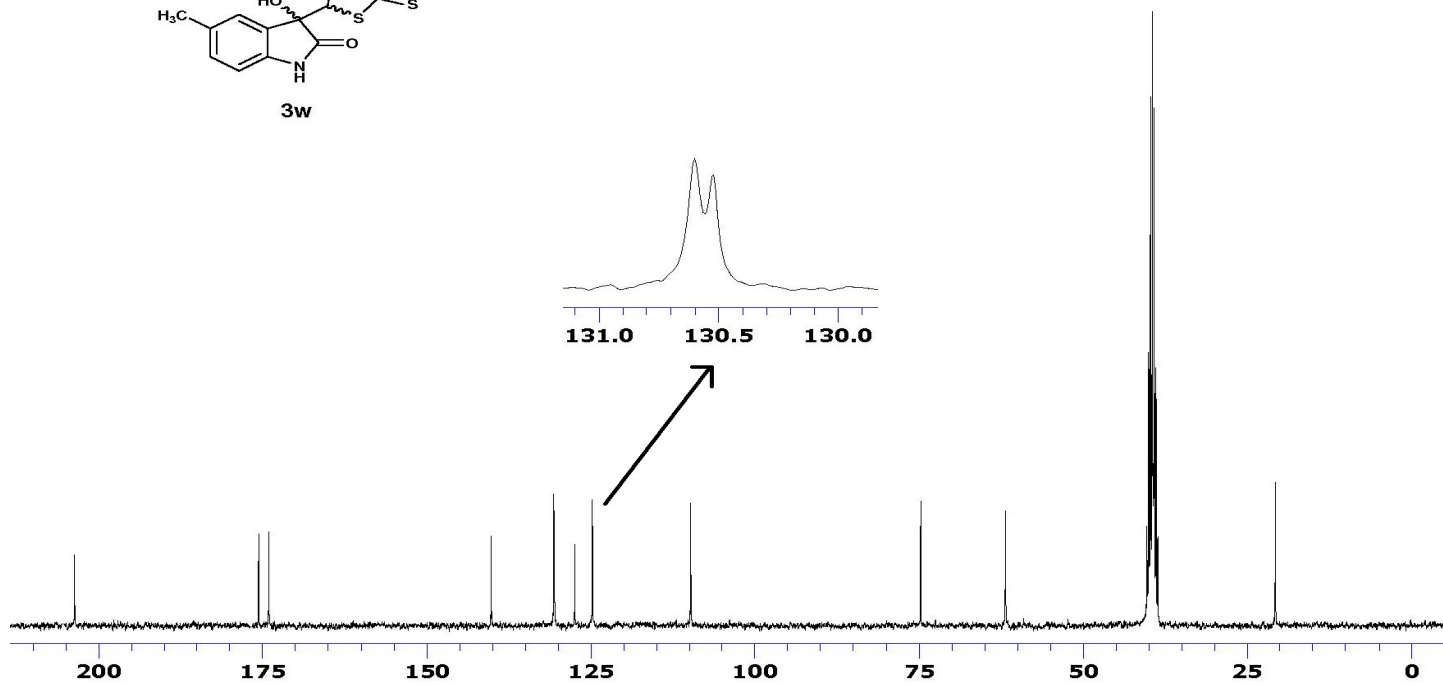
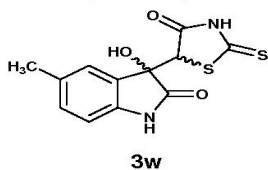


**3-hydroxy-5-methyl-3-(4-oxo-2-thioxothiazolidin-5-yl)indolin-2-one (3w, dr 100:00, Table 2, entry 23)**

<sup>1</sup>H NMR, 300 MHz, DMSO *d*<sub>6</sub>

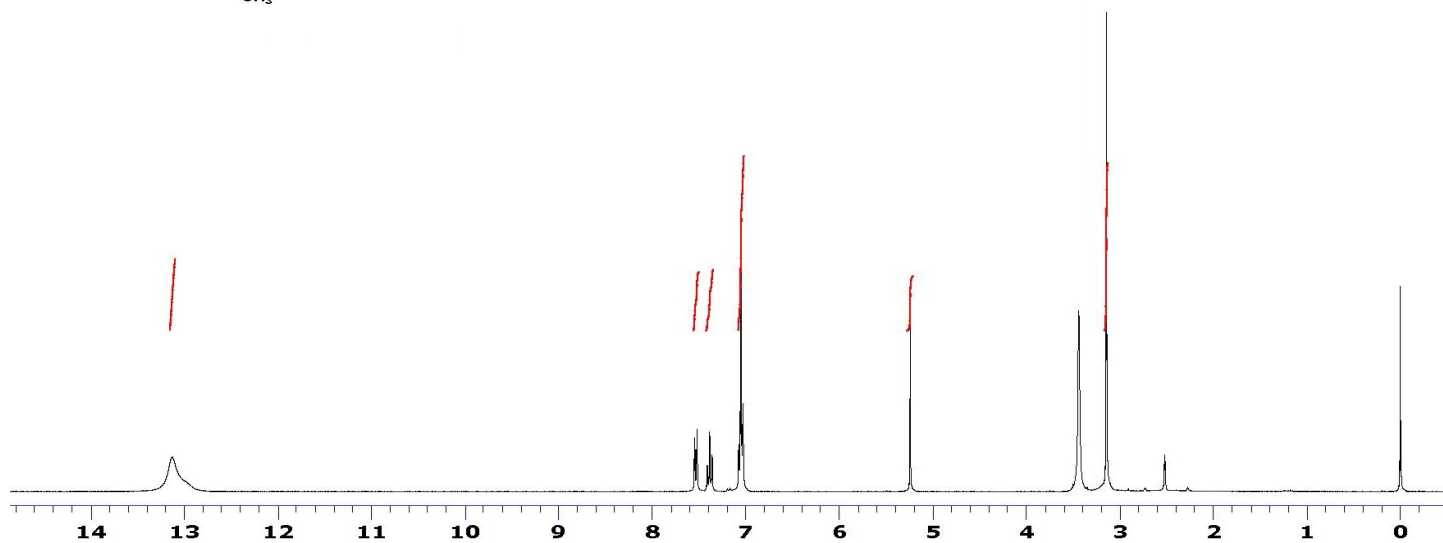
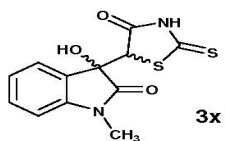


<sup>13</sup>C NMR, 75 MHz, DMSO *d*<sub>6</sub>

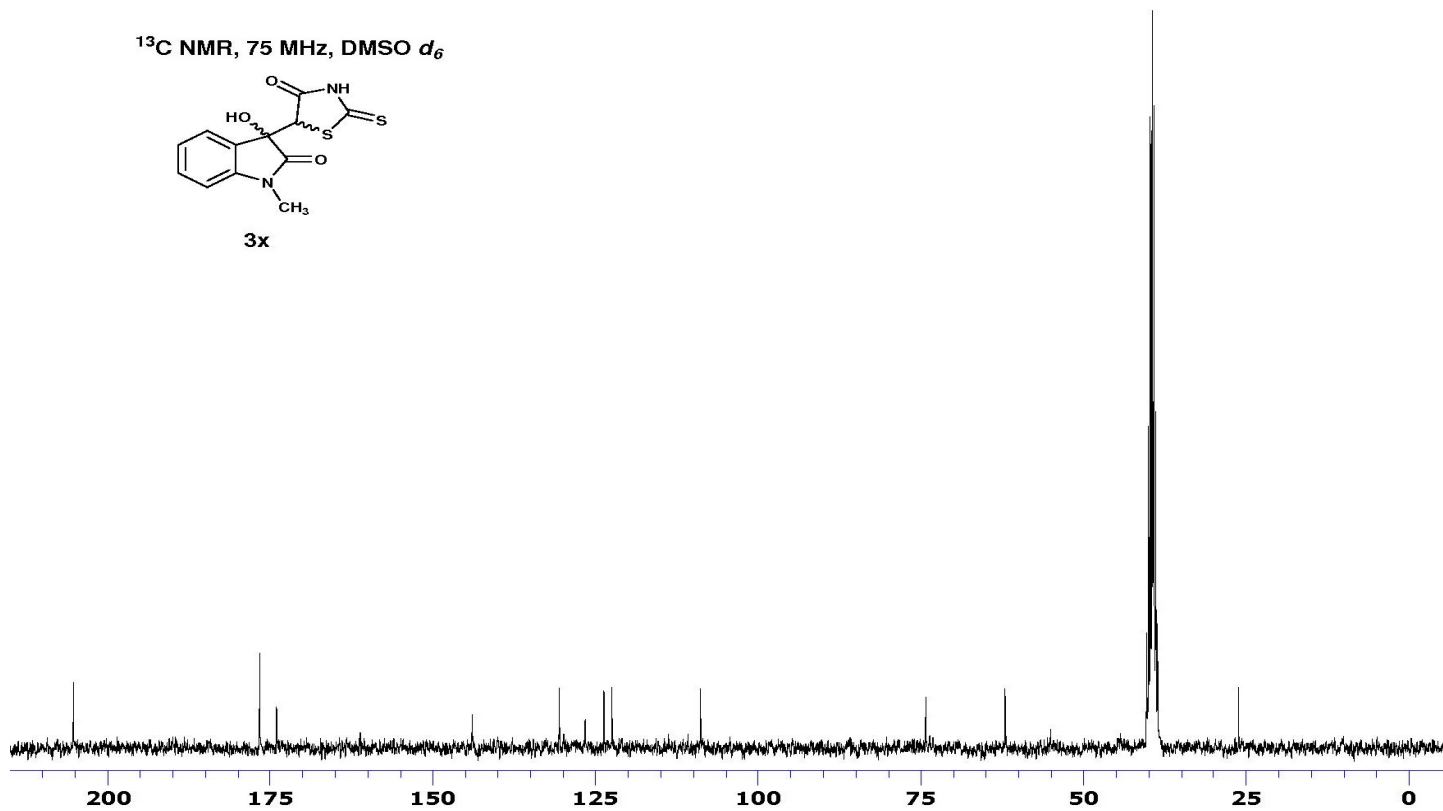
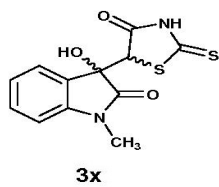


**3-hydroxy-1-methyl-3-(4-oxo-2-thioxothiazolidin-5-yl)indolin-2-one (3x, dr 100:00, Table 2, entry 24)**

<sup>1</sup>H NMR, 300 MHz, DMSO *d*<sub>6</sub>



<sup>13</sup>C NMR, 75 MHz, DMSO *d*<sub>6</sub>

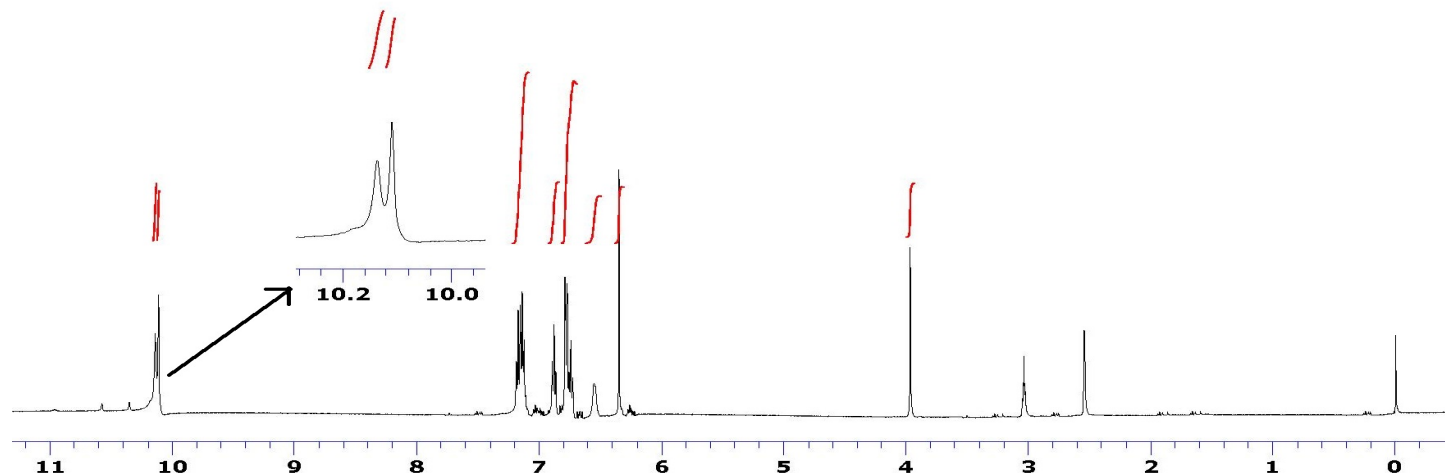
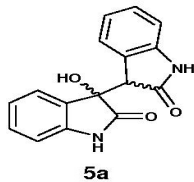




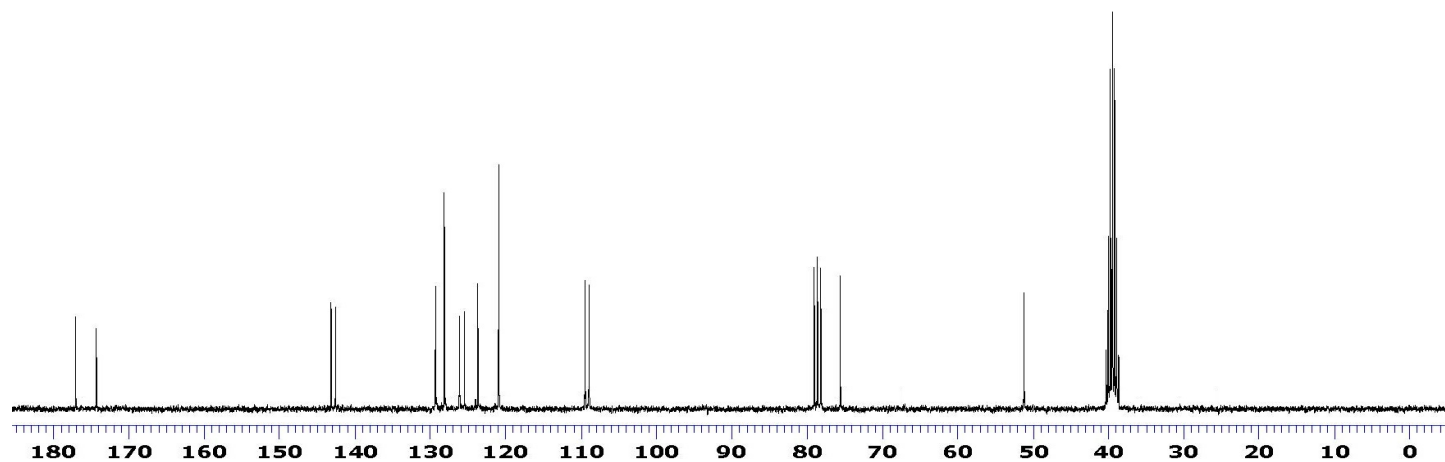
## $^1\text{H}$ and $^{13}\text{C}$ NMR Spectrum of the synthesized compounds (5a-5t):

3-hydroxy-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (3a, dr 96:04, Table 3, entry 1)

$^1\text{H}$  NMR, 500 MHz,  $\text{CDCl}_3+\text{DMSO } d_6$

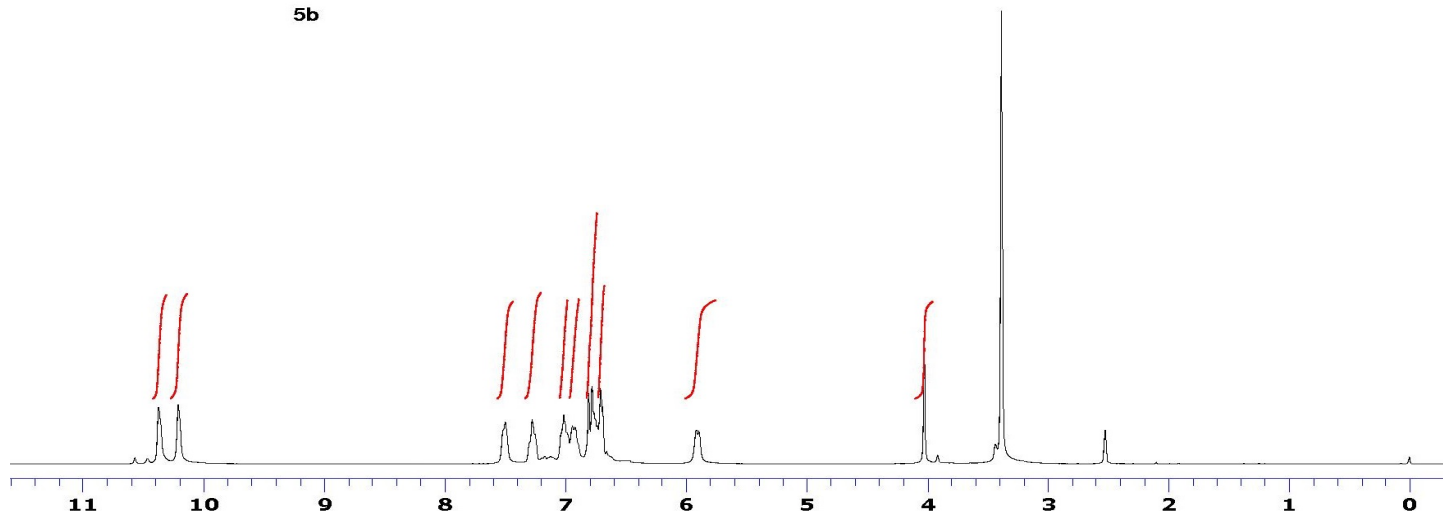
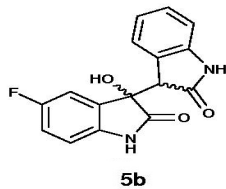


$^{13}\text{C}$  NMR, 75 MHz,  $\text{CDCl}_3+\text{DMSO } d_6$

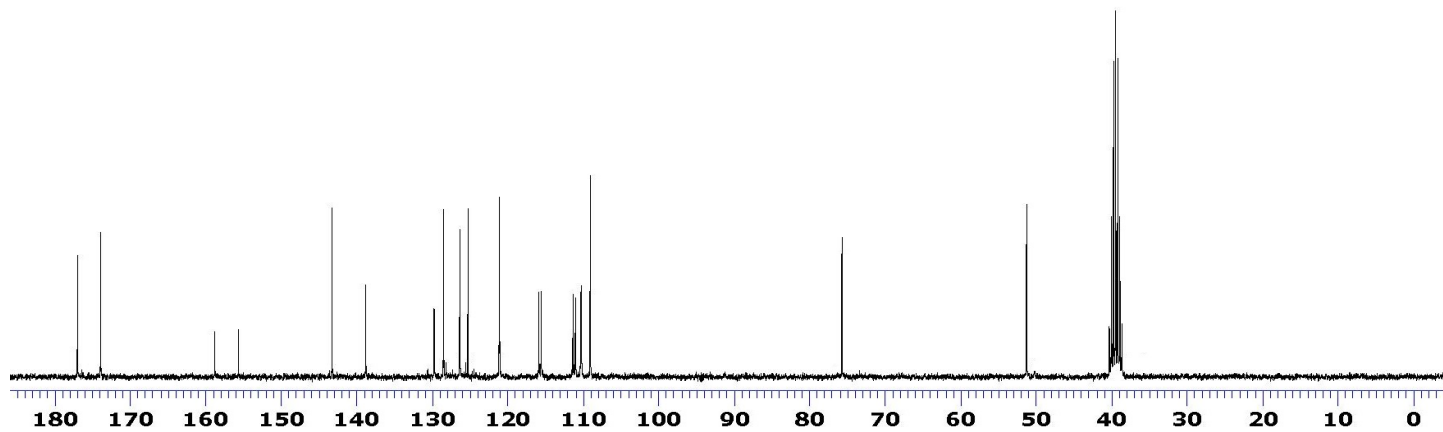
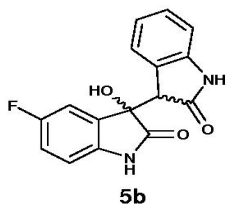


**5-fluoro-3-hydroxy-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5b, dr 95:05, Table 3, entry 2)**

<sup>1</sup>H NMR, 300 MHz, DMSO *d*<sub>6</sub>

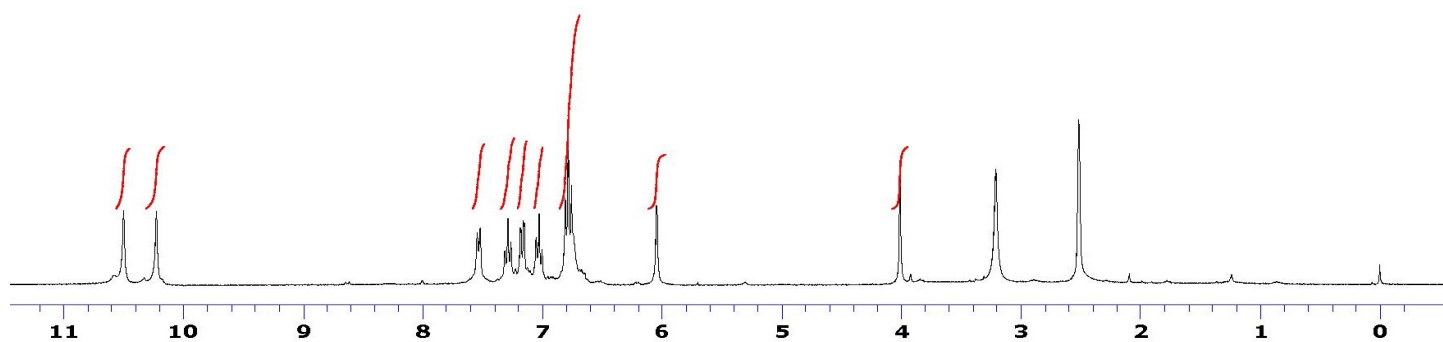
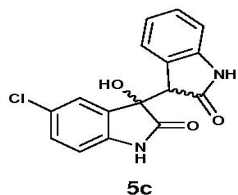


<sup>13</sup>C NMR, 75 MHz, DMSO *d*<sub>6</sub>

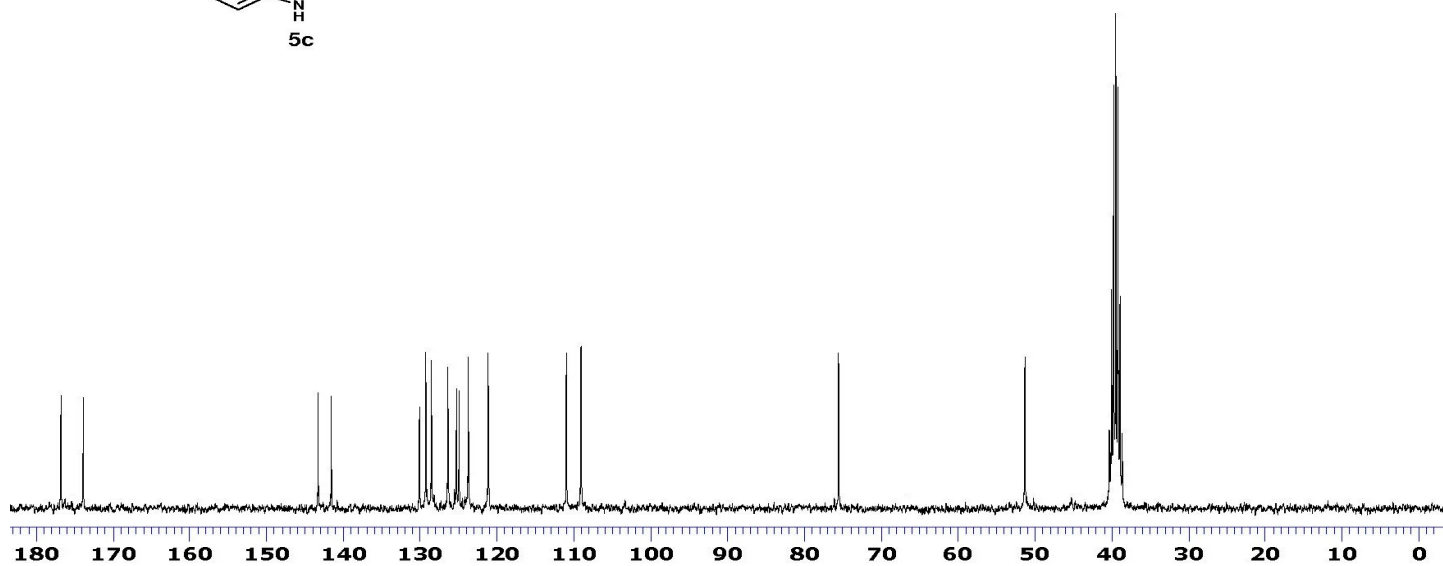
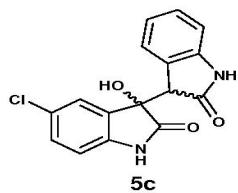


**5-chloro-3-hydroxy-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5c, dr 95:05, Table 3, entry 3)**

<sup>1</sup>H NMR, 300 MHz, DMSO *d*<sub>6</sub>

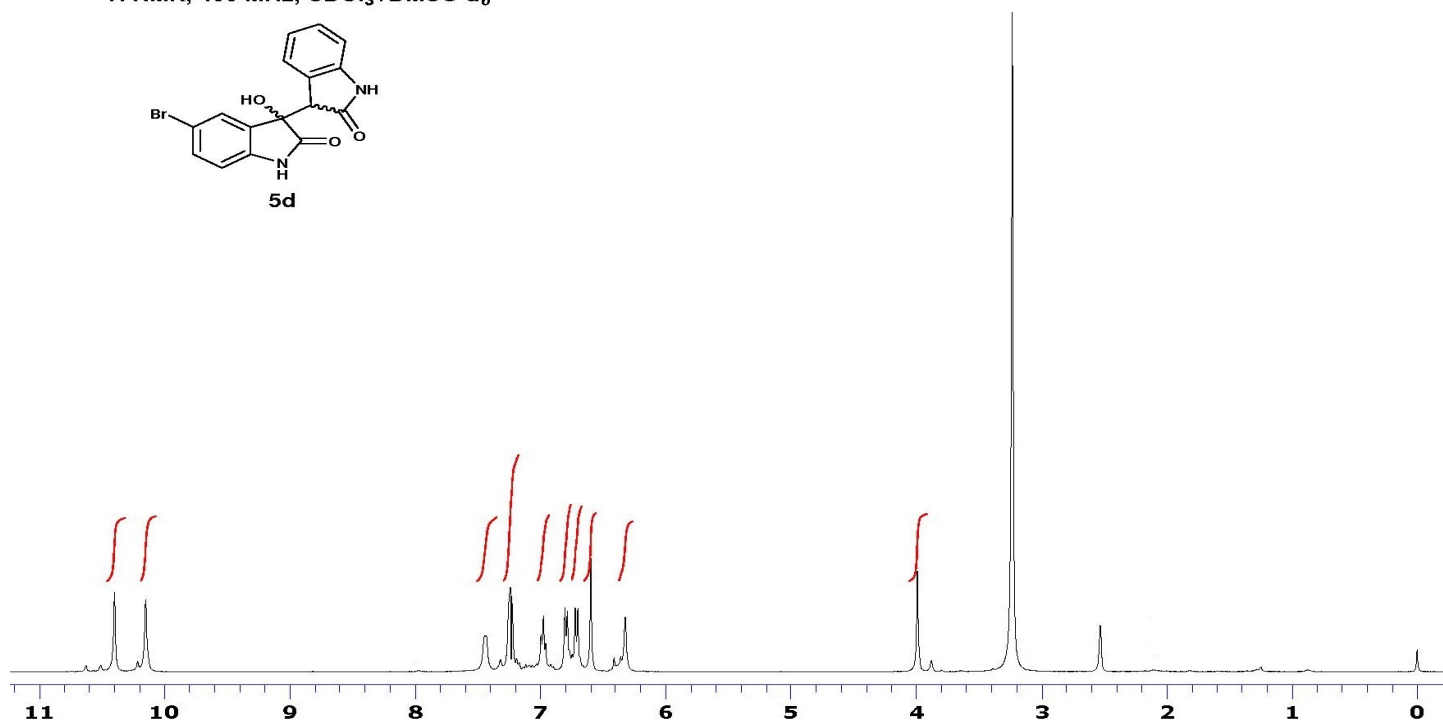
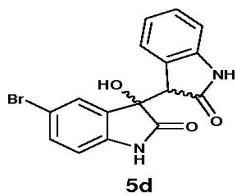


<sup>13</sup>C NMR, 75 MHz, DMSO *d*<sub>6</sub>

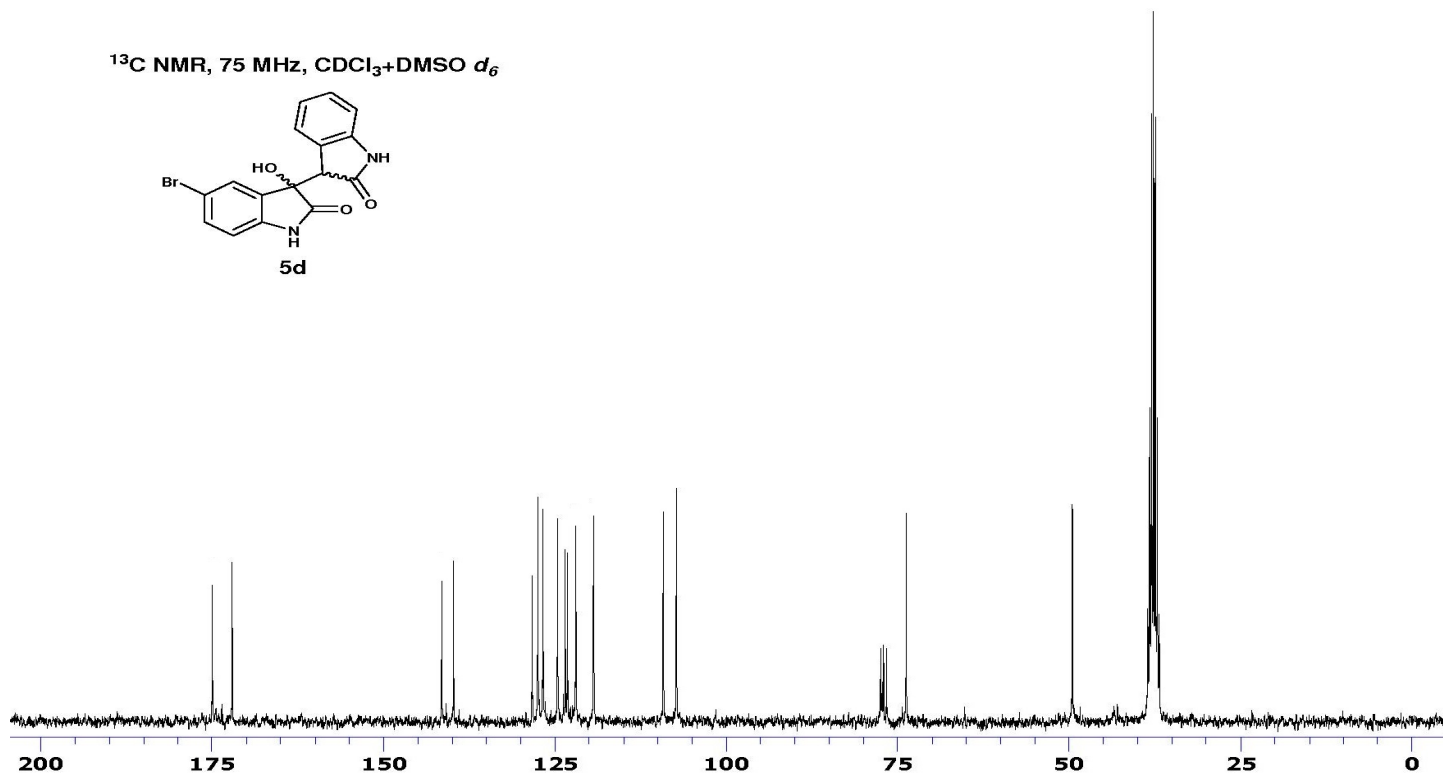
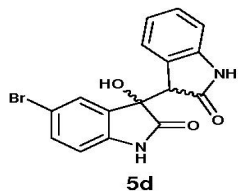


**5-bromo-3-hydroxy-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5d, dr 96:04, Table 3, entry 4)**

<sup>1</sup>H NMR, 400 MHz, CDCl<sub>3</sub>+DMSO *d*<sub>6</sub>

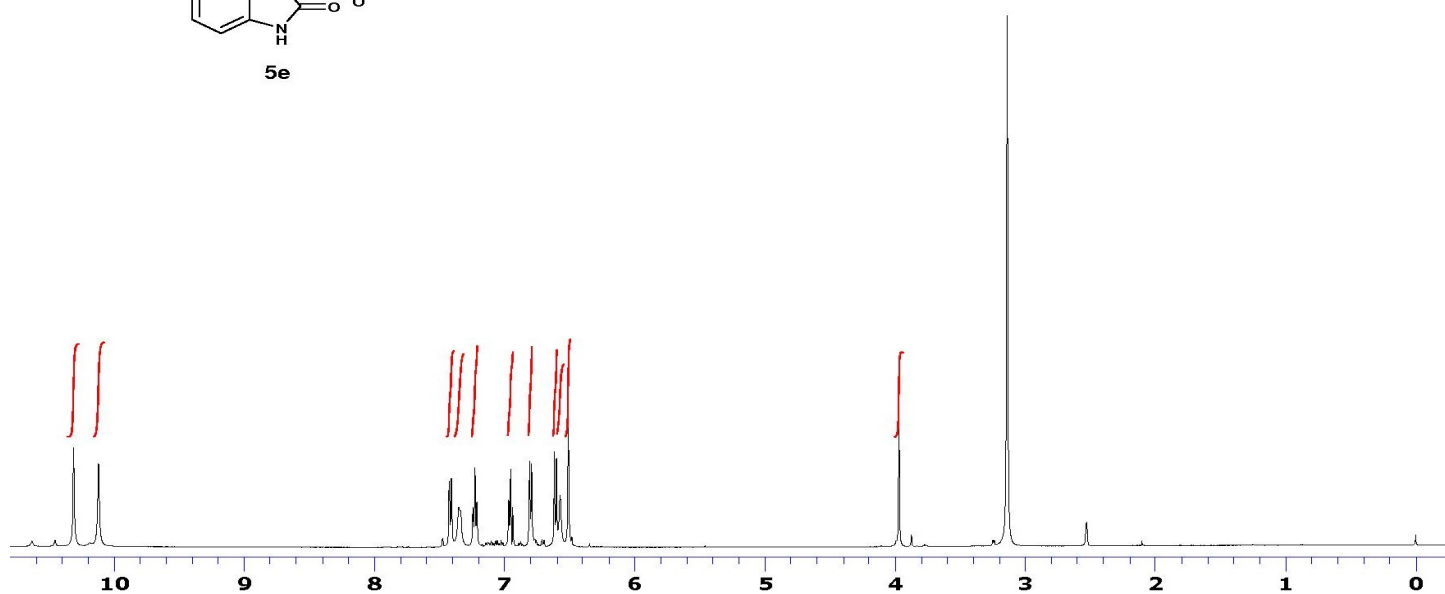
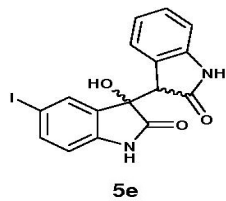


<sup>13</sup>C NMR, 75 MHz, CDCl<sub>3</sub>+DMSO *d*<sub>6</sub>

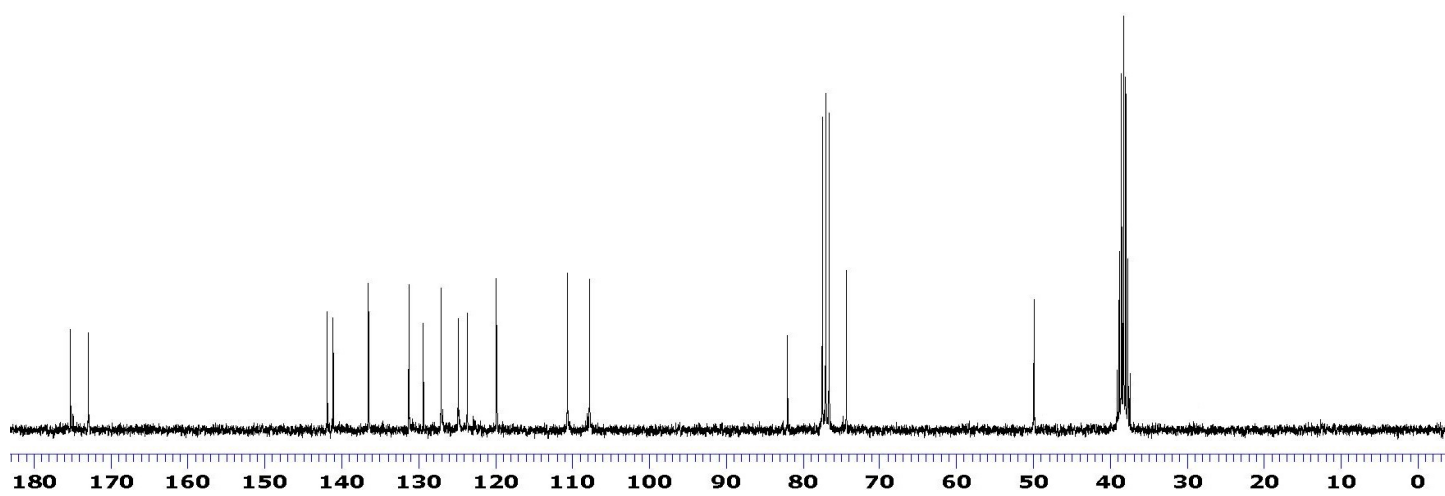
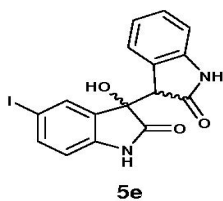


3-hydroxy-5-iodo-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5e, dr 96:04, Table 3, entry 5)

$^1\text{H}$  NMR, 500 MHz,  $\text{CDCl}_3+\text{DMSO } d_6$

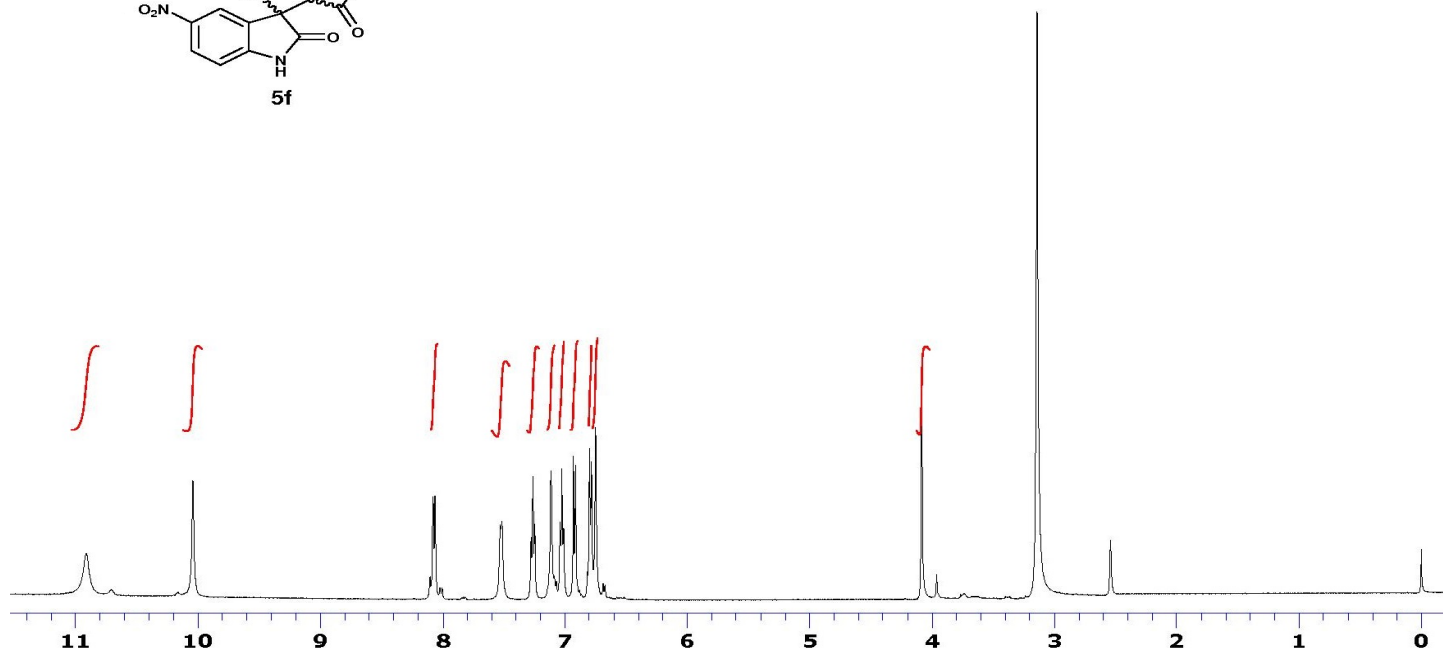
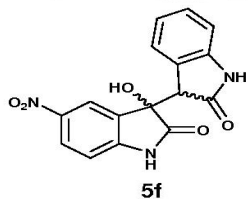


$^{13}\text{C}$  NMR, 75 MHz,  $\text{CDCl}_3+\text{DMSO } d_6$

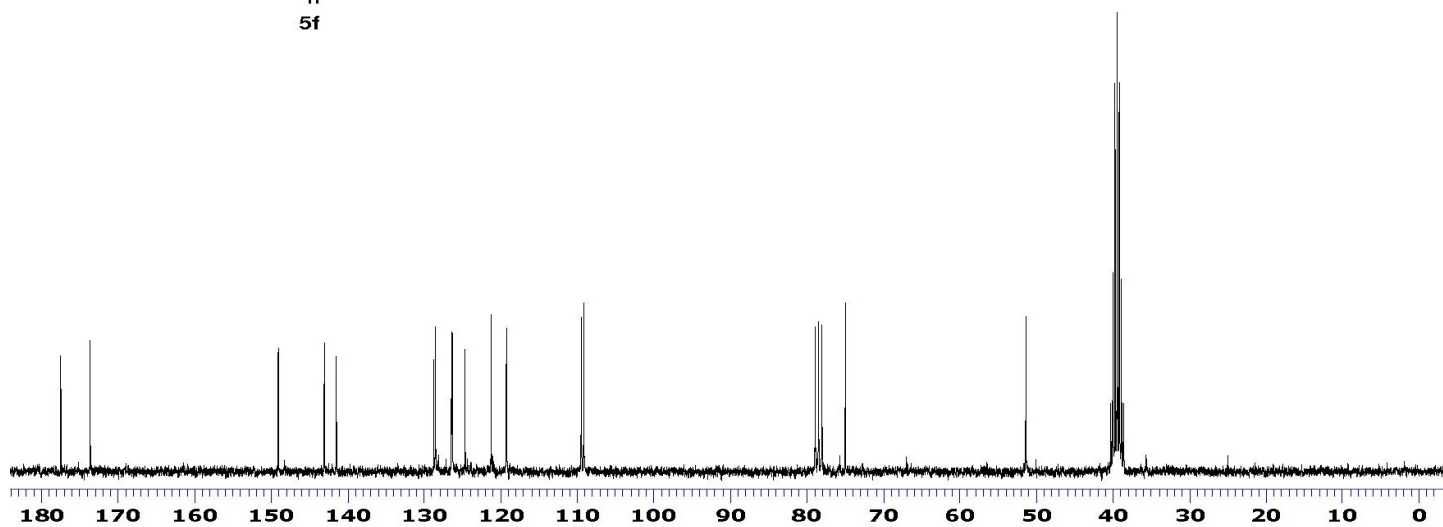
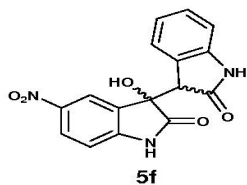


**3-hydroxy-5-nitro-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5f, dr 95:05, Table 3, entry 6)**

<sup>1</sup>H NMR, 500 MHz, CDCl<sub>3</sub>+DMSO *d*<sub>6</sub>

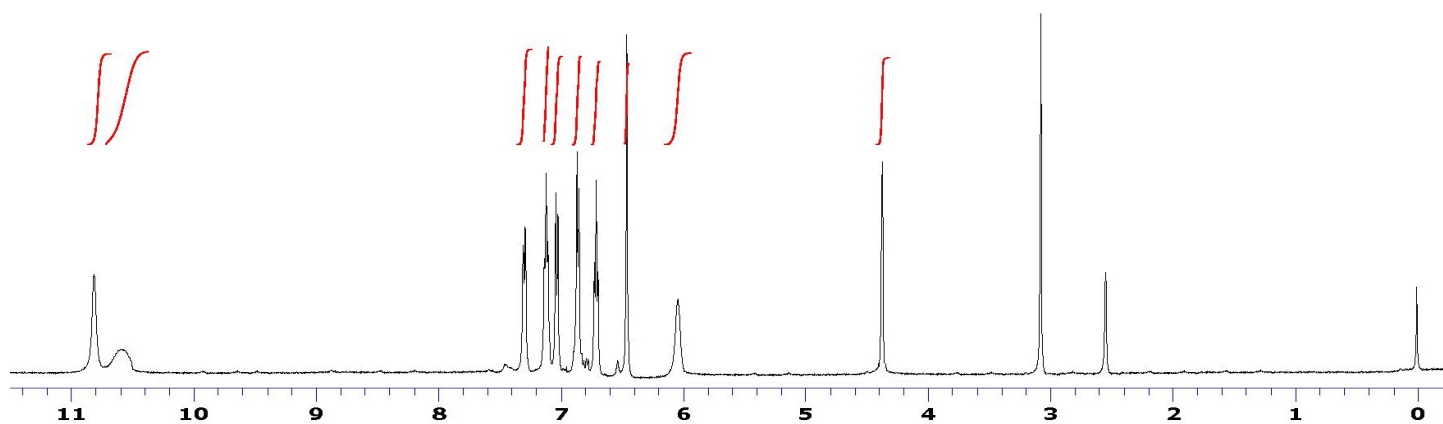


<sup>13</sup>C NMR, 75 MHz, CDCl<sub>3</sub>+DMSO *d*<sub>6</sub>

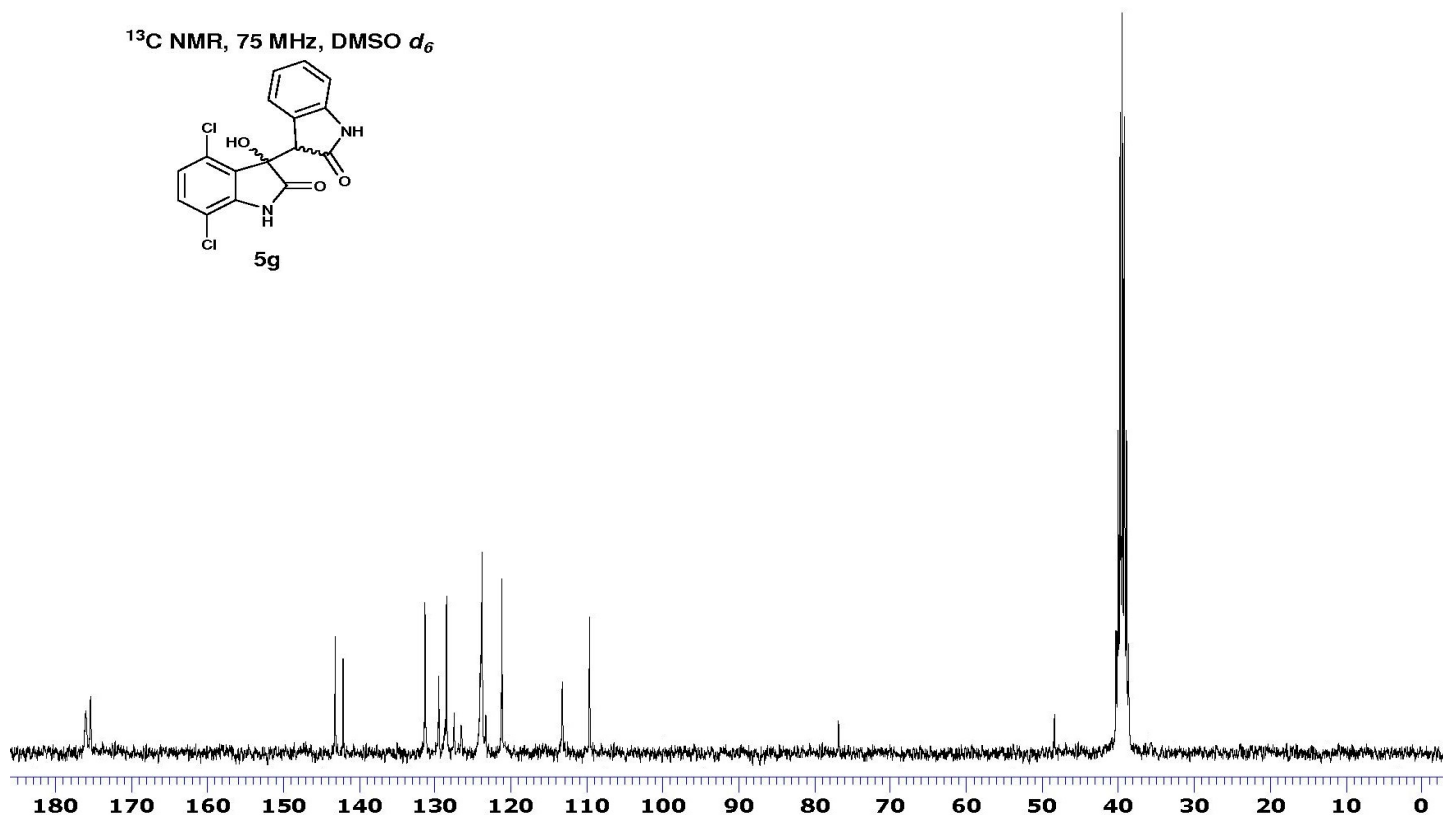
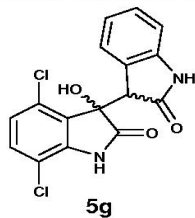


4,7-dichloro-3-hydroxy-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5g, dr 98:02, Table 3, entry 7)

<sup>1</sup>H NMR, 500 MHz, DMSO *d*<sub>6</sub>

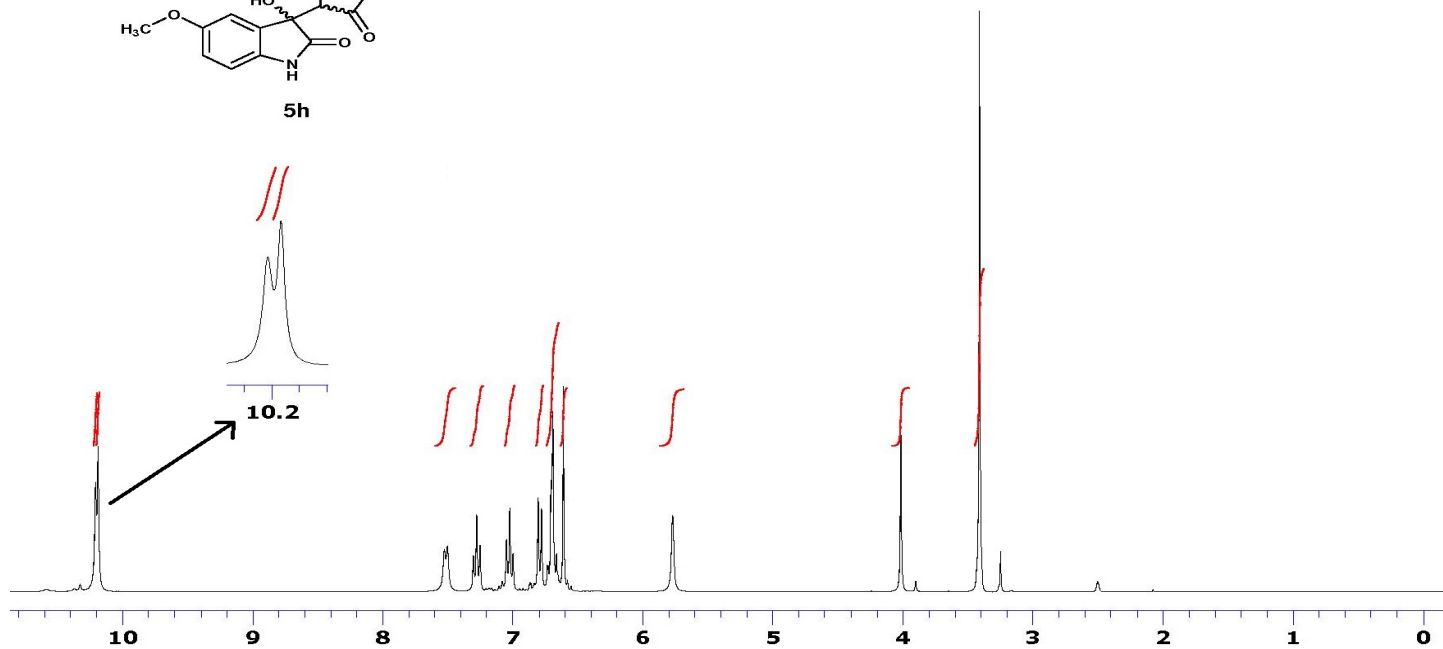
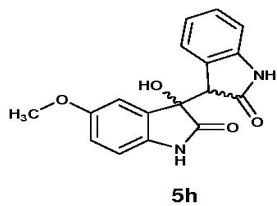


<sup>13</sup>C NMR, 75 MHz, DMSO *d*<sub>6</sub>

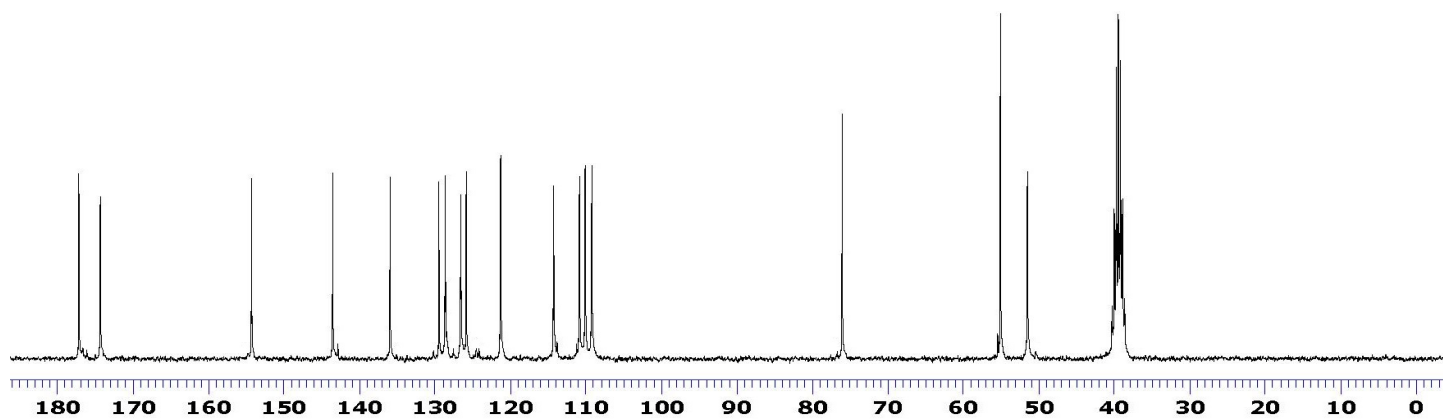
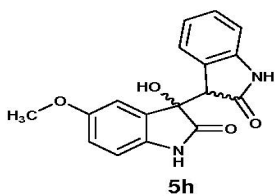


**3-hydroxy-5-methoxy-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5h, dr 98:02, Table 3, entry 8)**

<sup>1</sup>H NMR, 300 MHz, DMSO *d*<sub>6</sub>

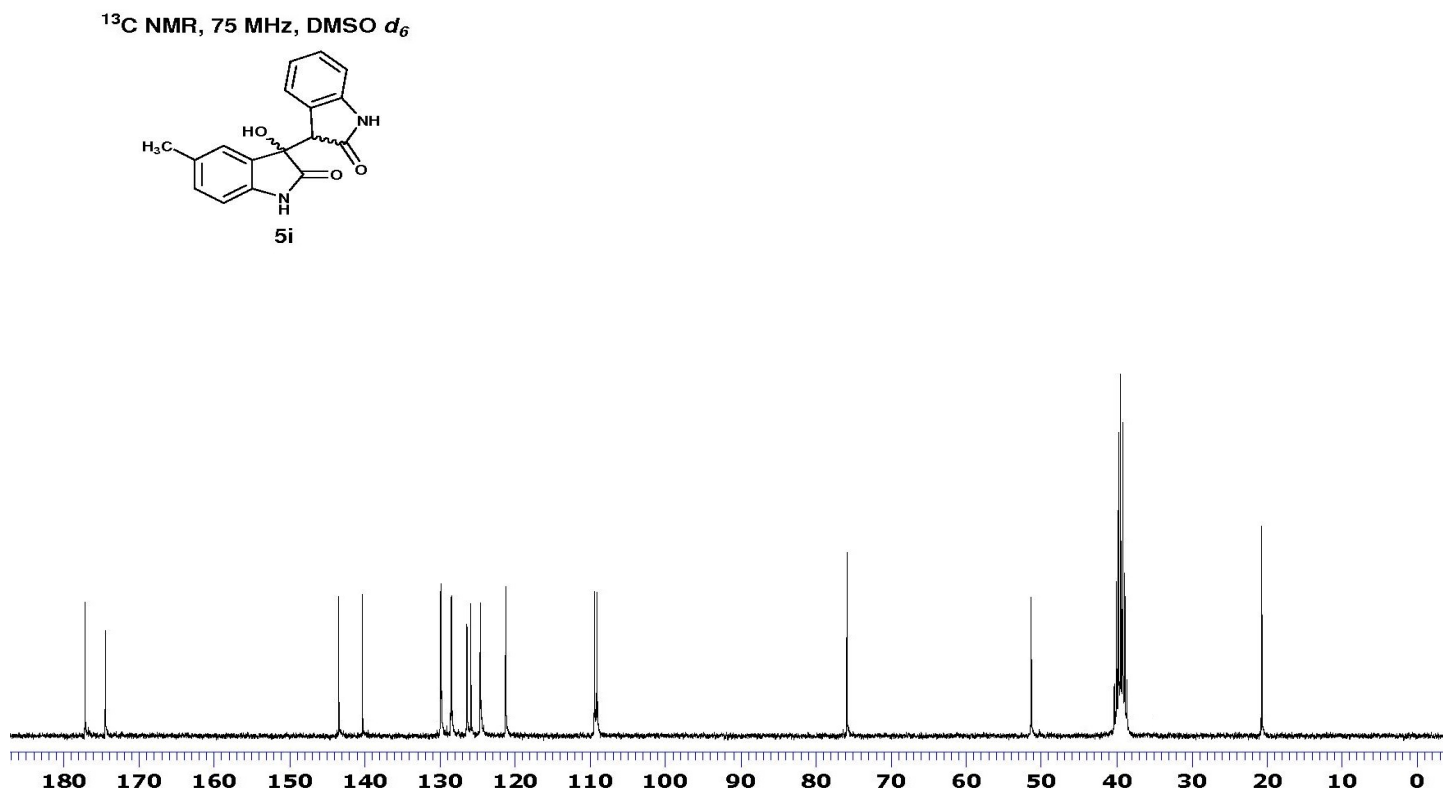
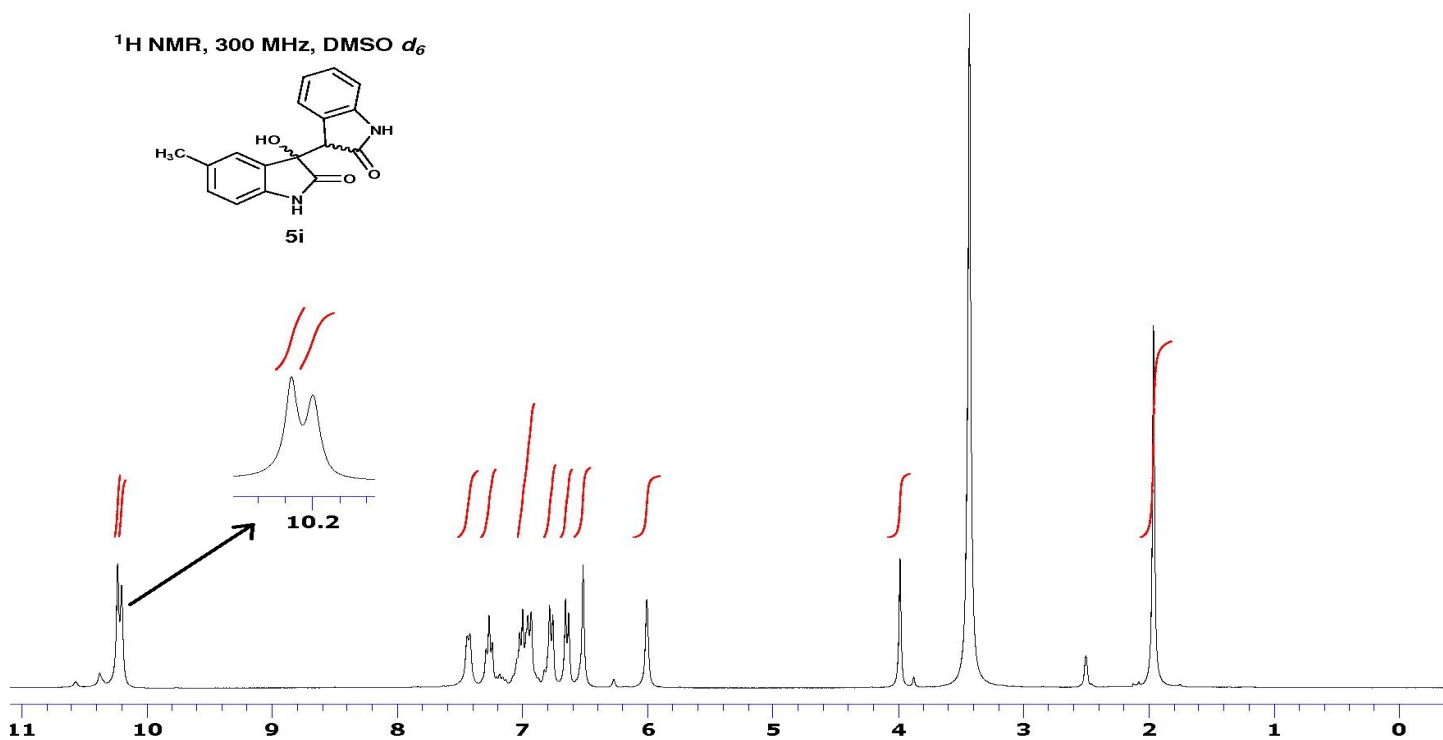


<sup>13</sup>C NMR, 75 MHz, DMSO *d*<sub>6</sub>



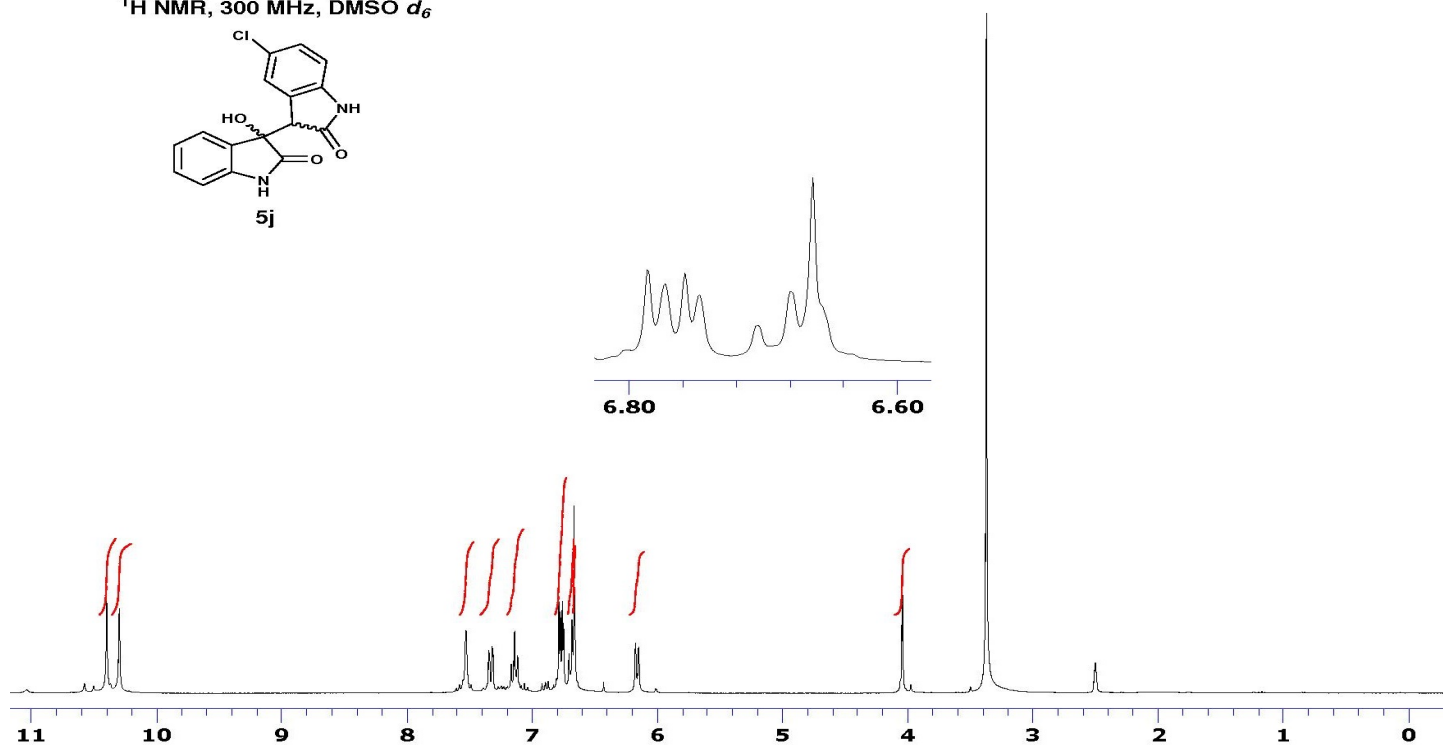
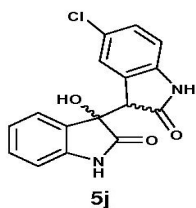


**3-hydroxy-5-methyl-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5i, dr 95:05, Table 3, entry 9)**

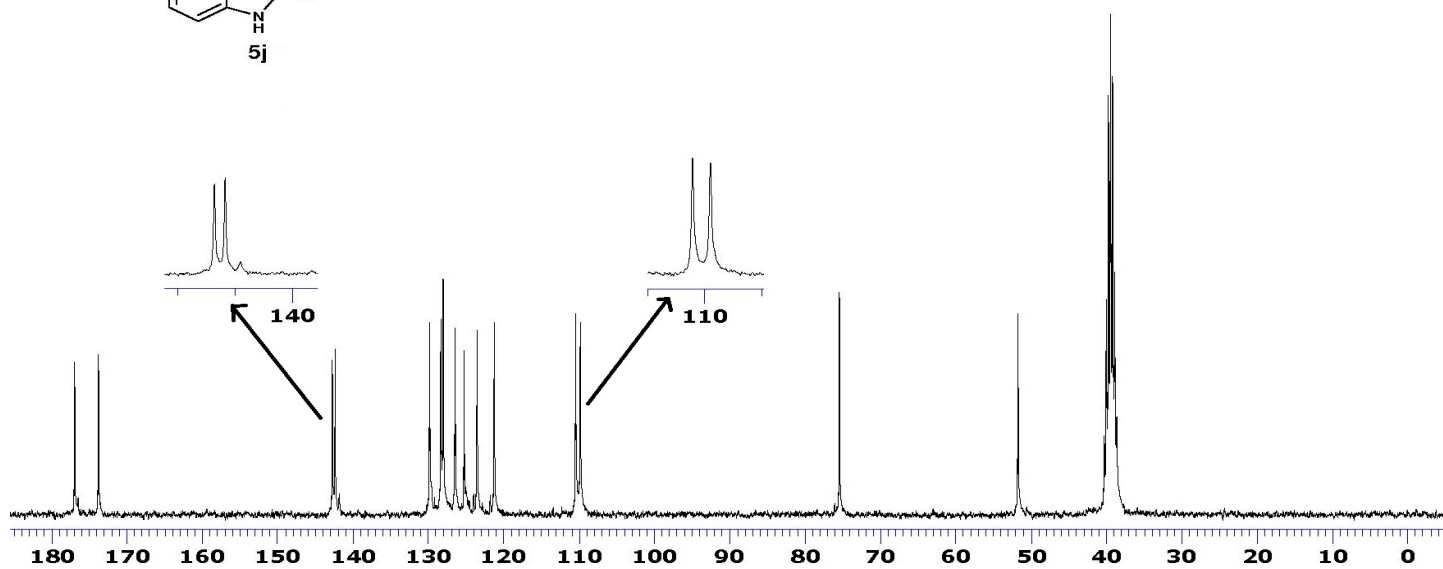


5'-chloro-3-hydroxy-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5j, dr 97:03, Table 3, entry 10)

<sup>1</sup>H NMR, 300 MHz, DMSO *d*<sub>6</sub>

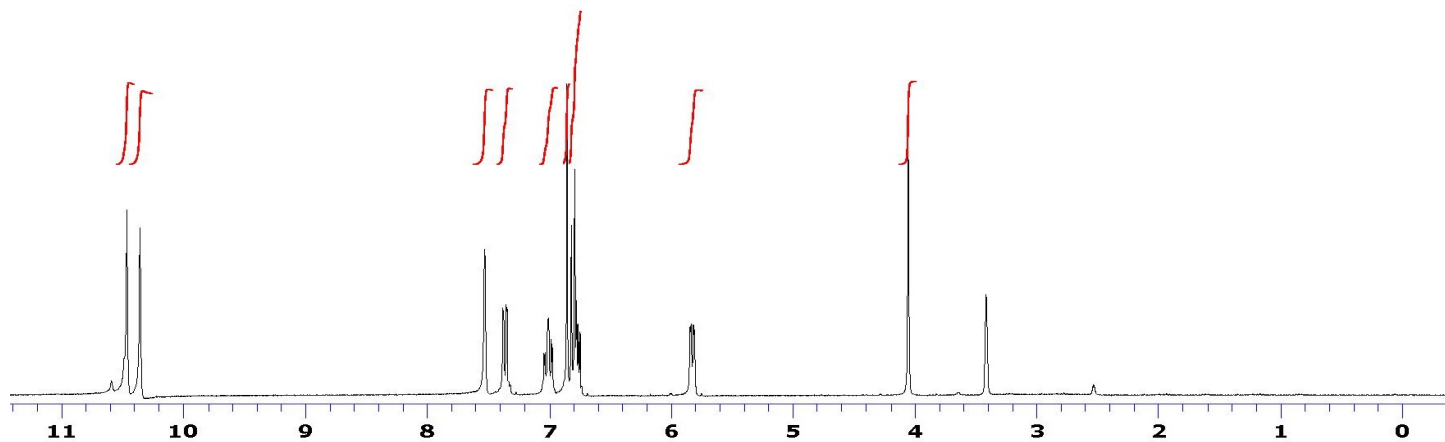
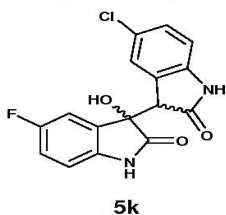


<sup>13</sup>C NMR, 75 MHz, DMSO *d*<sub>6</sub>

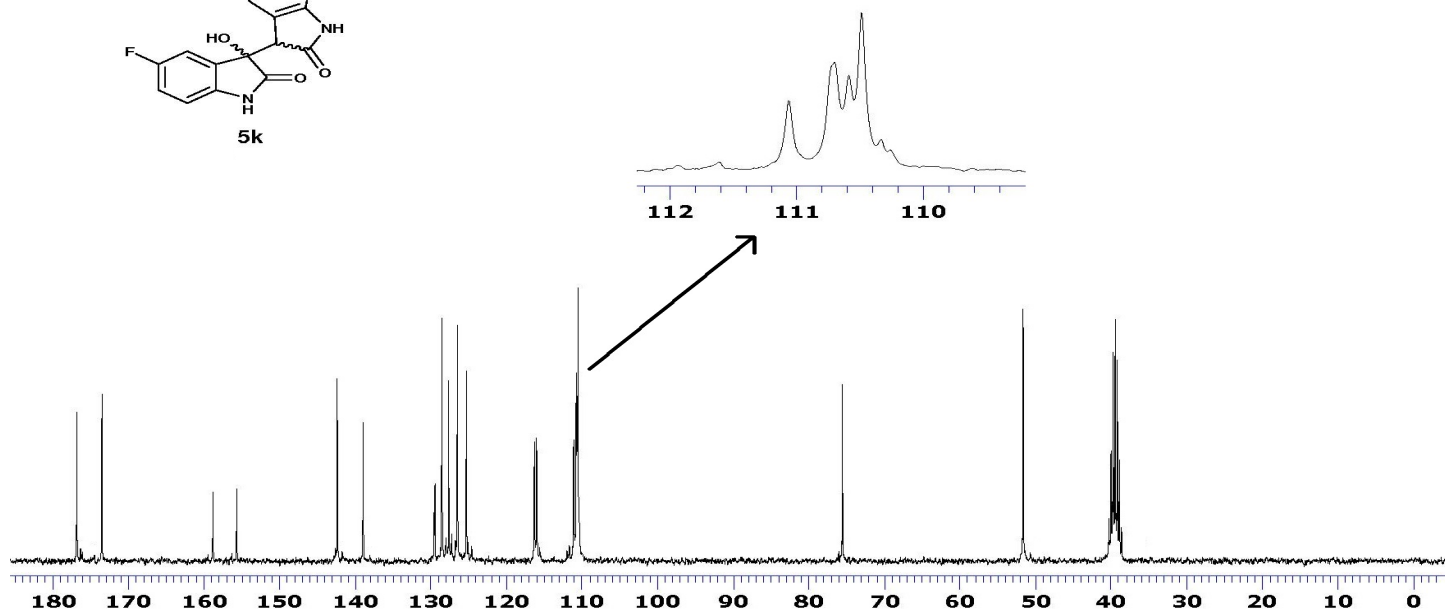
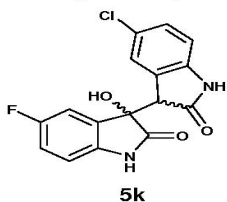


**5'-chloro-5-fluoro-3-hydroxy-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5k, dr 96:04, Table 3, entry 11)**

<sup>1</sup>H NMR, 300 MHz, DMSO *d*<sub>6</sub>

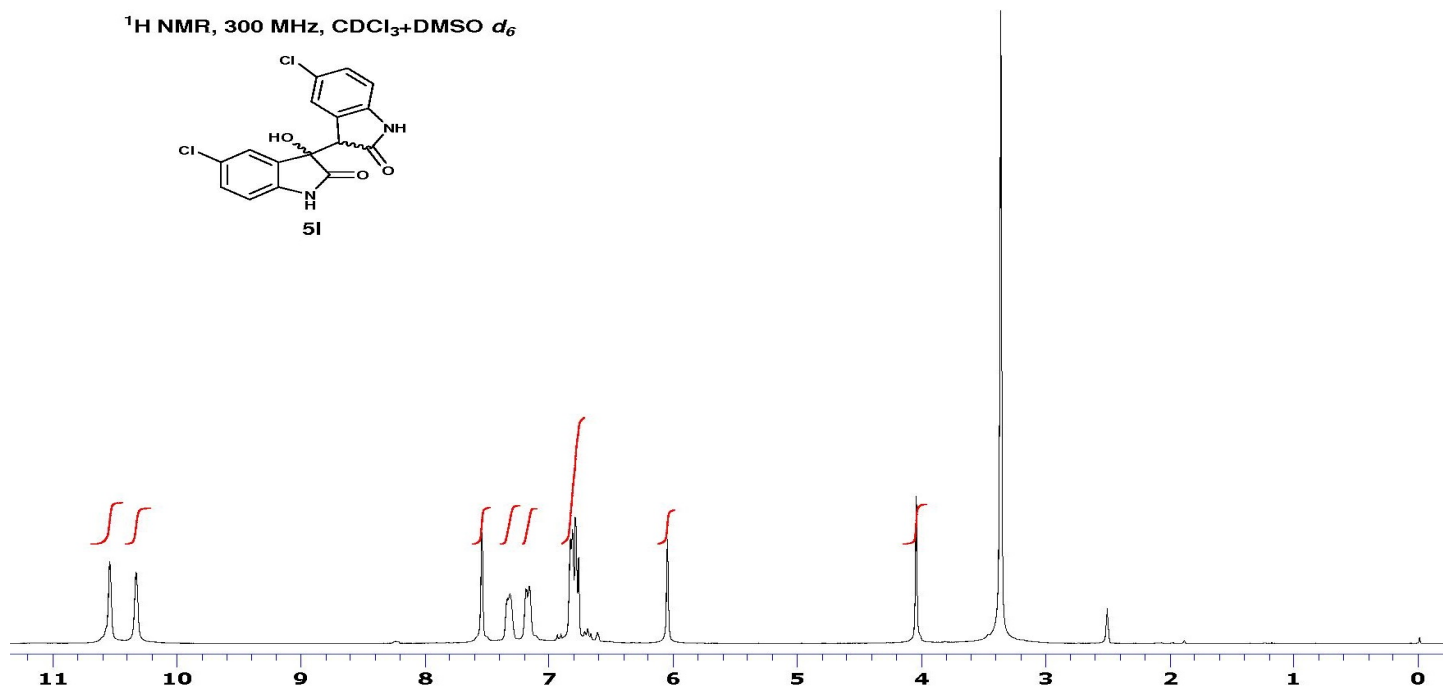
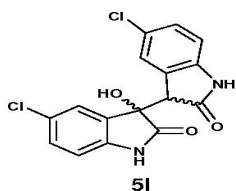


<sup>13</sup>C NMR, 75 MHz, DMSO *d*<sub>6</sub>

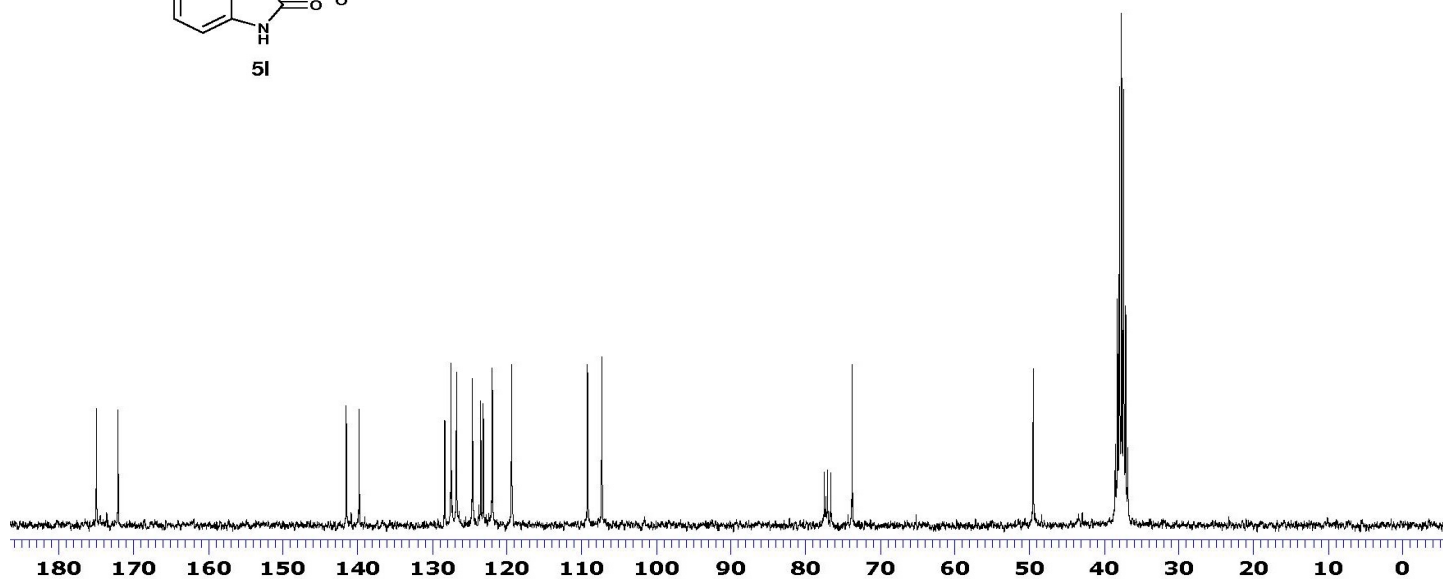
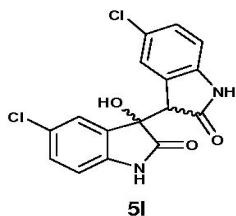


**5,5'-dichloro-3-hydroxy-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5I, dr 98:02, Table 3, entry 12)**

<sup>1</sup>H NMR, 300 MHz, CDCl<sub>3</sub>+DMSO *d*<sub>6</sub>

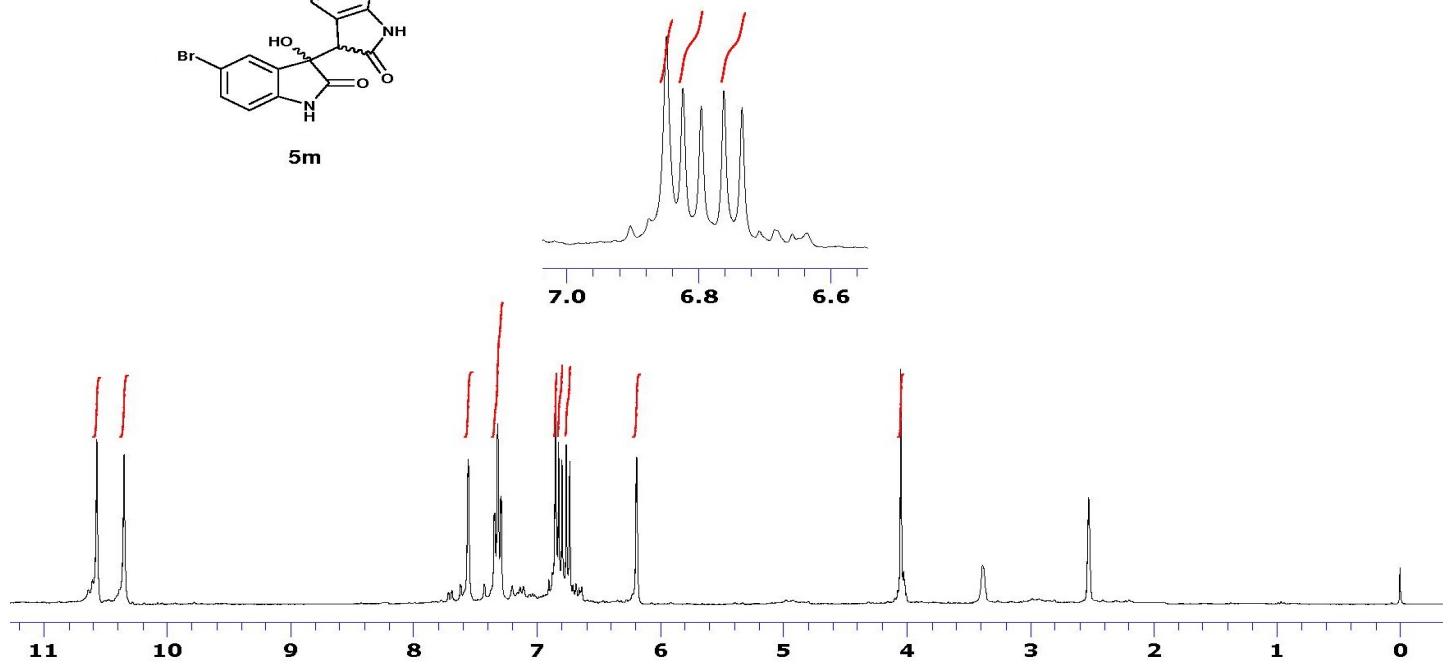
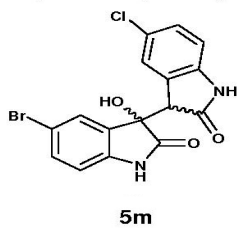


<sup>13</sup>C NMR, 75 MHz, CDCl<sub>3</sub>+DMSO *d*<sub>6</sub>

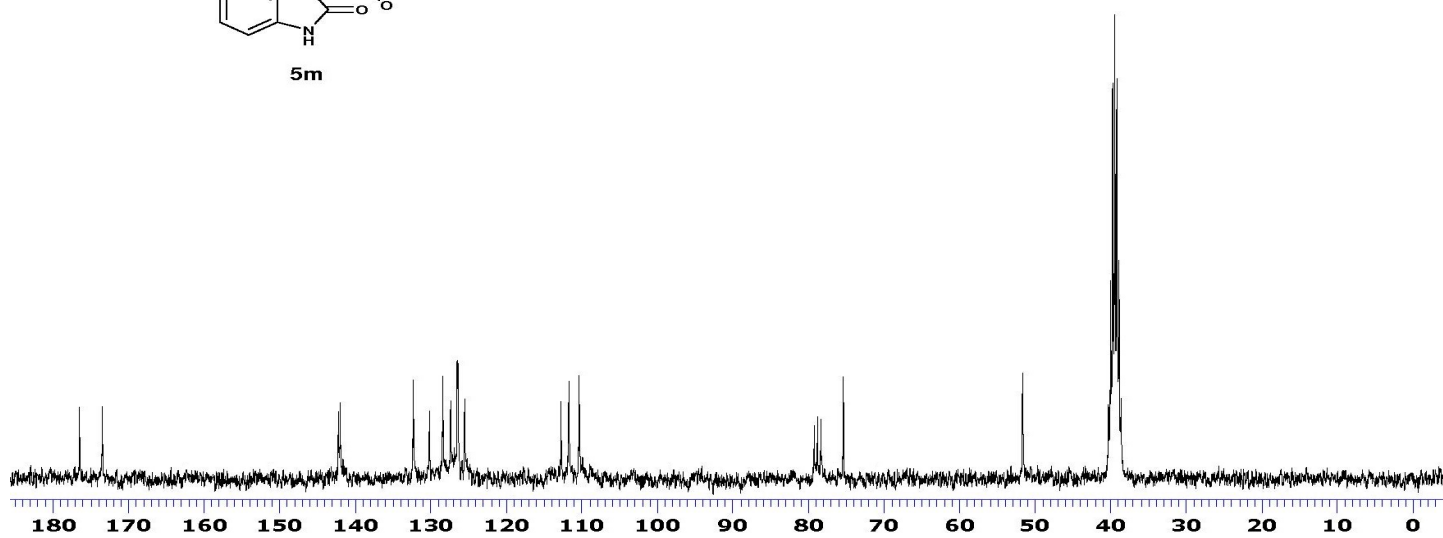
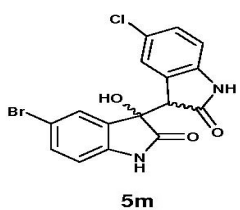


**5-bromo-5'-chloro-3-hydroxy-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5m, dr 97:03, Table 3, entry 13)**

<sup>1</sup>H NMR, 300 MHz, CDCl<sub>3</sub>+DMSO *d*<sub>6</sub>

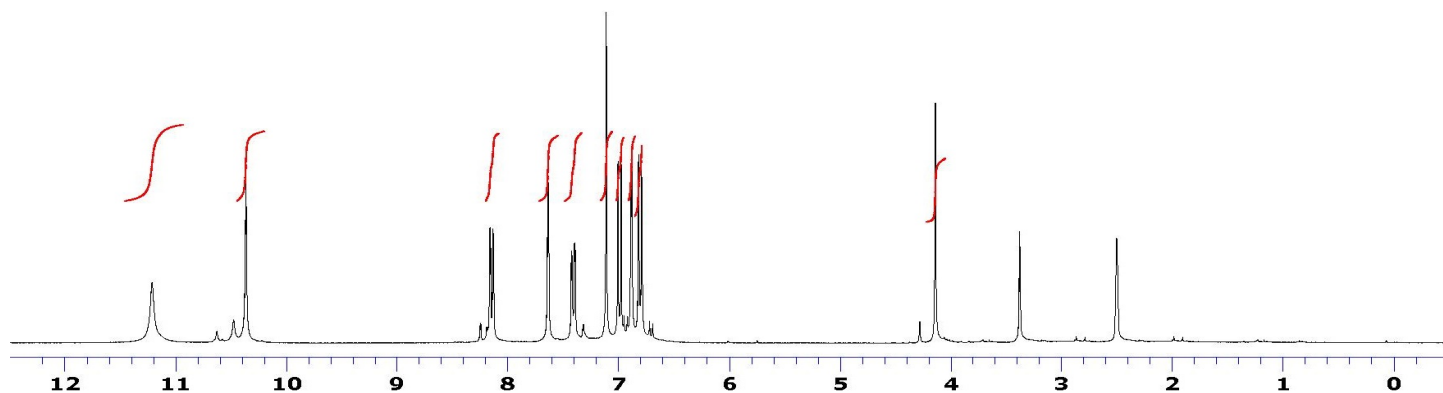
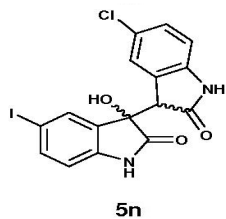


<sup>13</sup>C NMR, 75 MHz, CDCl<sub>3</sub>+DMSO *d*<sub>6</sub>

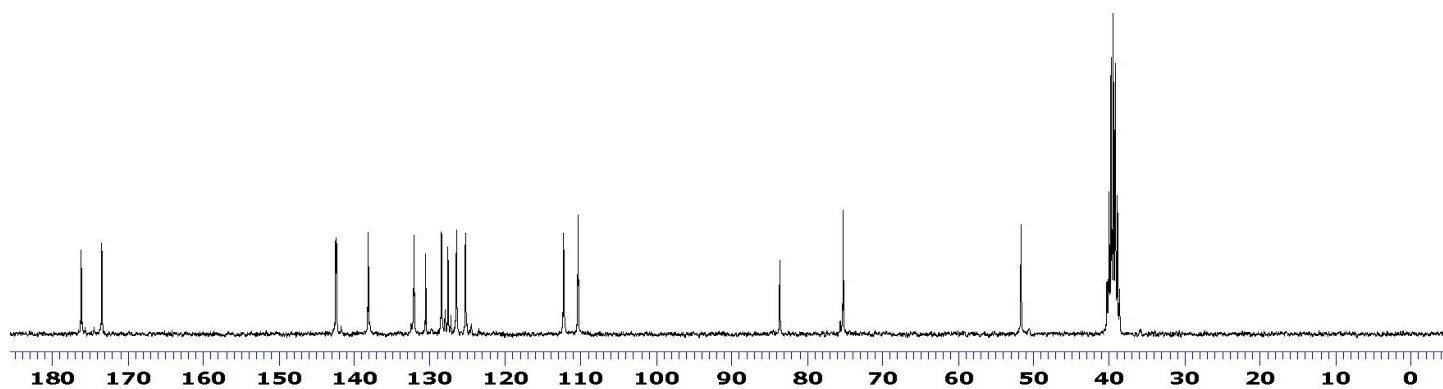
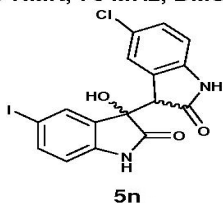


**5'-chloro-3-hydroxy-5-iodo-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5n, dr 96:04, Table 3, entry 14)**

<sup>1</sup>H NMR, 300 MHz, DMSO *d*<sub>6</sub>

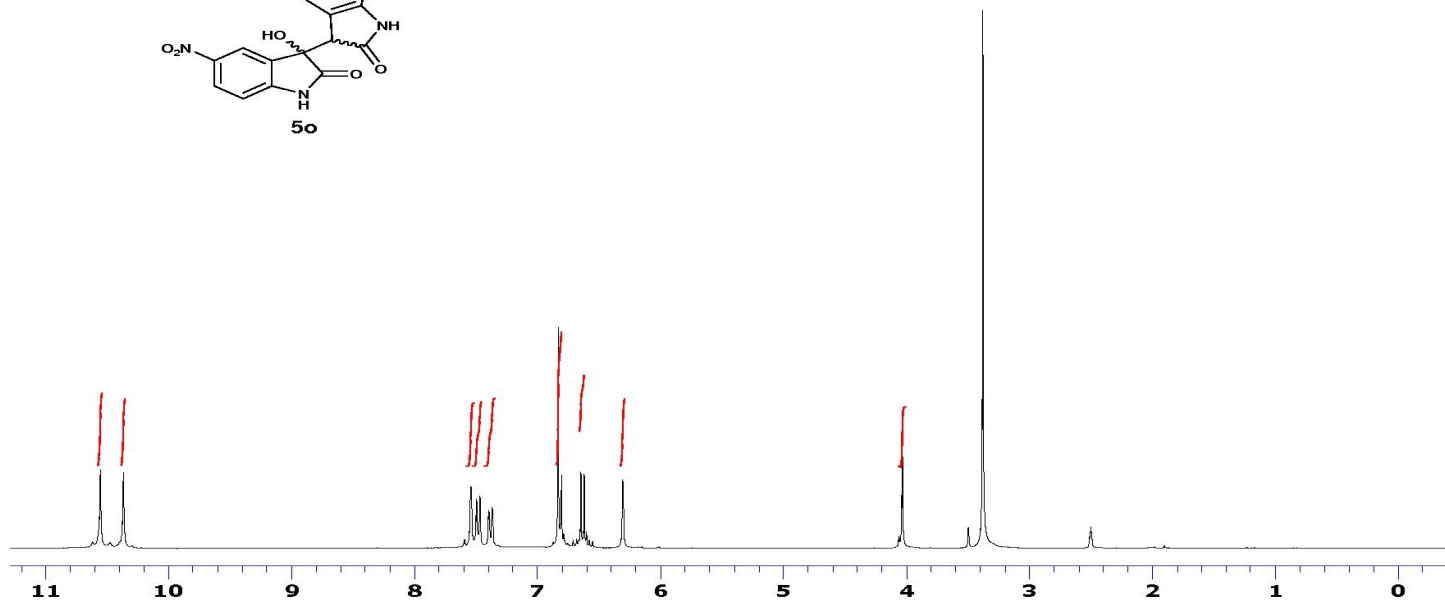
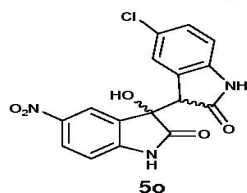


<sup>13</sup>C NMR, 75 MHz, DMSO *d*<sub>6</sub>

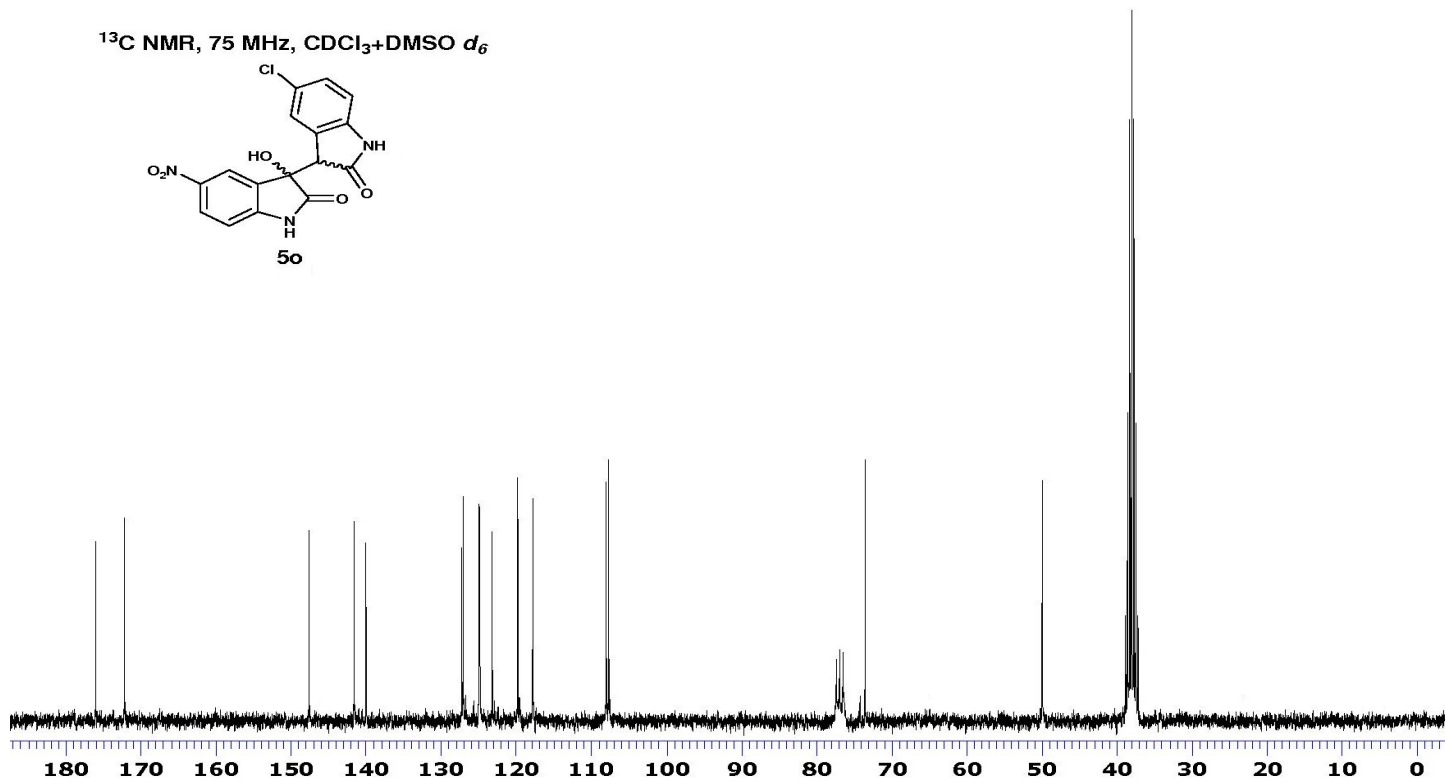
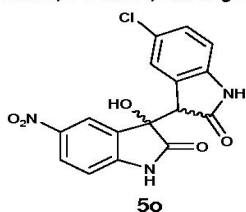


**5'-chloro-3-hydroxy-5-nitro-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5o, dr 97:03, Table 3, entry 15)**

<sup>1</sup>H NMR, 300 MHz, CDCl<sub>3</sub>+DMSO *d*<sub>6</sub>

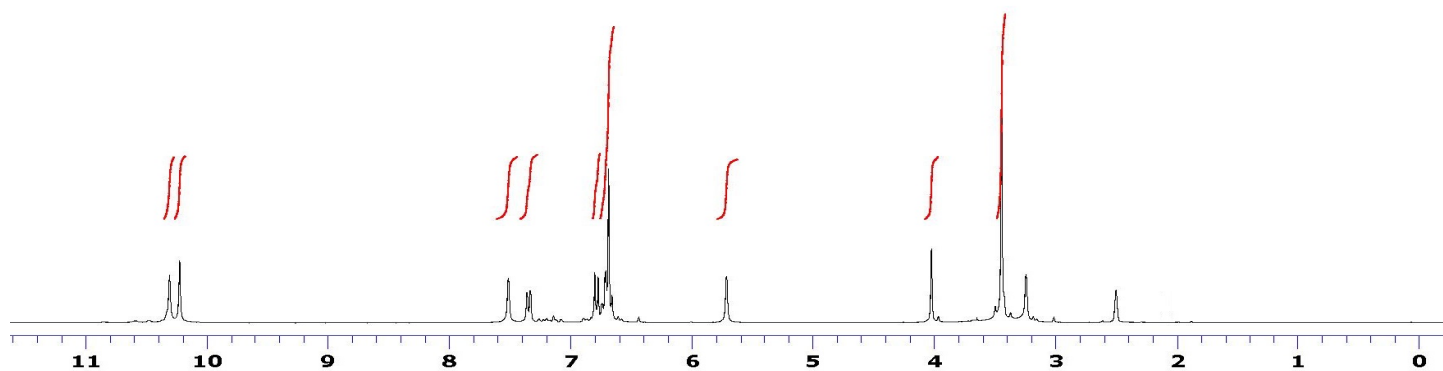
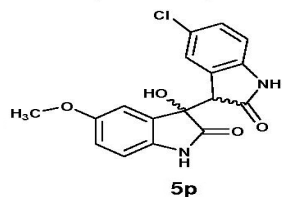


<sup>13</sup>C NMR, 75 MHz, CDCl<sub>3</sub>+DMSO *d*<sub>6</sub>

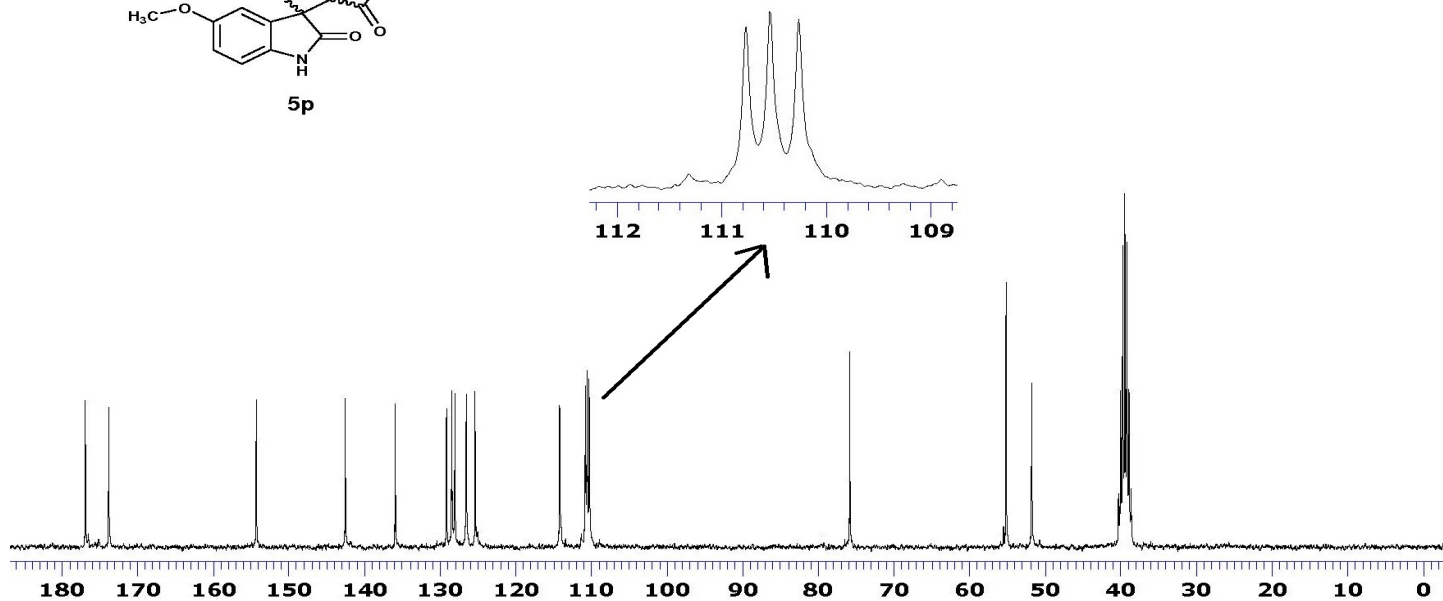
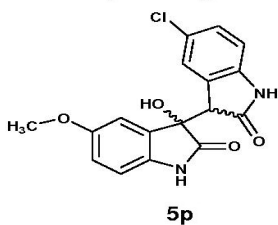


**5'-chloro-3-hydroxy-5-methoxy-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5p, dr 97:03, Table 3, entry 16)**

<sup>1</sup>H NMR, 300 MHz, DMSO *d*<sub>6</sub>



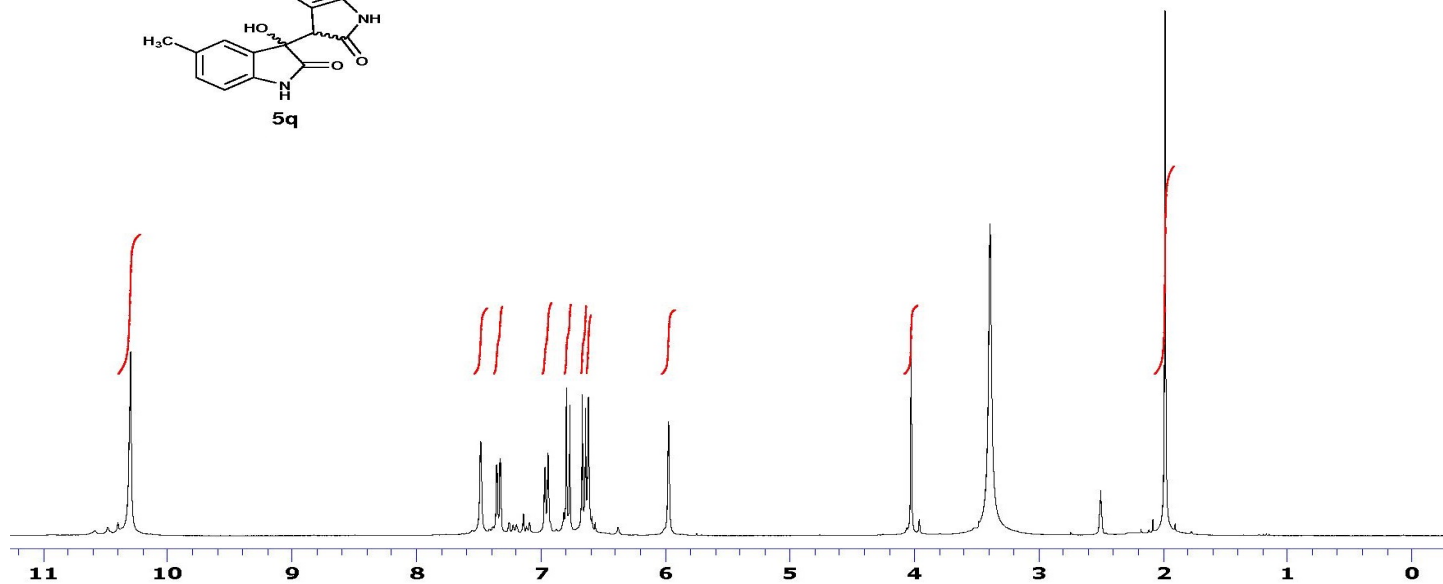
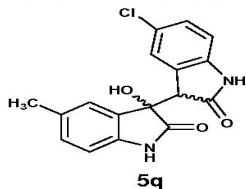
<sup>13</sup>C NMR, 75 MHz, DMSO *d*<sub>6</sub>



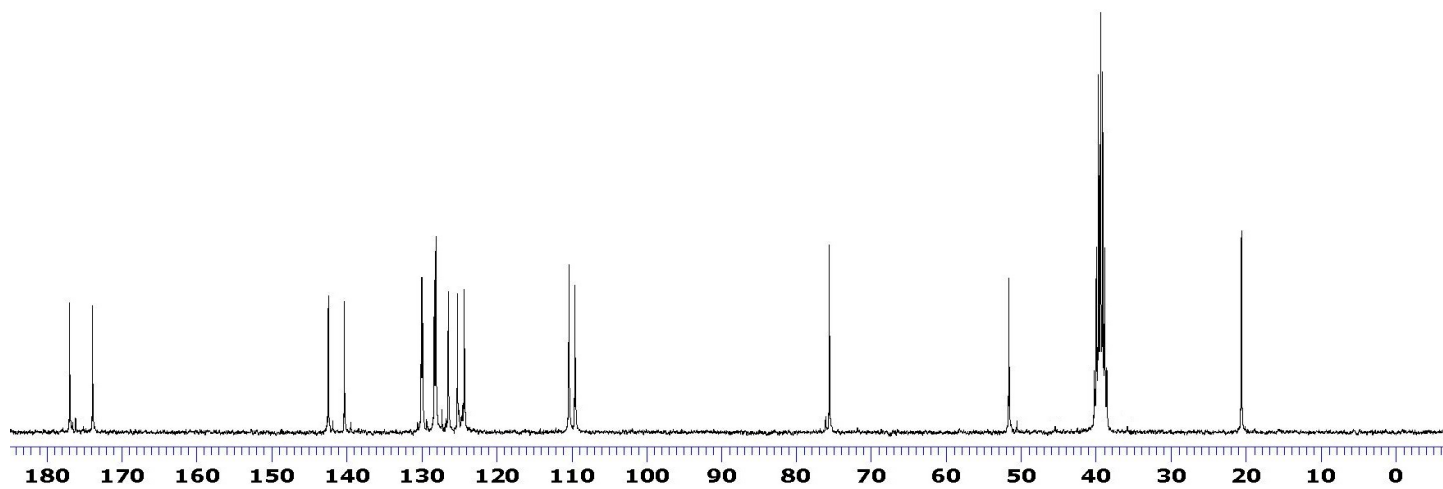
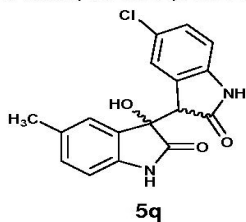


**5'-chloro-3-hydroxy-5-methyl-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione** (5q, dr 96:04, Table 3, entry 17)

<sup>1</sup>H NMR, 300 MHz, DMSO *d*<sub>6</sub>

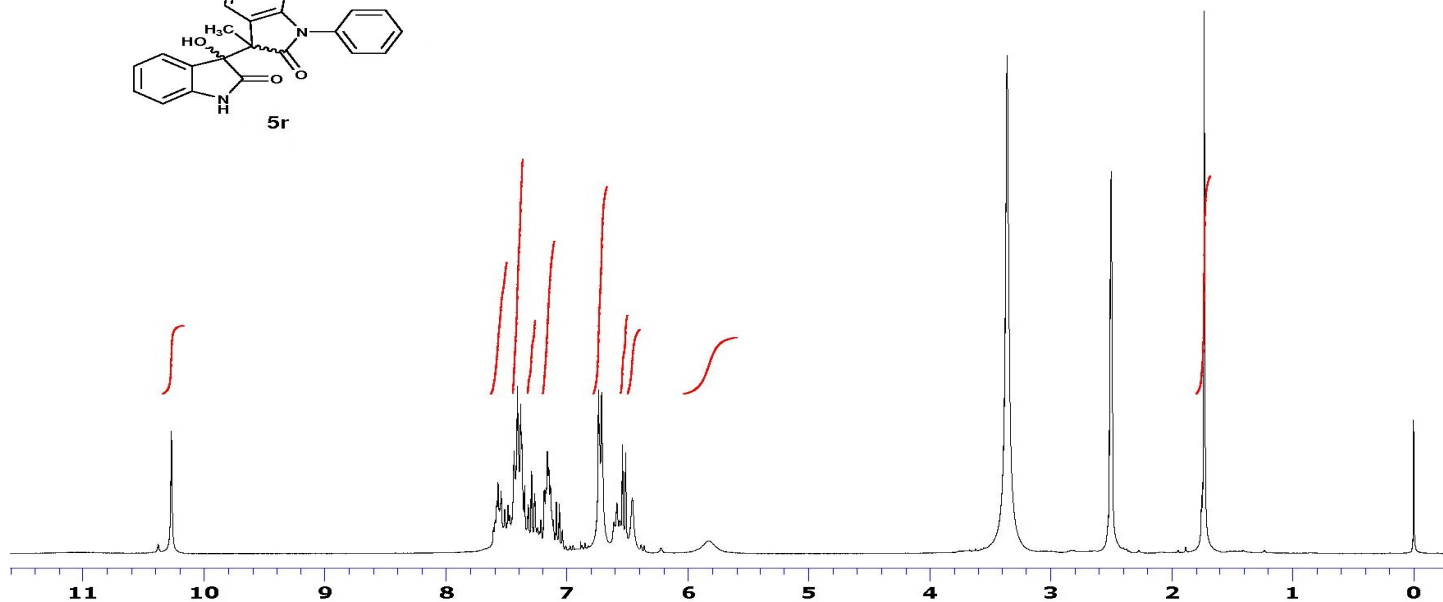
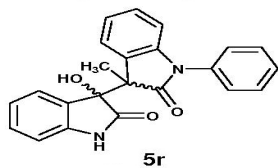


<sup>13</sup>C NMR, 75 MHz, DMSO *d*<sub>6</sub>

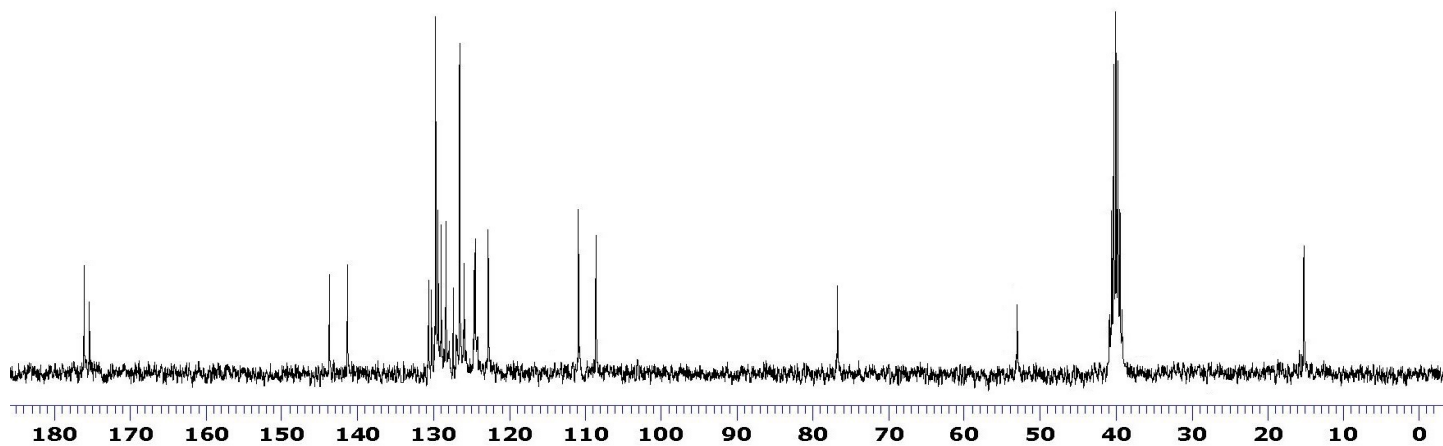
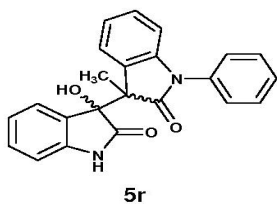


**3'-hydroxy-3-methyl-1-phenyl-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5r, dr 97:03, Table 3, entry 18)**

<sup>1</sup>H NMR, 300 MHz, DMSO *d*<sub>6</sub>

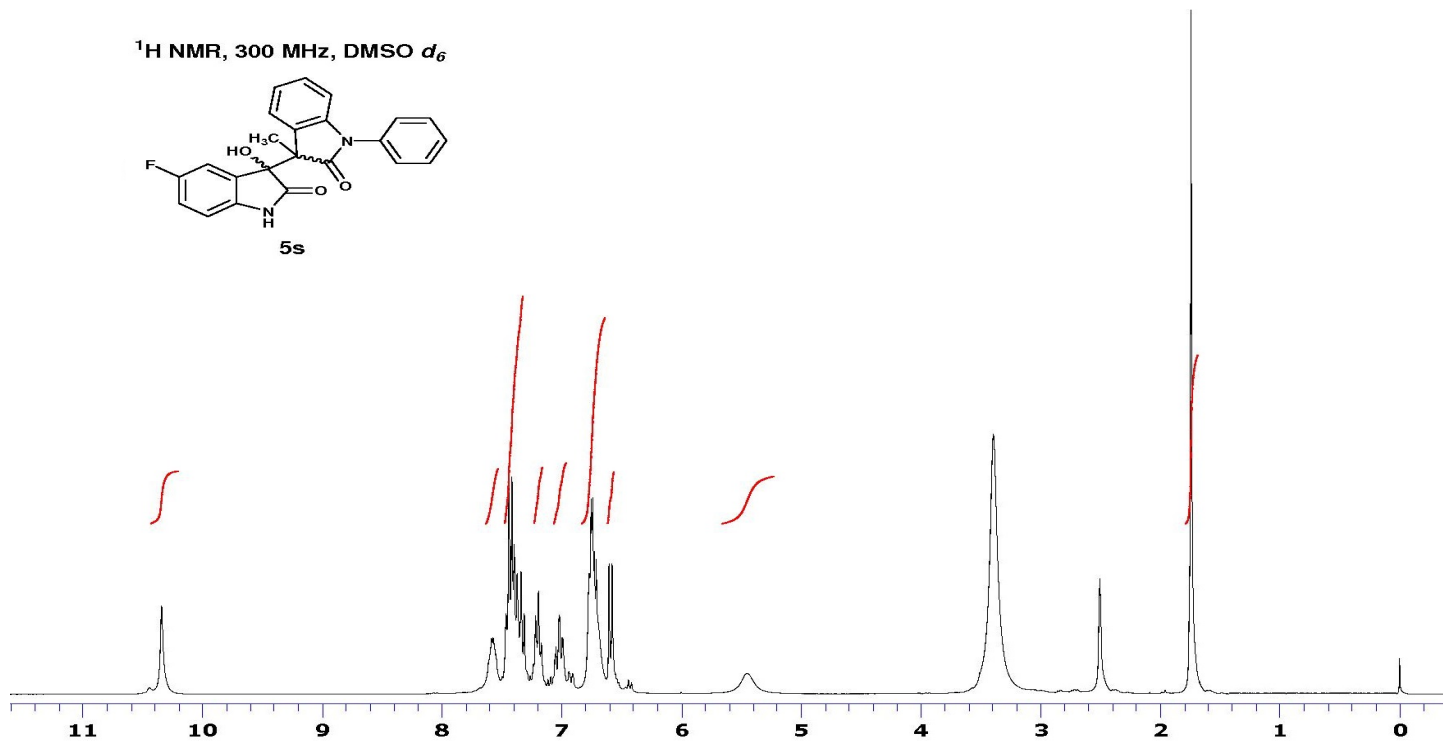
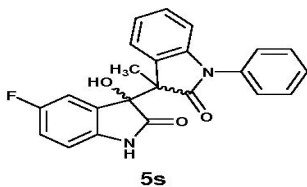


<sup>13</sup>C NMR, 75 MHz, DMSO *d*<sub>6</sub>

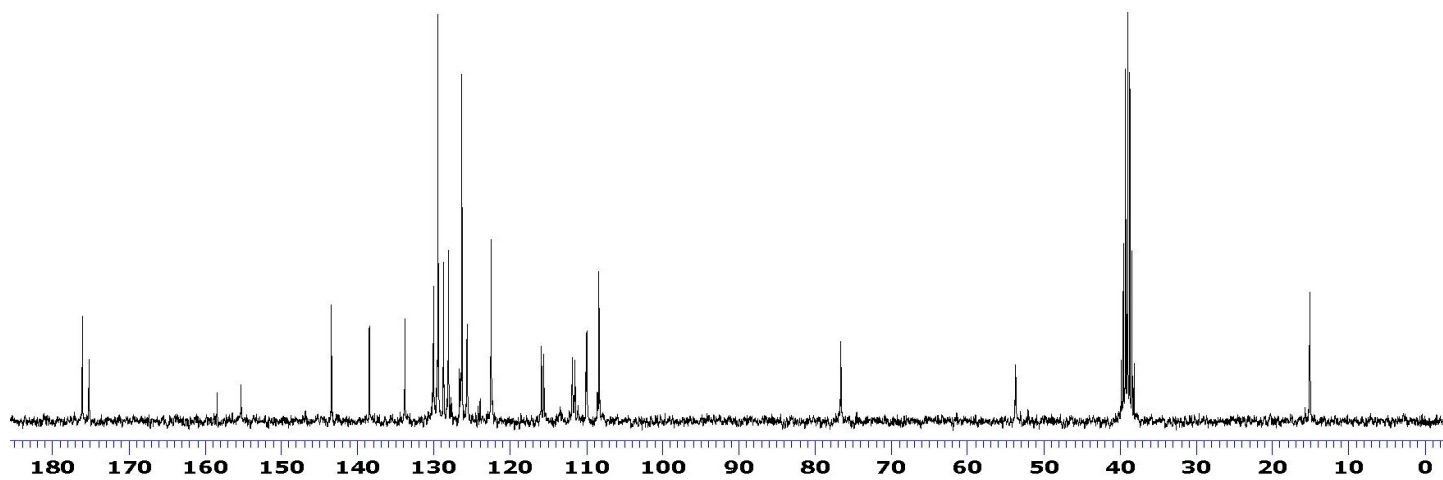
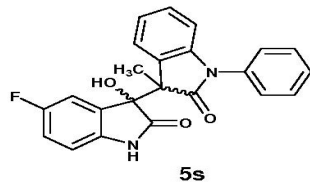


**5'-fluoro-3'-hydroxy-3-methyl-1-phenyl-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5s, dr 97:03, Table 3, entry 19)**

<sup>1</sup>H NMR, 300 MHz, DMSO *d*<sub>6</sub>

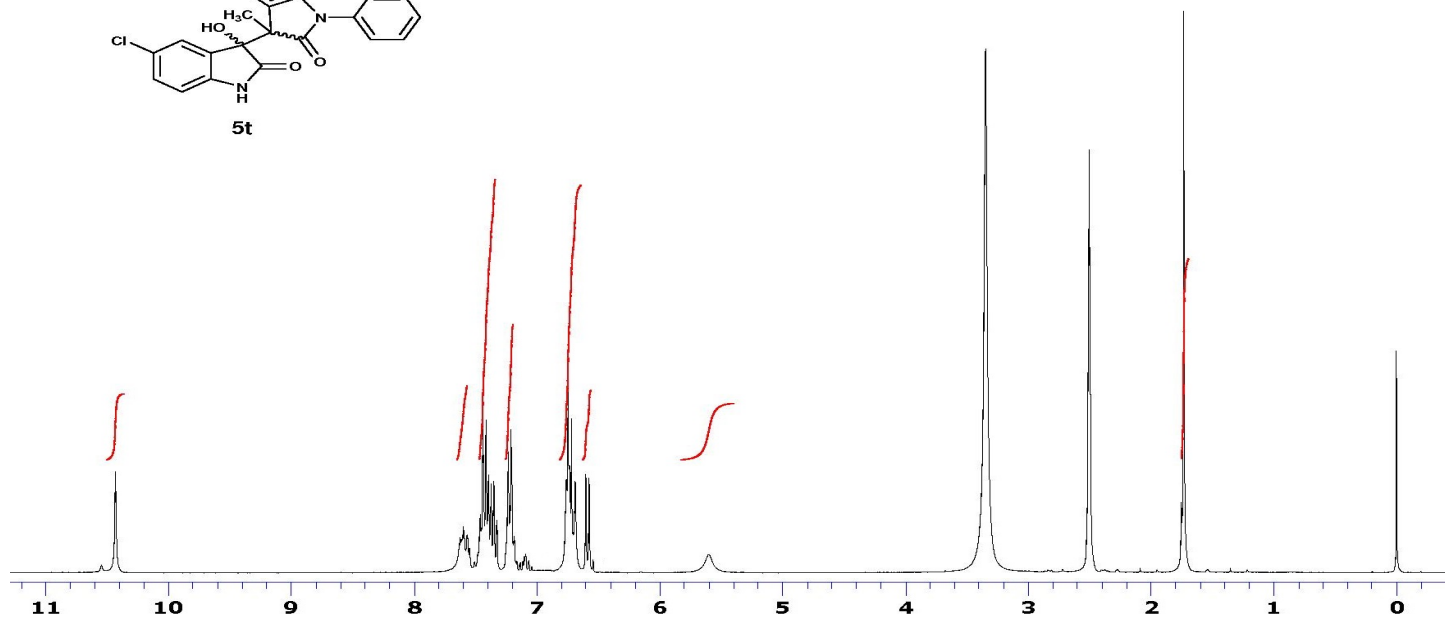
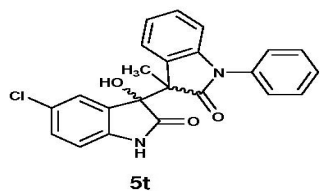


<sup>13</sup>C NMR, 75 MHz, DMSO *d*<sub>6</sub>



**5'-chloro-3'-hydroxy-3-methyl-1-phenyl-1,1',3,3'-tetrahydro-2H,2'H-3,3'-biindole-2,2'-dione (5t, dr 97:03, Table 3, entry 20)**

<sup>1</sup>H NMR, 300 MHz, DMSO *d*<sub>6</sub>



<sup>13</sup>C NMR, 75 MHz, DMSO *d*<sub>6</sub>

