Electronic Supplementary Information

Efficient and direct synthesis of poly-substituted indeno[1,2-*b*]quinolines assisted by *p*-toluene sulphonic acid using high-temperature water and microwave heating via one-pot, three-component reaction

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Characterization data of selected compounds are as follows:

10-(4-chlorophenyl)-5-cyclopropyl-7,8-dihydro-7,7-dimethyl-5*H*-indeno[1,2-*b*]quinoline-9,11(6*H*,10*H*)-dione (**4a**)

IR (KBr, *v*, cm^{-1}): 2954, 2887, 2865, 1684, 1645, 1633, 1560, 1405, 1371, 1190, 763, 734; ^{1}H NMR (DMSO-d_6) (δ, ppm): 7.80 (d, 1H, ArH, *J* = 7.2 Hz), 7.47–7.43 (m, 1H, ArH), 7.41 (d, 2H, ArH, *J* = 8.4 Hz), 7.35–7.30 (m, 2H, ArH), 7.04 (d, 2H, ArH, *J* = 8.4 Hz), 4.76 (s, 1H, CH), 3.58 (t, 1H, CH, *J* = 3.2 Hz), 3.10 (d, 1H, CH_2, *J* = 17.2 Hz), 2.72 (d, 1H, CH_2, *J* = 17.2 Hz), 2.26 (d, 1H, CH_2, *J* = 16.0 Hz), 2.19 (d, 1H, CH_2, *J* = 16.0 Hz), 1.30–1.28 (m, 2H, CH_2), 1.05 (s, 6H, CH_3), 0.96–0.94 (m, 1H, CH_2), 0.83–0.79 (m, 1H, CH_2). Anal calcd. for $C_{27}H_{24}ClNO_2$, C, 75.43; H, 5.63; N, 3.26; found C, 75.60; H, 5.58; N, 3.28.

5-cyclopropyl-7,8-dihydro-7,7-dimethyl-10-(4-nitrophenyl)-5*H*-indeno[1,2-*b*]quinoline-9,11(6*H*,10*H*)-dione (4b)

IR (KBr, *v*, cm^{-1}): 2959, 2869, 1677, 1647, 1556, 1518, 1346, 1219, 1136, 878, 727; ^{1}H NMR (DMSO-*d6*) (δ, ppm): 8.10 (d, 2H, ArH, *J* = 8.4 Hz), 7.83 (d, 1H, ArH, *J* = 7.6 Hz), 7.48–7.46 (m, 2H, ArH), 7.36 (d, 2H, ArH, *J* = 8.4 Hz), 7.32 (d, 1H, ArH, *J* = 7.6 Hz), 4.62 (s, 1H, CH), 3.60 (t, 1H, CH, *J* = 3.2 Hz), 3.12 (d, 1H, CH_2, *J* = 17.2 Hz), 2.75 (d, 1H, CH_2, *J* = 17.2 Hz), 2.27 (d, 1H, CH_2, *J* = 16.0 Hz), 2.20 (d, 1H, CH_2, *J* = 16.0 Hz), 1.32–1.26 (m, 2H, CH_2), 1.05 (s, 6H, CH_3), 1.02–0.86 (m, 2H, CH_2), Anal calcd. for $C_{27}H_{24}N_2O_4$, C, 73.62; H, 5.49; N, 6.36; found C, 73.81; H, 5.43; N, 6.51.

5-cyclopropyl-7,8-dihydro-10-(4-methoxyphenyl)-7,7-dimethyl-5*H*-indeno[1,2-*b*]quinoline-9,11(6*H*,10*H*)-dione (4c)

IR (KBr, *v*, cm^{-1}): 2954, 2892, 2866, 1683, 1632, 1591, 1560, 1404, 1260, 1192, 878, 848,765; ^{1}H NMR (DMSO-d_6) (δ, ppm): 7.78 (d, 1H, ArH, *J* = 7.6 Hz), 7.46–7.42 (m, 1H, ArH), 7.35–7.28 (m, 2H, ArH), 6.98 (d, 2H, ArH, *J* = 8.0 Hz), 6.77 (d, 2H, ArH, *J* = 8.0 Hz), 4.72 (s, 1H, CH), 3.66 (s, 3H, CH_3), 3.56 (t, 1H, CH, *J* = 3.2 Hz), 3.10 (d, 1H, CH_2, *J* = 17.2 Hz), 2.70 (d, 1H, CH_2, *J* = 17.2 Hz), 2.30 (d, 1H, CH_2, *J* = 16.4 Hz), 2.18 (d, 1H, CH_2, *J* = 16.4 Hz), 1.30–1.29 (m, 2H, CH_2), 1.05 (s, 6H, CH_3), 0.93–0.91 (m, 1H, CH_2), 0.80–0.77 (m, 1H, CH_2). Anal calcd. for $C_{28}H_{27}NO_3$, C, 79.03; H, 6.40; N, 3.29; found C, 78.89; H, 6.49; N, 3.23.

5-cyclopropyl-7,8-dihydro-10-(4-hydroxy-3-nitrophenyl)-7,7-dimethyl-5*H*-indeno[1,2-*b*]quinoline-9,11(6*H*,10*H*)-dion e (4d)

IR (KBr, *v*, cm^{-1}): 3218, 2956, 1676, 1646, 1533, 1340, 1264, 889, 745; ^{1}H NMR (DMSO-d_6) (δ, ppm): 10.78 (s, 1H, OH), 7.80 (d, 1H, ArH, *J* = 7.6 Hz), 7.49–7.44 (m, 2H, ArH), 7.37–7.28 (m, 3H, ArH), 7.01 (d, 1H, ArH, *J* = 8.8 Hz), 4.74 (s, 1H, CH), 3.60 (t, 1H, CH, *J* = 3.2 Hz), 3.11 (d, 1H, CH_2, *J* = 17.2 Hz), 2.72 (d, 1H, CH_2, *J* = 17.2 Hz), 2.26 (d, 1H, CH_2, *J* = 16.4 Hz), 2.23 (d, 1H, CH_2, *J* = 16.4 Hz), 1.32–1.29 (m, 2H, CH_2), 1.05 (s, 6H, CH_3), 0.99–0.96 (m, 1H, CH_2), 0.82–0.78 (m, 1H, CH_2). Anal calcd. for $C_{27}H_{24}N_2O_5$, C, 71.04; H, 5.30; N, 6.14; found C, 71.20; H, 5.21; N, 6.19.

2-(6,7,8,9-tetrahydro-7,7-dimethyl-9,11-dioxo-10-phenyl-10*H*-indeno[1,2-*b*]quinolin-5(11*H*)-yl)acetic acid (4e)

IR (KBr, ν, cm^{-1}): 2962, 2867, 2730, 1735, 1685, 1635, 1558, 1377, 1226, 984, 870, 693; ^{1}H NMR (DMSO-*d6*) (δ, ppm): 13.65 (brs, 1H, COOH), 7.43–7.40 (m, 1H, ArH), 7.35–7.29 (m, 4H, ArH), 7.23–7.19 (m, 2H, ArH), 7.12–7.08 (m, 2H, ArH), 5.10–4.98 (m, 2H, CH_2), 4.80 (s, 1H, CH), 2.86–2.84 (m, 1H, CH_2), 2.39–2.34 (m, 1H, CH_2), 2.24 (d, 1H, CH_2, J = 16.0 Hz), 2.13 (d, 1H, CH_2, J = 16.0 Hz), 1.06 (s, 3H, CH_3), 0.96 (s, 3H, CH_3). Anal calcd. for $C_{26}H_{23}NO_4$, C, 75.53; H, 5.61; N, 3.39; found C, 75.39; H, 5.56; N, 3.47.

2-(10-(4-fluorophenyl)-6,7,8,9-tetrahydro-7,7-dimethyl-9,11-dioxo-10*H*-indeno[1,2-*b*]quinolin-5(11*H*)-yl)acetic acid (4f)

IR (KBr, ν, cm^{-1}): 2965, 1731, 1682, 1627, 1602, 1549, 1403, 1379, 1221, 984, 874, 740; ^{1}H NMR (DMSO-d_6) (δ, ppm): 13.71 (brs, 1H, COOH), 7.44–7.41 (m, 1H, ArH), 7.36–7.30 (m, 5H, ArH), 7.05–7.00 (m, 2H, ArH), 5.09–4.98 (m, 2H, CH_2), 4.80 (s, 1H, CH), 2.86–2.85 (m, 1H, CH_2), 2.40–2.35 (m, 1H, CH_2), 2.24 (d, 1H, CH_2, J = 16.0 Hz), 2.14 (d, 1H, CH_2, J = 16.0 Hz), 1.03 (s, 3H, CH_3), 0.95 (s, 3H, CH_3). Anal calcd. for $C_{26}H_{22}FNO_4$, C, 72.38; H, 5.14; N, 3.25; found C, 72.51; H, 5.05; N, 3.32.

2-(6,7,8,9-tetrahydro-10-(4-hydroxy-3-nitrophenyl)-7,7-dimethyl-9,11-dioxo-10*H*-indeno[1,2-*b*]quinolin-5(11*H*)-yl)acetic acid (4g)

IR (KBr, ν, cm^{-1}): 3213, 2960, 1730, 1678, 1626, 1537, 1376, 1179, 871, 747; ^{1}H NMR (DMSO-*d6*) (δ, ppm): 13.20 (brs, 1H, COOH), 10.72 (s, 1H, OH), 7.46–7.37 (m, 5H, ArH), 7.00–6.98 (m, 2H, ArH), 5.04–4.96 (m, 2H, CH_2), 4.78 (s, 1H, CH), 2.84–2.81(m, 1H, CH_2), 2.36–2.31 (m, 1H, CH_2), 2.25 (d, 1H, CH_2, J = 16.0 Hz), 2.15 (d, 1H, CH_2, J = 16.0 Hz), 1.03 (s, 3H, CH_3), 0.97 (s, 3H, CH_3). Anal calcd. for $C_{26}H_{22}N_2O_7$, C, 65.82; H, 4.67; N, 5.90; found C, 65.93; H, 4.58; N, 5.93

7,8-dihydro-5,7,7-trimethyl-10-(thiophen-2-yl)-5*H*-indeno[1,2-*b*]quinoline-9,11(6*H*,10*H*)-dione (4h)

IR (KBr, ν, cm^{-1}): 2955, 2870, 1674, 1638, 1628, 1457, 1373, 1208, 868, 756; ^{1}H NMR (DMSO-d_6) (δ, ppm): 7.68 (d, 1H, ArH, J = 7.6 Hz), 7.47–7.43 (m, 1H, ArH), 7.40–7.37 (m, 2H, ArH), 7.23–7.21 (m, 1H, thiophenyl-H), 6.85–6.83 (m, 1H, thiophenyl-H), 6.73 (s, 1H, thiophenyl-H), 5.07 (s, 1H, CH), 3.74 (s, 3H, NCH_3), 2.90 (d, 1H, CH_2, J = 17.6 Hz), 2.54 (d, 1H, CH_2, J = 17.6 Hz), 2.24–2.18 (m, 2H, CH_2), 1.06 (s, 3H, CH_3), 1.05 (s, 3H, CH_3). Anal calcd. for $C_{23}H_{21}NO_2S$, C, 73.57; H, 5.64; N, 3.73; S, 8.54; found C, 73.45; H, 5.68; N, 3.64; S, 8.61.

7,8-dihydro-10-(4-methoxyphenyl)-5,7,7-trimethyl-5*H*-indeno[1,2-*b*]quinoline-9,11(6*H*,10*H*)-dione (4i)

IR (KBr, ν, cm^{-1}): 2953, 2898, 1680, 1643, 1587, 1368, 1216, 870, 763; ^{1}H NMR (DMSO-d_6) (δ, ppm): 7.65 (d, 1H, ArH, J = 7.6 Hz), 7.41–7.43 (m, 1H, ArH), 7.35–7.32 (m, 1H, ArH), 7.29 (d, 1H, ArH, J = 6.8 Hz), 7.11 (d, 2H, ArH, J = 8.8 Hz), 6.76 (d, 2H, ArH, J = 8.8 Hz), 4.74 (s, 1H, CH), 3.74 (s, 3H, CH_3), 3.67 (s, 3H, NCH_3), 2.90 (d, 1H, CH_2, J = 17.6 Hz), 2.54 (d, 1H, CH_2, J = 17.6 Hz), 2.17–2.11 (m, 2H, CH_2), 1.04 (s, 3H, CH_3), 1.01 (s, 3H, CH_3). Anal calcd. for $C_{26}H_{25}NO_3$, C, 78.17; H, 6.31; N, 3.51; found C, 78.34; H, 6.28; N, 3.60.

10-(4-bromophenyl)-7,8-dihydro-5,7,7-trimethyl-5*H*-indeno[1,2-*b*]quinoline-9,11(6*H*,10*H*)-dione (4j)

IR (KBr, ν, cm^{-1}): 2953, 2868, 1677, 1643, 1626, 1549, 1368, 1215, 1008, 871, 692; ^{1}H NMR (DMSO-d_6) (δ, ppm): 7.67 (d, 1H, ArH, J = 7.6 Hz), 7.46–7.43 (m, 1H, ArH), 7.40 (d, 2H, ArH, J = 8.4 Hz), 7.37–7.30 (m, 2H, ArH), 7.17 (d, 2H, ArH, J = 8.4 Hz), 4.78 (s, 1H, CH), 3.74 (s, 3H, NCH_3), 2.90 (d, 1H, CH_2, J = 17.2 Hz), 2.55 (d, 1H, CH_2, J = 17.2 Hz), 2.22–2.14 (m, 2H, CH_2), 1.06 (s, 3H, CH_3), 1.00 (s, 3H, CH_3). Anal calcd. for $C_{25}H_{22}BrNO_2$, C, 66.97; H, 4.95; N, 3.12; found C, 67.11; H, 4.87; N, 3.20.

10-(benzo[d][1,3]dioxol-5-yl)-7,8-dihydro-7,7-dimethyl-5*H*-indeno[1,2-*b*]quinoline-9,11(6*H*,10*H*)-dione (4k)

IR (KBr, ν, cm^{-1}): 3255, 3181, 3064, 2944, 2891, 1686, 1642, 1498, 1228, 1189, 1036, 884, 714; ^{1}H NMR (DMSO-d_6) (δ, ppm): 10.42 (s, 1H, NH), 7.56 (d, 1H, ArH, J = 6.8 Hz), 7.46–7.43 (m, 1H, ArH), 7.35–7.32 (m, 1H, ArH), 7.25 (d, 1H, ArH, J = 6.8 Hz), 6.75–6.73 (m, 2H, ArH), 6.66–6.63 (m, 1H, ArH), 5.92 (d, 2H, OCH_2O, J = 5.2 Hz), 4.64 (s, 1H, CH), 2.61–2.57 (m, 2H, CH_2), 2.24 (d, 1H, CH_2, J = 16 Hz), 2.12 (d, 1H, CH_2, J = 16 Hz), 1.06 (s, 3H, CH_3), 1.01 (s, 3H, CH_3); Anal calcd. for $C_{25}H_{21}NO_4$, C, 75.17; H, 5.30; N, 3.51; found C, 75.35; H, 5.37; N, 3.39.

10-(4-bromophenyl)-7,8-dihydro-7,7-dimethyl-5*H*-indeno[1,2-*b*]quinoline-9,11(6*H*,10*H*)-dione (4l)

IR (KBr, ν, cm^{-1}): 3261, 3221, 3189, 3069, 2940, 1670, 1642, 1507, 1357, 1188, 1134, 1010, 770, 723; ^{1}H NMR (DMSO-*d6*) (δ, ppm): 10.49 (s, 1H, NH), 7.57 (d, 1H, ArH, J = 7.6 Hz), 7.47–7.44 (m, 1H, ArH), 7.40 (d, 2H, ArH, J = 8.4 Hz), 7.37–7.32 (m, 1H, ArH), 7.25 (d, 1H, ArH, J = 6.8 Hz), 7.17 (d, 2H, ArH, J = 8.4 Hz), 4.69 (s, 1H, CH), 2.64 (d, 1H, CH_2, J = 17.6 Hz), 2.58 (d, 1H, CH_2, J = 17.6 Hz), 2.25 (d, 1H, CH_2, J = 16.0 Hz), 2.14(d, 1H, CH_2, J = 16.0 Hz), 1.06 (s, 3H, CH_3), 0.98 (s, 3H, CH_3); Anal calcd. for $C_{24}H_{20}BrNO_2$, C, 66.37; H, 4.64; N, 3.22; found C, 66.25; H, 4.71; N, 3.31.

7,8-dihydro-10-(3,4,5-trimethoxyphenyl)-7,7-dimethyl-5*H*-indeno[1,2-*b*]quinoline-9,11(6*H*,10*H*)-dione (4m)

IR (KBr, ν, cm^{-1}): 3255, 3183, 2956, 1687, 1646, 1610, 1458, 1339, 1126, 1014, 886; ^{1}H NMR (DMSO-d_6) (δ, ppm): 10.43 (s, 1H, NH), 7.55 (d, 1H, ArH, J = 7.6 Hz), 7.46–7.42 (m, 1H, ArH), 7.35–7.32 (m, 1H, ArH), 7.27 (d, 1H, ArH, J = 7.6 Hz), 6.48 (s, 2H, ArH), 4.69 (s, 1H, CH), 3.70 (s, 6H, OCH_3), 3.58 (s, 3H, OCH_3), 2.67 (d, 1H, CH_2, J = 17.6 Hz), 2.59 (d, 1H, CH_2, J = 17.6 Hz), 2.30 (d, 1H, CH_2, J = 16.0 Hz), 2.16 (d, 1H, CH_2, J = 16.0 Hz), 1.10(s, 6H, CH_3); Anal calcd. for $C_{27}H_{27}NO_5$, C, 72.79; H, 6.11; N, 3.14; found C, 72.88; H, 6.18; N, 3.08.

10-(4-(benzo[d]oxazol-2-yl)phenyl)-7,8-dihydro-7,7-dimethyl-5*H*-indeno[1,2-*b*]quinoline-9,11(6*H*,10*H*)-dione (4n)

IR (KBr, ν, cm^{-1}): 3252,3165, 3002, 2962, 1687, 1649, 1613, 1510, 1326, 883, 744; ^{1}H NMR (DMSO-*d6*) (δ, ppm): 10.56 (s, 1H, NH), 8.07 (d, 2H, ArH, J = 8.4 Hz), 7.81–7.76 (m, 2H, ArH), 7.61 (d, 1H, ArH, J = 7.2 Hz), 7.46 (d, 2H, ArH, J = 8.4 Hz), 7.41–7.33 (m, 4H, ArH), 7.27 (d, 1H, ArH, J = 7.2 Hz), 4.83 (s, 1H, CH), 2.68 (d, 1H, CH_2, J = 17.6 Hz), 2.62 (d, 1H, CH_2, J = 17.6 Hz), 2.28 (d, 1H, CH_2, J = 16.0 Hz), 2.13 (d, 1H, CH2, J = 16.0 Hz), 1.08 (s, 6H, CH_3); 1.00 (s, 3H, CH_3); Anal calcd. for $C_{31}H_{24}N_2O_3$; C, 78.79; H, 5.12; N, 5.93; found C, 78.65; H, 5.06; N, 6.01.

7,8-dihydro-10-(4-hydroxy-3-methoxyphenyl)-7,7-dimethyl-5*H*-indeno[1,2-*b*]quinoline-9,11(6*H*,10*H*)-dione (4o)

IR (KBr, ν, cm^{-1}): 3256, 3174, 3055, 1687, 1644, 1494, 1225, 1033, 679. ^{1}H NMR (DMSO-*d6*) (δ, ppm): 11.99 (s, 1H, OH), 10.36 (s, 1H, NH), 7.54 (d, 1H, ArH, J = 8.4 Hz), 7.46–7.32 (m, 2H, ArH), 7.25 (d, 1H, ArH, J = 7.6 Hz), 6.70 (s, 1H, ArH), 6.58–6.53 (m, 2H, ArH), 4.72 (s, 1H, CH), 3.69 (s, 3H, CH_3), 2.64 (d, 1H, CH_2, J = 17.6 Hz), 2.58 (d, 1H, CH_2, J = 17.6 Hz), 2.16 (d, 1H, CH_2, J = 16.0 Hz), 1.98 (d, 1H, CH_2, J = 16.0 Hz), 1.01 (s, 6H, CH_3); 0.89 (s, 3H, CH_3); Anal calcd. for $C_{25}H_{23}NO_4$, C, 74.79; H, 5.77; N, 3.49; found C, 74.95; H, 5.69; N, 3.41.

7,8-dihydro-7,7-dimethyl-5,10-di*p*-tolyl-5*H*-indeno[1,2-*b*]quinoline-9,11(6*H*,10*H*)-dione (4p)

IR (KBr, ν, cm^{-1}): 2960, 2895, 1692, 1644, 1623, 1557, 1510, 1366, 1223, 888, 762; ^{1}H NMR (DMSO-*d6*) (δ, ppm): 7.56 (d, 2H, ArH, J = 8.4 Hz), 7.48 (d, 2H, ArH, J = 8.4 Hz), 7.23 (t, 3H, ArH, J = 7.4 Hz), 7.18 (t, 1H, ArH, J = 7.2 Hz), 7.07 (d, 2H, ArH, J = 7.6 Hz), 6.99–7.03 (m, 1H, ArH), 5.20 (d, 1H, ArH, J =7.6 Hz), 4.81 (s, 1H, CH), 2.50 (s, 3H, CH_3), 2.40 (d, 1H, CH_2, J = 17.6 Hz), 2.26 (d, 1H, CH_2, J = 16.4 Hz), 2.23 (s, 3H, CH_3), 2.04 (d, 1H, CH_2, J = 16.4 Hz), 1.99 (d, 1H, CH_2, J = 17.6 Hz), 0.94 (s, 3H, CH_3), 0.80 (s, 3H, CH_3); Anal calcd. for $C_{32}H_{29}NO_2$, C, 83.63; H, 6.36; N, 3.05; found C, 83.80; H, 6.25; N, 3.00.

10-(4-bromophenyl)-7,8-dihydro-7,7-dimethyl-5-*p*-tolyl-5*H*-indeno[1,2-*b*]quinoline-9,11(6*H*,10*H*)-dione (4q)

IR (KBr, ν, cm^{-1}): 2953, 2886, 1686, 1634, 1561, 1511, 1367, 1224, 1102, 889, 764; ^{1}H NMR (DMSO-d_6) (δ, ppm): 7.62–7.45 (m, 6H, ArH), 7.33 (d, 2H, ArH, J = 8.0 Hz), 7.24–7.17 (m, 2H, ArH), 7.05–7.00 (m, 1H, ArH), 5.20 (d, 1H, ArH, J = 7.6 Hz), 4.83 (s, 1H, CH), 2.50 (s, 3H, CH_3), 2.39 (d, 1H, CH_2, J = 17.6 Hz), 2.26 (d, 1H, CH_2, J = 16.4 Hz), 2.05 (d, 1H, CH_2, J = 16.4 Hz), 1.99 (d, 1H, CH_2, J = 17.6 Hz), 0.94 (s, 3H, CH_3), 0.80 (s, 3H, CH_3); Anal calcd. for $C_{31}H_{26}BrNO_2$, C, 71.00; H, 5.00; N, 2.67; found C, 71.21; H, 4.89; N, 2.61.

7,8-dihydro-10-(3,4-dimethoxyphenyl)-5-*p*-tolyl-5*H*-indeno[1,2-*b*]quinoline-9,11(6*H*,10*H*)-dione (4r)

IR (KBr, ν, cm^{-1}): 2946, 2830, 1684, 1633, 1590, 1509, 1396, 1264, 1177, 1137, 1029, 893, 759; ^{1}H NMR (DMSO-d_6) (δ, ppm): 7.55–7.46 (m, 4H, ArH), 7.24 (d, 2H, ArH, J = 6.8 Hz), 7.18 (t, 1H, ArH, J = 7.6 Hz), 7.03–6.93 (m, 1H, ArH), 6.93 (s, 1H, ArH), 6.86–6.82 (m, 1H, ArH), 5.23 (d, 1H, ArH, J = 7.6 Hz), 4.85 (s, 1H, CH), 3.75 (s, 3H, CH_3), 3.70 (s, 3H, CH_3), 2.50 (s, 3H, CH_3), 2.49–2.40 (m, 1H, CH_2), 2.33–2.16 (m, 3H, CH_2), 1.97–1.90 (m, 1H, CH_2), 1.77–1.71 (m, 1H, CH_2); Anal calcd. for $C_{32}H_{29}NO_4$, C, 78.19; H, 5.95; N, 2.85; found C, 78.35; H, 5.91; N, 2.89.

7,8-dihydro-10-(thiophen-2-yl)-5-*p*-tolyl-5*H*-indeno[1,2-*b*]quinoline-9,11(6*H*,10*H*)-dione (4s)

IR (KBr, ν, cm^{-1}): 3059, 2943, 2923, 2866, 1678, 1643, 1588, 1510, 1395, 1177, 896, 844, 711; ^{1}H NMR (DMSO-d_6) (δ, ppm): 7.59–7.58 (m, 1H, thiophenyl-H), 7.47 (d, 2H, ArH, J = 7.6 Hz), 7.42–7.40 (m, 1H, thiophenyl-H), 7.32–7.21 (m, 3H, ArH), 7.07–7.03 (m, 1H, thiophenyl-H), 6.91–6.89 (m, 2H, ArH), 5.27 (d, 1H, ArH, J = 7.6 Hz), 5.20 (s, 1H, CH), 2.48 (s, 3H, CH_3), 2.33–2.31 (m, 3H, CH_2), 2.16–2.11 (m, 1H, CH_2), 1.92–1.69 (m, 2H, CH_2); Anal calcd. for $C_{27}H_{21}NO_2S$, C, 76.57; H, 5.00; N, 3.31; S, 7.57; found C, 76.40; H, 5.12; N, 3.41; S, 7.43.

10-benzyl-7,8-dihydro-7,7-dimethyl-5-phenyl-5*H*-indeno[1,2-*b*]quinoline-9,11(6*H*,10*H*)-dione (4t)

IR (KBr, ν, cm^{-1}): 3026, 2960, 1686, 1637, 1587, 1398, 1101, 882, 718; ^{1}H NMR (DMSO-d_6) (δ, ppm): 7.61–7.52 (m, 4H, ArH), 7.34 (d, 1H, ArH, J = 6.8 Hz), 7.26–7.18 (m, 4H, ArH), 6.94 (t, 1H, ArH, J = 7.6 Hz), 6.89 (d, 2H, ArH, J = 6.8 Hz), 6.21 (s, 1H, ArH), 4.91 (d, 1H, ArH, J = 7.6 Hz), 4.20 (t, 1H, CH, J = 3.8 Hz), 2.87–2.78 (m, 2H, CH_2), 2.28 (s, 2H, CH_2), 2.16 (d, 1H, CH_2, J = 17.6 Hz), 1.63 (d, 1H, CH_2, J = 17.6 Hz), 0.93 (s, 3H, CH_3), 0.91(s, 3H, CH_3). Anal calcd. for $C_{31}H_{27}NO_2$, C, 83.57; H, 6.11; N, 3.14; found C, 83.76; H, 6.02; N, 3.16.

7,8-dihydro-10-(4-methoxyphenyl)-7,7-dimethyl-5-phenyl-5*H*-indeno[1,2-*b*]quinoline-9,11(6*H*,10*H*)-dione (4x)

IR (KBr, *v*, cm^{-1}): 2951, 1693, 1640, 1586, 1560, 1366, 1256, 887. ^{1}H NMR (DMSO-d_6) (δ, ppm): 7.70–7.34 (m, 5H, ArH), 7.28 (d, 2H, ArH, *J* = 8.8 Hz), 7.16–7.14 (m, 2H, ArH), 6.99 (t, 1H, ArH, *J* = 7.6 Hz), 6.84 (d, 2H, ArH, *J* = 8.4 Hz), 5.09 (d, 1H, ArH, *J* = 7.6 Hz), 4.80 (s, 1H, CH), 3.70 (s, 3H, CH_3), 2.42 (d, 1H, CH_2, *J* = 17.6 Hz), 2.27 (d, 1H, CH_2, *J* = 16.4 Hz), 2.05 (d, 1H, CH_2, *J* = 16.4 Hz), 1.98 (d, 1H, CH_2, *J* = 17.6 Hz), 0.94 (s, 3H, CH_3), 0.81 (s, 3H, CH_3); Anal calcd. for $C_{31}H_{27}NO_3$, C, 80.67; H, 5.90; N, 3.03; found C, 80.81; H, 5.82; N, 3.11

10-(4-chlorophenyl)-7,8-dihydro-5-phenyl-5*H*-indeno[1,2-*b*]quinoline-9,11(6*H*,10*H*)-dione (4y)

IR (KBr, *v*, cm^{-1}): 2959, 1685, 1648, 1563, 1485, 889, 765; ^{1}H NMR (DMSO-d_6) (δ, ppm): 7.74–7.69 (m, 3H, ArH), 7.68–7.66 (m, 2H, ArH), 7.41 (d, 2H, ArH, *J* = 8.4 Hz), 7.32 (d, 2H, ArH, *J* = 8.4 Hz), 7.25 (d, 1H, ArH, *J* = 7.6 Hz), 7.17 (t, 1H, ArH, *J* = 7.6 Hz), 6.99 (t, 1H, ArH, *J* = 7.6 Hz), 5.11 (d, 1H, ArH, *J* = 7.6 Hz), 4.90 (s, 1H, CH), 2.30–2.26 (m, 2H, CH_2), 2.23–2.16 (m, 2H, CH_2), 1.91–1.89 (m, 1H, CH_2), 1.75–1.71 (m, 1H, CH_2); Anal calcd. for $C_{28}H_{20}ClNO_2$, C, 76.80; H, 4.60; N, 3.20; found C, 76.92; H, 4.51; N, 3.17.

7,8-dihydro-7,7-dimethyl-5-phenyl-10-(thiophen-2-yl)-5*H*-indeno[1,2-*b*]quinoline-9,11(6H,10*H*)-dione (4z)

IR (KBr, *v*, cm^{-1}): 3066, 2950, 2867, 1696, 1643, 1590, 1491, 1391, 1256, 885; ^{1}H NMR (DMSO-d_6) (δ, ppm): 7.71–7.67 (m, 4H, ArH), 7.55 (s, 1H, thiophenyl-H), 7.31–7.28 (m, 2H, ArH), 7.22 (t, 1H, thiophenyl-H, *J* = 7.2 Hz), 7.02 (t, 1H, thiophenyl-H, *J* = 7.2 Hz), 6.91 (d, 2H, ArH, *J* = 3.2 Hz), 5.19 (s, 1H, CH), 5.14 (d, 1H, ArH, *J* = 7.6 Hz), 2.47 (d, 1H, CH_2, *J* = 17.2 Hz), 2.33 (d, 1H, CH_2 *J* = 16.4 Hz), 2.14 (d, 1H, CH_2, *J* = 16.4 Hz), 1.94 (d, 1H, CH_2, *J* = 17.2 Hz), 0.96 (s, 3H, CH_3), 0.84 (s, 3H, CH_3). Anal calcd. for $C_{28}H_{23}NO_2S$, C, 76.86; H, 5.30; N, 3.20; S, 7.33; found C, 76.78; H, 5.13; N, 3.14, S, 7.39.