Electronic Supplementary Material (ESI) for RSC Advances.

Indium chloride catalyzed three-component reaction for synthesis of 2-((oxoindolin-3-yl)-4,5,6,7-tetrahydro-1*H*-indol-1-yl)benzamides

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Supporting Information

General procedure for the three-component reactions: A mixture of benzohydrazide, 2-hydroxybenzohydrazide, or 2-picolinohydrazide (0.50 mmol), cyclic diketone (0.5 mmol), 3-phenacylideneoxindole (0.3 mmol), and indium chloride (0.2 mmol) in acetonitrile (10. 0 mL) was refluxed for eight hours. TLC monitor indicted that the reaction has finished. The solvent was removed by rotator evaporation at reduced pressure. The residue was subjected to preparative thin-layer chromatography with light petroleum and ethyl acetate (V/V = 1:1) as elute to give pure product for analysis.

N-(3-(1-benzyl-5-methyl-2-oxoindolin-3-yl)-4-oxo-2-(p-tolyl)-4,5,6,7-tetrahydro-1*H*-indol-1-yl)benzamide (1a): White solid, 80%, m.p. 202~204°C; ^{1}H NMR (600 MHz, $CDCl_3$) δ: keto-form: 10.19 (s, 1H, NH), 7.33 (d, *J* = 7.8 Hz, 2H, ArH), 7.40 (d, *J* = 7.8 Hz, 2H, ArH), 7.35-7.34 (m, 2H, ArH), 7.31 (t, *J* = 7.8 Hz, 1H, ArH), 7.26-7.24 (m, 1H, ArH), 7.20-7.14 (m, 4H, ArH), 7.01 (d, *J* = 7.2 Hz, 1H, ArH), 6.93-6.90 (m, 2H, ArH), 6.76 (d, *J* = 7.2 Hz, 1H, ArH), 6.60 (d, *J* = 7.8 Hz, 1H, ArH), 5.23 (d, *J* = 16.2 Hz, 1H, CH), 4.72 (d, *J* = 16.2 Hz, 1H, CH), 4.69 (s, 1H, CH), 2.68-2.60 (m, 3H, CH), 2.32 (s, 3H, CH_3), 2.30-2.29 (m, 1H, CH), 2.24 (s, 3H, CH_3), 2.04-2.00 (m, 1H, CH), 1.93 (s, 1H, CH); enol-form: 10.71 (s, 1H, NH), 7.60 (d, *J* = 7.8Hz, 2H, ArH), 7.31 (d, *J* = 7.8Hz, 1H, ArH), 6.54 (d, *J* = 7.2Hz, 1H, ArH), 6.47 (d, *J* = 7.8Hz, 1H, ArH), 6.04 (s, 1H, CH), 4.54 (d, *J* = 16.2Hz, 1H, CH), 4.02 (d, *J* = 16.2Hz, 1H, CH), 2.26-2.25 (m, 1H, CH), 2.28 (s, 3H, CH_3), 2.23 (s, 3H, CH_3), 2.20-2.19 (m, 1H, CH), 2.09 (s, 1H, CH); ratio of keto/enol forms = 0.65:0.35. ^{13}C NMR (150 MHz, $CDCl_3$) δ: 195.9, 193.1, 177.8, 176.8, 166.9, 166.2, 145.8, 145.0, 141.8, 139.6, 138.2, 137.4, 136.7, 136.4, 135.6, 133.2, 133.0, 132.4, 132.2, 132.0, 131.4, 131.3, 131.1, 130.2, 130.1, 129.6, 129.3, 128.7, 128.5, 128.3, 128.2, 128.0, 127.8, 127.7, 127.6, 127.5, 127.4, 127.0, 126.9, 126.3, 125.9, 125.8, 124.3, 116.6, 115.7, 108.6, 44.8, 44.7, 43.9, 43.8, 38.8, 28.0, 23.0, 22.8, 21.4, 21.3, 21.2, 21.1, 21.0, 20.9; IR (KBr) υ: 3754, 3518, 3268, 3024, 2942, 2872, 1693 1656 1497, 1369, 1271, 1186, 1100, 1025, 978, 898, 857, 812, 731 cm^{-1}; MS (*m*/*z*): HRMS (ESI) Calcd. for $C_{38}H_{33}N_3NaO_3$ ([M+Na]$^+$): 602.2414. Found: 602.2420.

N-(3-(1-benzyl-5-chloro-2-oxoindolin-3-yl)-4-oxo-2-(p-tolyl)-4,5,6,7-tetrahydro-1*H*-indol-1-yl)benzamide (1b) White solid, 69%, m.p. 195~197°C; ^{1}H NMR (600 MHz, $CDCl_3$) δ: keto-form: 9.76 (s, 1H, NH), 7.71 (d, *J* = 7.2 Hz, 2H, ArH), 7.46-7.44 (m, 1H, ArH), 7.38-7.37 (m, 2H, ArH), 7.33-7.31 (m, 5H, ArH), 7.23-7.17 (m, 4H, ArH), 7.07 (d, *J* = 8.4 Hz, 1H, ArH), 7.01-7.00 (m, 1H, ArH), 6.61 (d, *J* = 8.4 Hz, 1H, ArH), 5.26 (d, *J* = 15.6 Hz, 1H, CH), 4.71 (d, *J* = 16.2 Hz, 1H, CH), 4.67 (s, 1H, CH), 2.72-2.64 (m, 3H, CH), 2.34 (s, 3H, CH_3), 2.32-2.30 (m, 1H, CH), 2.06-1.96 (m, 2H, CH_2); enol-from: 10.30 (s, 1H, NH), 7.59 (d, *J* = 7.2 Hz, 2H, ArH), 6.45 (d, *J* = 8.4 Hz, 1H, ArH), 6.04 (s, 1H, CH), 4.69 (d, *J* = 15.6 Hz, 1H, CH), 4.03 (d, *J* = 16.2 Hz, 1H, CH), 2.32-2.30 (m, 1H, CH), 2.24 (s, 3H, CH_3); ratio of keto/enol forms = 0.74:0.26. ^{13}C NMR (150 MHz, $CDCl_3$) δ: 195.9, 193.2, 177.4, 166.9, 166.2, 145.9, 145.0, 142.8, 138.7, 136.9, 135.9, 135.1, 132.6, 132.5, 132.4, 132.3, 131.3, 131.2, 130.3, 130.2, 129.4, 128.8, 128.7, 128.6, 128.5, 128.4, 128.3, 127.9, 127.8, 127.7, 127.6, 127.5, 127.4, 127.0, 126.9, 126.8, 126.0, 125.5, 125.4, 123.8, 116.5, 115.7, 110.6, 110.5, 109.7, 44.8, 44.7, 43.9, 38.7, 37.9, 29.7, 23.0, 21.4, 21.3, 21.0, 20.9; IR (KBr) υ: 3498, 3281, 3030, 2948, 2879, 1698, 1652, 1611, 1478, 1433, 1365, 1270, 1188, 1083, 1027, 977, 892, 814, 730, 695 cm^{-1}; MS (*m*/*z*): HRMS (ESI) Calcd. for $C_{37}H_{30}ClN_3NaO_3$ ([M+Na]$^+$): 622.1868. Found: 622.1868.

N-(3-(1-benzyl-5-chloro-2-oxoindolin-3-yl)-2-(4-methoxyphenyl)-4-oxo-4,5,6,7-tetrahydro-1*H*-indol-1-yl)benzamide (1c): White solid, 75%, m.p. 250~252 °C; ^{1}H NMR (600 MHz, $CDCl_3$) δ: keto-form: 9.67 (s, 1H, NH), 7.71 (d, *J* = 7.2 Hz, 2H, ArH), 7.47-7.45 (m, 1H, ArH), 7.42-7.39

(m, 2H, ArH), 7.34-7.31 (m, 5H, ArH), 7.23-7.20 (m, 2H, ArH), 7.07 (t, *J* = 15.6 Hz, 1H, ArH), 6.99 (s, 1H, ArH), 6.90 (d, *J* = 7.2 Hz, 2H, ArH), 6.62-6.60 (m, 1H, ArH), 5.25 (d, *J* = 15.6 Hz, 1H, CH), 4.71 (d, *J* = 16.2 Hz, 1H, CH), 4.65 (s, 1H, CH), 3.78 (s, 3H, CH_3), 2.74-2.64 (m, 2H, CH_2), 2.32-2.22 (m, 2H, CH_2), 2.07-2.00 (m, 2H, CH_2); enol-form: 10.25 (s, 1H, NH), 7.60 (d, *J* = 7.2 Hz, 2H, ArH), 6.06 (s, 1H, CH), 4.69 (d, *J* = 16.2 Hz, 1H, CH), 4.17 (d, *J* = 15.6 Hz, 1H, CH), 3.68 (s, 3H, CH_3); ratio of keto/enol forms = 0.72:0.28; ^{13}C NMR (150 MHz, $CDCl_3$) δ: 195.9, 193.2, 166.9, 166.3, 160.0, 159.5, 145.8, 144.9, 142.7, 136.7, 135.9, 132.6, 132.4, 132.3, 131.8, 131.7, 131.3, 131.2, 131.1, 128.8, 128.7, 128.6, 128.5, 127.7, 127.6, 127.5, , 127.4, 127.0, 126.9, 125.3, 123.7, 121.2, 120.6, 115.6, 114.2, 114.1, 113.2, 109.7, 55.3, 55.2, 44.8, 44.7, 44.0, 38.7, 37.9, 23.0, 22.8, 21.0, 20.9; IR (KBr) υ: 3655, 3305, 3057, 2948, 2835, 1895, 1692, 1655, 1612, 1478, 1435, 1364, 1262, 1183, 1103, 1029, 975, 892, 829, 732, 691 cm^{-1}; MS (*m*/*z*): HRMS (ESI) Calcd. for $C_{37}H_{30}ClN_3NaO_4$ ([M+Na]$^+$): 638.1817. Found: 638.1809.

N-(3-(1-benzyl-5-fluoro-2-oxoindolin-3-yl)-4-oxo-2-(p-tolyl)-4,5,6,7-t etrahydro-1*H*-indol-1-yl)benzamide (1d): White solid, 70%, m.p. 270~272°C; ^{1}H NMR (600 MHz, $CDCl_3$) δ: keto-form: 10.02 (s, 1H, NH), 7.72 (d, *J* = 7.2 Hz, 2H, ArH), 7.43-7.40 (m, 1H, ArH), 7.38-7.32 (m, 5H, ArH), 7.28-7.25 (m, 1H, ArH), 7.22-7.16 (m, 4H, ArH), 6.80-6.77 (m, 3H, ArH), 6.62-6.60 (m, 1H, ArH), 5.25 (d, *J* = 15.6 Hz, 1H, CH), 4.71 (d, *J* = 16.2 Hz, 1H, CH), 4.68 (s, 1H, CH), 2.70-2.59 (m, 3H, CH), 2.33 (s, 3H, CH_3), 2.32-2.29 (m, 1H, CH), 2.04 (s 1H, CH), 1.94 (s 1H, CH); enol-form: 10.50 (s, 1H, NH), 7.60 (d, *J* = 7.2 Hz, 2H, ArH), 6.05 (s, 1H, CH), 4.59 (d, *J* = 15.6Hz, 1H, CH), 4.03 (d, *J* = 16.2 Hz, 1H, CH), 2.23 (s, 3H, CH_3); ratio of keto/enol forms = 0.71:0.29. ^{13}C NMR (150 MHz, $CDCl_3$) δ: 195.9, 193.3, 177.6, 166.8, 166.2, 159.3(d, *J* = 238.0 Hz), 146.0, 140.1, 138.7, 136.8, 136.1, 135.2, 132.5, 131.3, 131.2, 131.1, 130.3, 130.2, 129.4, 128.8, 128.7, 128.6, 128.4, 128.3, 127.6 (*J* = 8.4 Hz), 127.5, 127.1, 127.0, 127.0, 126.9, 126.0, 125.4, 115.7, 115.5, 113.8 (*J* = 23.1 Hz), 111.7, 111.6, 111.5, 110.9, 109.2 (*J* = 8.1Hz), 109.1, 100.0, 60.4, 44.9, 44.8, 44.0, 43.8, 38.7, 37.9, 29.7, 23.0, 22.8, 21.4, 21.3, 21.1, 20.0, 14.21; IR (KBr) υ: 3829, 3754, 3665, 3287, 3053, 2942, 1885, 1692, 1656, 1620, 1483, 1367, 1272, 1180, 1127, 1096, 1026, 968, 917, 868, 825, 788, 733, 690 cm^{-1}; MS (*m*/*z*): HRMS (ESI) Calcd. for $C_{37}H_{30}FN_3NaO_3$ ([M+Na]$^+$): 606.2163. Found: 606.2153.

N-(3-(1-benzyl-2-oxoindolin-3-yl)-2-(4-chlorophenyl)-4-oxo-4,5,6,7-tetrahydro-1*H*-indol-1-yl)benzamide (1e): White solid, 88%, m.p. 276~278°C; ^{1}H NMR (600 MHz, $CDCl_3$) δ: keto-form: 9.93 (s, 1H, NH), 7.71 (d, *J* = 7.2 Hz, 2H, ArH), 7.54-7.53 (m, 1H, ArH), 7.43-7.41 (m, 1H, ArH), 7.37-7.27 (m, 6H, ArH), 7.22-7.18 (m, 3H, ArH), 7.15-7.09 (m, 2H, ArH), 7.04-7.00 (m, 1H, ArH), 6.96-6.93 (m, 1H, ArH), 6.74 (d, *J* = 7.8 Hz, 1H, ArH), 5.28 (d, *J* = 16.2 Hz, 1H, CH), 4.75 (d, *J* = 15.6 Hz, 1H, CH), 4.69 (s, 1H, CH), 2.53-2.44 (m, 3H, CH), 2.22-2.13 (m, 1H, CH), 1.03 (s, 3H, CH_3), 0.96 (s, 3H, CH_3); enol-form: 10.42 (s, 1H, NH), 7.58 (d, *J* = 7.2 Hz, 2H, ArH), 6.55 (d, *J* = 7.8 Hz, 1H, ArH), 6.04 (s, 1H, CH), 4.61 (d, *J* = 16.2 Hz, 1H, CH), 4.08 (d, *J* = 15.6 Hz, 1H, CH), 1.16 (s, 3H, CH_3), 1.06 (s, 3H, CH_3); ratio of keto/enol forms = 0.6:0.4; ^{13}C NMR (150 MHz, $CDCl_3$) δ: 195.3, 192.4, 166.8, 166.0, 159.9, 145.2, 144.1, 137.0, 136.3, 135.5, 132.5, 132.3, 131.8, 131.7, 131.6, 131.3, 131.2, 130.9, 130.5, 130.4, 129.7, 129.3, 128.8, 128.7, 128.6, 128.5, 128.4, 128.0, 127.8, 127.6, 127.5, 127.4, 127.1, 127.0, 126.9, 125.0, 123.5, 123.3, 122.6, 115.5, 114.6, 114.1, 108.9, 108.8, 55.3, 55.1, 53.0, 52.0, 44.7, 44.6, 43.9, 43.6, 40.6, 40.4, 35.4, 35.3, 35.1, 35.0, 32.0, .31.9, 29.7, 29.6, 29.5, 29.4, 29.3, 27.6, 27.4, 22.7, 20.3, 20.2, 14.2, 13.8, 13.7; IR (KBr) υ: 3646, 3275, 3056, 2964, 2878, 1895, 1693, 1653, 1612, 1478, 1373, 1272, 1186, 1096,

1014, 960, 917, 846, 737, 688 cm^{-1}; MS (*m*/*z*): HRMS (ESI) Calcd. for $C_{38}H_{33}ClN_3O_3$ ($[M+H]^+$): 614.2205. Found: 614.2209.

N-(3-(1-butyl-5-methyl-2-oxoindolin-3-yl)-2-(4-methoxyphenyl)-6,6-dimethyl-4-oxo-4,5,6,7-tetrahydro-1*H*-indol-1-yl)benzamide (1f): White solid, 65%, m.p. 260~262°C; ^1H NMR (600 MHz, $CDCl_3$) δ: 10.08 (s, 1H, NH), 7.79 (d, *J* = 7.2 Hz, 2H, ArH), 7.53 (t, *J* = 7.2 Hz, 1H, ArH), 7.45-7.44 (m, 1H, ArH), 7.41 (t, *J* = 7.2 Hz, 1H, ArH), 7.33 (t, *J* = 7.2 Hz, 1H, ArH), 7.02 (t, *J* = 7.2 Hz, 1H, ArH), 6.87 (s, 1H, ArH), 6.63 (d, *J* = 8.4 Hz, 1H, ArH), 6.78 (d, *J* = 7.8 Hz, 1H, ArH), 6.54-6.53 (m, 1H, ArH), 4.50 (s, 1H, CH), 3.82-3.77 (m, 1H, CH), 3.65 (s, 3H, CH_3), 3.22-3.12 (m, 1H, CH), 2.56-2.45 (m, 3H, CH), 2.20-2.11 (m, 1H, CH), 1.71-1.67 (m, 2H, CH_2), 1.32-1.28 (m, 2H, CH_2), 1.02 (s, 3H, CH_3), 0.98 (s, 3H, CH_3), 0.88 (t, *J* = 7.2 Hz, 3H, CH_3); enol-form: 10.69 (s, 1H, NH), 7.67 (d, *J* = 7.2 Hz, 2H, ArH), 7.45-7.44 (m, 1H, ArH), 7.11 (s, 1H, ArH), 6.60 (d, *J* = 7.8 Hz, 1H, ArH), 5.86 (s, 1H, CH), 3.76 (s, 3H, OCH_3), 3.63-3.61 (m, 1H, CH), 2.32 (s, 3H, CH_3), 1.41 (s, 3H, CH_3), 1.15-1.09 (m, 2H, CH), 1.04 (s, 3H, CH_3), 0.78 (t, *J* = 7.2 Hz, 3H, CH_3); ratio of keto/enol forms = 0.54:0.46; ^{13}C NMR (150 MHz, $CDCl_3$) δ: 195.2, 192.1, 166.7, 165.9, 159.7, 1589.2, 144.7, 144.0, 142.0, 140.0, 136.6, 132.5, 132.2, 131.8, 131.6, 131.5, 131.3, 131.3, 130.0, 128.6, 128.4, 127.9, 127.8, 127.7, 127.7, 125.8, 124.1, 115.4, 114.5, 114.0, 113.0, 107.8, 107.7, 55.2, 55.0, 53.1, 52.0, 44.7, 43.7, 40.4, 40.0, 35.4, 35.0, 34.9, 29.7, 29.6, 29.5, 29.4, 27.8, 27.5, 21.2, 21.1, 20.3, 20.2, 13.8, 13.7; IR (KBr) υ: 3226, 2957, 2873, 1680, 1613, 1502, 1463, 1375, 1252, 1187, 1104, 1036, 964, 892, 845, 802, 732, 690 cm^{-1}; MS (*m*/*z*): HRMS (ESI) Calcd. for $C_{37}H_{39}N_3NaO_4$ ($[M+Na]^+$): 612.2833. Found: 612.2848.

N-(3-(1-benzyl-5-methyl-2-oxoindolin-3-yl)-2-(4-chlorophenyl)-6,6-dimethyl-4-oxo-4,5,6,7-tetrahydro-1*H*-indol-1-yl)benzamide (1g): White solid, 85%, m.p. 268~270°C; ^1H NMR (600 MHz, $CDCl_3$) δ: keto-from: 10.62 (s, 1H, NH), 7.59 (d, *J* = 7.2 Hz, 2H, ArH), 7.47-7.45 (m, 2H, ArH), 7.39 (s, 1H, ArH), 7.35-7.27 (m, 3H, ArH), 7.24-7.09 (m, 4H, ArH), 7.05 (s, 1H, ArH), 6.98-6.94 (m, 1H, ArH), 6.90-6.89 (m, 1H, ArH), 6.67-6.63 (m, 2H, ArH), 5.22 (d, *J* = 16.2 Hz, 1H, CH), 4.76 (d, *J* = 16.2 Hz, 1H, CH), 4.61 (s, 1H, CH), 2.66-2.61 (m, 1H, CH), 2.53-2.48 (m, 2H, CH_2), 2.30 (s, 3H, CH_3), 2.20-2.16 (m, 1H, CH), 1.18 (s, 3H, CH_3), 1.13 (s, 3H, CH_3); enol-form: 10.00 (s, 1H, NH), 7.73 (d, *J* = 7.2 Hz, 2H, ArH), 6.86 (s, 1H, ArH), 6.56 (d, *J* = 7.8 Hz, 1H, ArH), 6.07 (s, 1H, CH), 4.59 (d, *J* = 16.2 Hz, 1H, CH), 4.19 (d, *J* = 16.2 Hz, 1H, CH), 2.53-2.48 (m, 1H, CH), 2.24 (s, 3H, CH_3), 1.03 (s, 3H, CH_3), 0.99 (s, 3H, CH_3); ratio of keto/enol forms = 0.51:0.49; ^{13}C NMR (150 MHz, $CDCl_3$) δ: 195.2, 192.2, 166.4, 165.7, 145.2, 136.2, 135.3, 134.8, 132.7, 132.4, 131.6, 131.4, 131.0, 128.9, 128.8, 128.7, 128.6, 128.5, 128.2, 127.9, 127.7, 127.6, 127.4, 127.1, 127.0, 126.9, 126.8, 125.8, 124.0, 123.9, 115.8, 114.8, 113.7, 108.8, 108.7, 53.0, 52.0, 44.7, 44.0, 43.8, 43.7, 35.4, 35.1, 35.0, 34.9, 34.9, 30.0, 29.5, 27.6, 27.3, 21.2, 21.1; IR (KBr) υ: 3240, 3025, 2961, 2876, 1680, 1487, 1372, 1270, 1186, 1098, 1018, 896, 845, 808, 734, 700 cm^{-1}; MS (*m*/*z*): HRMS (ESI) Calcd. for $C_{39}H_{34}ClN_3NaO_3$ ($[M+Na]^+$): 650.2181. Found: 650.2181.

N-(3-(1-benzyl-5-chloro-2-oxoindolin-3-yl)-6,6-dimethyl-4-oxo-2-phenyl-4,5,6,7-tetrahydro-1*H*-indol-1-yl)benzamide (1h): White solid, 70%, m.p. 288~290°C; ^1H NMR (600 MHz, $CDCl_3$) δ: keto-form: 9.76 (s, 1H, NH), 7.71 (d, *J* = 7.2 Hz, 2H, ArH), 7.59-7.45 (m, 2H, ArH), 7.34-7.33 (m, 7H, ArH), 7.24-7.15 (m, 2H, ArH), 7.09-6.99 (m, 3H, ArH), 6.70 (s, 1H, ArH), 6.63 (d, *J* = 7.8 Hz, 1H, ArH), 5.23 (d, *J* = 15.0 Hz, 1H, CH), 4.72 (d, *J* = 15.6 Hz, 1H, CH), 4.65 (s, 1H, CH), 2.54-2.45 (m, 3H, CH), 2.19 (s, 1H, CH), 1.03 (s, 3H, CH_3), 1.02 (s, 3H, CH_3); enol-form: 10.23 (s, 1H, NH), 7.58 (d, *J* = 7.2 Hz, 2H, ArH), 6.45 (d, *J* = 7.8 Hz, 1H, ArH), 6.01 (s, 1H, CH), 4.61 (d, *J* = 15.6 Hz, 1H, CH), 4.04 (d, *J* = 15.6 Hz, 1H, CH), 1.16 (s, 3H, CH_3), 1.09 (s, 3H, CH_3);

ratio of keto/enol forms = 0.70:0.30; ^{13}C NMR (150 MHz, $CDCl_3$) δ: 192.6, 177.3, 166.7, 166.1, 145.2, 142.8, 137.0, 135.9, 135.1, 132.8, 132.7, 132.5, 131.3, 131.2, 131.1, 130.5, 130.3, 129.1, 129.0, 128.9, 128.7, 128.6, 128.5, 128.4, 127.9, 127.8, 127.7, 127.6, 127.5, 127.4, 127.2, 127.1, 127.0, 125.3, 123.6, 115.5, 114.7, 109.8, 109.7, 100.0, 52.9, 51.9, 44.7, 44.6, 43.9, 43.5, 35.4, 35.1, 35.0, 29.7, 29.4, 29.2, 28.0, 27.9; IR (KBr) υ: 3658, 3272, 3040, 2956, 2877, 1695, 1672, 1609, 1526, 1481, 1438, 1372, 1265, 1174, 1075, 1028, 899, 808, 765, 701 cm^{-1}; MS (*m*/*z*): HRMS (ESI) Calcd. for $C_{38}H_{32}ClN_3NaO_3$ ([M+Na]$^+$): 636.2024. Found: 636.2047.

N-(3-(1-benzyl-5-chloro-2-oxoindolin-3-yl)-6,6-dimethyl-4-oxo-2-(p-tolyl)-4,5,6,7-tetrahydro-1*H*-indol-1-yl)benzamide (1i): White solid, 72%, m.p. 278~280°C; ^{1}H NMR (600 MHz, $CDCl_3$) δ: keto-form: 9.29 (s, 1H, NH), 7.74 (d, *J* = 7.2Hz, 2H, ArH), 7.51-7.50 (m, 1H, ArH), 7.41-7.40 (m, 2H, ArH), 7.34-7.31 (m, 5H, ArH), 7.24 (s, 1H, ArH), 7.20-7.17 (m, 2H, ArH), 7.08-7.06 (m, 2H, ArH), 6.96 (s, 1H, ArH), 6.62-6.60 (m, 1H, ArH), 5.29 (d, *J* = 16.2Hz, 1H, CH), 4.72 (d, *J* = 16.2Hz, 1H, CH), 4.65 (s, 1H, CH), 2.26-2.49 (m, 3H, CH), 2.34 (s, 3H, CH_3), 2.19 (s, 1H, CH), 1.04 (s, 3H, CH_3), 1.03 (s, 3H, CH_3); enol-form: 9.93 (s, 1H, NH), 7.61 (d, *J* = 7.2 Hz, 2H, ArH), 6.80 (s, 1H, ArH), 6.00 (s, 1H, CH), 4.64 (d, *J* = 13.8 Hz, 1H, CH), 4.07 (d, *J* = 14.4 Hz, 1H, CH), 2.24 (s, 3H, CH_3), 1.18 (s, 3H, CH_3), 1.10 (s, 3H, CH_3); ratio of keto/enol forms = 0.77:0.23; ^{13}C NMR (150 MHz, $CDCl_3$) δ: 192.5, 166.6, 144.9, 142.8, 138.7, 136.9, 136.0, 132.7, 132.2, 131.3, 131.2, 130.3, 130.1, 129.5, 128.8, 128.7, 128.6, 128.5, 128.4, 127.7, 127.6, 127.5, 127.4, 127.1, 127.0, 126.9, 125.4, 123.5, 114.7, 109.6, 52.9, 52.0, 44.7, 44.5, 43.9, 35.3, 35.1, 35.0, 29.4, 29.1, 28.1, 28.0, 21.3; IR (KBr) υ: 3487, 3251, 3032, 2957, 2869, 1704, 1661, 1613, 1530, 1477, 1435, 1374, 1338, 1274, 1162, 1102, 1082, 1030, 903, 817, 699 cm^{-1}; MS (*m*/*z*): HRMS (ESI) Calcd. for $C_{39}H_{34}ClN_3NaO_3$ ([M+Na]$^+$): 650.2181. Found: 650.2173.

N-(3-(1-benzyl-5-chloro-2-oxoindolin-3-yl)-2-(4-methoxyphenyl)-6,6-dimethyl-4-oxo-4,5,6,7-tetrahydro-1*H*-indol-1-yl)benzamide (1j): White solid, 83%, m.p. 220~222°C; ^{1}H NMR (600 MHz, $CDCl_3$) δ: keto-form: 9.43 (s, 1H, NH), 7.74-7.73 (m, 2H, ArH), 7.50-7.49 (m, 1H, ArH), 7.44-7.43 (m, 2H, ArH), 7.34-7.27 (m, 5H, ArH), 7.24-7.20 (m, 2H, ArH), 7.08-7.02 (m, 2H, ArH), 7.00 (s, 1H, ArH), 6.89-6.87 (m, 1H, ArH), 6.63-6.62 (m, 1H, ArH), 5.27 (d, *J* = 16.8 Hz, 1H, CH), 4.73 (d, *J* = 16.2 Hz, 1H, CH), 4.63 (s, 1H, CH), 3.78 (s, 3H, CH_3), 2.56-2.48 (m, 3H, CH), 2.19 (s, 1H, CH), 1.04 (s, 3H, CH_3), 1.03 (s, 3H, CH_3); enol-form：9.98 (s, 1H, NH), 7.62-7.61 (m, 2H, ArH), 6.01 (s, 1H, CH), 4.64 (d, *J* = 16.2 Hz, 1H, CH), 4.19 (d, *J* = 16.2 Hz, 1H, CH), 3.68 (s, 3H, OCH_3), 1.17 (s, 3H, CH_3), 1.07 (s, 3H, CH_3); ratio of keto/enol forms = 0.75:0.25; ^{13}C NMR (150 MHz, $CDCl_3$) δ: 192.4, 160.0, 144.8, 142.8, 136.8, 136.0, 132.7, 131.8, 131.7, 131.4, 131.2, 131.1, 128.8, 128.7, 128.6, 127.7, 127.6, 127.5, 127.4, 127.1, 127.0, 125.2, 123.5, 121.2, 120.6, 114.6, 114.2, 113.2, 109.7, 109.6, 55.3, 55.2, 52.9, 52.0, 44.7, 44.6, 44.0, 35.4, 35.1, 35.0, 29.4, 29.3, 29.2, 29.1, 28.1, 28.0; IR (KBr) υ: 3660, 3293, 3016, 2959, 2884, 2836, 1716, 1664, 1610, 1493, 1473, 1370, 1330, 1284, 1252, 1176, 1104, 1079, 1032, 895, 819, 733, 700 cm^{-1}; MS (*m*/*z*): HRMS (ESI) Calcd. for $C_{39}H_{34}ClN_3NaO_4$ ([M+Na]$^+$): 666.2130. Found: 666.2144.

N-(3-(1-butyl-5-chloro-2-oxoindolin-3-yl)-2-(4-methoxyphenyl)-6,6-dimethyl-4-oxo-4,5,6,7-tetrahydro-1*H*-indol-1-yl)benzamide (1k): White solid, 80%, m.p. 210~212°C; ^{1}H NMR (600 MHz, $CDCl_3$) δ: keto-form: 9.49 (s, 1H, NH), 7.76 (d, *J* = 7.2 Hz, 2H, ArH), 7.56 (t, *J* = 7.2 Hz, 1H, ArH), 7.45-7.42 (m, 3H, ArH), 7.35 (t, *J* = 7.2 Hz, 1H, ArH), 7.19-7.17 (m, 1H, ArH), 6.95 (s, 1H, ArH), 6.86 (d, *J* = 8.4 Hz, 1H, ArH), 6.79 (d, *J* = 8.4 Hz, 1H, ArH), 6.59 (d, *J* = 7.8 Hz, 1H, ArH), 4.49 (s, 1H, CH), 3.84-3.79 (m, 1H, CH), 3.77 (s, 3H, CH_3), 3.25-3.13 (m, 1H, CH), 2.56-2.55 (m, 2H, CH_2), 2.48-2.47 (m, 1H, CH), 2.15 (s, 1H, CH), 1.93 (s, 2H, CH_2), 1.72-1.67 (m, 1H,

CH), 1.33-1.32 (m, 1H, CH), 1.04 (s, 3H, CH_3), 1.01 (s, 3H, CH_3), 0.91 (t, *J* = 7.2 Hz, 3H, CH_3); enol-form: 10.08 (s, 1H, NH), 7.64 (d, *J* = 7.2 Hz, 2H, ArH), 7.48 (t, *J* = 7.2 Hz, 1H, ArH), 7.21 (s, 1H, ArH), 6.86 (d, *J* = 8.4 Hz, 1H, ArH), 6.49 (d, *J* = 7.8 Hz, 1H, ArH), 5.85 (s, 1H, CH), 3.66 (s, 3H, OCH_3), 1.16 (s, 3H, CH_3), 1.08 (s, 3H, CH_3), 0.81 (t, *J* = 6.6 Hz, 3H, CH_3); ratio of keto/enol forms = 0.65:0.35; ^{13}C NMR (150 MHz, $CDCl_3$) δ: 195.2, 192.4, 166.8, 159.9, 144.8, 143.0, 136.8, 136.3, 132.6, 132.4, 131.8, 131.6, 131.5, 131.3, 131.2, 130.5, 130.4, 128.8, 128.37, 128.7, 128.6, 128.5, 128.4, 127.6, 127.5, 127.4, 127.1, 1269.9, 125.4, 123.5, 121.3, 120.7, 115.3, 114.5, 114.2, 113.1, 108.8, 108.7, 55.3, 55.1, 53.0, 52.9, 52.0, 51.9, 44.7, 44.5, 40.6, 40.1, 35.4, 35.3, 35.1, 35.0, 34.9, 29.7, 29.5, 29.4, 29.3, 27.9, 27.8; IR (KBr) υ: 3752, 3655, 3527, 3248, 2960, 2873, 1691, 1651, 1620, 1474, 1431, 1365, 1258, 1180, 1104, 1035, 983, 917, 843, 810, 762, 695 cm^{-1}; MS (*m*/*z*): HRMS (ESI) Calcd. for $C_{36}H_{36}ClN_3NaO_4$ ([M+Na]$^+$): 632.2287. Found: 632.2294.

N-(3-(1-benzyl-5-fluoro-2-oxoindolin-3-yl)-6,6-dimethyl-4-oxo-2-(p-tolyl)-4,5,6,7-tetrahydro-1*H*-indol-1-yl)benzamide (1l): White solid, 75%, m.p. 270~272°C; ^{1}H NMR (600 MHz, $CDCl_3$) δ: keto-from: 9.78 (s, 1H, NH), 7.74 (d, *J* = 7.2 Hz, 2H, ArH), 7.48-7.43 (m, 1H, ArH), 7.40-7.38 (m, 2H, ArH), 7.34-7.31 (m, 4H, ArH), 7.24-7.20 (m, 2H, ArH), 7.16-7.14 (m, 2H, ArH), 7.04-7.02 (m, 1H, ArH), 6.82-6.79 (m, 2H, ArH), 6.62-6.61 (m, 1H, ArH), 5.26 (d, *J* = 16.2 Hz, 1H, CH), 4.72 (d, *J* = 16.2 Hz, 1H, CH), 4.66 (s, 1H, CH), 2.53-2.47 (m, 3H, CH), 2.22-2.15 (m, 1H, CH), 2.33 (s, 3H, CH_3), 1.02 (s, 3H, CH_3), 1.00 (s, 3H, CH_3); enol-form: 10.36 (s, 1H, NH), 7.61 (d, *J* = 7.2 Hz, 2H, ArH), 6.57-6.56 (m, 1H, ArH), 6.48-6.47 (m, 1H, ArH), 6.01 (s, 1H, CH), 4.64 (d, *J* = 16.2 Hz, 1H, CH), 4.06 (d, *J* = 16.2 Hz, 1H, CH), 2.24 (s, 3H, CH_3), 2.22-2.15 (m, 1H, CH), 1.16 (s, 3H, CH_3), 1.08 (s, 3H, CH_3); ratio of keto/enol forms = 0.70:0.30; ^{13}C NMR (150 MHz, $CDCl_3$) δ: 195.2, 192.4, 166.7, 166.0, 145.0, 140.1, 138.6, 137.0 ,136.1, 135.3, 132.6, 132.3, 131.5, 131.4, 131.3, 131.2, 130.3, 130.1, 129.4, 128.8, 128.7, 128.6, 128.5, 128.3, 127.7, 127.6, 127.5, 127.1, 127.0, 126.2, 125.5, 115.4 114.6, 113.9 (*J* = 23.2Hz), 113.8 (*J* = 23.1Hz), 111.4, 111.3, 109.3 (*J* = 7.7 Hz), 109.1 (*J* = 8.1 Hz), 53.0, 52.0, 44.9, 44.8, 44.0, 43.9, 35.4, 35.1, 35.0, 29.7, 29.4, 27.7, 27.6, 21.4, 21.3; IR (KBr) υ: 3652, 3287, 3030, 2961, 2877, 1695, 1652, 1484, 1368, 1273, 1179, 1097, 1027, 938, 887, 819, 788, 692 cm^{-1}; MS (*m*/*z*): HRMS (ESI) Calcd. for $C_{39}H_{34}FN_3NaO_3$ ([M+Na]$^+$): 634.2476. Found: 634.2491.

N-(3-(1-butyl-5-fluoro-2-oxoindolin-3-yl)-2-(4-methoxyphenyl)-6,6-dimethyl-4-oxo-4,5,6,7-tetrahydro-1*H*-indol-1-yl)benzamide (1m): White solid, 73%, m.p. 260~262°C; ^{1}H NMR (600 MHz, $CDCl_3$) δ: keto-form: 9.76 (s, 1H, NH), 7.77 (d, *J* = 7.2 Hz, 2H, ArH), 7.56 (t, *J* = 7.2 Hz, 1H, ArH), 7.44-7.42 (m, 3H, ArH), 6.91 (t, *J* = 8.4 Hz, 1H, ArH), 6.85 (d, *J* = 8.4 Hz, 1H, ArH), 6.79-6.78 (m, 1H, ArH), 6.76 (d, *J* = 7.8 Hz, 1H, ArH), 6.55-6.54 (m, 1H, ArH), 6.48-6.47 (m, 1H, ArH), 4.50 (s, 1H, CH), 3.83-3.79 (m, 1H, CH), 3.77 (s, 3H, CH_3), 3.32-3.13 (m, 1H, CH), 2.53-2.46 (m, 3H, CH), 2.17-2.11 (m, 1H, CH), 1.71-1.68 (m, 2H, CH_2), 1.36-1.28 (m, 2H, CH_2), 1.02 (s, 3H, CH_3), 1.00 (s, 3H, CH_3), 0.90 (t, *J* = 7.2 Hz, 3H, CH_3); enol-form: 10.41 (s, 1H, NH), 7.66 (d, *J* = 7.2 Hz, 2H, ArH), 7.47 (t, *J* = 7.2 Hz, 1H, ArH), 7.35 (t, *J* = 7.2 Hz, 2H, ArH), 7.02 (d, *J* = 6.6 Hz, 1H, ArH), 6.62-6.60 (m, 1H, ArH), 5.86 (s, 1H, CH), 3.65 (s, 3H, OCH_3), 3.64-3.62 (m, 1H, CH), 1.71-1.68 (m, 2H, CH), 1.15 (s, 3H, CH_3), 1.08 (s, 3H, CH_3), 0.81 (t, *J* = 6.6 Hz, 3H, CH_3); ratio of keto/enol forms = 0.63:0.37; ^{13}C NMR (150 MHz, $CDCl_3$) δ: 195.2, 192.2, 166.8, 166.0, 159.9, 159.4, 144.8, 140.3, 136.7, 132.6, 132.4, 131.8, 131.6, 131.5, 131.4, 131.2, 128.7, 128.5, 127.7, 127.6, 124.0, 123.4, 121.63, 120.7, 115.3, 114.5, 114.1, 113.7 (*J* = 23.4 Hz), 113.0, 111.3 (*J* = 24.6 Hz), 108.4 (*J* = 7.7 Hz), 108.2 (*J* = 8.1 Hz), 55.2, 55.1, 53.0, 52.0, 45.8, 44.8, 43.8, 40.1, 35.4, 35.1, 35.0, 29.7, 29.6, 29.5, 29.3, 27.7, 27.6, 20.3, 20.2, 13.8, 13.7; IR (KBr) υ:

3281, 3042, 2961, 2872, 1908, 1831, 1689, 1658, 1615, 1576, 1491, 1458, 1366, 1277, 1257, 1182, 1130, 1098, 1029, 941, 887, 844, 801, 700 cm^{-1}; MS (*m*/*z*): HRMS (ESI) Calcd. for $C_{36}H_{36}FN_3NaO_4$ ($[M+Na]^+$): 616.2582. Found: 616.2592.

N-(3-(1-benzyl-5-fluoro-2-oxoindolin-3-yl)-2-(4-chlorophenyl)-6,6-dimethyl-4-oxo-4,5,6,7-tetrahydro-1*H*-indol-1-yl)benzamide (1n): White solid, 83%, m.p. 290~292°C; ^1H NMR (600 MHz, $CDCl_3$) δ: keto-form: 9.75 (s, 1H, NH), 7.74 (d, *J* = 7.8 Hz, 2H, ArH), 7.48-7.41 (m, 2H, ArH), 7.34-7.32 (m, 4H, ArH), 7.29-7.27 (m, 2H, ArH), 7.20 (s, 1H, ArH), 7.05-7.04 (m, 1H, ArH), 6.91 (s, 1H, ArH), 6.87-6.80 (m, 1H, ArH), 6.76-6.75 (m, 1H, ArH), 6.65-6.63 (m, 2H, ArH), 5.24 (d, *J* = 15.6 Hz, 1H, CH), 4.75 (d, *J* = 16.2 Hz, 1H, CH), 4.60 (s, 1H, CH), 2.52 (s, 1H, CH), 2.51-2.48 (m, 2H, CH), 2.19 (s, 1H, CH), 1.03 (s, 3H, CH_3), 1.01 (s, 3H, CH_3); enol-form: 10.40 (s, 1H, NH), 7.59 (d, *J* = 7.8 Hz, 2H, ArH), 6.56-6.54 (m, 1H, ArH), 6.08 (s, 1H, CH), 4.64 (d, *J* = 15.6 Hz, 1H, CH), 4.20 (d, *J* = 16.2 Hz, 1H, CH), 1.18 (s, 3H, CH_3), 1.14 (s, 3H, CH_3); ratio of keto/enol forms = 0.57:0.43; ^{13}C NMR (150 MHz, $CDCl_3$) δ: 195.3, 192.3, 166.6, 165.8, 145.4, 140.0, 135.8, 135.7, 134.9 (*J* = 25.4Hz), 134.1, 132.6 (*J* = 23.7 Hz), 131.6, 131.4, 131.1, 131.0, 130.9, 130.8, 129.0, 128.9, 128.8, 128.5, 127.9, 127.7, 127.6, 127.5, 27.4 ,127.2, 127.0, 126.9, 126.8, 115.6, 114.7, 114.6, 114.2 (*J* = 24.9 Hz), 114.0 (*J* = 23.7 Hz), 111.3, 111.2, 111.1, 109.6 (*J* = 7.2 Hz), 109.4 (*J* = 8.4 Hz), 100.0, 52.9, 51.9, 44.9, 44.8, 44.1, 43.9, 35.5, 35.1, 34.9, 29.9, 29.4, 27.6, 27.3; IR (KBr) υ: 3659, 3279, 3033, 2964, 2879, 1695, 1654, 1617, 1573, 1485, 1370, 1273, 1179, 1097, 1020, 938, 885, 824, 789, 726, 692 cm^{-1}; MS (*m*/*z*): HRMS (ESI) Calcd. for $C_{38}H_{32}ClFN_3O_3$ ($[M+H]^+$): 632.2111. Found: 632.2111.

N-(3-(1-benzyl-5-chloro-2-oxoindolin-3-yl)-4-oxo-2-(p-tolyl)-4,5,6,7-tetrahydro-1*H*-indol-1-yl)-2-hydroxybenzamide (2a): White solid, 65%, m.p. 260~262°C; ^1H NMR (600 MHz, DMSO-d_6) δ: keto-form: 11.43 (brs, 1H, NH), 11.21 (s, 1H, OH), 7.72-7.70 (m, 1H, ArH), 7.45-7.42 (m, 5H, ArH), 7.32 (t, *J* = 7.2 Hz, 2H, ArH), 7.29-7.24 (m, 3H, ArH), 7.20-7.19 (m, 1H, ArH), 6.97 (d, *J* = 8.4 Hz, 1H, ArH), 6.94-6.91 (m, 1H, ArH), 6.86-6.82 (m, 1H, ArH), 6.77-6.76 (m, 1H, ArH), 5.11-5.08 (m, 1H, CH), 4.75 (d, *J* = 16.2 Hz, 1H, CH), 4.66 (s, 1H, CH), 2.80-2.77 (m, 1H, CH), 2.69-2.62 (m, 1H, CH), 2.30 (s, 3H, CH_3), 2.28-2.17 (m, 2H, CH_2), 2.01 (s, 2H, CH_2); enol-form: 11.55 (brs, 1H, NH), 7.62-7.57 (m, 1H, ArH), 7.40-7.37 (m, 1H, ArH), 6.86-6.82 (m, 1H, ArH), 6.63-6.57 (m, 1H, ArH), 5.85 (s, 1H, CH), 4.56 (d, *J* = 16.2 Hz, 1H, CH), 4.39-4.31 (m, 1H, CH), 2.28-2.17 (m, 1H, CH), 2.08 (s, 3H, CH_3); ratio of keto/enol form = 0.79:0.21; ^{13}C NMR (150 MHz, DMSO-d_6) δ: 190.7, 174.4, 165.4, 156.5, 144.2, 144.1, 142.2, 140.3, 136.8, 135.4, 134.8, 133.0, 132.9, 130.6, 128.6, 128.1, 127.4, 127.3, 126.2, 126.1, 126.0, 125.9, 124.8, 124.4, 124.3, 121.3, 118.1, 118.0, 115.9, 115.8, 114.7, 114.6, 113.8, 109.1, 109.1, 109.0, 42.7, 42.4, 36.4, 21.6, 21.5, 19.7, 19.6, 19.4; IR (KBr) υ: 3655, 3263, 3037, 2924, 1933, 1810, 1696, 1654, 1597, 1520, 1481, 1438, 1363, 1255, 1205, 1168, 1111, 1072, 1028, 974, 905, 868, 818, 757, 693 cm^{-1}; MS (*m*/*z*): HRMS (ESI) Calcd. for $C_{37}H_{31}ClN_3O_4$ ($[M+H]^+$): 616.1998. Found: 616.1981.

N-(3-(1-benzyl-5-chloro-2-oxoindolin-3-yl)-2-(4-methoxyphenyl)-4-oxo-4,5,6,7-tetrahydro-1*H*-indol-1-yl)-2-hydroxybenzamide (2b): White solid, 78%, m.p. 268~270°C; ^1H NMR (600 MHz, DMSO-d_6) δ: keto-form: 11.39 (brs, 1H, NH), 11.17 (brs, 1H, OH), 7.70 (brs, 1H, ArH), 7.48-7.44 (m, 4H, ArH), 7.33-7.24 (m, 3H, ArH), 7.21-7.18 (m, 1H, ArH), 7.02 (d, *J* = 8.4 Hz, 2H, ArH), 6.97 (d, *J* = 8.4 Hz, 1H, ArH), 6.94-6.90 (m, 1H, ArH), 6.88-6.85 (m, 1H, ArH), 6.76 (d, *J* = 7.8 Hz, 1H, ArH), 6.64-6.56 (m, 1H, ArH), 5.09 (d, *J* = 16.2 Hz, 1H, CH), 4.75 (d, *J* = 16.2 Hz, 1H, CH), 4.62 (s, 1H, CH), 3.74 (s, 3H, CH_3), 2.76-2.55 (m, 2H, CH_2), 2.23-2.15 (m, 2H, CH_2),

2.00 (s, 2H, CH_2); enol-form: 11.52 (brs, 1H, NH), 7.58 (brs, 1H, ArH), 7.38 (t, *J* = 7.2 Hz, 1H, ArH), 5.84 (s, 1H, CH), 4.57 (d, *J* = 15.6 Hz, 1H, CH), 4.46-4.43 (m, 1H, CH), 3.64 (s, 3H, CH_3), 2.23-2.15 (m, 1H, CH); ratio of keto/enol form = 0.78:0.22; ^{13}C NMR (150 MHz, DMSO-d_6) δ: 191.9, 175.6, 166.6, 159.4, 157.7, 145.1, 144.0, 143.3, 141.4, 136.5, 136.0, 135.8, 134.1, 134.0, 131.7, 131.2, 130.8, 128.5, 128.4, 127.4, 127.3, 127.2, 127.1, 127.0, 125.4, 122.4, 120.9, 120.5, 119.2, 119.1, 117.0, 116.9, 115.9, 115.7, 114.9, 114.1, 110.1, 110.0, 109.7, 56.0, 55.1, 55.0, 43.8, 43.5, 43.0, 37.5, 22.8, 20.7, 20.6, 18.6; IR (KBr) υ: 3666, 3270, 3052, 2954, 2834, 1894, 1691, 1658, 1609, 1501, 1437, 1365, 1302, 1248, 1215, 1174, 1112, 1035, 975, 893, 829, 740, 691 cm^{-1}; MS (*m*/*z*): HRMS (ESI) Calcd. for $C_{37}H_{30}ClN_3NaO_5$ ([M+Na]$^+$): 654.1766. Found: 654.1753.

N-(3-(1-benzyl-5-fluoro-2-oxoindolin-3-yl)-4-oxo-2-(p-tolyl)-4,5,6,7-tetrahydro-1*H*-indol-1-yl)-2-hydroxybenzamide (2c): White solid, 70%, m.p. 288~290°C; ^{1}H NMR (600 MHz, DMSO-d_6) δ: 11.50 (brs, 1H, NH), 11.19 (s, 1H, OH), 7.69 (brs, 1H, ArH), 7.45-7.41 (m, 4H, ArH), 7.33-7.21 (m, 5H, ArH), 6.97-6.90 (m, 3H, ArH), 6.81 (brs, 1H, ArH), 6.73-6.71 (m, 2H, ArH), 5.10 (d, *J* = 16.2 Hz, 1H, CH), 4.73 (d, *J* = 16.2 Hz, 1H, CH), 4.61 (s, 1H, CH), 2.76-2.62 (m, 2H, CH_2), 2.30 (s, 3H, CH_3), 2.23 (brs, 2H, CH_2), 2.01 (s, 2H, CH_2); enol-form: 7.58 (brs, 1H, ArH), 7.40-7.37 (m, 1H, ArH), 6.87 (t, *J* = 7.8 Hz, 1H, ArH), 6.60 (brs, 1H, ArH), 5.84 (s, 1H, CH), 4.57 (d, *J* = 15.6 Hz, 1H, CH), 4.36 (brs, 1H, CH), 2.76-2.62 (m, 1H, CH), 2.15 (s, 3H, CH_3), 2.15 (brs, 1H, CH); ratio of keto/enol form = 0.76:0.24; ^{13}C NMR (150 MHz, DMSO-d_6) δ: 191.8, 175.7, 166.6, 158.4 (*J* = 194.0 Hz), 158.1 (*J* = 235.5 Hz), 157.7, 140.6, 138.8, 138.0, 136.6, 135.9, 134.1, 134.0, 131.4, 129.7, 129.2, 128.5, 128.4, 127.4, 127.3, 127.1, 125.9, 125.5, 119.2, 119.1, 117.0, 169.8, 115.8, 115.0, 113.2 (*J* = 22.5 Hz), 110.4 (*J* = 24.2 Hz), 109.4 (*J* = 6.8 Hz), 108.9 (*J* = 7.8 Hz), 56.0, 44.1, 43.6, 40.0, 37.6, 22.8, 22.6, 20.8, 20.7, 20.6, 18.5; IR (KBr) υ: 3282, 3038, 1689, 1658, 1613, 1488, 1462, 1370, 1342, 1305, 1265, 1209, 1175, 1068, 1031, 970, 871, 824, 787, 736, 694 cm^{-1}; MS (*m*/*z*): HRMS (ESI) Calcd. for $C_{37}H_{31}FN_3O_4$ ([M+H]$^+$): 600.2293. Found: 600.2286.

N-(3-(1-butyl-5-fluoro-2-oxoindolin-3-yl)-2-(4-methoxyphenyl)-4-oxo-4,5,6,7-tetrahydro-1*H*-indol-1-yl)-2-hydroxybenzamide (2d): White solid, 80%, m.p. 258~260°C; ^{1}H NMR (600 MHz, DMSO-d_6) δ: keto-form: 11.50 (brs, 1H, NH), 11.19 (s, 1H, OH), 7.68 (brs, 1H, ArH), 7.45 (d, *J* = 8.0 Hz, 1H, ArH), 7.43 (t, *J* = 7.2 Hz, 1H, ArH), 7.06-7.03 (m, 1H, ArH), 7.01-6.96 (m, 3H, ArH), 6.93-6.89 (m, 1H, ArH), 6.87-6.82 (m, 1H, ArH), 6.66-6.56 (m, 2H, ArH), 4.38 (s, 1H, CH), 3.72 (s, 3H, CH_3), 2.76-2.61 (m, 2H, CH_2), 2.17-2.15 (m, 2H, CH_2), 1.98 (brs, 2H, CH_2), 1.64-1.62 (m, 2H, CH_2), 1.38-1.36 (m, 2H, CH_2), 1.26-1.09 (m, 2H, CH), 0.91 (t, *J* = 7.2 Hz, 3H, CH_3); enol-form: 7.56 (brs, 1H, ArH), 7.38 (t, *J* = 7.2 Hz, 1H, ArH), 5.67 (s, 1H, CH), 3.72-3.69 (m, 2H, CH_2), 3.63 (s, 3H, CH_3), 3.62-3.59 (m, 2H, CH_2), 3.28-3.25 (m, 2H, CH_2), 0.83 (t, *J* = 7.2 Hz, 3H, CH_3); ratio of keto/enol form = 0.68:0.32; ^{13}C NMR (150 MHz, DMSO-d_6) δ: 195.0, 191.7, 175.4, 158.5 (*J* = 255.9 Hz), 157.9 (*J* = 234.8 Hz), 144.9, 144.0, 140.7, 139.0, 135.7, 134.1, 134.0, 131.2, 130.1, 120.9, 120.5, 119.2, 117.0, 116.9, 115.8 (*J* = 20.2 Hz), 114.9, 114.0, 113.3 (*J* = 23.0 Hz), 112.9, 112.8, 110.4, 110.2 (*J* = 8.0 Hz), 108.4 (*J* = 7.8 Hz), 99.5, 56.1, 55.1, 54.9, 44.0, 39.8, 38.2, 37.5, 29.1, 28.8, 22.7, 22.6, 20.7, 20.5, 19.6, 19.5, 13.7, 13.5; IR (KBr) υ: 3742, 3245, 3043, 2950, 2873, 1689, 1656, 1613, 1492, 1459, 1367, 1346, 1302, 1247, 1179, 1135, 1071, 1028, 981, 911, 870, 834, 751, 690 cm^{-1}; MS (*m*/*z*): HRMS (ESI) Calcd. for $C_{34}H_{32}FN_3NaO_5$ ([M+Na]$^+$): 604.2218. Found: 604.2209.

N-(3-(1-benzyl-5-chloro-2-oxoindolin-3-yl)-6,6-dimethyl-4-oxo-2-(p-tolyl)-4,5,6,7-tetrahydro-1*H*-indol-1-yl)-2-hydroxybenzamide (2e): White solid, 72%, m.p. 180~182°C; ^{1}H NMR (600 MHz, DMSO-d_6) δ: keto-form: 11.43 (brs, 1H, NH), 11.22 (s, 1H, OH), 7.71 (brs, 1H, ArH), 7.45-

7.43 (m, 4H, ArH), 7.32 (t, *J* = 7.2 Hz, 2H, ArH), 7.29-7.24 (m, 3H, ArH), 7.21-7.17 (m, 1H, ArH), 6.97 (d, *J* = 8.4 Hz, 1H, ArH), 6.93 (d, *J* = 7.2 Hz, 1H, ArH), 6.88-6.81 (m, 2H, ArH), 6.76 (d, *J* = 7.8 Hz, 1H, ArH), 5.10 (d, *J* = 15.6 Hz, 1H, CH), 4.75 (d, *J* = 16.2 Hz, 1H, CH), 4.66 (s, 1H, CH), 2.66-2.54 (m, 2H, CH_2), 2.30 (s, 3H, CH_3), 2.19 (brs, 1H, CH), 2.10-2.08 (m, 1H, CH), 1.03 (s, 3H, CH_3), 0.99 (s, 3H, CH_3); enol-form: 11.54 (brs, 1H, NH), 7.61 (brs, 1H, ArH), 7.39 (t, *J* = 7.2 Hz, 1H, ArH), 6.65-6.57 (m, 2H, ArH), 5.81 (s, 1H, CH), 4.56 (d, *J* = 15.6 Hz, 1H, CH), 4.35 (brs, 1H, CH), 2.41-2.37 (m, 2H, CH_2), 2.19(s, 3H, CH_3), 1.16 (s, 3H, CH_3), 1.15 (s, 3H, CH_3); ratio of keto/enol forms = 0.79:0.21; ^{13}C NMR (150 MHz, DMSO-d_6) δ: 192.5, 166.6, 144.9, 142.8, 138.7, 136.9, 136.0, 132.7, 132.2, 131.3, 131.2, 130.3, 130.1, 129.5, 128.8, 128.7, 128.6, 128.5, 128.4, 127.7, 127.6, 127.5, 127.4, 127.1, 127.0, 126.9, 125.4, 123.5, 114.7, 109.6, 52.9, 52.0, 44.7, 44.5, 43.9, 35.3, 35.1, 35.0, 29.4, 29.1, 28.1, 28.0, 21.3, 21.3, 19.5, 14.2; IR (KBr) υ: 3487, 3251, 3032, 2957, 2869, 1704, 1661, 1613, 1530, 1477, 1435, 1374, 1338, 1274, 1162, 1102, 1082, 1030, 903, 817, 699 cm^{-1}; MS (*m*/*z*): HRMS (ESI) Calcd. for $C_{39}H_{34}ClN_3NaO_4$ ([M+Na]$^+$): 666.2130. Found: 666.2146.

N-(3-(1-benzyl-5-chloro-2-oxoindolin-3-yl)-2-(4-methoxyphenyl)-6,6-dimethyl-4-oxo-4,5,6,7-tetrahydro-1*H*-indol-1-yl)-2-hydroxybenzamide (2f): White solid, 83%, m.p. 178~180°C; ^{1}H NMR (600 MHz, DMSO-d_6) δ: keto-form: 11.42 (brs, 1H, NH), 11.22 (brs, 1H, OH), 7.72 (brs, 1H, ArH), 7.49-7.43 (m, 4H, ArH), 7.33-7.25 (m, 3H, ArH), 7.19 (t, *J* = 7.8 Hz, 2H, ArH), 7.02 (d, *J* = 8.0 Hz, 2H, ArH), 6.97 (d, *J* = 7.6 Hz, 1H, ArH), 6.95-6.92 (m, 1H, ArH), 6.88-6.84 (m, 1H, ArH), 6.78-6.75 (m, 1H, ArH), 5.11 (d, *J* = 16.2 Hz, 1H, CH), 4.74 (d, *J* = 16.2 Hz, 1H, CH), 4.63 (s, 1H, CH), 3.75 (s, 3H, CH_3), 2.67-2.54 (m, 2H, CH_2), 2.17-2.09 (m, 2H, CH_2), 1.04 (s, 3H, CH_3), 0.99 (s, 3H, CH_3); enol-form: 11.54 (brs, 1H, NH), 11.14 (brs, 1H, OH), 7.60 (brs, 1H, ArH), 7.41-7.38 (m, 1H, ArH), 6.67-6.58 (m, 4H, ArH), 5.81 (s, 1H, CH), 4.58 (d, *J* = 16.2 Hz, 1H, CH), 4.43 (brs, 1H, CH), 3.65 (s, 3H, CH_3), 2.40 (brs, 1H, CH), 1.16 (s, 3H, CH_3), 1.15 (s, 3H, CH_3); ratio of keto/enol forms = 0.76:0.24; ^{13}C NMR (150 MHz, DMSO-d_6) δ: 192.4, 160.0, 144.8, 142.8, 136.8, 136.0, 132.7, 131.8, 131.7, 131.4, 131.2, 131.1, 128.8, 128.7, 128.6, 127.7, 127.6, 127.5, 127.4, 127.1, 127.0, 125.25, 123.5, 121.2, 120.6, 114.6, 114.2, 113.2, 109.7, 109.6, 55.3, 55.2, 52.9, 52.0, 44.7, 44.6, 44.0, 35.4, 35.1, 35.0, 29.4, 29.3, 29.2, 29.1, 28.1, 28.0; IR (KBr) υ: 3660, 3293, 3016, 2959, 2884, 2836, 1716, 1664, 1610, 1493, 1473, 1370, 1330, 1284, 1252, 1176, 1104, 1079, 1032, 895, 819, 733, 700 cm^{-1}; MS (*m*/*z*): HRMS (ESI) Calcd. for $C_{39}H_{34}ClN_3NaO_5$ ([M+Na]$^+$): 682.2079. Found: 682.2096.

N-(3-(1-butyl-5-chloro-2-oxoindolin-3-yl)-2-(4-methoxyphenyl)-6,6-dimethyl-4-oxo-4,5,6,7-tetrahydro-1*H*-indol-1-yl)-2-hydroxybenzamide (2g): White solid, 81%, m.p. 166~168°C; ^{1}H NMR (600 MHz, DMSO-d_6) δ: keto-form: 11.42 (brs, 1H, NH), 11.20 (s, 1H, OH), 7.72 (brs, 1H, ArH), 7.47-7.42 (m, 2H, ArH), 7.25 (d, *J* = 7.8 Hz, 1H, ArH), 7.02-7.00 (m, 2H, ArH), 6.97 (d, *J* = 8.4 Hz, 1H, ArH), 6.94-6.90 (m, 2H, ArH), 6.79 (brs, 1H, ArH), 6.63 (brs, 1H, ArH), 4.43 (s, 1H, CH), 3.74 (s, 3H, CH_3), 3.24 (brs, 1H, CH), 2.69-2.52 (m, 2H, CH), 2.13-2.06 (m, 2H, CH), 1.66-1.61 (m, 2H, CH), 1.38-1.36 (m, 2H, CH), 1.21-1.18 (m, 1H, CH), 1.02 (s, 3H, CH_3), 0.97 (s, 3H, CH_3), 0.91 (t, *J* = 7.2 Hz, 3H, CH_3); enol-form: 11.51 (brs, 1H, NH), 7.59 (brs, 1H, ArH), 7.39 (t, *J* = 7.8 Hz, 1H, ArH), 7.29 (d, *J* = 7.8 Hz, 1H, ArH), 6.87 (d, *J* = 7.2 Hz, 1H, ArH), 6.54 (brs, 1H, ArH), 5.64 (s, 1H, CH), 3.72-3.70 (m, 2H, CH), 3.64 (s, 3H, CH_3), 3.62-3.59 (m, 2H, CH_2), 2.44-2.36 (m, 2H, CH_2), 1.26 (brs, 2H, CH_2), 1.15 (s, 3H, CH_3), 1.14 (s, 3H, CH_3), 0.83 (t, *J* = 7.2 Hz, 3H, CH_3); ratio of keto/enol forms = 0.70:0.30; ^{13}C NMR (150 MHz, DMSO-d_6) δ: 211.8, 194.2, 191.0, 175.2, 159.3, 58.0, 143.9, 143.5, 141.8, 135.8, 134.2, 131.1, 129.1, 127.4,

127.1, 125.7, 125.1, 123.6, 122.2, 121.0, 12.6, 119.2, 119.1, 117.1, 117.0, 115.5, 114.6, 114.1, 113.8, 113.0, 110.0, 109.7, 109.2, 55.9, 54.9, 52.3, 51.5, 43.7, 42.3, 34.8, 34.0, 34.4, 34.3, 29.1, 28.8, 28.2, 28.0, 27.8, 19.7, 19.5, 13.7, 13.6; IR (KBr) υ: 3754, 3476, 3296, 3072, 2959, 2874, 1688, 1662, 1606, 1473, 1423, 1366, 1303, 1251, 1182, 1108, 1036, 950, 910, 868, 826, 755, 693 cm^{-1}; MS (*m*/*z*): HRMS (ESI) Calcd. for $C_{36}H_{36}ClN_3NaO_5$ ($[M+Na]^+$): 648.2236. Found: 648.2247.

N-(3-(1-benzyl-5-fluoro-2-oxoindolin-3-yl)-6,6-dimethyl-4-oxo-2-(p-tolyl)-4,5,6,7-tetrahydro-1H-indol-1-yl)-2-hydroxybenzamide (2h): White solid, 75%, m.p. 170~172°C; ^{1}H NMR (600 MHz, DMSO-d_6) δ: keto-form: 11.55 (brs, 1H, NH), 11.24 (s, 1H, OH), 7.72 (brs, 1H, ArH), 7.45-7.40 (m, 4H, ArH), 7.33-7.23 (m, 5H, ArH), 6.98-6.84 (m, 3H, ArH), 6.73-6.58 (m, 3H, ArH), 5.12 (d, *J* = 15.6 Hz, 1H, CH), 4.73 (d, *J* = 15.6 Hz, 1H, CH), 4.62 (s, 1H, CH), 2.70-2.54 (m, 2H, CH), 2.45-2.38 (m, 1H, CH), 2.30 (s, 3H, CH_3), 2.10 (brs, 1H, CH), 1.04 (s, 3H, CH_3), 0.96 (s, 3H, CH_3); enol-form: 7.60 (brs, 1H, ArH), 6.98-6.84 (m, 2H, ArH), 5.81 (s, 1H, CH), 4.57 (brs, 1H, CH), 4.36 (brs, 1H, CH), 2.18 (s, 3H, CH_3), 2.10 (brs, 1H, CH), 1.16 (s, 3H, CH_3), 1.15 (s, 3H, CH_3); ratio of keto/enol forms = 0.76:0.24; ^{13}C NMR (150 MHz, DMSO-d_6) δ: 194.2, 191.2, 175.8, 174.6, 166.8, 158.1 (*J* = 235.2 Hz), 158.0, 157.9, 144.3, 140.5, 137.9, 136.6, 136.1, 136.0, 135.9, 134.2, 134.1, 131.5, 130.9, 129.7, 129.2, 128.5, 128.4, 128.1, 127.9, 127.3, 127.2, 127.1, 126.0, 125.6, 119.3, 119.2, 119.1, 117.1, 117.0, 115.5, 115.2, 114.7, 114.4, 113.8 (*J* = 28.1 Hz), 113.5, 113.2 (*J* = 22.6 Hz), 110.3, 110.1, 109.5 (*J* = 8.6 Hz), 108.9 (*J* = 7.7 Hz), 52.3, 51.6, 44.1, 43.6, 43.0, 42.7, 34.8, 34.7, 34.4, 34.3, 28.4, 28.2, 28.1, 27.9, 20.8; IR (KBr) υ: 3756, 3658, 3432, 3297, 3040, 2962, 2877, 1674, 1610, 1484, 1460, 1372, 1306, 1254, 1176, 1129, 1087, 1031, 878, 821, 789, 755, 695 cm^{-1}; MS (*m*/*z*): HRMS (ESI) Calcd. for $C_{39}H_{34}FN_3O_4$ ($[M+H]^+$): 628.2606. Found: 628.2618.

N-(3-(1-butyl-5-fluoro-2-oxoindolin-3-yl)-2-(4-methoxyphenyl)-6,6-dimethyl-4-oxo-4,5,6,7-tetrahydro-1*H*-indol-1-yl)-2-hydroxybenzamide (2i): White solid, 73%, m.p. 258~260°C; ^{1}H NMR (600 MHz, DMSO-d_6) δ: keto-form: 11.51 (brs, 1H, NH), 11.20 (s, 1H, OH), 7.71 (brs, 1H, ArH), 7.47-7.42 (m, 2H, ArH), 7.06-6.87 (m, 6H, ArH), 6.63 (brs, 2H, ArH), 4.39 (s, 1H, CH), 3.74 (s, 3H, CH_3), 3.27 (brs, 1H, CH), 2.64-2.56 (m, 2H, CH_2), 2.07 (brs, 2H, CH_2), 1.66-1.61 (m, 2H, CH_2), 1.39-1.34 (m, 2H, CH_2), 1.19 (brs, 1H, CH), 1.01 (s, 3H, CH_3), 0.96 (s, 3H, CH_3), 0.91 (t, *J* = 7.2 Hz, 3H, CH_3); enol-form: 7.58 (brs, 1H, ArH), 7.40-7.38 (m, 1H, ArH), 6.78 (brs, 1H, ArH), 6.55 (brs, 1H, ArH), 5.63 (s, 1H, CH), 3.72-3.70 (m, 2H, CH), 3.64 (s, 3H, CH_3), 3.62-3.59 (m, 2H, CH_2), 3.28-3.26 (m, 2H, CH_2), 1.27 (brs, 2H, CH), 1.15 (s, 3H, CH_3), 1.14 (s, 3H, CH_3), 0.83 (t, *J* = 7.2 Hz, 3H, CH_3); ratio of keto/enol forms = 0.67:0.33; ^{13}C NMR (150 MHz, DMSO-d_6) δ: 194.1, 190.9, 158.6 (*J* = 213.4Hz), 157.9 (*J* = 234.2Hz), 143.7, 142.8, 140.8, 139.1, 139.0, 135.8, 134.2, 134.1, 131.2, 123.5, 123.2, 122.4, 122.2, 121.5, 121.4, 121.0, 120.6, 119.2, 119.1, 117.1, 117.0, 115.5, 114.6, 114.0, 113.8, 113.7 (*J* = 23.1Hz), 113.2 (*J* = 20.6Hz), 110.2, 110.1, 109.0 (*J* = 8.4Hz), 108.3 (*J* = 8.9Hz), 55.1, 54.9, 52.5, 52.3, 51.5, 44.0, 42.5, 42.4, 40.1, 37.5, 34.8, 34.6, 34.4, 34.3, 29.1, 28.9, 28.4, 28.1, 27.8, 19.7, 19.6, 13.7, 13.6; IR (KBr) υ: 3666, 3264, 3045, 2960, 1688, 1656, 1611, 1494, 1458, 1571, 1300, 1253, 1176, 1130, 1076, 1039, 942, 885, 838, 762, 691 cm^{-1}; MS (*m*/*z*): HRMS (ESI) Calcd. for $C_{36}H_{36}FN_3NaO_5$ ($[M+Na]^+$): 632.2531. Found: 632.2500.

N-(3-(1-benzyl-5-methyl-2-oxoindolin-3-yl)-6,6-dimethyl-4-oxo-2-(p-tolyl)-4,5,6,7-tetrahydro-1*H*-indol-1-yl)picolinamide (3a): White solid, 56%, m.p. 290~292°C; ^{1}H NMR (600 MHz, DMSO-d_6) δ: keto-form: 11.97 (brs, 1H, NH), 8.71-8.60 (m, 1H, ArH), 8.04-7.87 (m, 2H, ArH),

7.68-7.65 (m, 1H, ArH), 7.44 (s, 3H, ArH), 7.31-7.18 (m, 5H, ArH), 6.96-6.76 (m, 2H, ArH), 6.62 (brs, 1H, ArH), 5.09 (d, *J* = 15.0 Hz, 1H, CH), 4.70 (d, *J* = 16.2 Hz, 1H, CH), 4.53 (s, 1H, CH), 2.62-2.58 (m, 1H, CH), 2.41 (brs, 2H, CH_2), 2.27 (s, 3H, CH_3), 2.20 (s, 3H, CH_3), 2.09 (brs, 1H, CH), 1.02 (s, 3H, CH_3), 0.97 (s, 3H, CH_3); enol-form: 12.15 (brs, 1H, NH), 6.53 (brs, 1H, ArH), 5.74 (s, 1H, CH), 4.49 (brs, 1H, CH), 4.27 (brs, 1H, CH), 2.41-2.37 (m, 2H, CH_2), 2.26 (s, 3H, CH_3), 2.17 (s, 3H, CH_3), 1.16 (s, 3H, CH_3), 1.15 (s, 3H, CH_3); ratio of keto/enol forms = 0.69:0.31; ^{13}C NMR (150 MHz, DMSO-d_6) δ: 193.5, 190.5, 175.3, 163.0, 148.4, 148.3, 147.4, 147.3, 143.5, 141.4, 139.6, 137.6, 137.2, 136.4, 135.9, 135.4, 129.7, 129.0, 128.6, 127.9, 127.1, 127.0, 126.9, 126.6, 126.5, 125.7, 125.3, 122.6, 122.4, 114.3, 113.6, 110.4, 107.9, 107.6, 59.2, 51.9, 51.1, 43.3, 42.9, 42.3, 41.9, 34.2, 34.1, 33.9, 33.7, 27.7, 27.5, 20.2, 20.1, 13.6; IR (KBr) υ: 3736, 3613, 3306, 3036, 2954, 2920, 2865, 1957, 1705, 1650, 1611, 1478, 1363, 1275, 1236, 1183, 1098, 1034, 996, 962, 919, 853, 809, 699, 647 cm^{-1}; MS (*m*/*z*): HRMS (ESI) Calcd. for $C_{39}H_{36}N_3NaO_3$ ([M+Na]$^+$): 631.2680. Found: 631.2673.

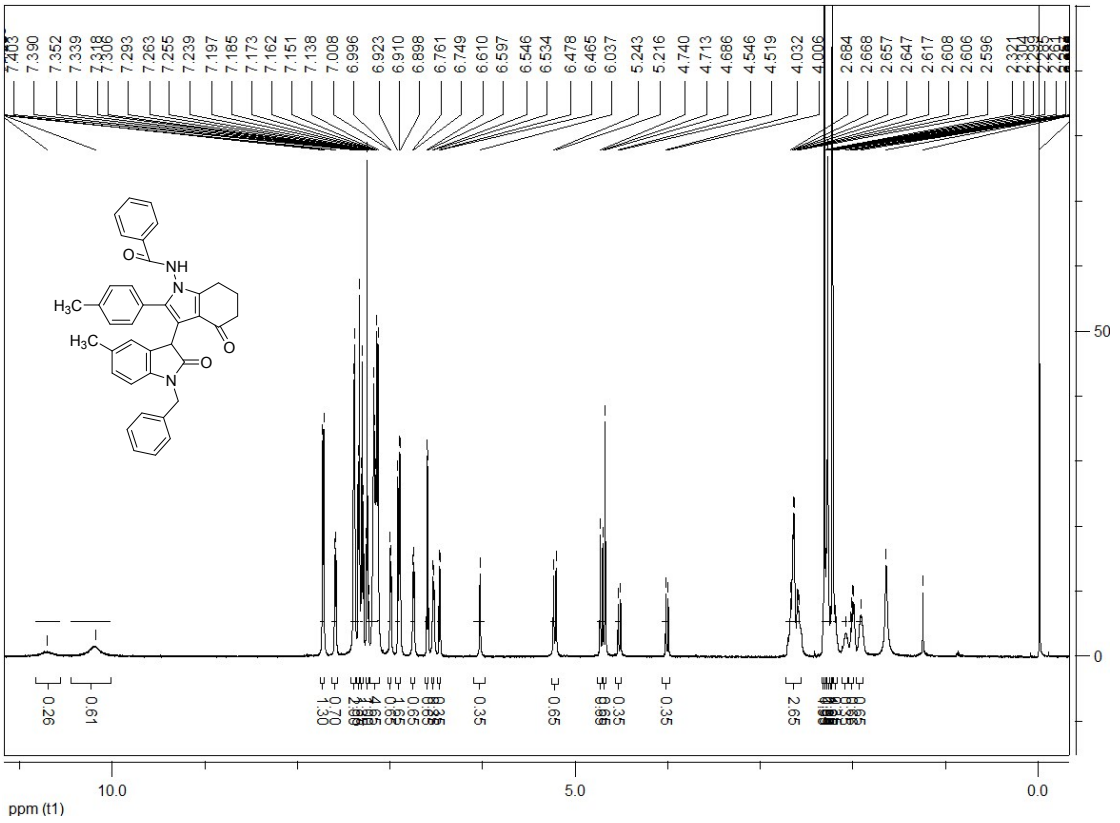
N-(3-(1-butyl-5-methyl-2-oxoindolin-3-yl)-2-(4-methoxyphenyl)-6,6-dimethyl-4-oxo-4,5,6,7-tetrahydro-1*H*-indol-1-yl)picolinamide (3b): White solid, 70%, m.p. 218~220°C; ^{1}H NMR (600 MHz, DMSO-d_6) δ: keto-form: 11.95 (brs, 1H, NH), 8.70 (brs, 1H, ArH), 8.04 (brs, 2H, ArH), 7.70-7.69 (m, 1H, ArH), 7.45 (d, *J* = 7.8Hz, 2H, ArH), 7.01-7.00 (m, 1H, ArH), 6.97 (d, *J* = 8.4 Hz, 2H, ArH), 6.86-6.85 (m, 1H, ArH), 6.62 (brs, 1H, ArH), 6.56 (brs, 1H, ArH), 4.31 (s, 1H, CH), 3.71 (s, 3H, CH_3), 2.61-2.56 (m, 1H, CH), 2.42-2.36 (m, 2H, CH_2), 2.22 (s, 3H, CH_3), 2.07-2.04 (m, 2H, CH_2), 1.64-1.62 (m, 2H, CH_2), 1.37-1.36 (m, 1H, CH), 1.23 (brs, 1H, CH), 0.99 (s, 3H, CH_3), 0.95 (s, 3H, CH_3), 0.91 (t, *J* = 7.2 Hz, 3H, CH_3); enol-form: 12.09 (brs, 1H, NH), 8.62 (brs, 1H, ArH), 7.91 (brs, 1H, ArH), 7.64-7.63 (m, 1H, ArH), 7.05 (d, *J* = 7.8 Hz, 1H, ArH), 6.77 (d, *J* = 7.8 Hz, 2H, ArH), 6.71 (brs, 1H, ArH), 6.49 (brs, 1H, ArH), 5.58 (s, 1H, CH), 3.60 (s, 3H, CH_3), 2.25 (s, 3H, CH_3), 1.13 (s, 6H, $2CH_3$), 0.81 (t, *J* = 7.2 Hz, 3H, CH_3); ratio of keto/enol form = 0.69:0.31; ^{13}C NMR (150 MHz, DMSO-d_6) δ: 193.9, 190.6, 175.4, 174.3, 163.6, 159.2, 148.9, 148.8, 147.9, 147.8, 143.6, 142.7, 142.2, 140.5, 138.1, 138.0, 135.6, 131.0, 130.7, 130.4, 129.8, 129.5, 127.8, 127.7, 127.6, 127.5, 123.0, 122.9, 121.3, 120.9, 114.7, 114.0, 112.7, 110.8, 108.0, 107.5, 55.1, 54.9, 52.4, 51.6, 43.7, 42.3, 40.0, 34.7, 34.6, 34.4, 34.2, 29.2, 28.9, 28.2, 28.1, 28.0, 20.7, 20.6, 19.7, 19.6, 13.7, 13.6; IR (KBr) υ: 3846, 3754, 3645, 3276, 3054, 2952, 2923, 2861, 1897, 1699, 1657, 1611, 1585, 1490, 1374, 1289, 1244, 1184, 1100, 1037, 995, 913, 824, 748, 689 cm^{-1}; MS (*m*/*z*): HRMS (ESI) Calcd. for $C_{36}H_{38}N_4NaO_4$ ([M+Na]$^+$): 613.2785. Found: 613.2790.

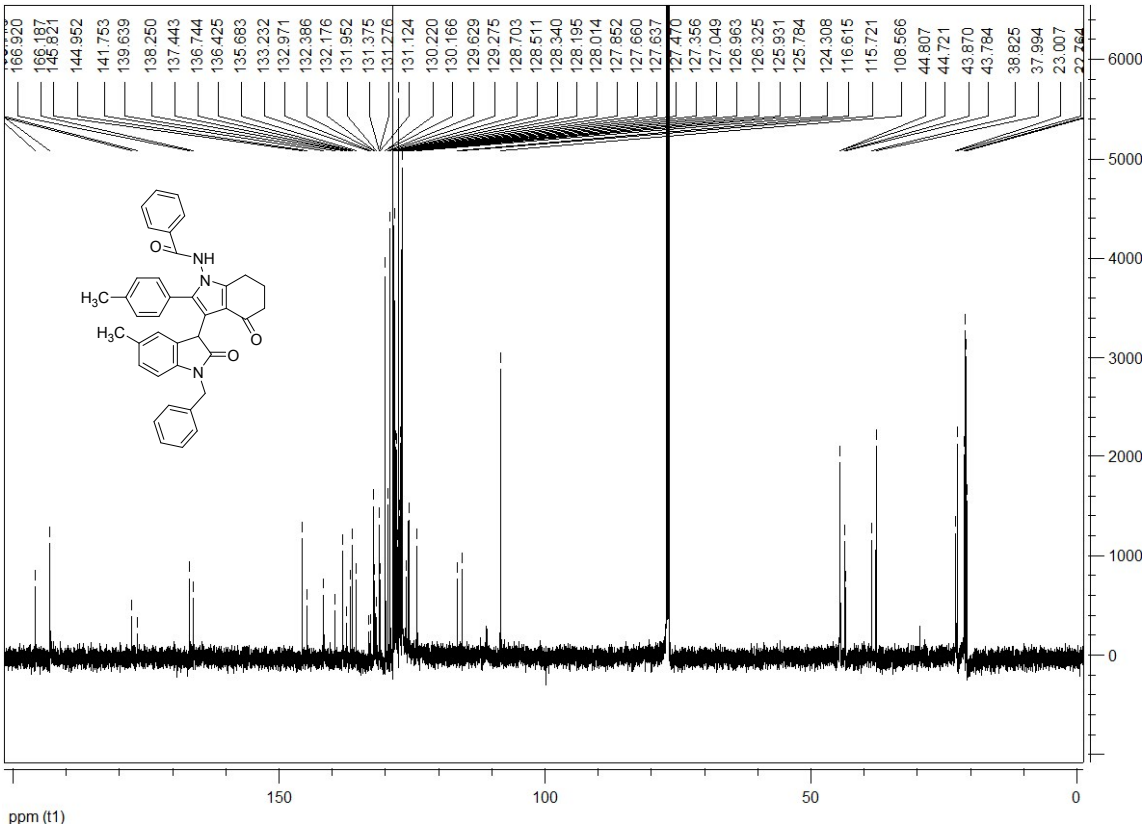
N-(3-(1-benzyl-5-chloro-2-oxoindolin-3-yl)-2-(4-methoxyphenyl)-6,6-dimethyl-4-oxo-4,5,6,7-tetrahydro-1*H*-indol-1-yl)picolinamide (3c): White solid, 60%, m.p. 260~262°C; ^{1}H NMR (600 MHz, DMSO-d_6) δ: keto-form: 11.96 (brs, 1H, NH), 8.71 (brs, 1H, ArH), 8.04-7.91 (m, 2H, ArH), 7.70-7.67 (m, 1H, ArH), 7.46-7.44 (m, 3H, ArH), 7.33-7.19 (m, 4H, ArH), 7.00 (d, *J* = 8.4Hz, 2H, ArH), 6.76-6.74 (m, 2H, ArH), 6.64-6.54 (m, 1H, ArH), 5.11 (d, *J* = 16.2 Hz, 1H, CH), 4.75 (d, *J* = 15.6 Hz, 1H, CH), 4.62 (s, 1H, CH), 3.72 (s, 3H, CH_3), 2.61-2.59 (m, 1H, CH), 2.47-2.46 (m, 1H, CH), 2.14-2.11 (m, 2H, CH_2), 1.02 (s, 3H, CH_3), 0.96 (s, 3H, CH_3); enol-form: 12.14 (brs, 1H, NH), 8.63 (brs, 1H, ArH), 7.66-7.64 (m, 1H, ArH), 6.94 (brs, 1H, ArH), 6.85 (brs, 1H, ArH), 5.80 (s, 1H, CH), 4.57 (d, *J* = 15.6 Hz, 1H, CH), 4.42 (d, *J* = 16.2 Hz, 1H, CH), 3.62 (s, 3H, CH_3), 1.14 (s, 3H, CH_3), 1.13 (s, 3H, CH_3); ratio of keto/enol forms = 0.75:0.25; ^{13}C NMR (150 MHz, DMSO-d_6) δ: 194.1, 191.2, 175.6, 163.6, 159.3, 148.9, 148.8, 147.9, 147.8, 144.0, 143.2, 141.4, 138.1, 138.0, 136.5, 136.1, 136.0, 131.9, 131.1, 130.7, 128.5, 128.4, 127.7, 127.6, 127.4, 127.3, 127.2, 127.1, 127.0, 125.5, 123.7, 122.9, 122.8, 122.2, 121.0, 120.7, 114.7, 114.1, 114.0, 113.9,

112.9, 112.8, 110.1, 109.9, 109.7, 55.1, 55.0, 51.5, 43.8, 43.5, 43.0, 42.5, 34.8, 34.7, 34.3, 34.2, 28.1, 28.0; IR (KBr) υ: 3314, 3063, 2954, 2876, 1712, 1649, 1610, 1475, 1428, 1353, 1287, 1250, 1177, 1102, 1034, 960, 918, 841, 808, 740, 700 cm^{-1}; MS (*m*/*z*): HRMS (ESI) Calcd. for $C_{38}H_{33}ClN_4NaO_4$ ($[M+Na]^+$): 667.2083. Found: 667.2066.

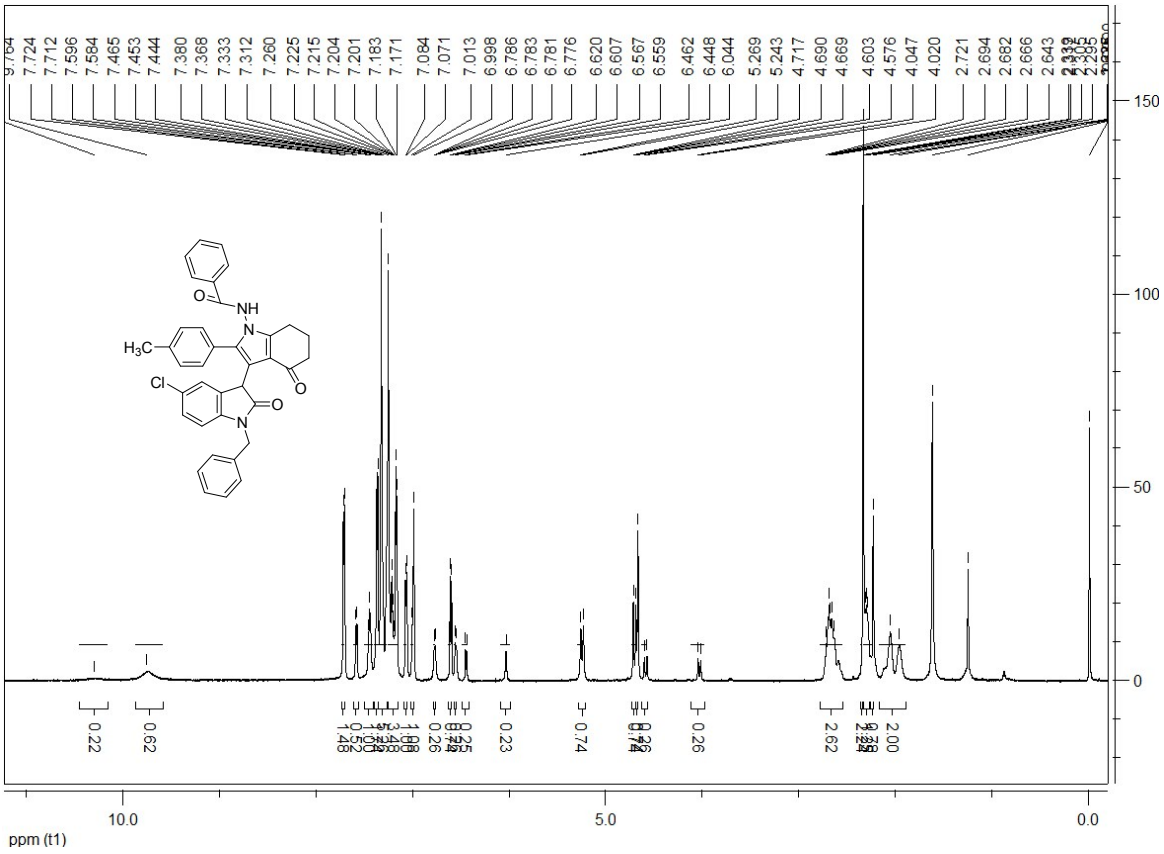
N-(3-(1-butyl-5-chloro-2-oxoindolin-3-yl)-2-(4-methoxyphenyl)-6,6-dimethyl-4-oxo-4,5,6,7-tetrahydro-1*H*-indol-1-yl)picolinamide (3d): White solid, 68%, m.p. 228~230°C; ^1H NMR (600 MHz, DMSO-d_6) δ: keto-form: 11.95 (brs, 1H, NH), 8.71 (brs, 1H, ArH), 8.05 (brs, 2H, ArH), 7.70-7.69 (m, 1H, ArH), 7.44 (d, *J* = 7.8 Hz, 2H, ArH), 7.26 (brs, 1H, ArH), 7.02 (d, *J* = 7.8 Hz, 1H, ArH), 6.98 (d, *J* = 7.8 Hz, 2H, ArH), 6.60 (brs, 1H, ArH), 4.42 (s, 1H, CH), 3.71 (s, 3H, CH_3), 2.45-2.42 (m, 2H, CH), 2.10-2.07 (m, 2H, CH), 1.64-1.62 (m, 2H, CH), 1.64-1.62 (m, 2H, CH), 1.37-1.36 (m, 2H, CH), 1.00 (s, 3H, CH_3), 0.94 (s, 3H, CH_3), 0.91 (t, *J* = 7.2 Hz, 3H, CH_3); enol-form: 12.13 (brs, 1H, NH), 8.62 (brs, 1H, ArH), 7.93 (brs, 1H, ArH), 7.65-7.64 (m, 1H, ArH), 7.30 (d, *J* = 8.4 Hz, 1H, ArH), 6.93 (d, *J* = 7.8 Hz, 2H, ArH), 6.53 (brs, 1H, ArH), 5.63 (s, 1H, CH), 3.61 (s, 3H, CH_3), 3.74-3.72 (m, 1H, CH), 3.57 (brs, 1H, CH), 3.27-3.20 (m, 1H, CH), 2.64-2.57 (m, 1H, CH), 1.25-1.23 (m, 1H, CH), 1.13 (s, 3H, CH_3), 1.10 (s, 3H, CH_3), 1.07-1.05 (m, 1H, CH), 1.64-1.62 (m, 2H, CH_2), 1.64-1.62 (m, 2H, CH_2), 1.37-1.36 (m, 2H, CH_2), 0.82 (t, *J* = 7.2 Hz, 3H, CH_3); ratio of keto/enol forms = 0.67:0.33; ^{13}C NMR (150 MHz, DMSO-d_6) δ: 194.2, 194.1, 191.3, 191.0, 175.6, 175.2, 163.6, 159.3, 148.9, 148.8, 147.8, 147.7, 144.4, 143.9, 143.5, 143.3, 138.1, 138.0, 136.4, 136.2, 136.0, 135.9, 131.8, 131.1, 129.7, 129.3, 129.0, 128.6, 128.5, 128.4, 128.3, 128.2, 122.9, 122.2, 122.1, 120.7, 114.0, 113.9, 113.8, 109.7, 109.7, 59.7, 55.7, 54.9, 52.3, 51.5, 51.4, 43.8, 43.7, 43.5, 43.0, 40.1, 34.8, 34.7, 34.6, 34.3, 34.2, 29.1, 28.8, 28.2, 28.1, 28.0, 27.9, 20.7, 19.7, 19.5, 14.1, 13.7, 13.6; IR (KBr) υ: 3599, 3294, 3052, 2952, 2866, 1896, 1706, 1654, 1606, 1583, 1478, 1426, 1372, 1355, 1284, 1247, 1182, 1103, 1038, 996, 957, 915, 840, 749, 695 cm^{-1}; MS (*m*/*z*): HRMS (ESI) Calcd. for $C_{35}H_{35}N_4NaO_4$ ($[M+Na]^+$): 633.2239. Found: 633.2250.

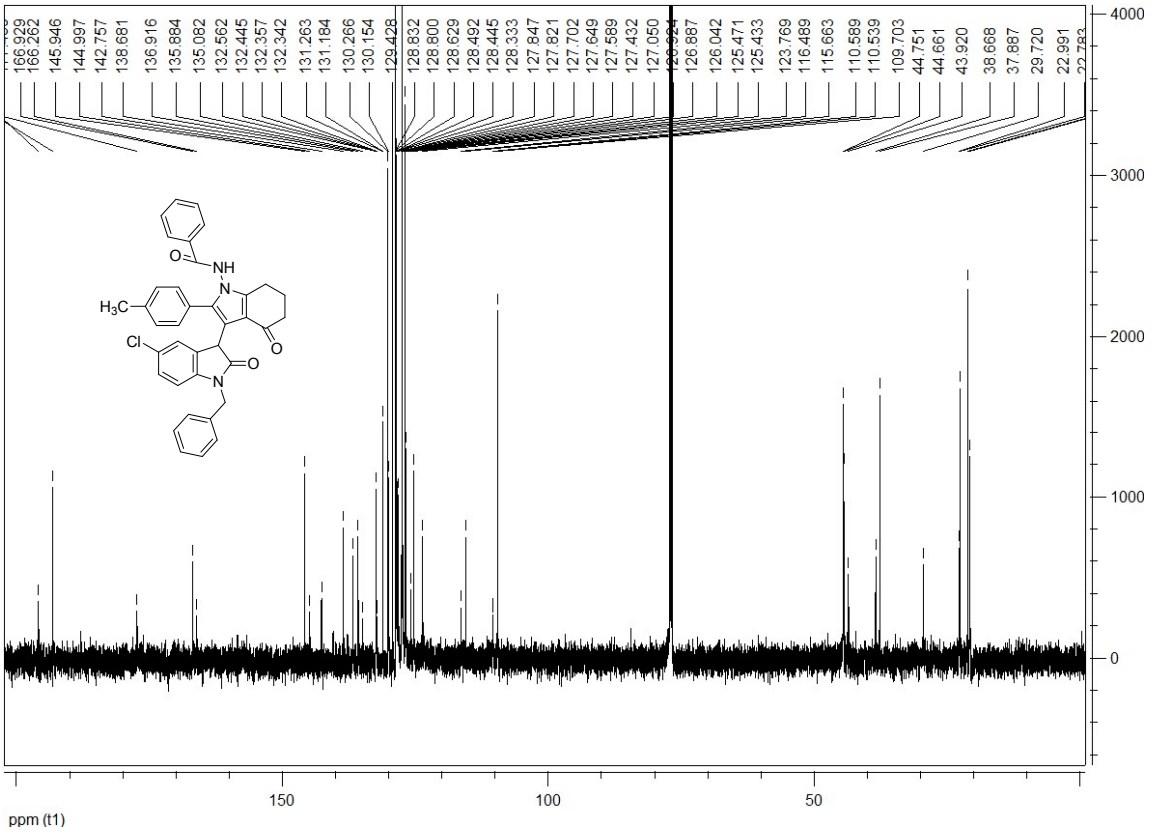
N-(3-(1-benzyl-5-methyl-2-oxoindolin-3-yl)-4-oxo-2-(p-tolyl)-4,5,6,7-tetrahydro-1H-indol-1-yl)benzamide (1a):



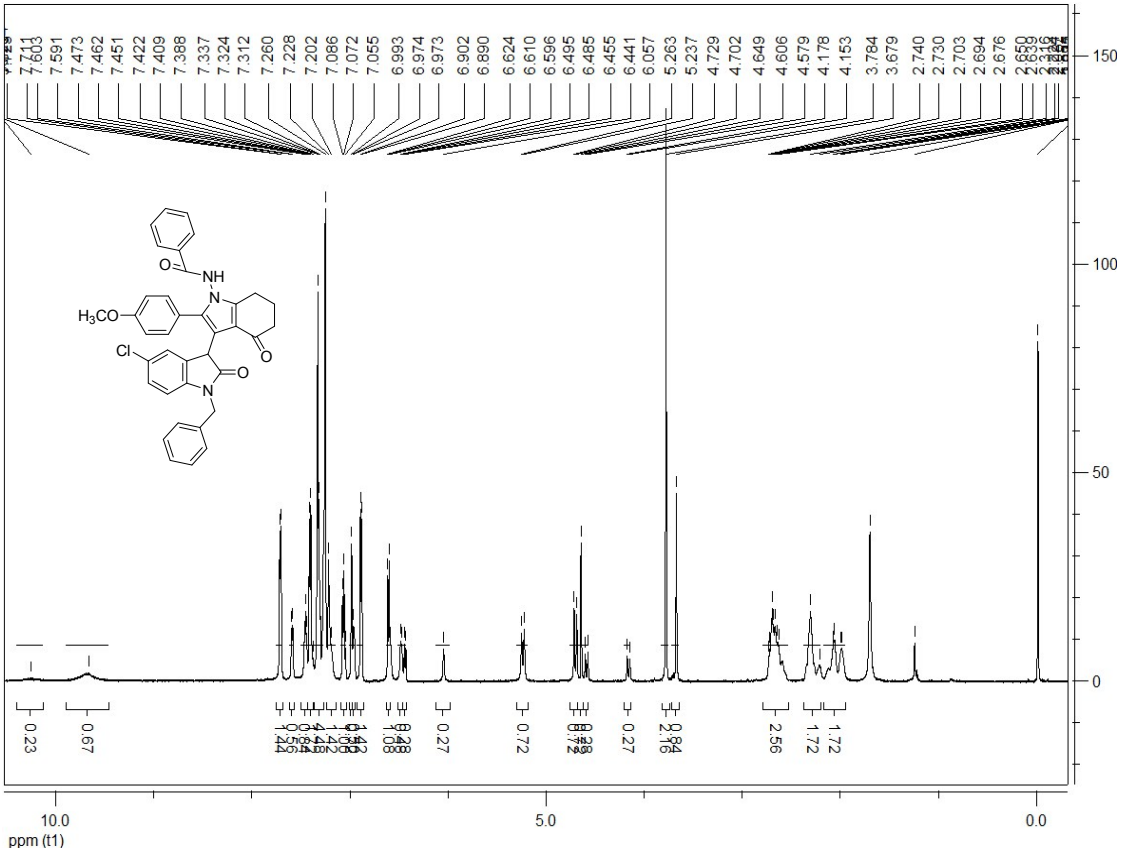


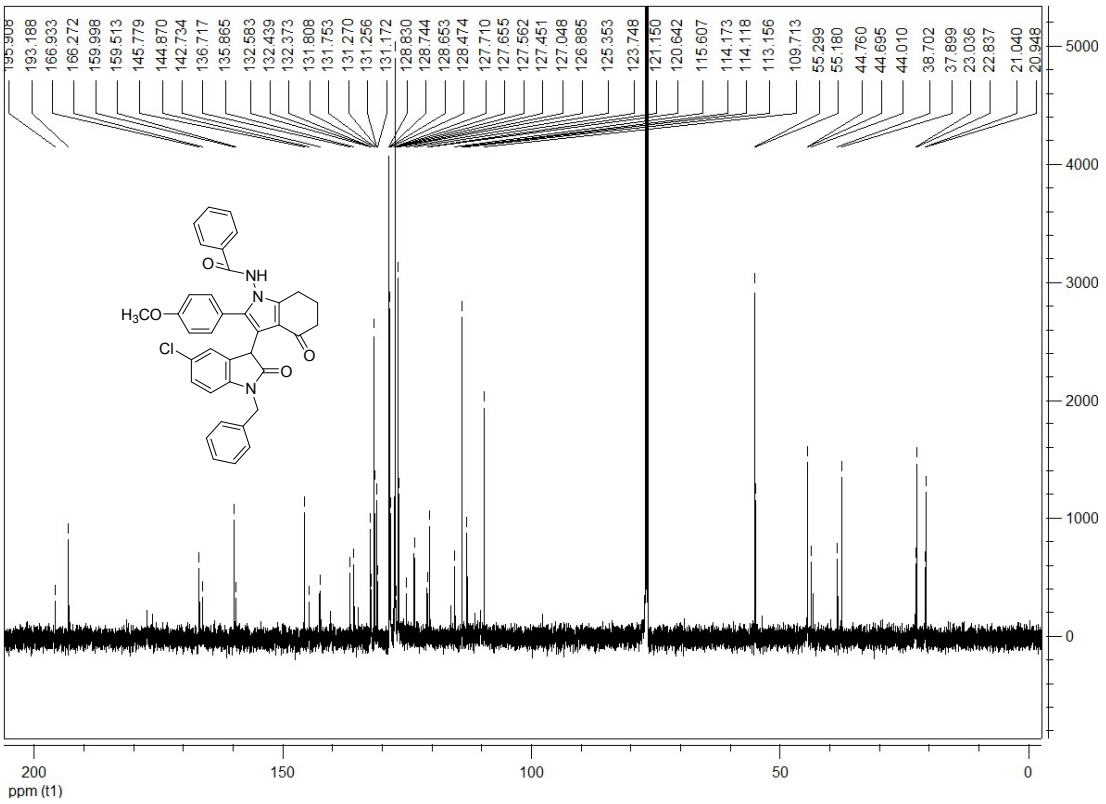
N-(3-(1-benzyl-5-chloro-2-oxoindolin-3-yl)-4-oxo-2-(p-tolyl)-4,5,6,7-tetrahydro-1H-indol-1-yl)benzamide (1b):



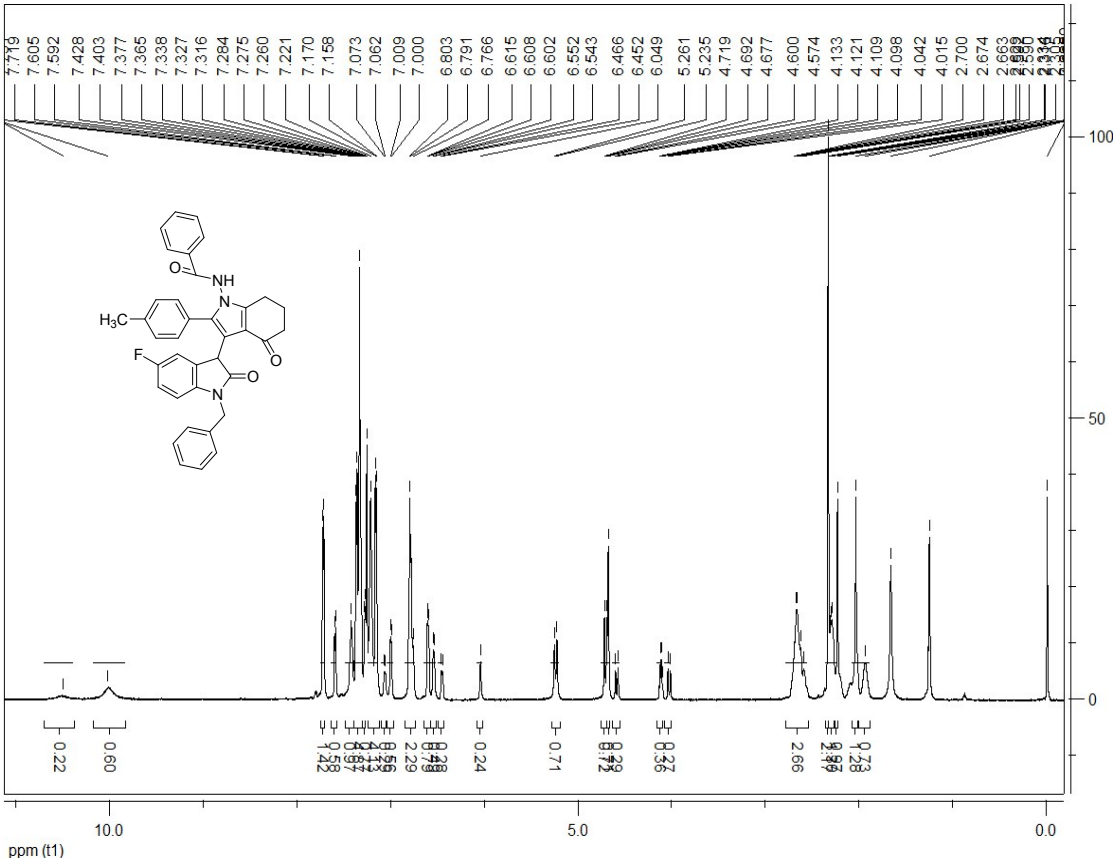


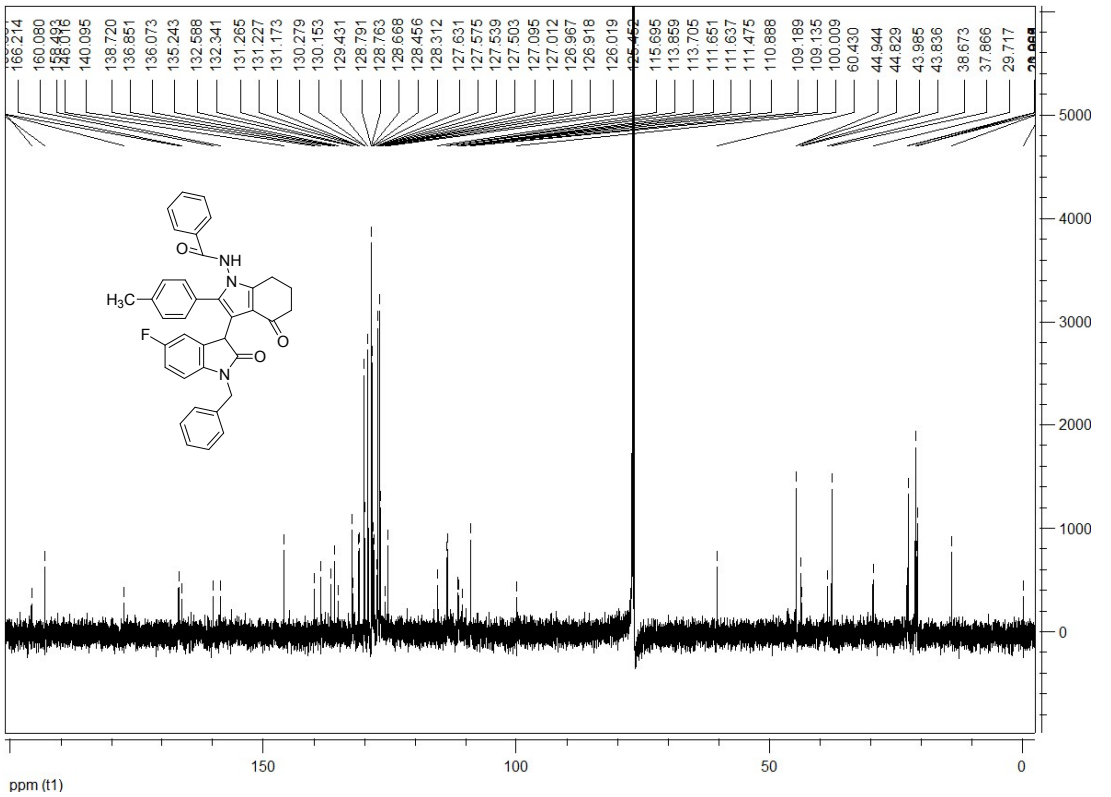
N-(3-(1-benzyl-5-chloro-2-oxoindolin-3-yl)-2-(4-methoxyphenyl)-4-oxo-4,5,6,7-tetrahydro-1H-indol-1-yl)benzamide (1c):



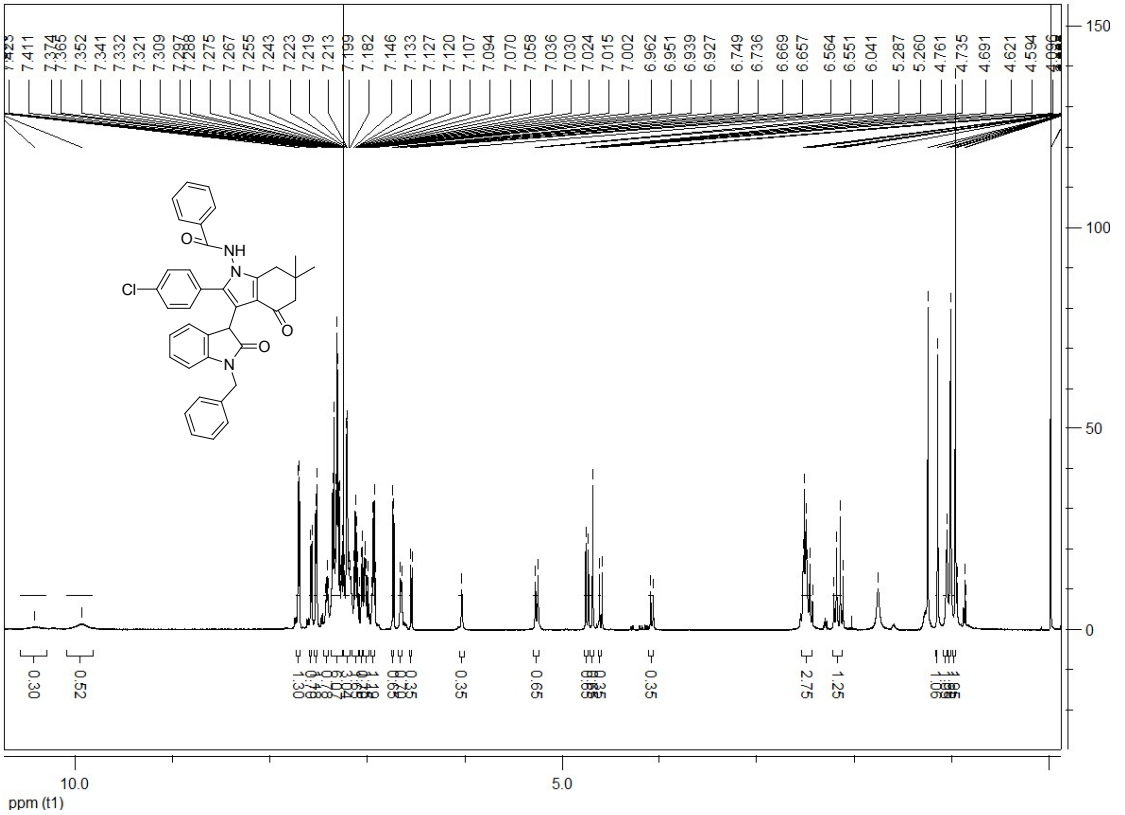


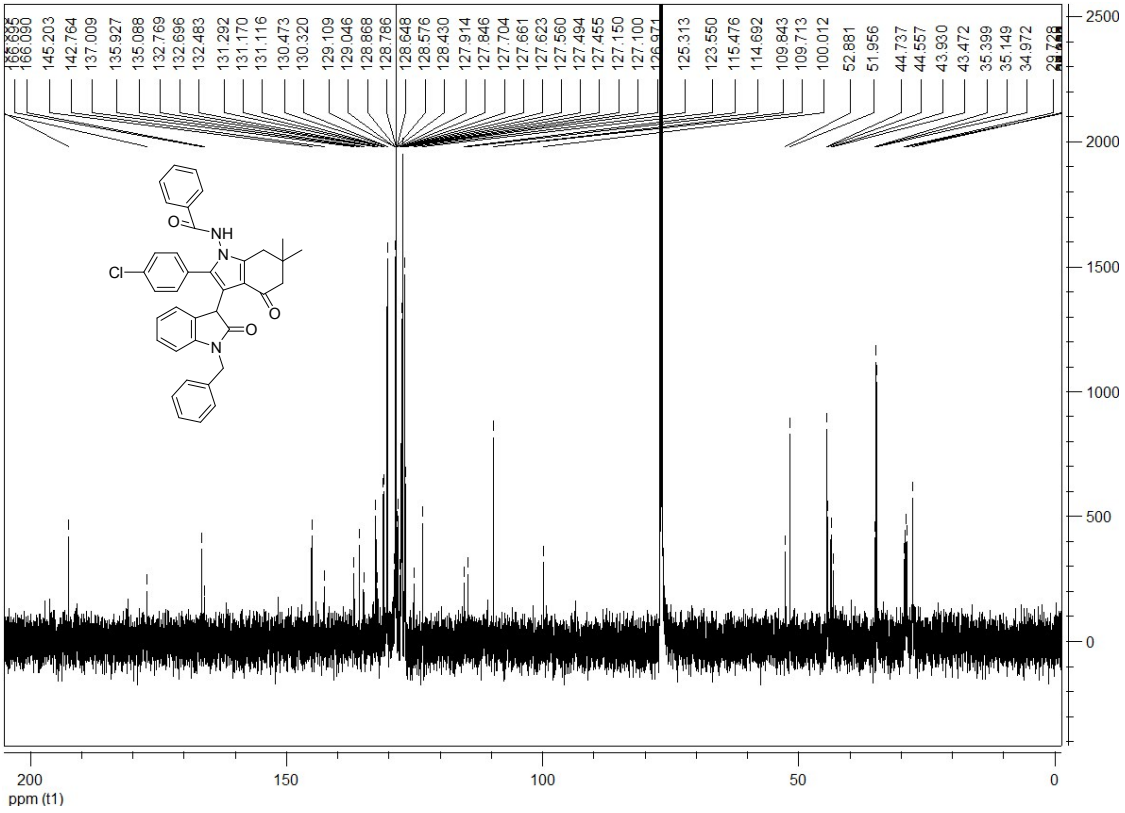
N-(3-(1-benzyl-5-fluoro-2-oxoindolin-3-yl)-4-oxo-2-(p-tolyl)-4,5,6,7-t etrahydro-1H-indol-1-yl)benzamide (1d):



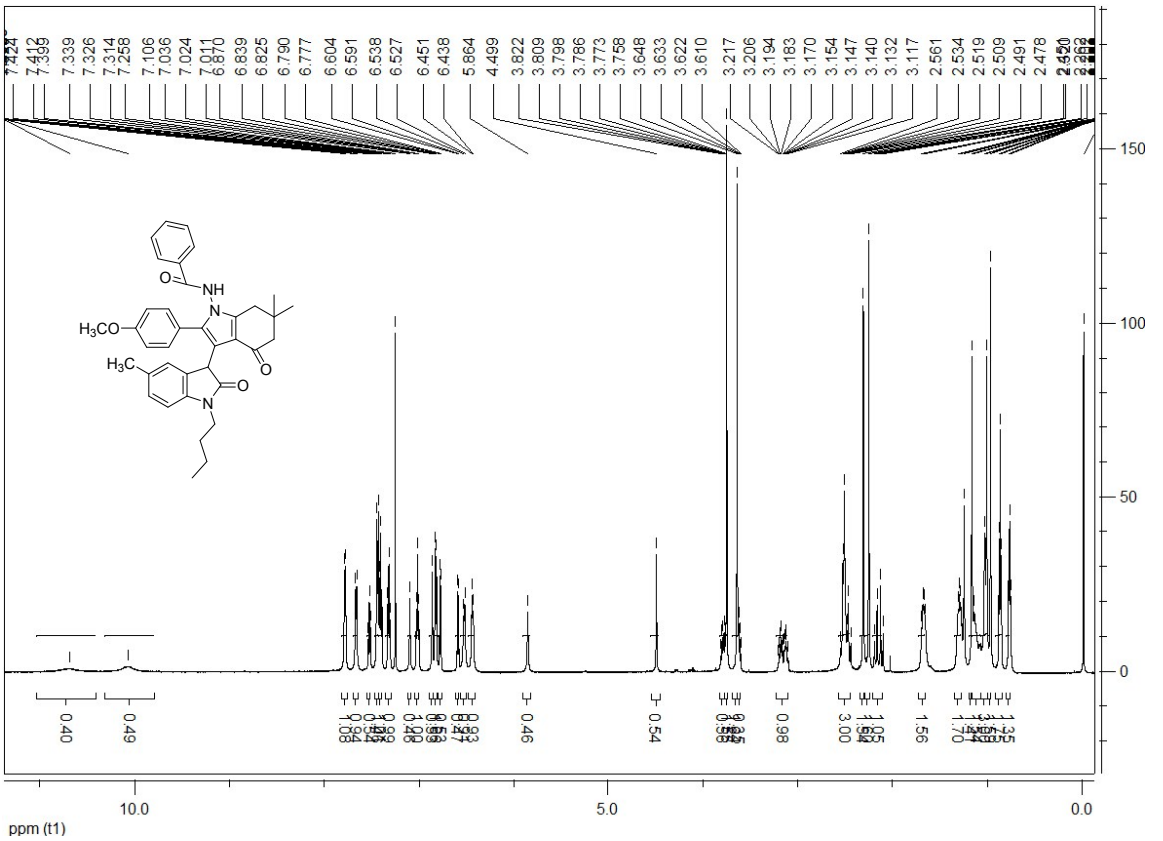


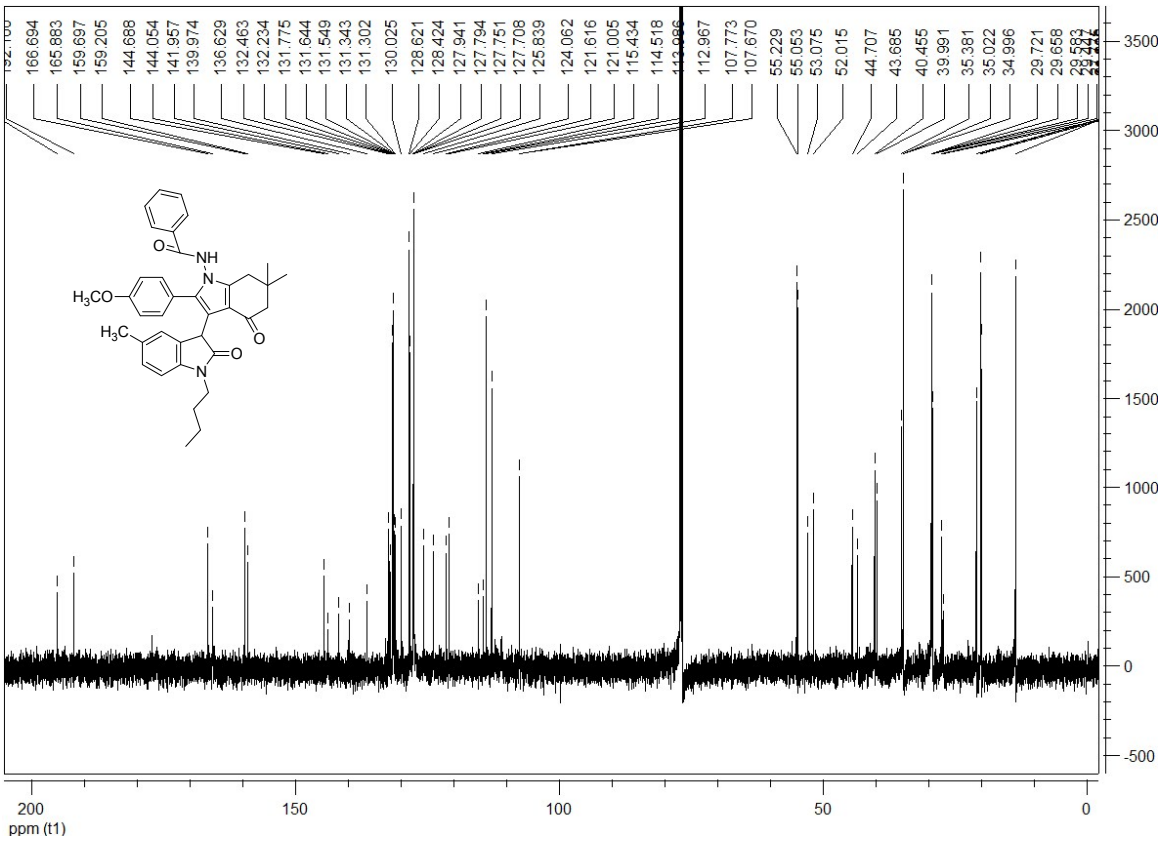
N-(3-(1-benzyl-2-oxoindolin-3-yl)-2-(4-chlorophenyl)-4-oxo-4,5,6,7-tetrahydro-1H-indol-1-yl)benzamide (1e):



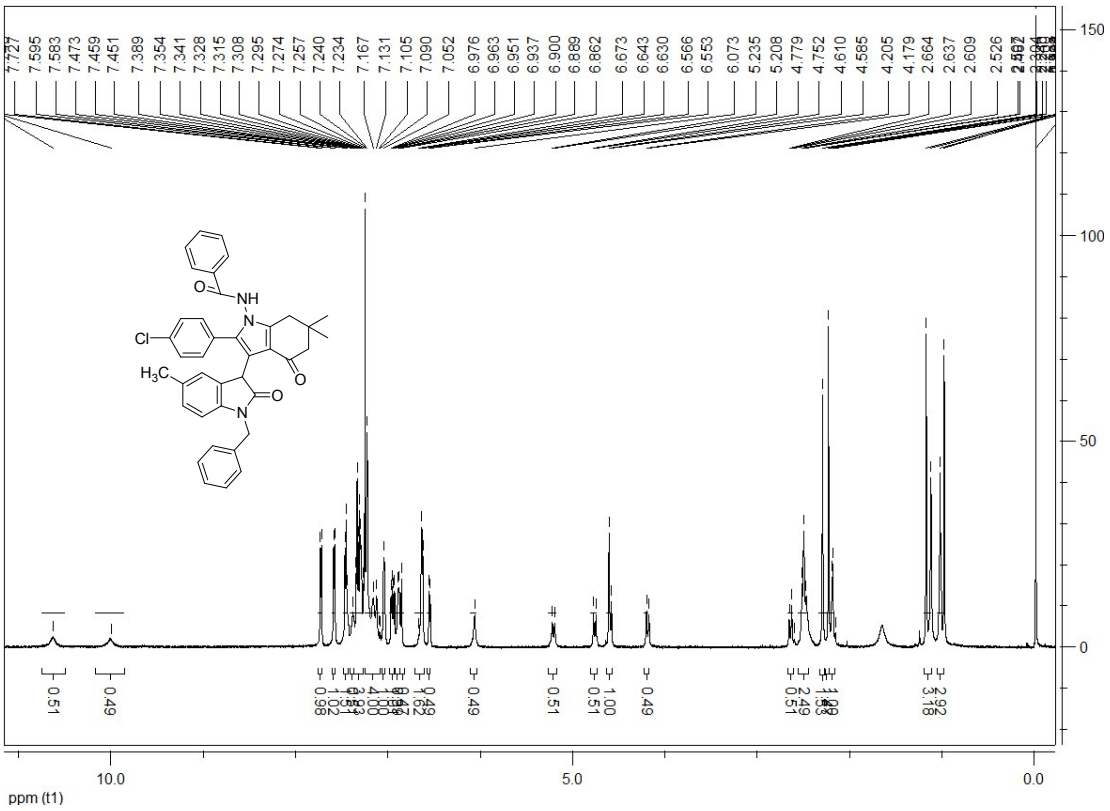


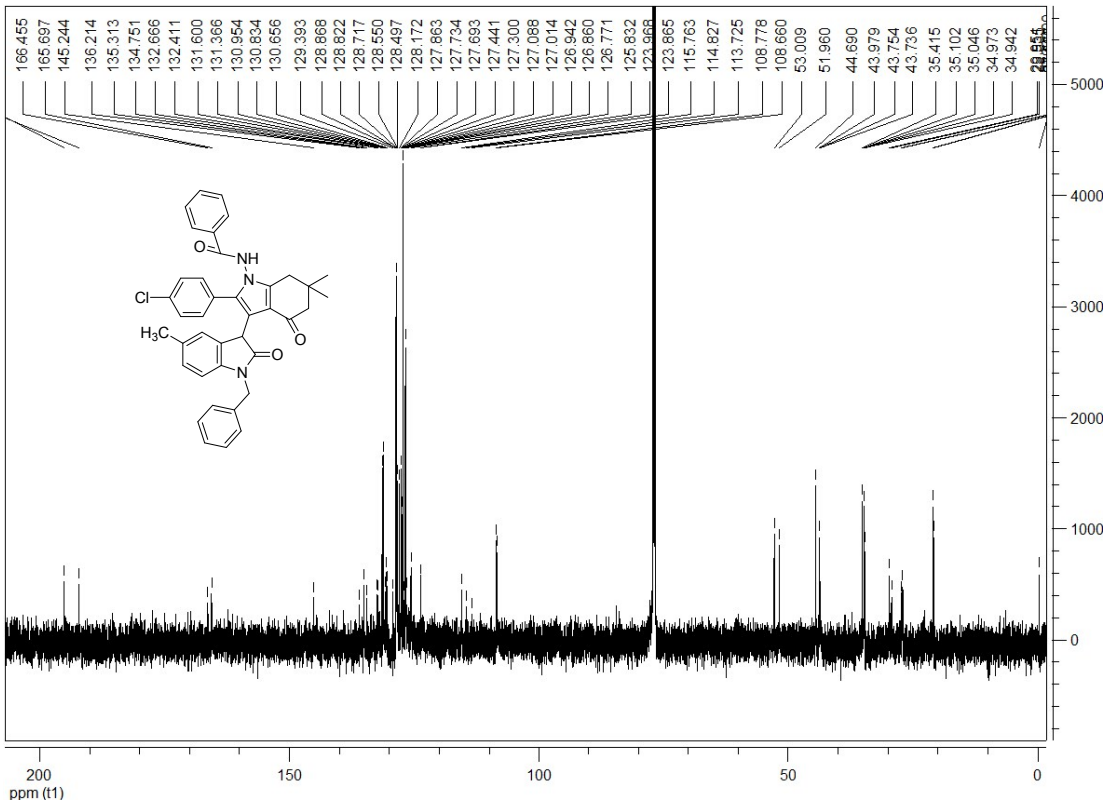
N-(3-(1-butyl-5-methyl-2-oxoindolin-3-yl)-2-(4-methoxyphenyl)-6,6-dimethyl-4-oxo-4,5,6,7-tetrahydro-1H-indol-1-yl)benzamide (1f):



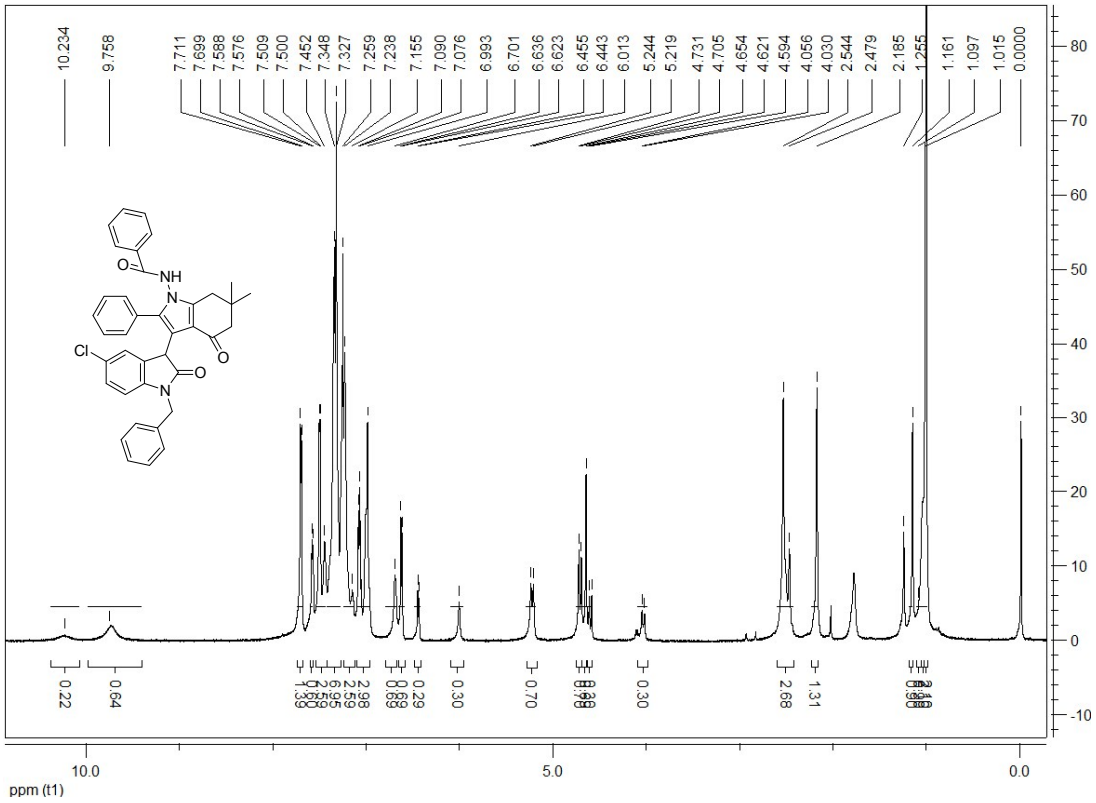


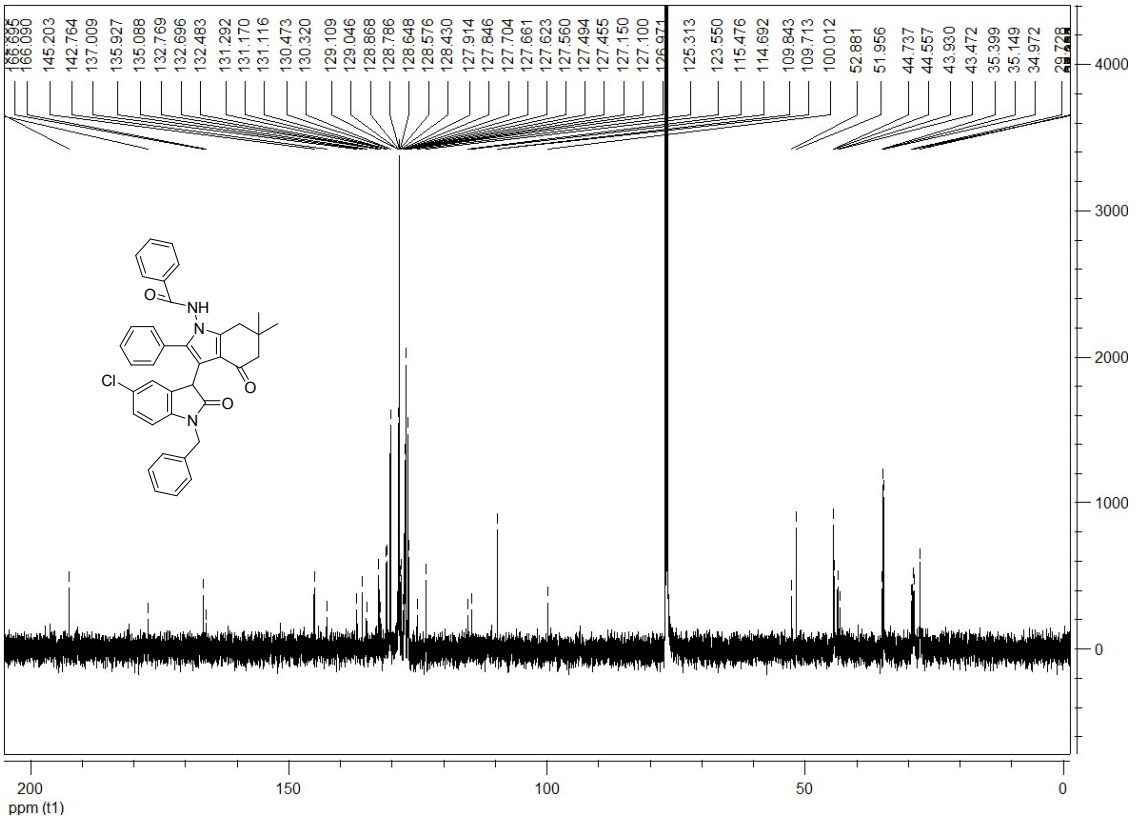
N-(3-(1-benzyl-5-methyl-2-oxoindolin-3-yl)-2-(4-chlorophenyl)-6,6-dimethyl-4-oxo-4,5,6,7-tetrahydro-1H-indol-1-yl)benzamide (1g):



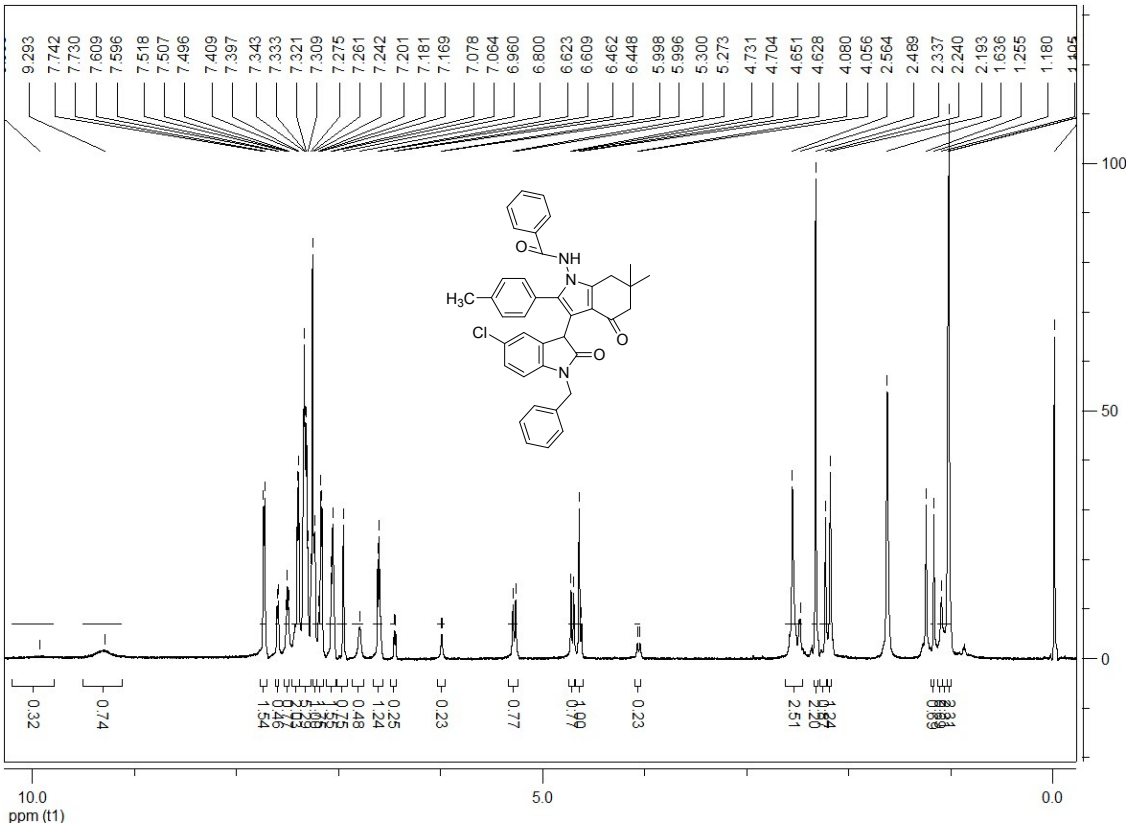


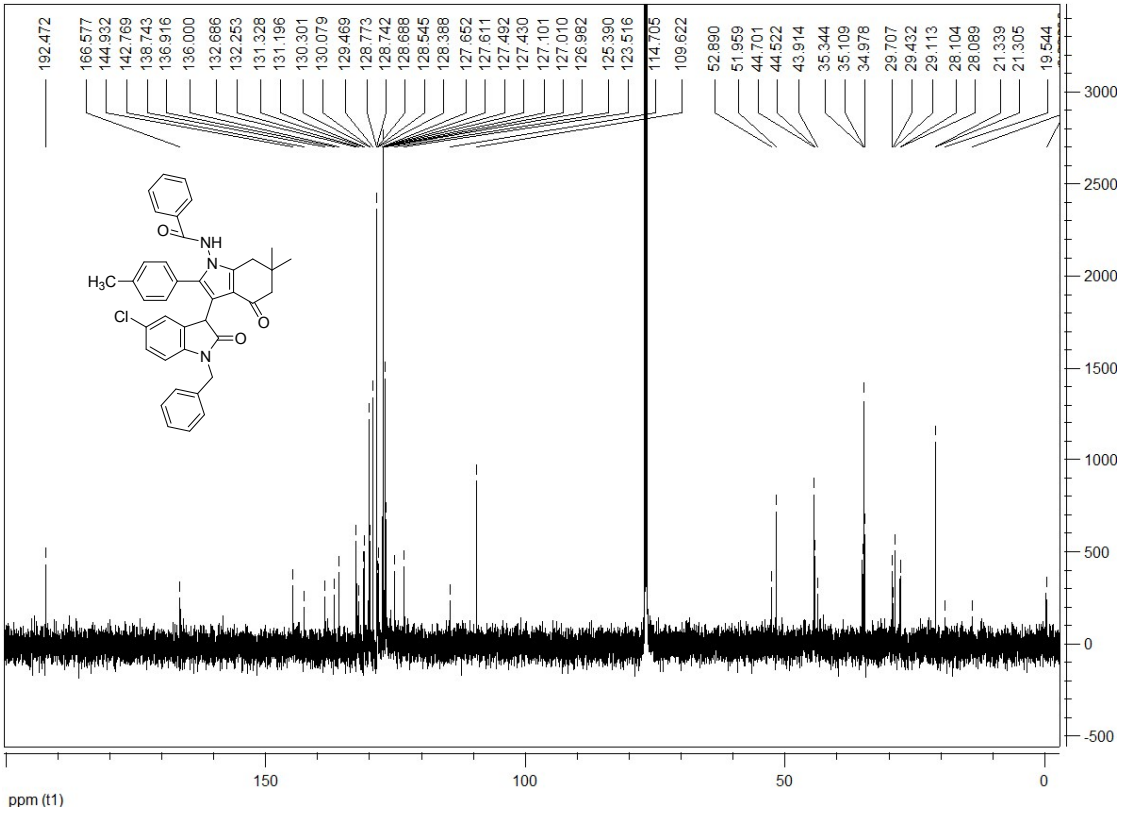
N-(3-(1-benzyl-5-chloro-2-oxoindolin-3-yl)-6,6-dimethyl-4-oxo-2-phenyl-4,5,6,7-tetrahydro-1H-indol-1-yl)benzamide (1h):



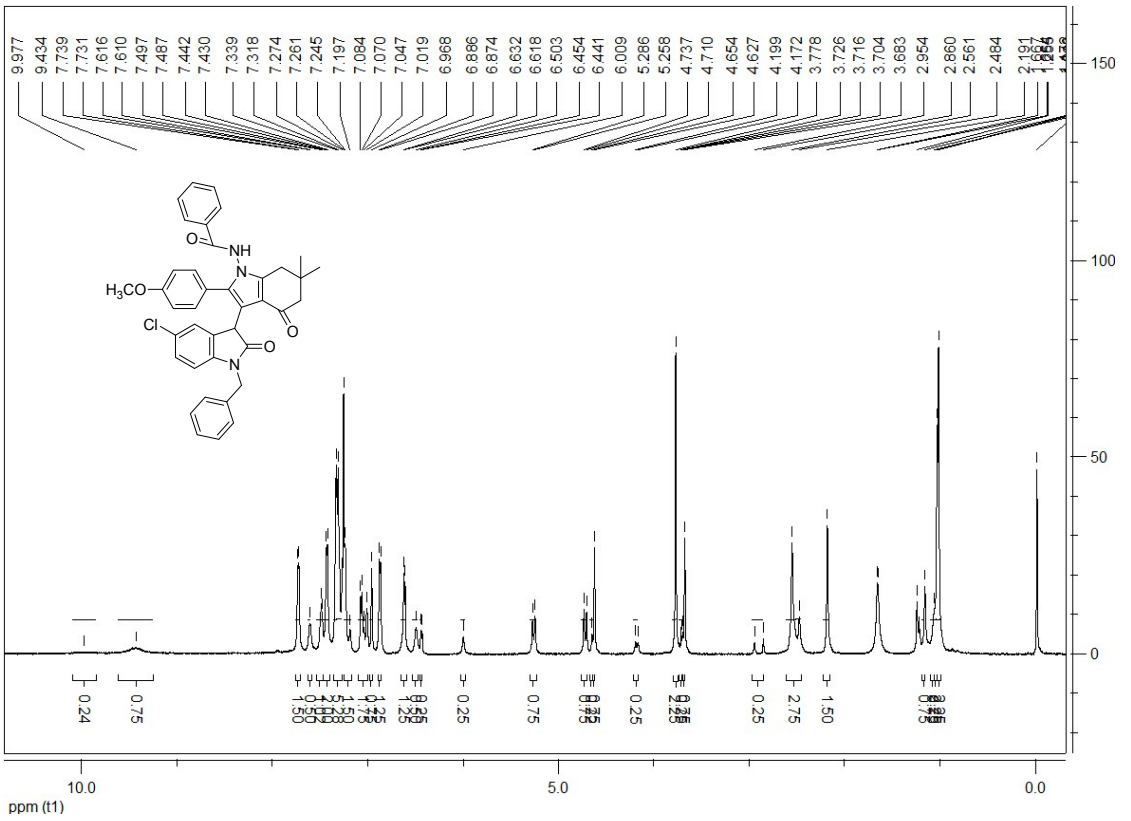


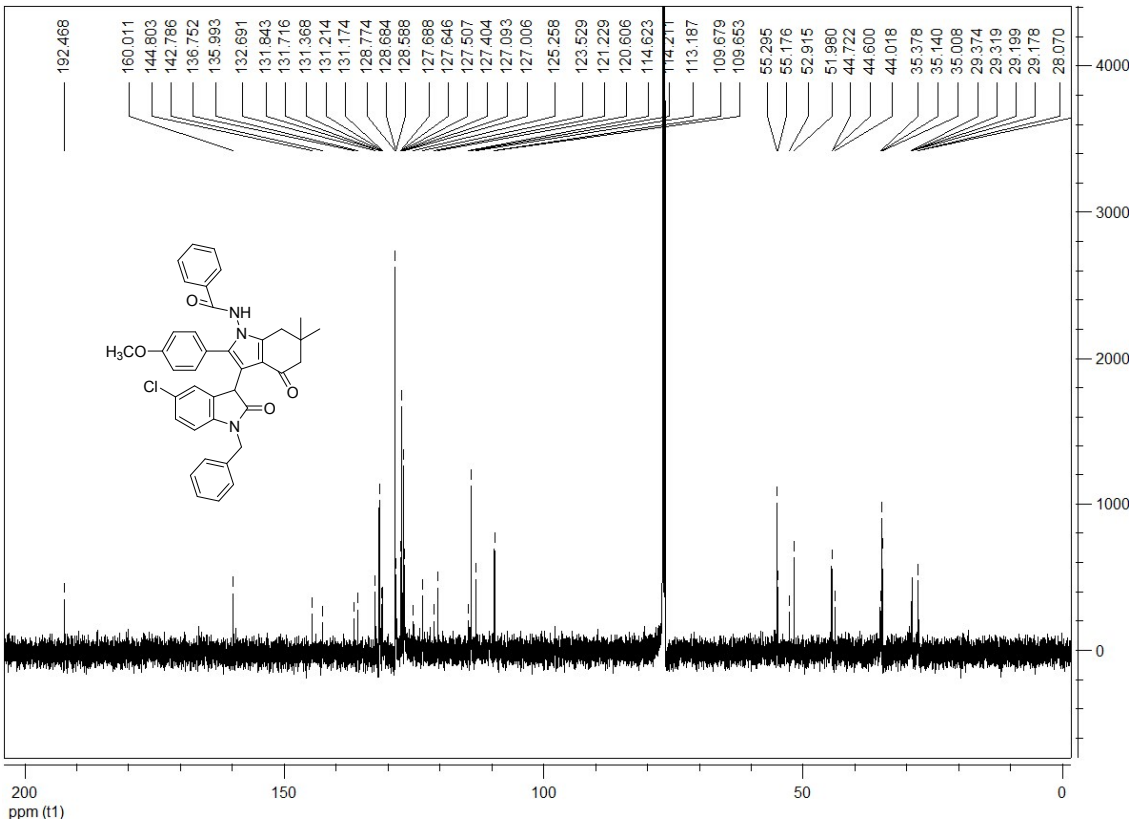
N-(3-(1-benzyl-5-chloro-2-oxoindolin-3-yl)-6,6-dimethyl-4-oxo-2-(p-tolyl)-4,5,6,7-tetrahydro-1H-indol-1-yl)benzamide (1i):



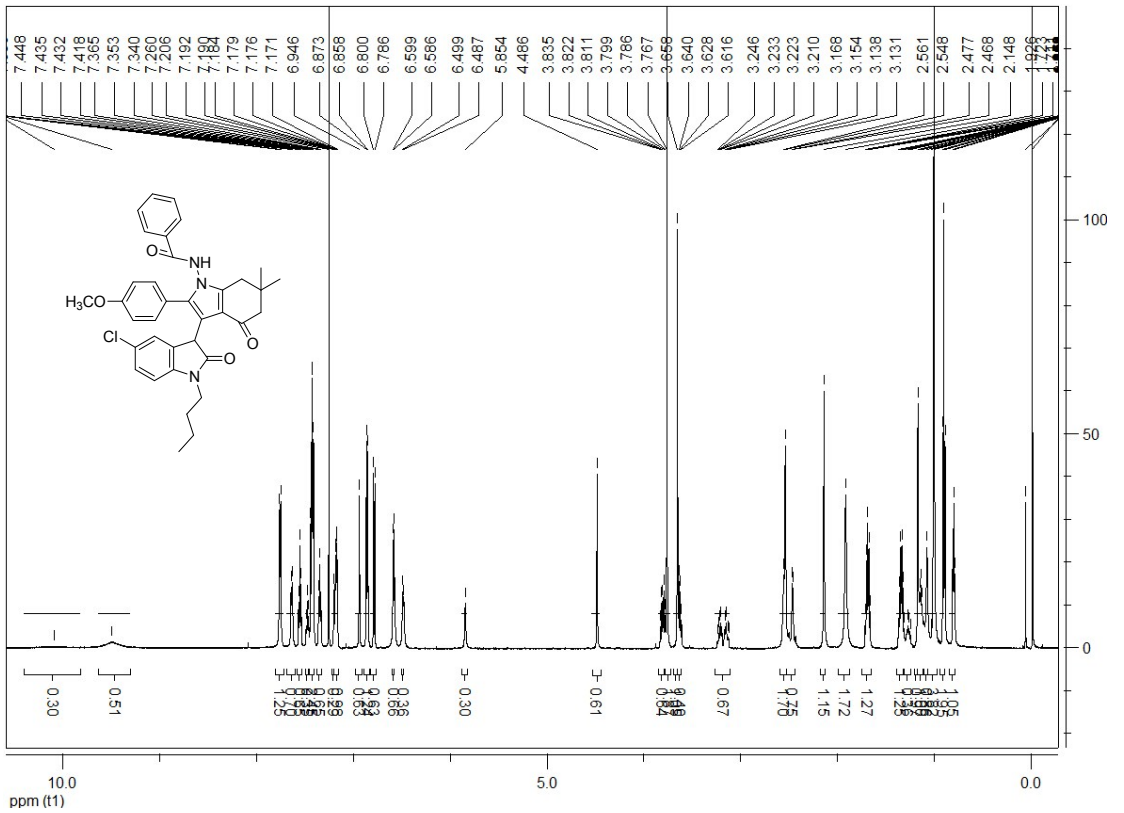


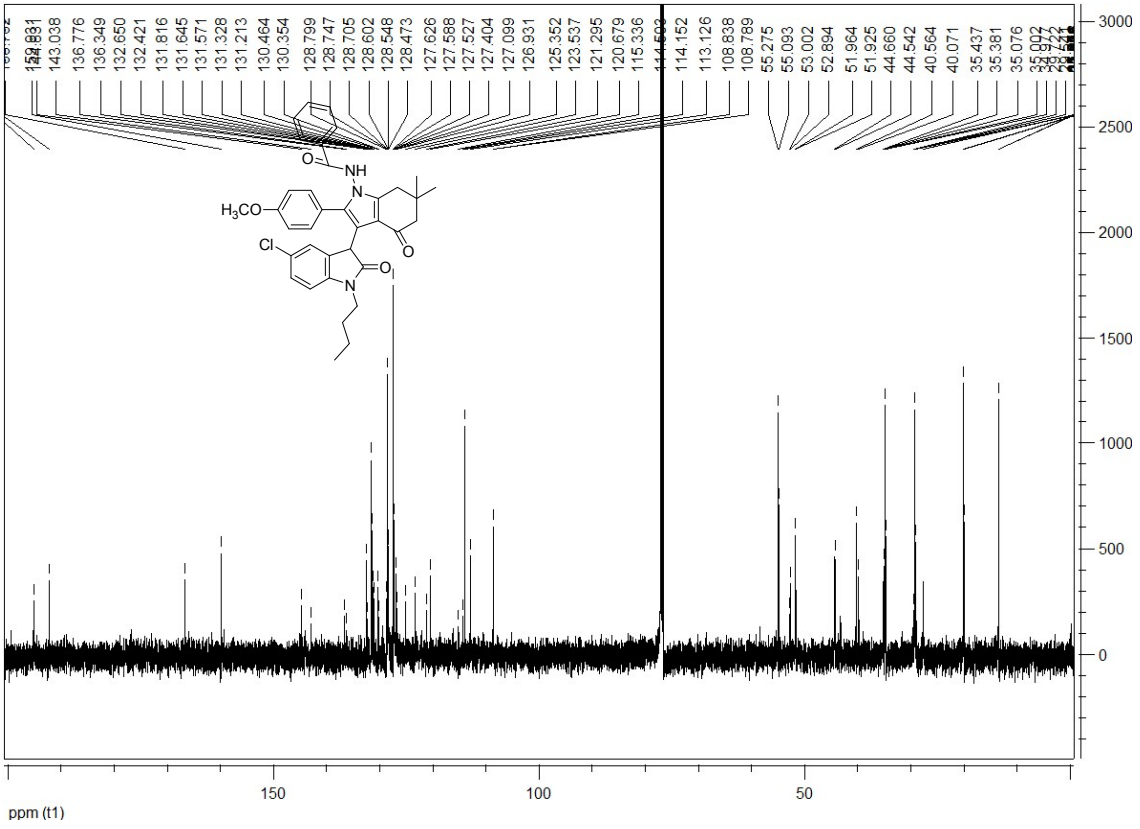
N-(3-(1-benzyl-5-chloro-2-oxoindolin-3-yl)-2-(4-methoxyphenyl)-6,6-dimethyl-4-oxo-4,5,6,7-tetrahydro-1H-indol-1-yl)benzamide (1j):



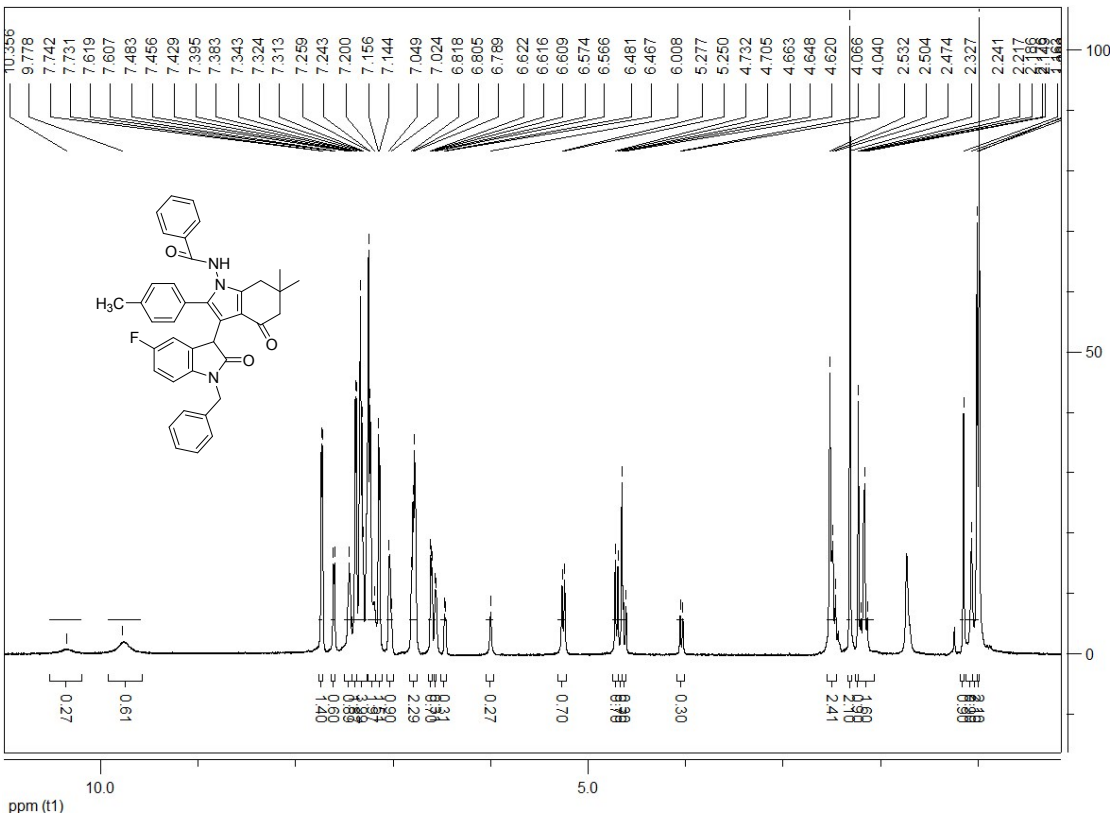


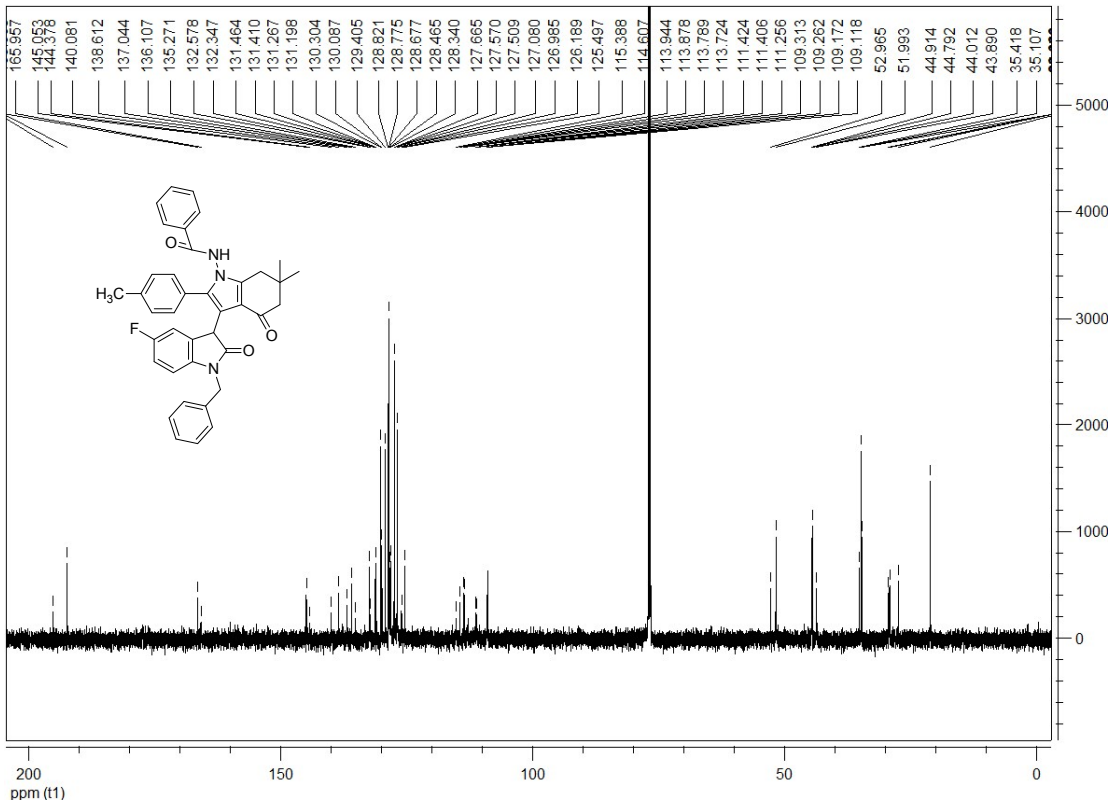
N-(3-(1-butyl-5-chloro-2-oxoindolin-3-yl)-2-(4-methoxyphenyl)-6,6-dimethyl-4-oxo-4,5,6,7-tetrahydro-1H-indol-1-yl)benzamide (1k):



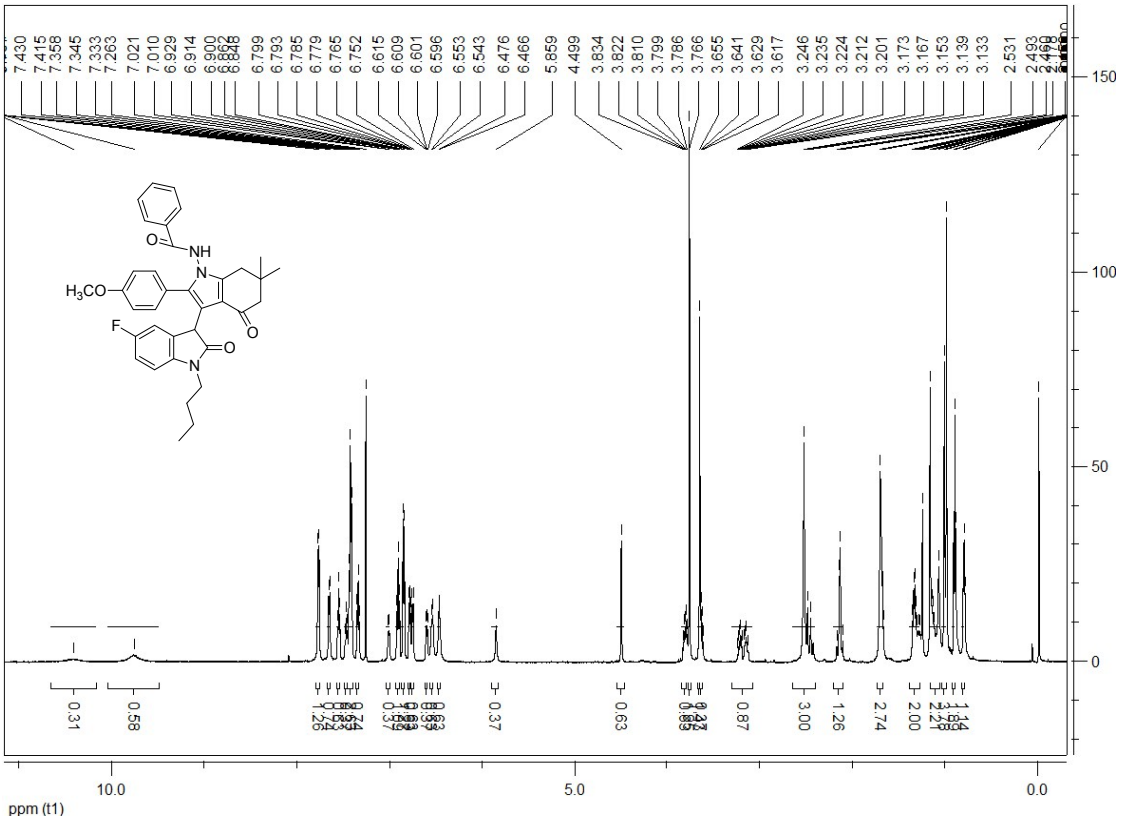


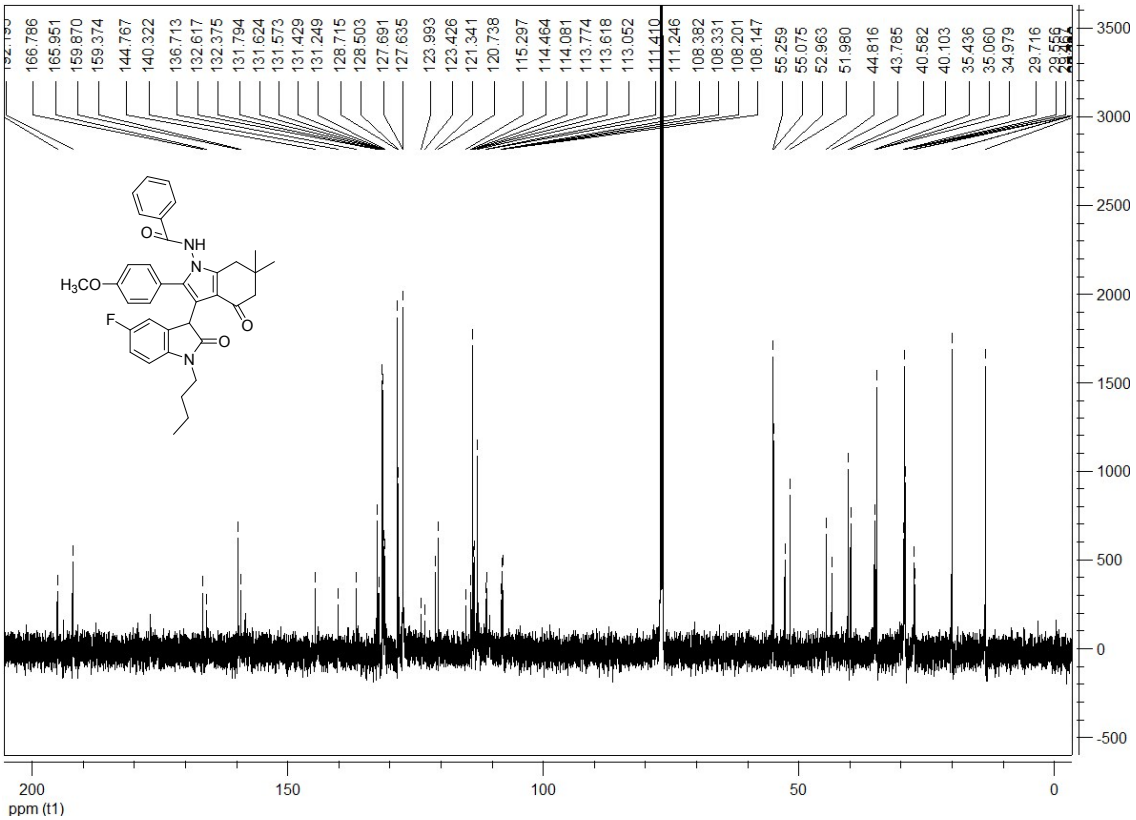
N-(3-(1-benzyl-5-fluoro-2-oxoindolin-3-yl)-6,6-dimethyl-4-oxo-2-(p-tolyl)-4,5,6,7-tetrahydro-1H-indol-1-yl)benzamide (1l):



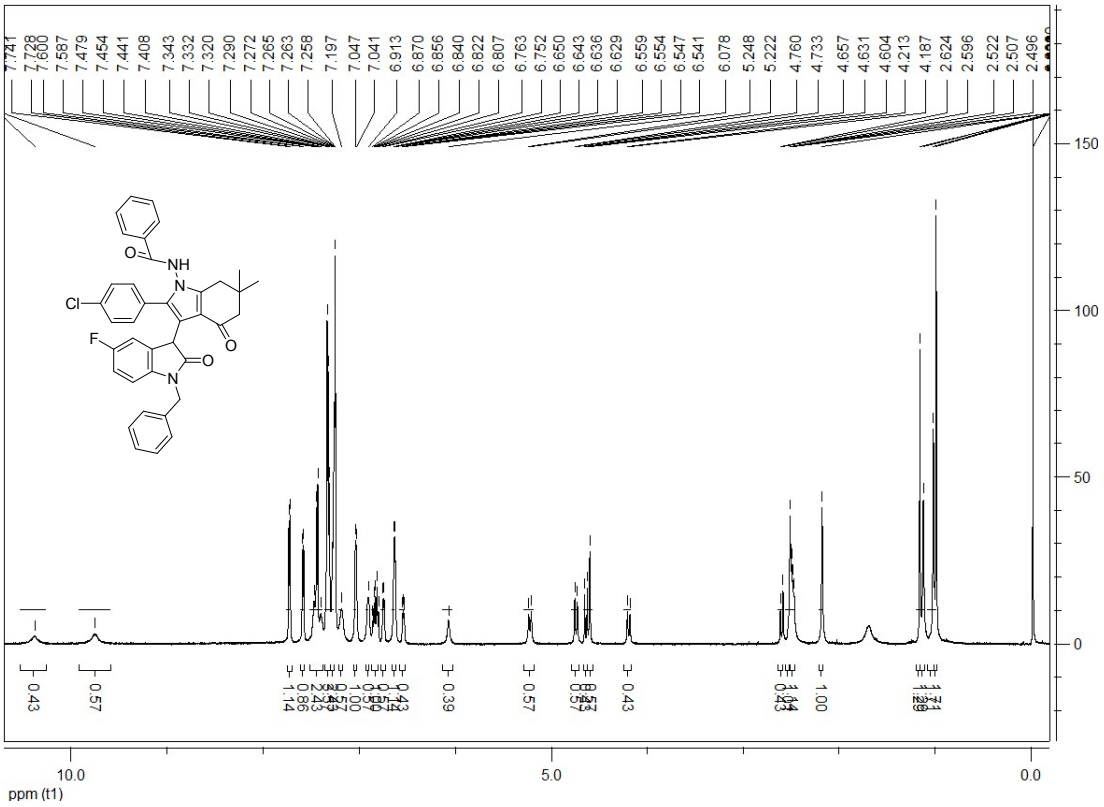


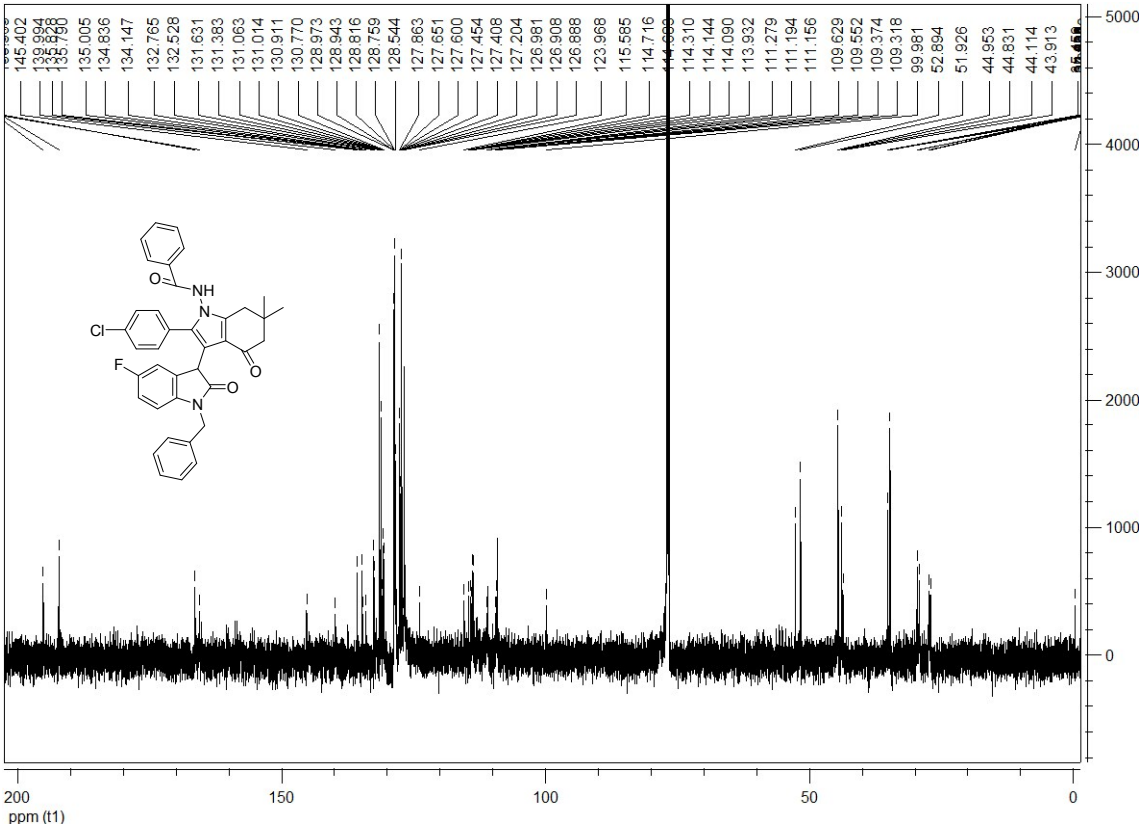
N-(3-(1-butyl-5-fluoro-2-oxoindolin-3-yl)-2-(4-methoxyphenyl)-6,6-dimethyl-4-oxo-4,5,6,7-tetrahydro-1H-indol-1-yl)benzamide (1m):



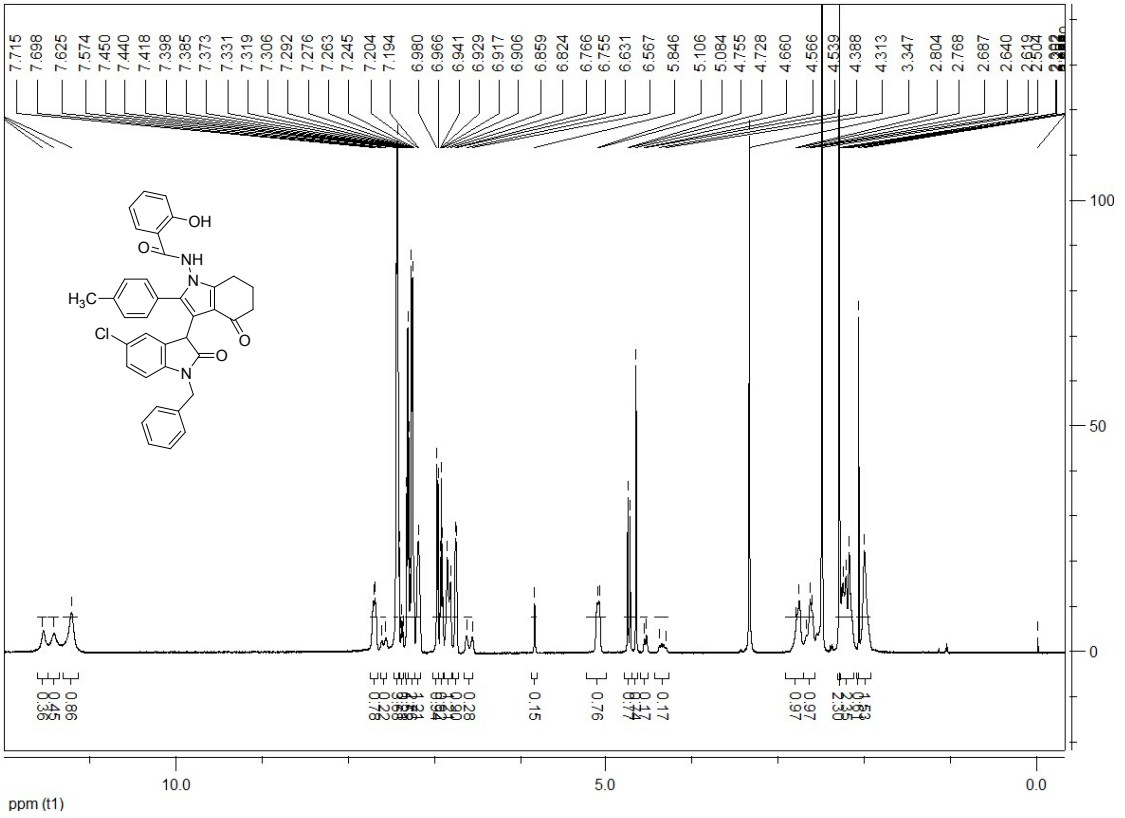


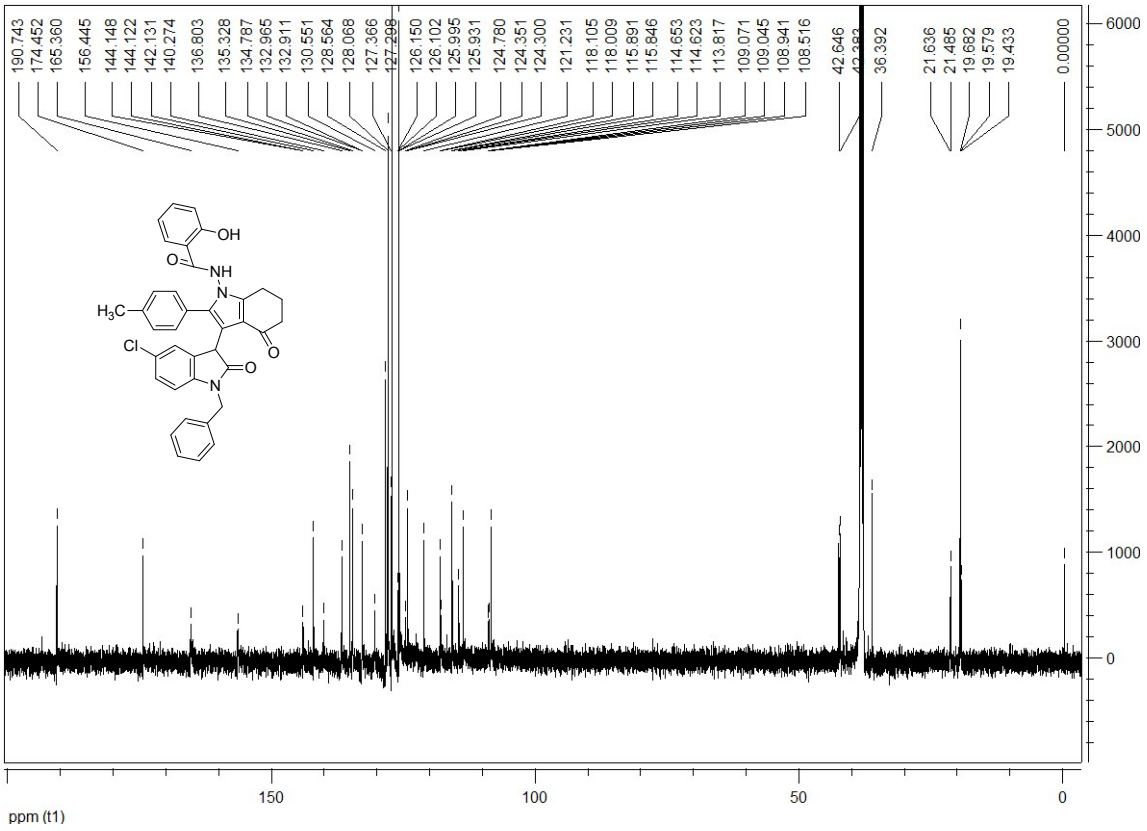
N-(3-(1-benzyl-5-fluoro-2-oxoindolin-3-yl)-2-(4-chlorophenyl)-6,6-dimethyl-4-oxo-4,5,6,7-tetrahydro-1H-indol-1-yl)benzamide (1n):



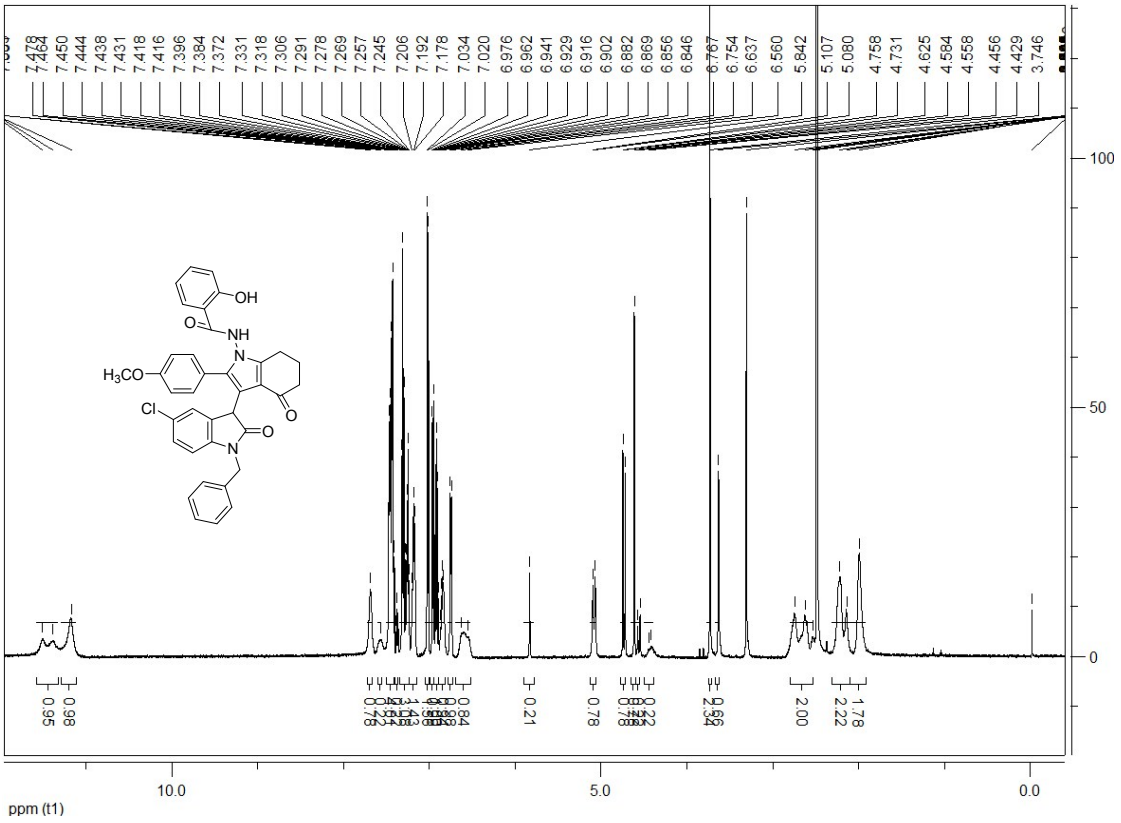


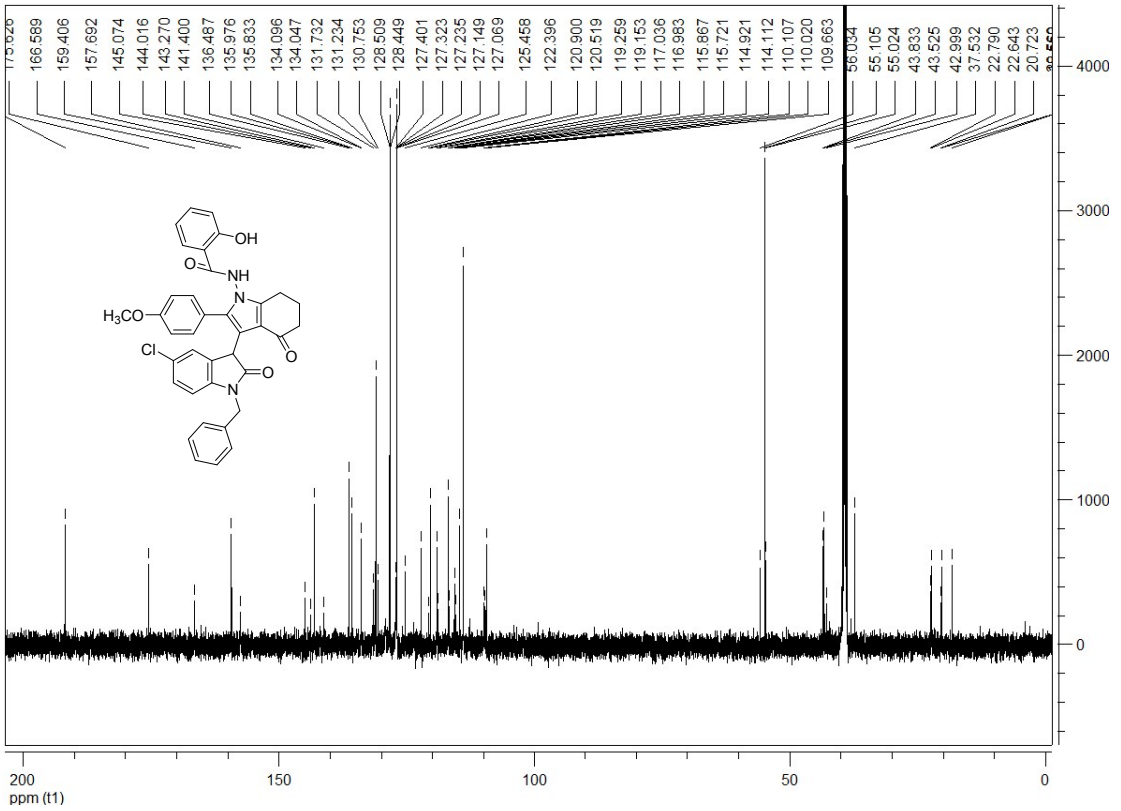
N-(3-(1-benzyl-5-chloro-2-oxoindolin-3-yl)-4-oxo-2-(p-tolyl)-4,5,6,7-tetrahydro-1H-indol-1-yl)-2-hydroxybenzamide (2a):



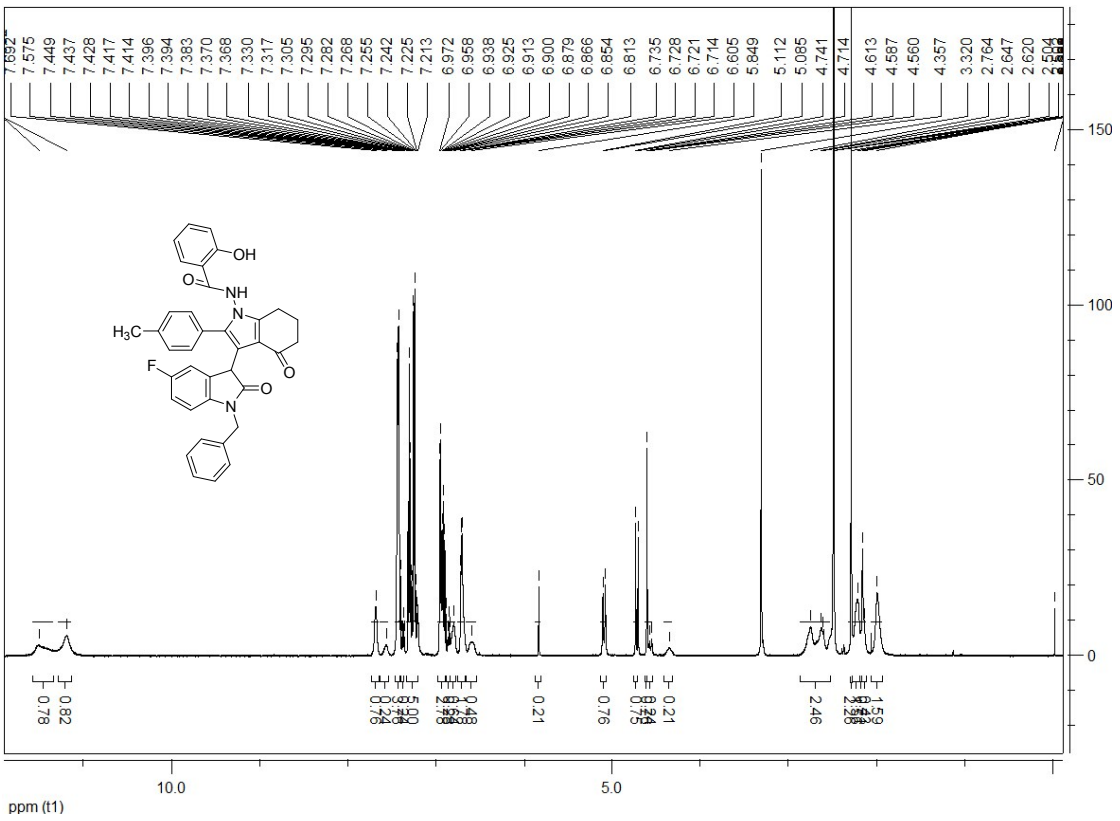


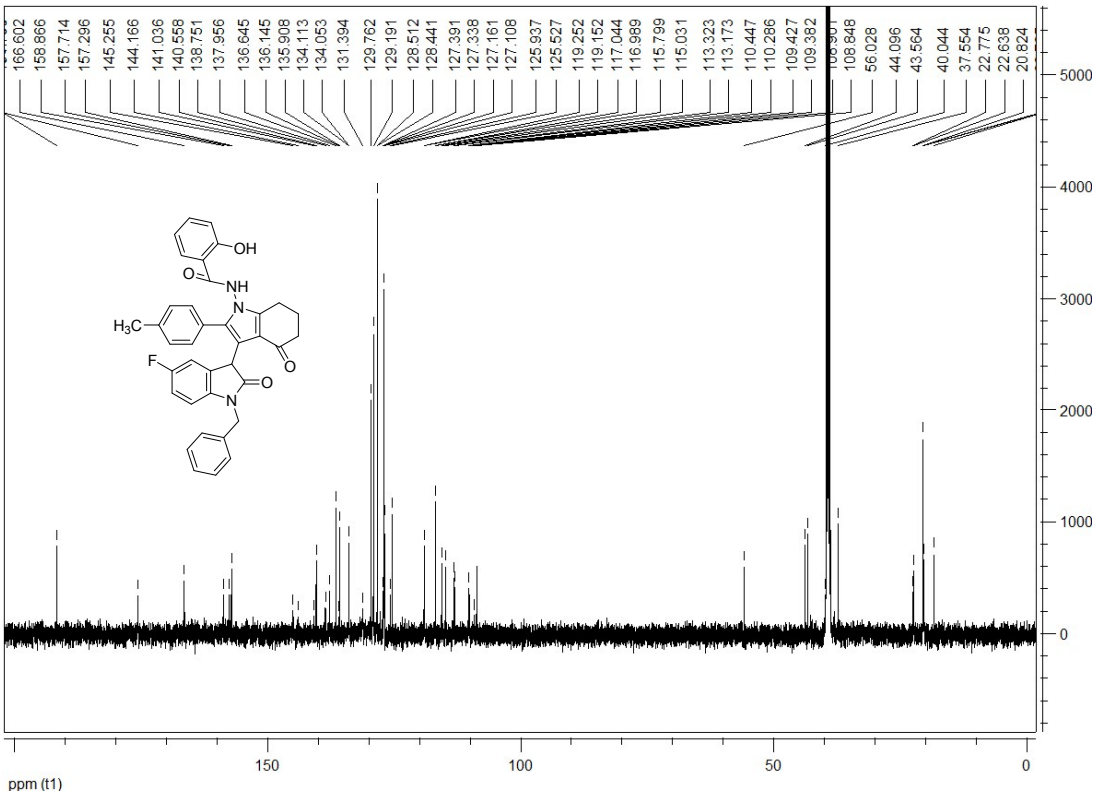
N-(3-(1-benzyl-5-chloro-2-oxoindolin-3-yl)-2-(4-methoxyphenyl)-4-oxo-4,5,6,7-tetrahydro-1H-indol-1-yl)-2-hydroxybenzamide (2b):



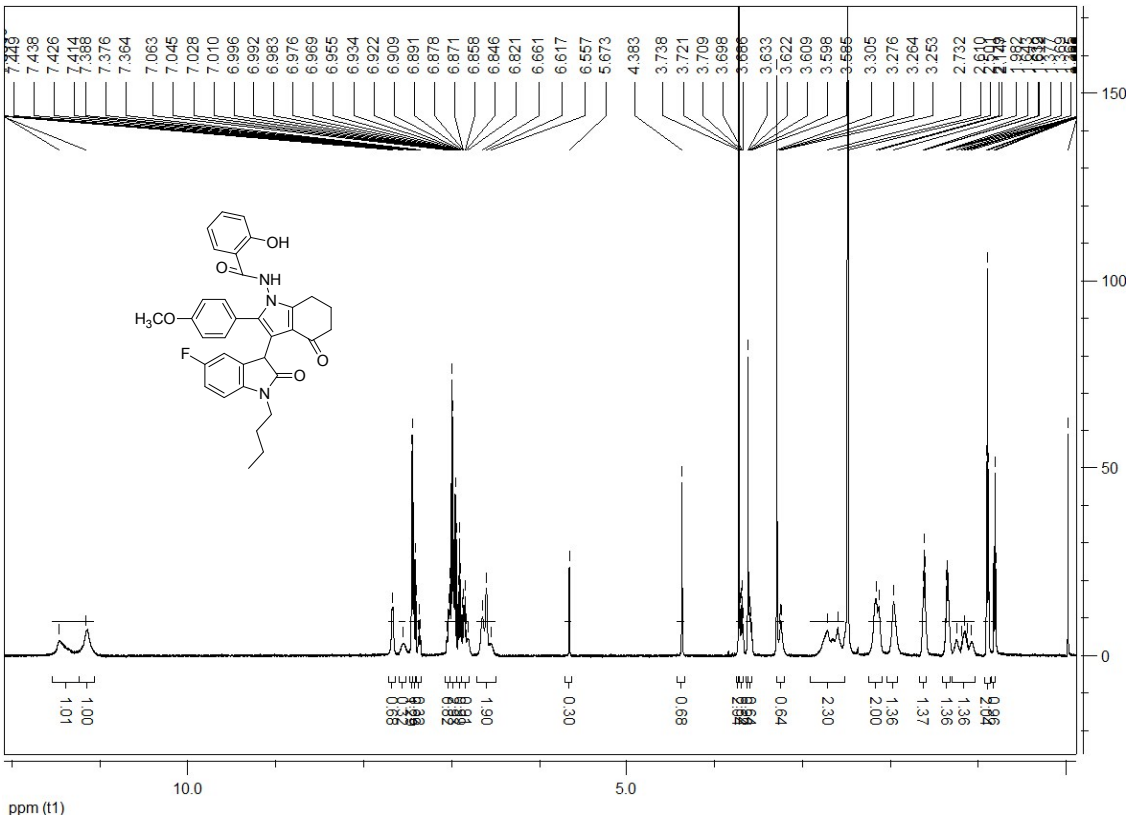


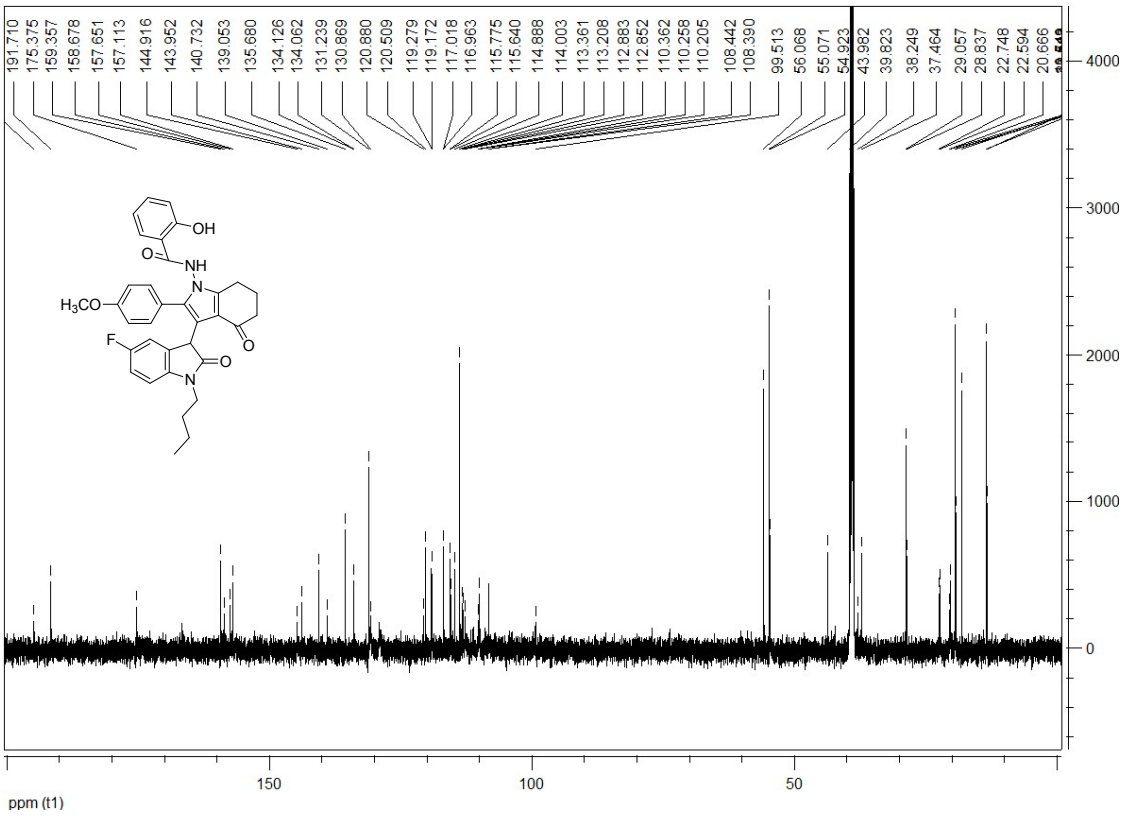
N-(3-(1-benzyl-5-fluoro-2-oxoindolin-3-yl)-4-oxo-2-(p-tolyl)-4,5,6,7-tetrahydro-1H-indol-1-yl)-2-hydroxybenzamide (2c):



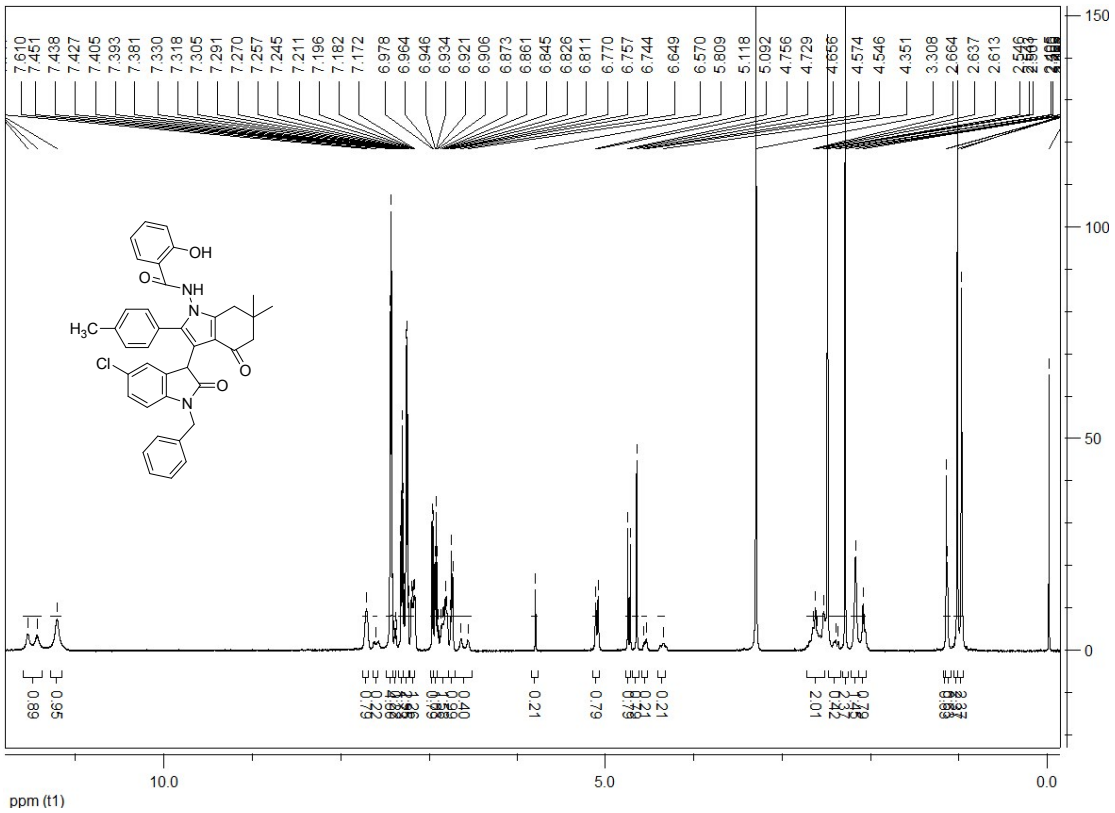


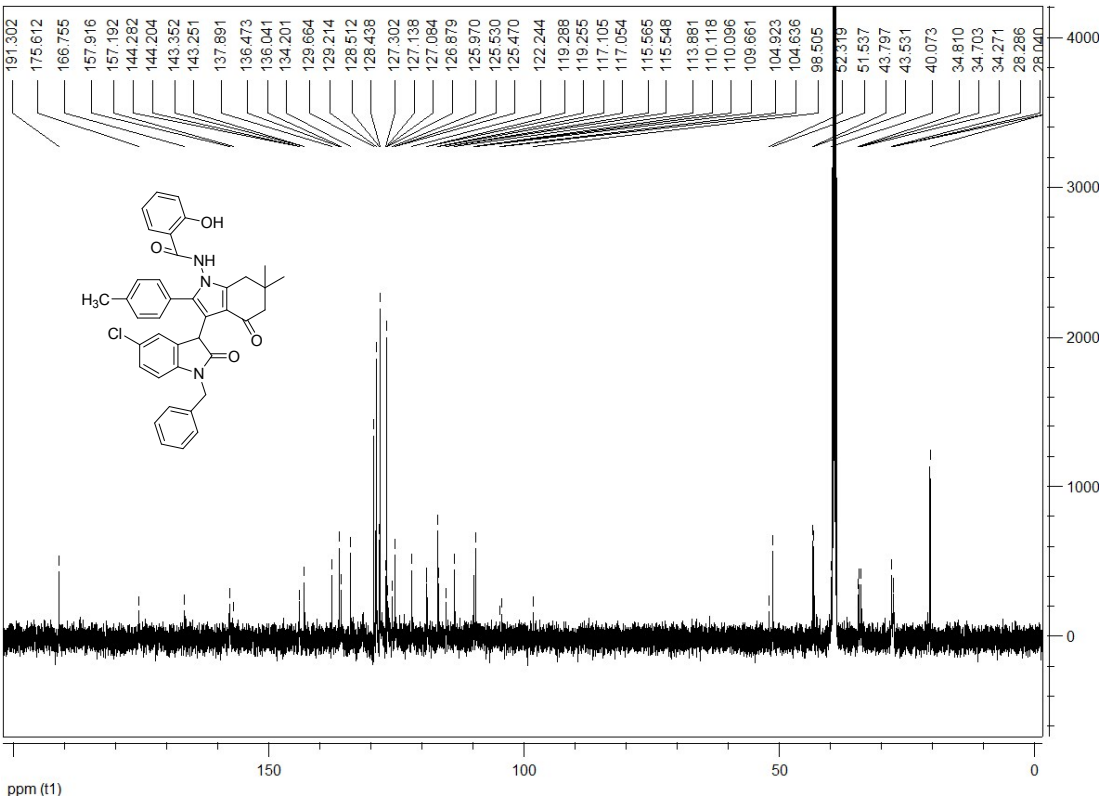
N-(3-(1-butyl-5-fluoro-2-oxoindolin-3-yl)-2-(4-methoxyphenyl)-4-oxo-4,5,6,7-tetrahydro-1H-indol-1-yl)-2-hydroxybenzamide (2d):



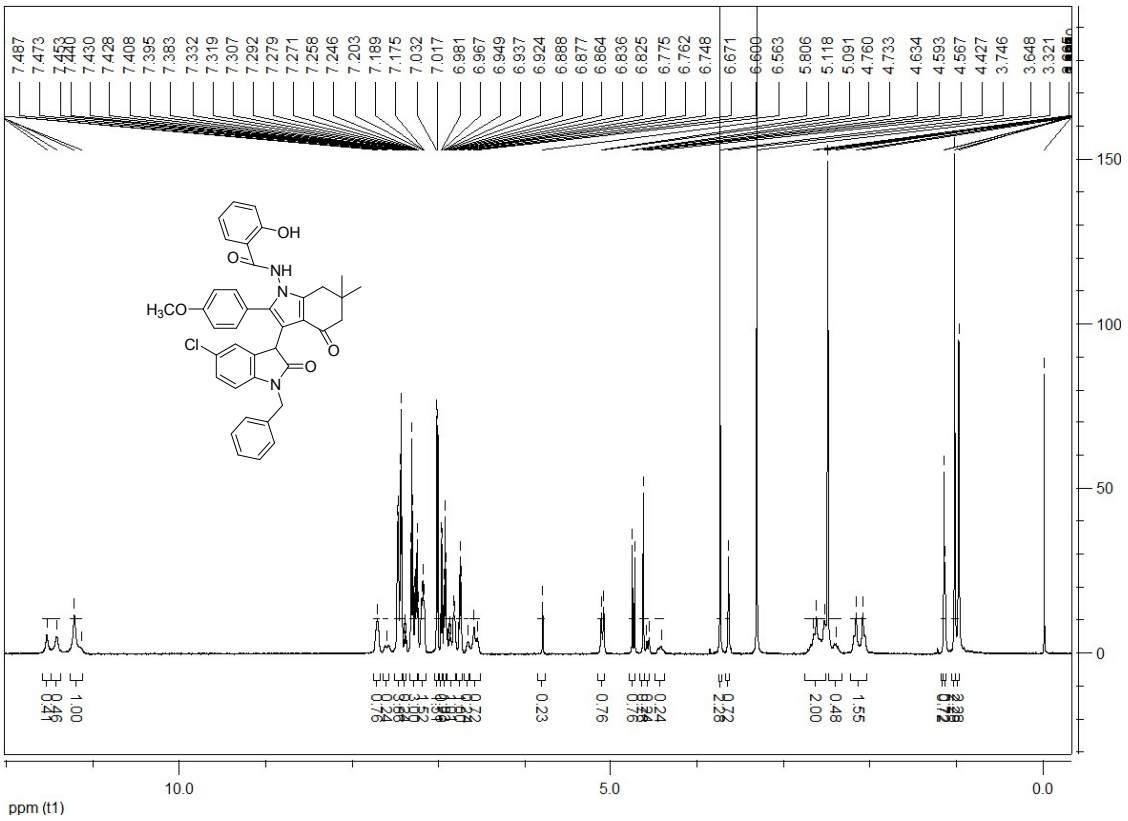


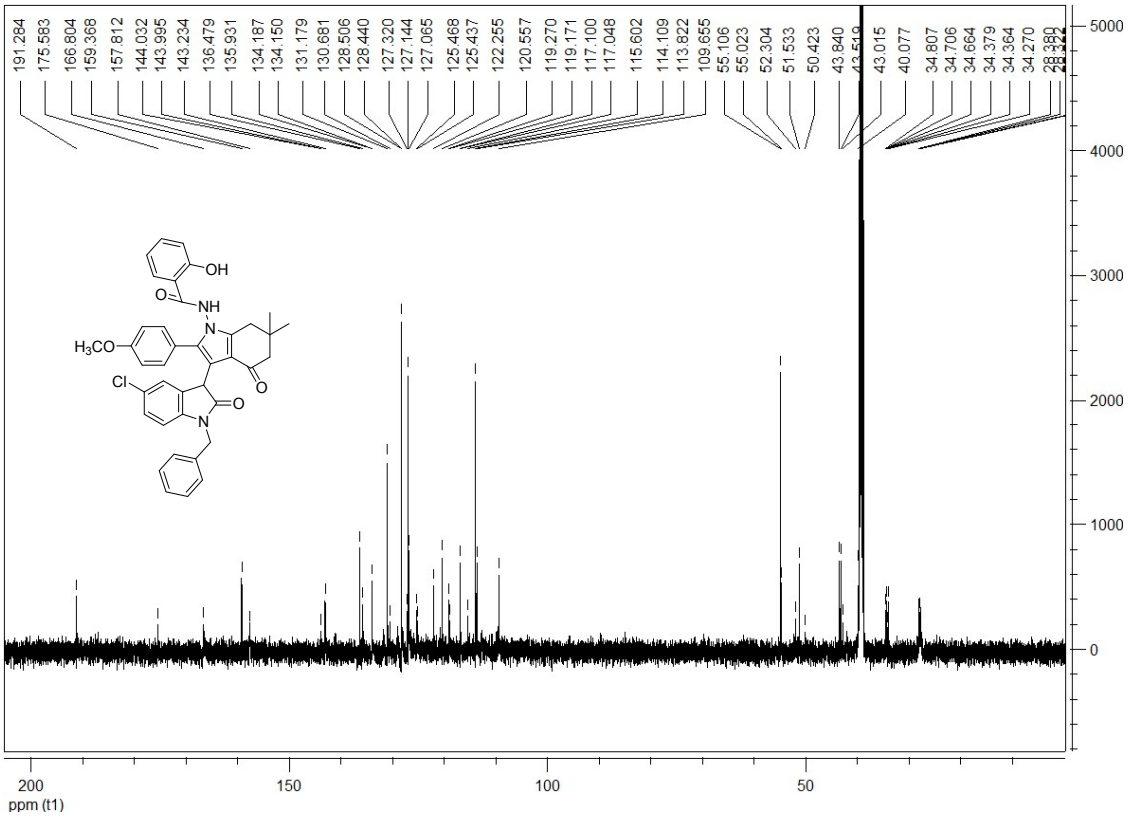
N-(3-(1-benzyl-5-chloro-2-oxoindolin-3-yl)-6,6-dimethyl-4-oxo-2-(p-tolyl)-4,5,6,7-tetrahydro-1H-indol-1-yl)-2-hydroxybenzamide (2e):



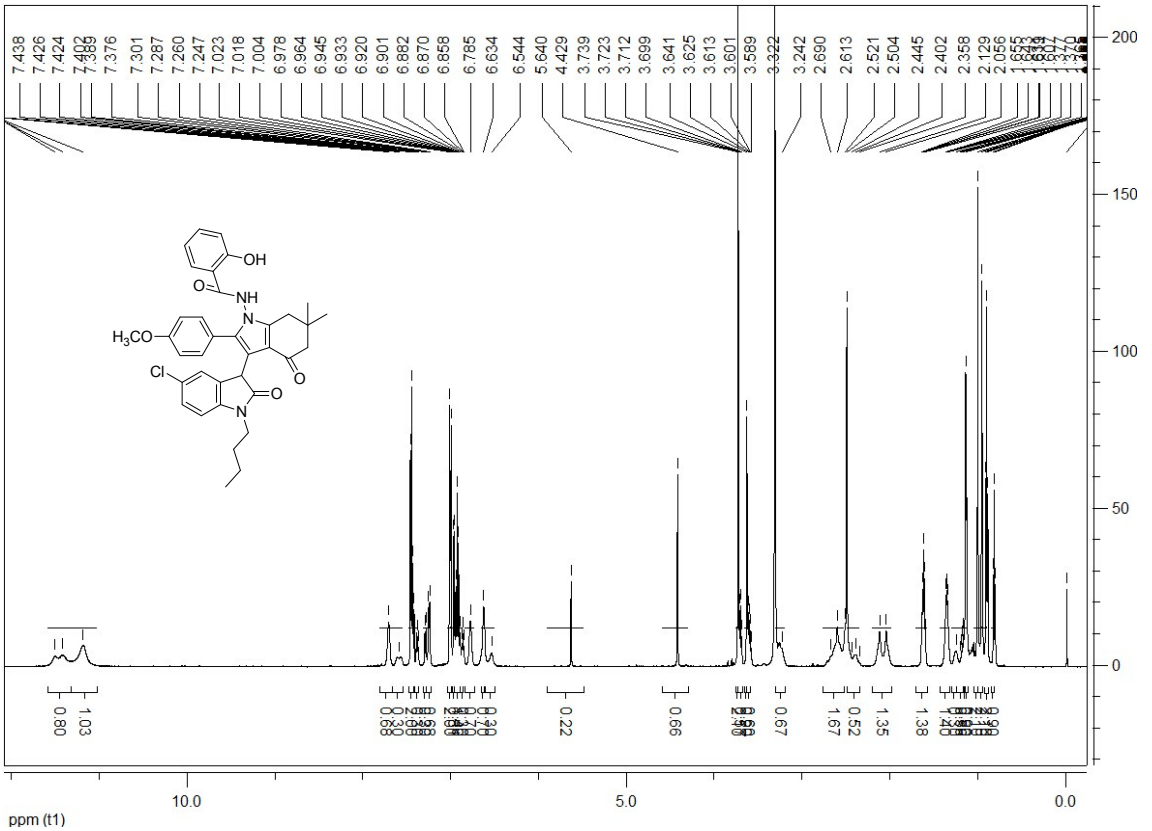


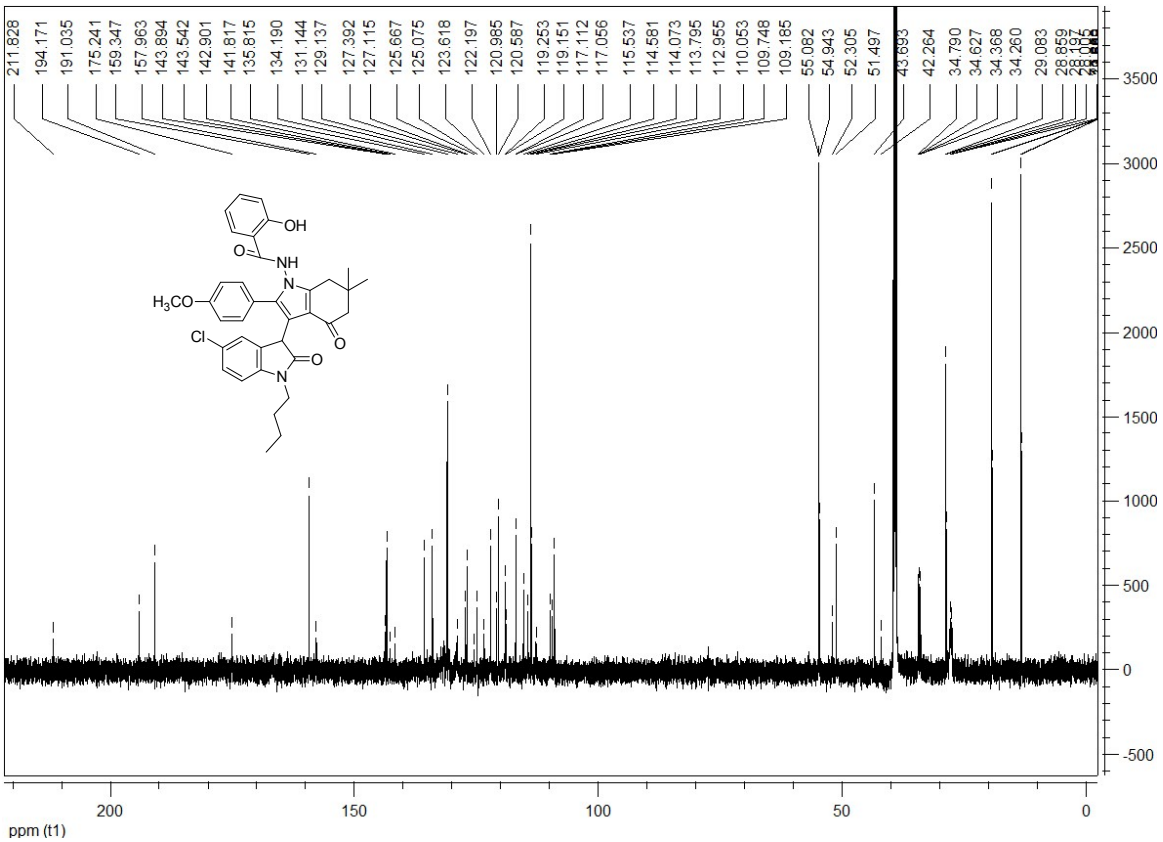
N-(3-(1-benzyl-5-chloro-2-oxoindolin-3-yl)-2-(4-methoxyphenyl)-6,6-dimethyl-4-oxo-4,5,6,7-tetrahydro-1H-indol-1-yl)-2-hydroxybenzamide (2f):



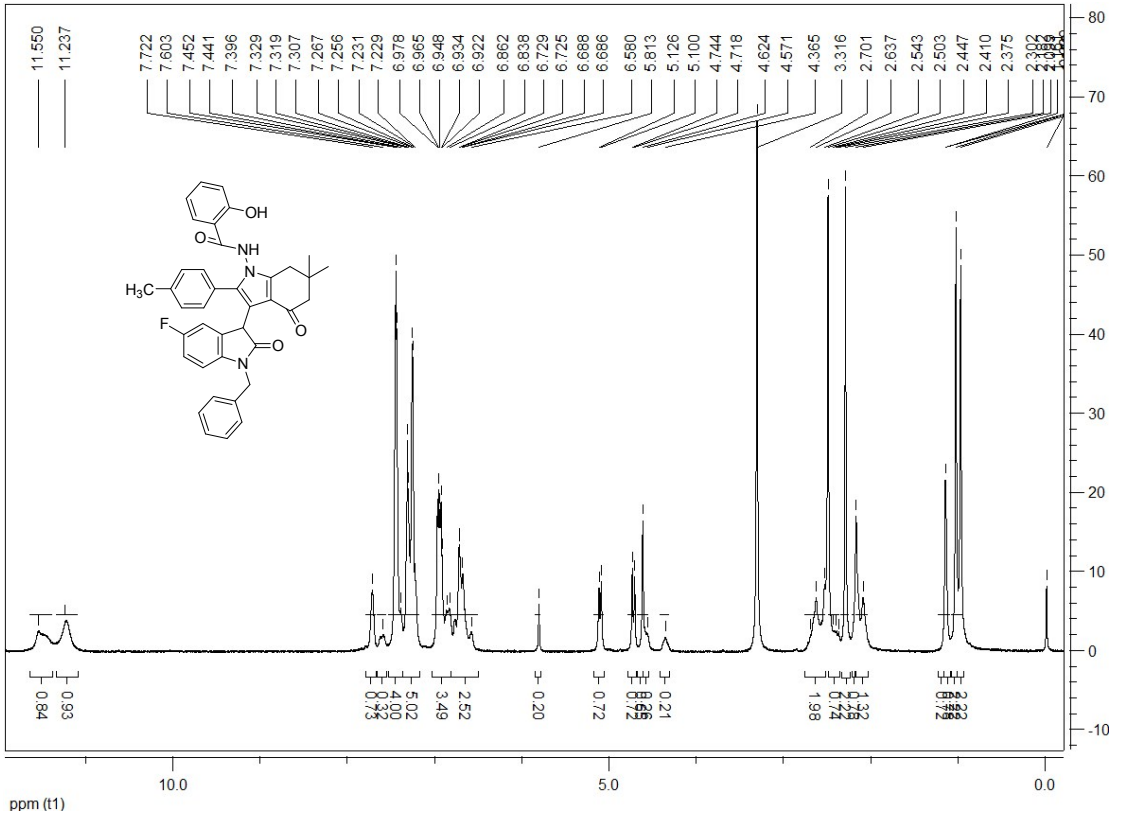


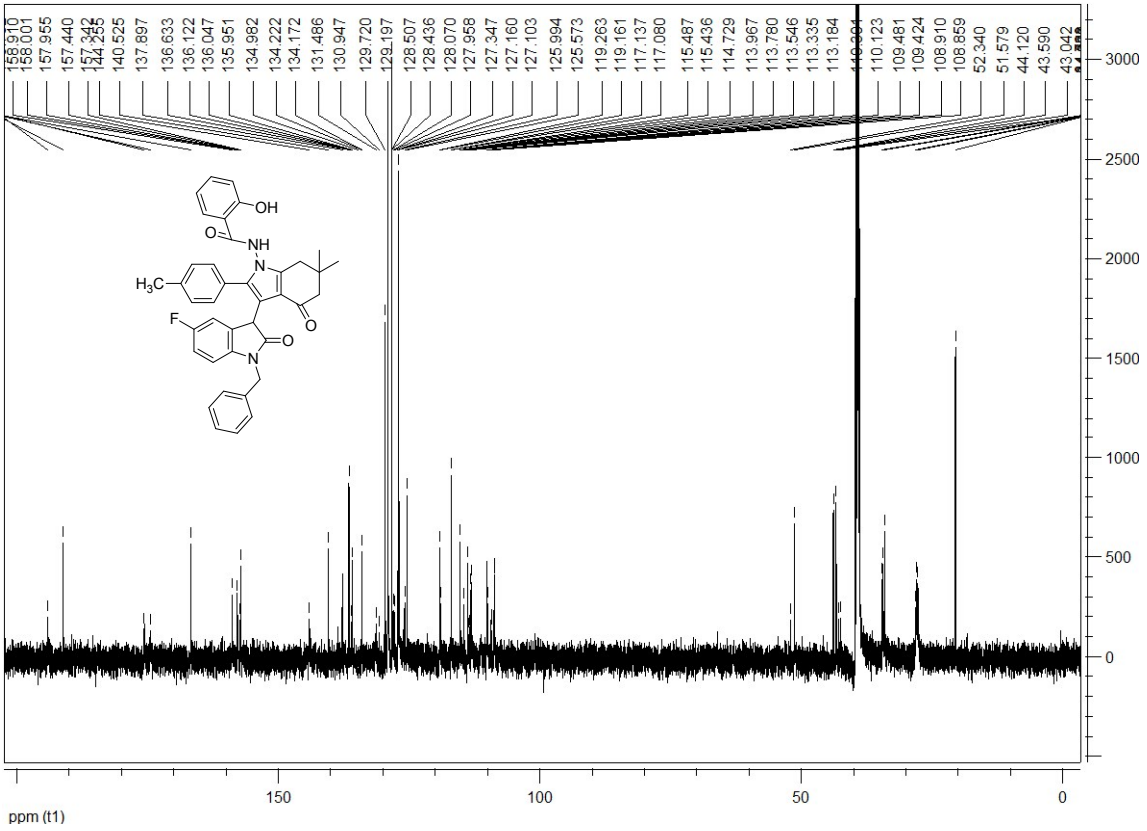
N-(3-(1-butyl-5-chloro-2-oxoindolin-3-yl)-2-(4-methoxyphenyl)-6,6-dimethyl-4-oxo-4,5,6,7-tetrahydro-1H-indol-1-yl)-2-hydroxybenzamide (2g):



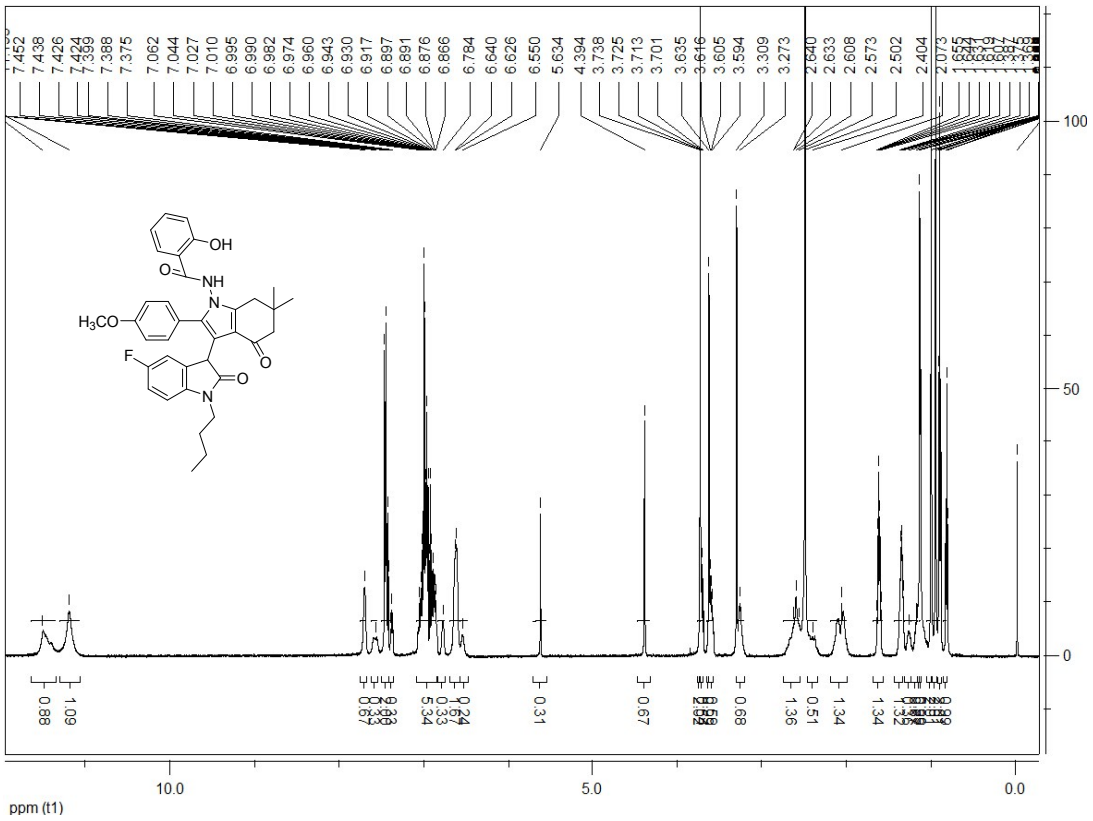


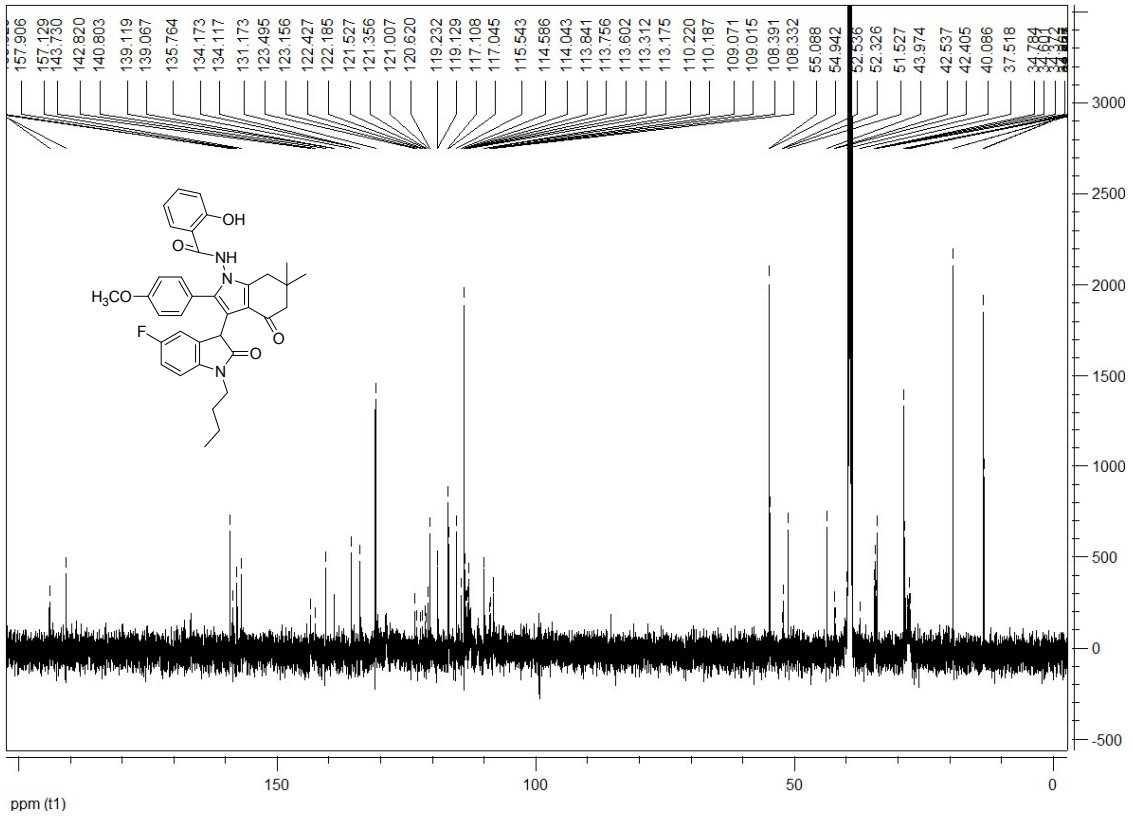
N-(3-(1-benzyl-5-fluoro-2-oxoindolin-3-yl)-6,6-dimethyl-4-oxo-2-(p-tolyl)-4,5,6,7-tetrahydro-1H-indol-1-yl)-2-hydroxybenzamide (2h):



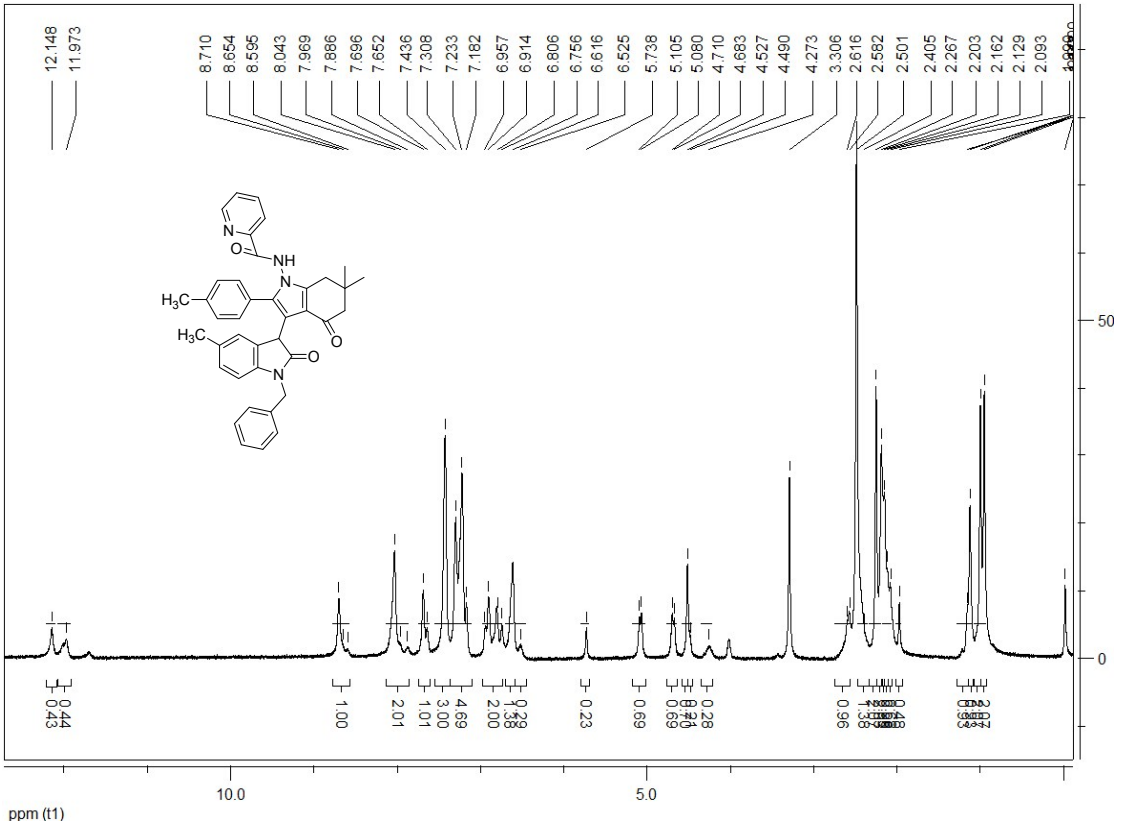


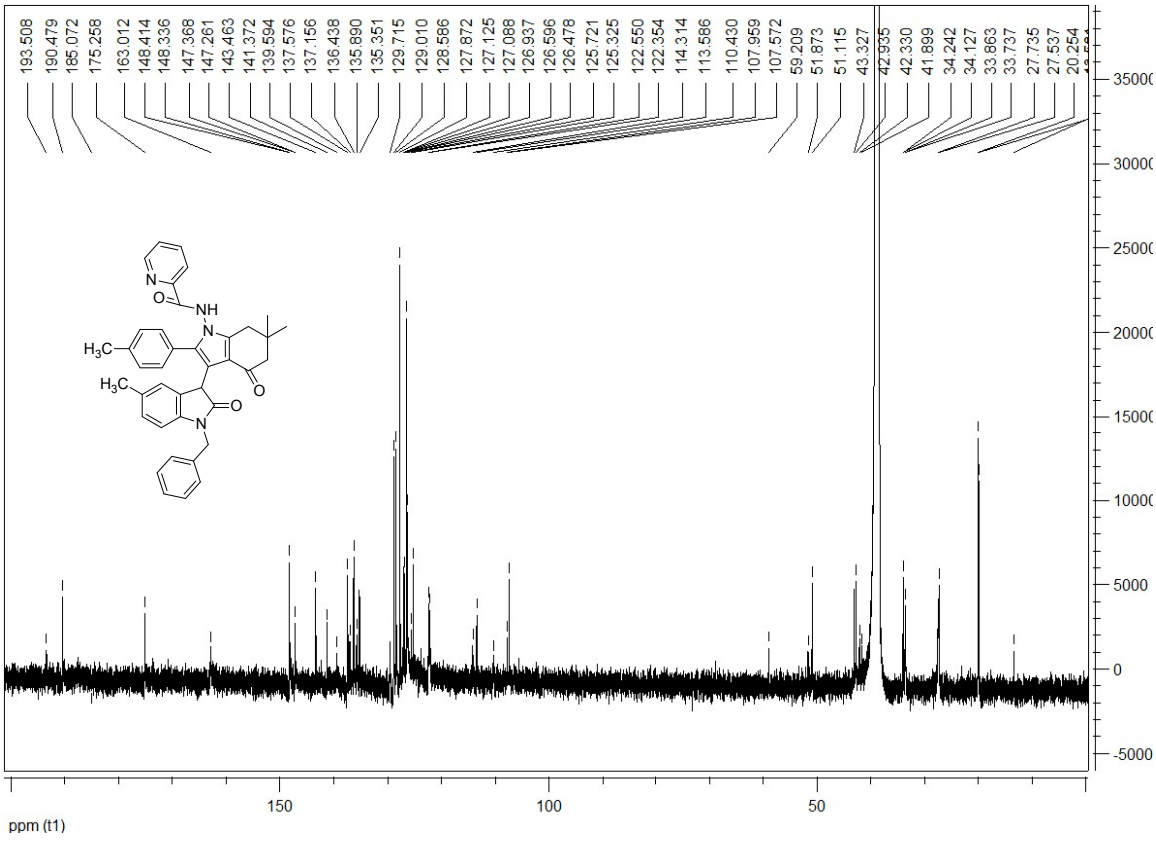
N-(3-(1-butyl-5-fluoro-2-oxoindolin-3-yl)-2-(4-methoxyphenyl)-6,6-dimethyl-4-oxo-4,5,6,7-tetrahydro-1H-indol-1-yl)-2-hydroxybenzamide (2i):



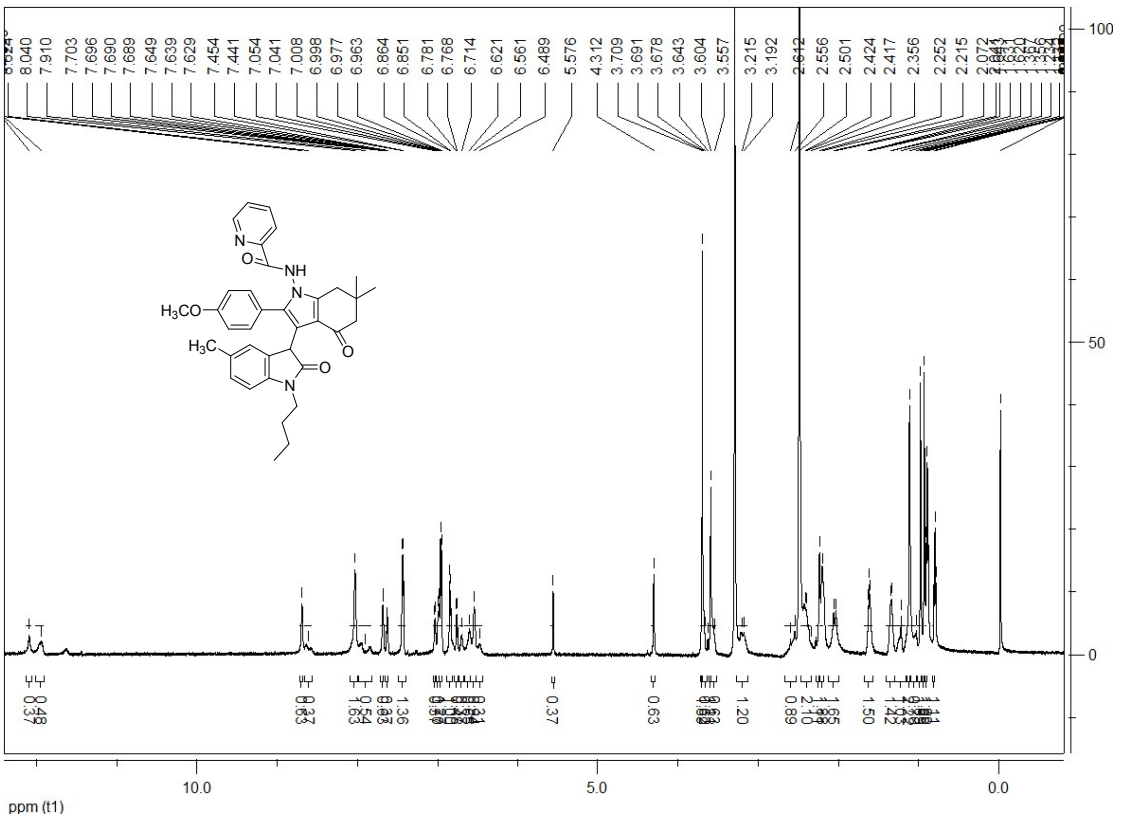


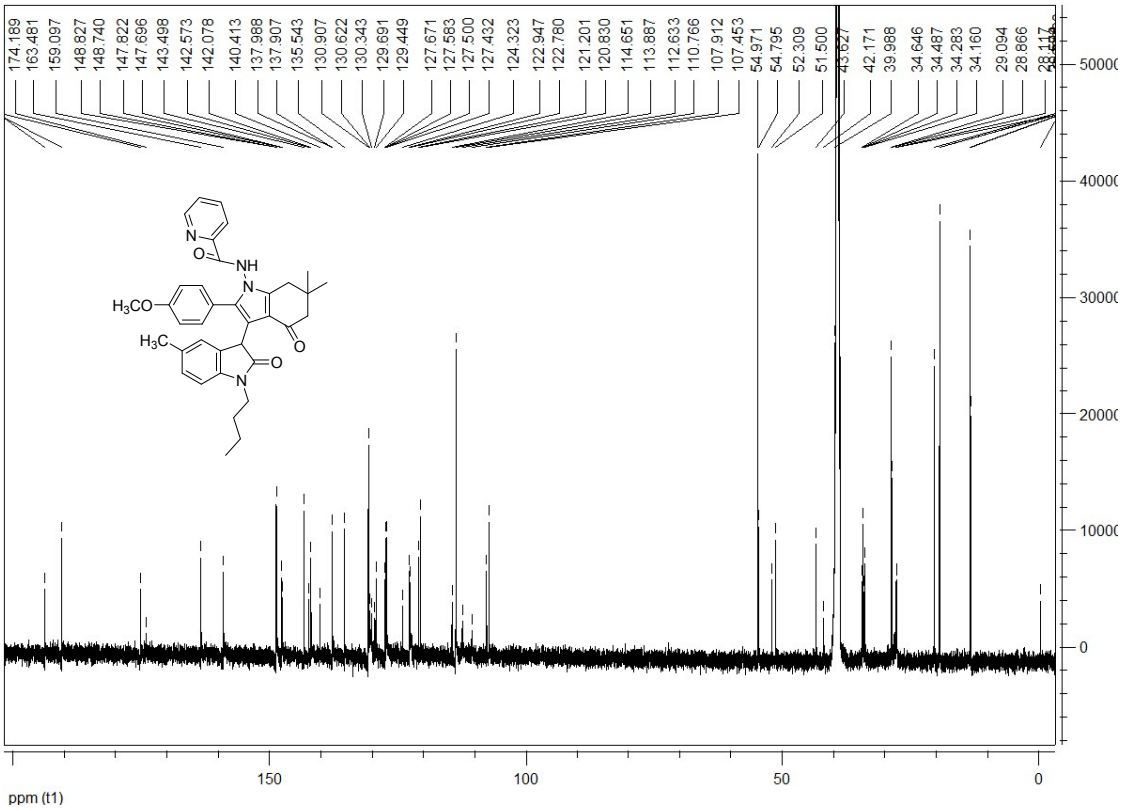
N-(3-(1-benzyl-5-methyl-2-oxoindolin-3-yl)-6,6-dimethyl-4-oxo-2-(p-tolyl)-4,5,6,7-tetrahydro-1H-indol-1-yl)picolinamide (3a):



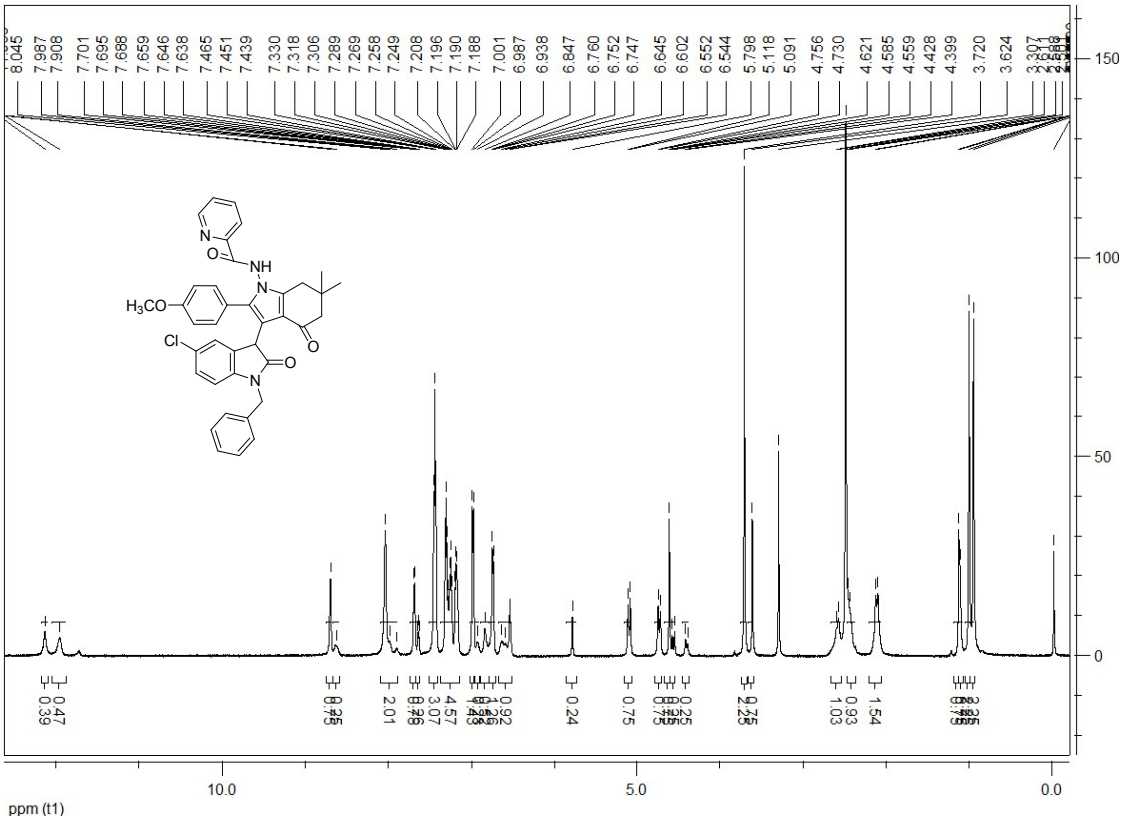


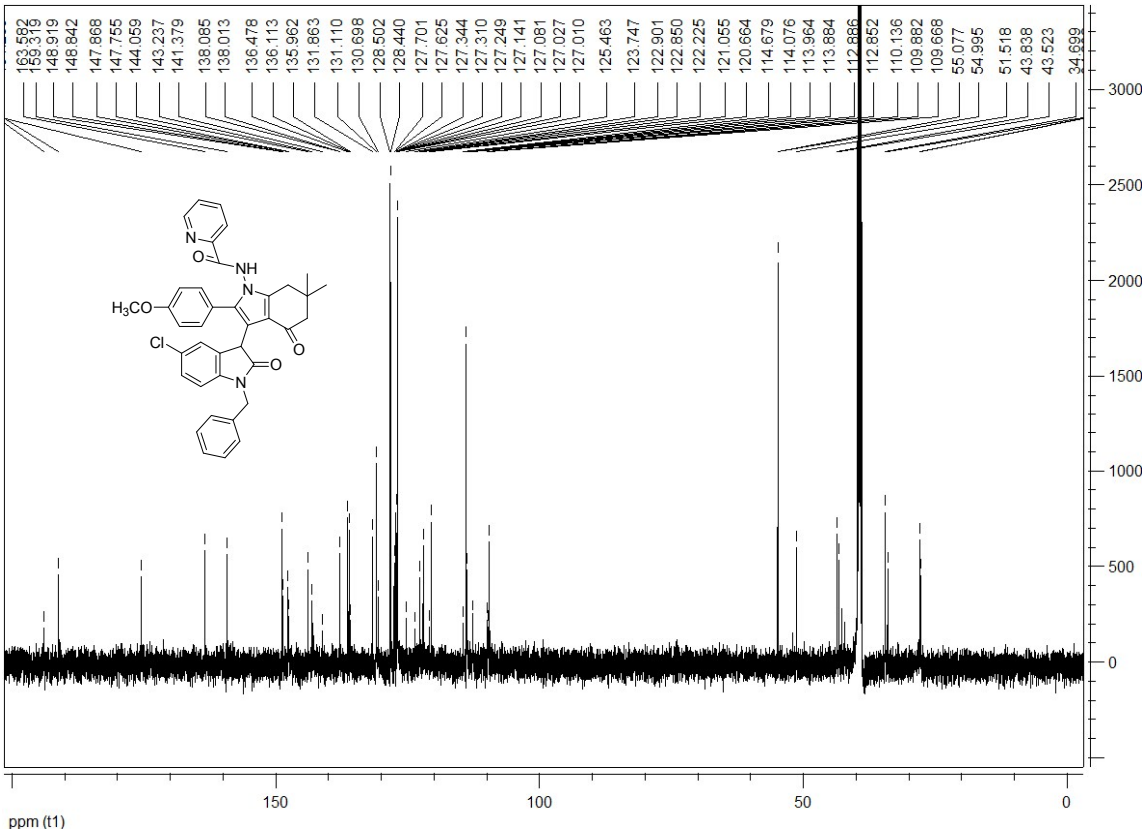
N-(3-(1-butyl-5-methyl-2-oxoindolin-3-yl)-2-(4-methoxyphenyl)-6,6-dimethyl-4-oxo-4,5,6,7-tetrahydro-1H-indol-1-yl)picolinamide (3b):



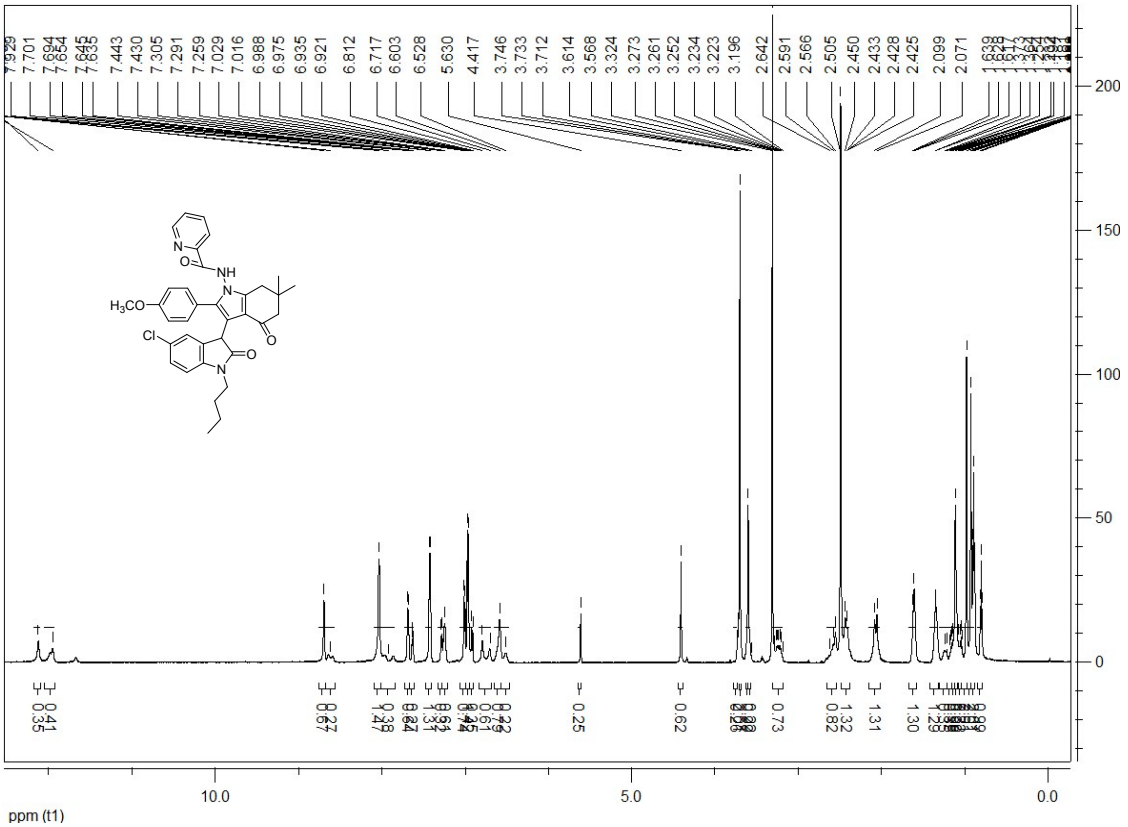


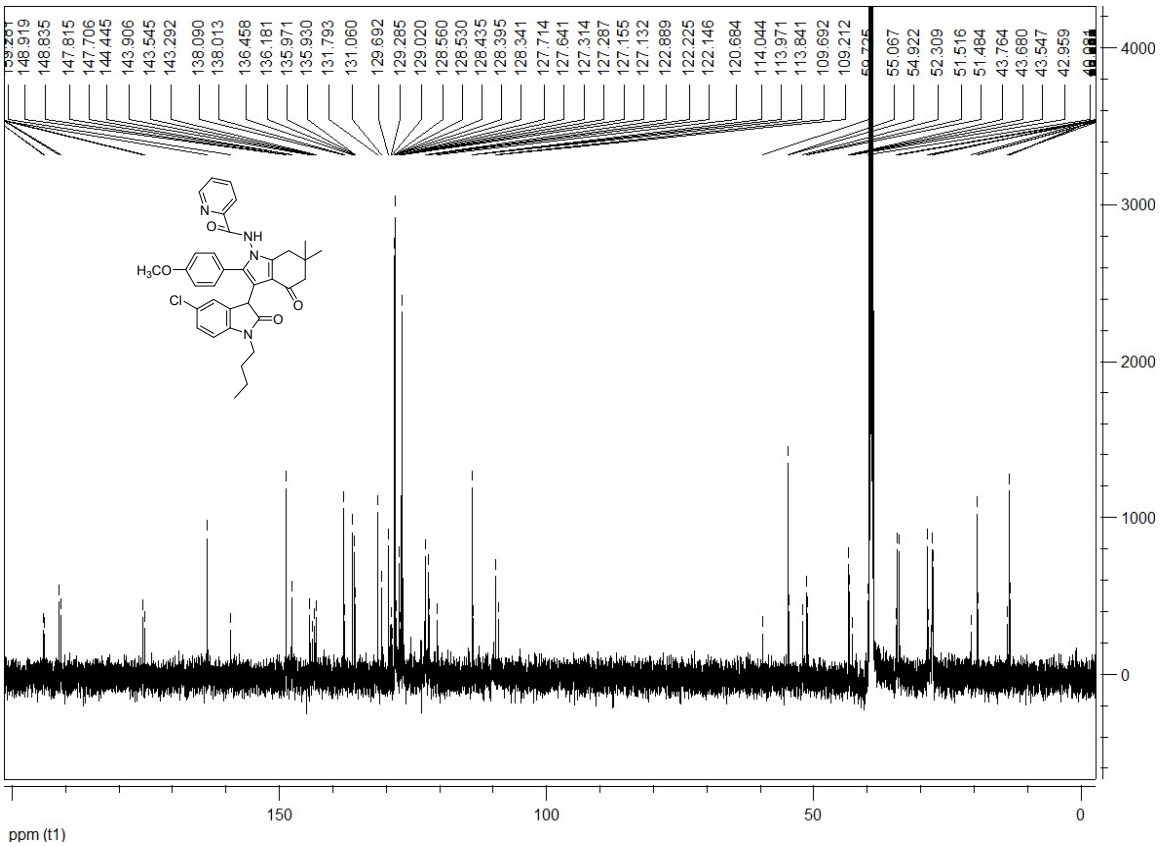
N-(3-(1-benzyl-5-chloro-2-oxoindolin-3-yl)-2-(4-methoxyphenyl)-6,6-dimethyl-4-oxo-4,5,6,7-tetrahydro-1H-indol-1-yl)picolinamide (3c):





N-(3-(1-butyl-5-chloro-2-oxoindolin-3-yl)-2-(4-methoxyphenyl)-6,6-dimethyl-4-oxo-4,5,6,7-tetrahydro-1H-indol-1-yl)picolinamide (3d):


ppm (t1)


ppm (t1)