

Electronic Supplementary Information

An Efficient One-pot, Three-component Synthesis of Indeno[1,2-*b*]quinolin-9,11(6*H*, 10*H*)-dione, Acridine-1,8(2*H*,5*H*)-dione and Quinoline-3-carbonitrile Derivatives from Enaminones

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Characterization data of selected compounds are as follows:

4a.

IR (KBr, ν , cm^{-1}): 3265, 3066, 2956, 2870, 1685, 1636, 1589, 1562, 1395, 1227, 891, 764; $^1\text{H NMR}$ (DMSO-*d*₆) (δ , ppm): 10.81 (s, 1H, OH), 7.80 (d, 1H, ArH, $J = 2$ Hz), 7.56–7.59 (m, 3H, ArH), 7.48–7.50 (m, 2H, ArH), 7.18–7.26 (m, 2H, ArH), 7.01–7.08 (m, 2H, ArH), 5.21 (d, 1H, ArH, $J = 7.6$ Hz), 4.84 (s, 1H, CH), 2.51 (s, 3H, CH₃), 2.41 (d, 1H, CH₂, $J = 17.2$ Hz), 2.28 (d, 1H, CH₂, $J = 16.4$ Hz), 2.07 (d, 1H, CH₂, $J = 16.4$ Hz), 2.00 (d, 1H, CH₂, $J = 17.2$ Hz), 0.95 (s, 3H, CH₃), 0.82 (s, 3H, CH₃). Anal calcd. for C₃₁H₂₆N₂O₅, C, 73.50; H, 5.17; N, 5.53; found C, 73.62; H, 5.10; N, 5.62.

4b.

IR (KBr, ν , cm^{-1}): 2960, 2895, 1692, 1644, 1623, 1557, 1510, 1366, 1223, 888, 762; $^1\text{H NMR}$ (DMSO-*d*₆) (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, CH₃), 2.40 (d, 1H, CH₂, $J = 17.6$ Hz), 2.26 (d, 1H, CH₂, $J = 16.4$ Hz), 2.23 (s, 3H, CH₃), 2.04 (d, 1H, CH₂, $J = 16.4$ Hz), 1.99 (d, 1H, CH₂, $J = 17.6$ Hz), 0.94 (s, 3H, CH₃), 0.80 (s, 3H, CH₃); Anal calcd. for C₃₂H₂₉NO₂, C, 83.63; H, 6.36; N, 3.05; found C, 83.80; H, 6.25; N, 3.00.

4c.

IR (KBr, ν , cm^{-1}): 3037, 2958, 2869, 1685, 1634, 1589, 1561, 1367, 1225, 889; $^1\text{H NMR}$ (DMSO-*d*₆) (δ , ppm): 8.16 (d, 2H, ArH, $J = 8.4$ Hz), 7.67 (d, 3H, ArH, $J = 8.4$ Hz), 7.58–7.50 (m, 3H, ArH), 7.25–7.19 (m, 2H, ArH), 7.04 (t, 1H, ArH, $J = 14.8$ Hz), 5.23 (d, 1H, Ar, $J = 7.6$ Hz), 4.98 (s, 1H, CH), 2.51 (s, 3H, CH₃), 2.41 (d, 1H, CH₂, $J = 17.6$ Hz), 2.28 (d, 1H, CH₂, $J = 16.4$ Hz), 2.07 (d, 1H, CH₂, $J = 16.4$ Hz), 2.03 (d, 1H, CH₂, $J = 17.6$ Hz), 0.95 (s, 3H, CH₃), 0.80 (1s, 3H, CH₃); Anal calcd. for C₃₁H₂₆N₂O₄, C, 75.90; H, 5.34; N, 5.71; found C, 76.02; H, 5.21; N, 5.62.

4d

IR (KBr, ν , cm^{-1}): 3031, 2954, 2889, 1685, 1650, 1636, 1505, 1369, 1225, 1155, 889, 764; $^1\text{H NMR}$ (DMSO-*d*₆) (δ , ppm): 7.60–7.55 (m, 2H, ArH), 7.49 (d, 2H, ArH, $J = 8.4$ Hz), 7.41–7.38 (m, 2H, ArH), 7.24 (d, 1H, ArH, $J = 6.8$ Hz), 7.19 (t, 1H, ArH, $J = 7.4$ Hz), 7.08 (t, 2H, ArH, $J = 8.8$ Hz), 7.04–7.01 (m, 1H, ArH), 5.21 (d, 1H, ArH, $J = 7.6$ Hz), 4.86 (s, 1H, CH), 2.51 (s, 3H, CH₃), 2.40 (d, 1H, CH₂, $J = 17.6$ Hz), 2.27 (d, 1H, CH₂, $J = 16.4$ Hz), 2.05 (d, 1H, CH₂, $J = 16.4$ Hz), 2.00 (d, 1H, CH₂, $J = 17.6$ Hz), 0.94 (s, 3H, CH₃), 0.80 (1s, 3H, CH₃); Anal calcd. for C₃₁H₂₆FNO₂, C, 80.32; H, 5.65; N, 3.02; found C, 80.45; H, 5.48; N, 3.14.

4e

IR (KBr, ν , cm^{-1}): 3035, 2953, 2868, 1686, 1637, 1561, 1376, 1224, 1008, 889, 764; $^1\text{H NMR}$ (DMSO-*d*₆) (δ , ppm): 7.75–7.70 (m, 5H, ArH), 7.24 (d, 1H, ArH, $J = 6.4$ Hz), 7.19 (t, 1H, ArH, $J = 14.4$ Hz), 7.02–6.97 (m, 1H, ArH), 6.89 (d,

1H, ArH, $J = 9.6$ Hz), 6.85–6.80 (m, 1H, ArH), 5.96 (d, 2H, CH₂, $J = 4.8$ Hz), 5.09 (d, 1H, ArH, $J = 7.6$ Hz), 4.79 (s, 1H, CH), 2.50 (s, 3H, CH₃), 2.40 (d, 1H, CH₂, $J = 17.2$ Hz), 2.27 (d, 1H, CH₂, $J = 16.4$ Hz), 2.08 (d, 1H, CH₂, $J = 16.4$ Hz), 2.00 (d, 1H, CH₂, $J = 17.2$ Hz), 0.94 (s, 3H, CH₃), 0.84 (1s, 3H, CH₃); Anal calcd. for C₃₂H₂₇NO₄, C, 78.51; H, 5.56; N, 2.86; found C, 78.49; H, 5.46; N, 2.77.

4f

IR (KBr, ν , cm⁻¹): 2953, 2886, 1686, 1634, 1561, 1511, 1367, 1224, 1102, 889, 764; ¹H 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, CH₃), 2.39 (d, 1H, CH₂, $J = 17.6$ Hz), 2.26 (d, 1H, CH₂, $J = 16.4$ Hz), 2.05 (d, 1H, CH₂, $J = 16.4$ Hz), 1.99 (d, 1H, CH₂, $J = 17.6$ Hz), 0.94 (s, 3H, CH₃), 0.80 (s, 3H, CH₃); Anal calcd. for C₃₁H₂₆BrNO₂, C, 71.00; H, 5.00; N, 2.67; found C, 71.21; H, 4.89; N, 2.61.

4g

IR (KBr, ν , cm⁻¹): 2956, 2833, 1687, 1644, 1457, 1491, 1365, 1126, 888; ¹H NMR (DMSO-*d*₆) (δ , ppm): 7.54–7.48 (m, 4H, ArH), 7.27 (d, 1H, ArH, $J = 6.8$ Hz), 7.18 (t, 1H, ArH, $J = 7.4$ Hz), 7.01 (t, 1H, ArH, $J = 7.6$ Hz), 6.59 (s, 2H, ArH), 5.19 (d, 1H, ArH, $J = 7.6$ Hz), 4.82 (s, 1H, CH), 3.76 (s, 6H, CH₃), 3.61 (s, 3H, CH₃), 2.50 (s, 3H, CH₃), 2.48 (d, 1H, CH₂, $J = 16.4$ Hz), 2.31 (d, 1H, CH₂, $J = 17.6$ Hz), 2.10 (d, 1H, CH₂, $J = 16.4$ Hz), 2.03 (d, 1H, CH₂, $J = 17.6$ Hz), 0.97 (s, 3H, CH₃), 0.93 (s, 3H, CH₃). Anal calcd. for C₃₄H₃₃NO₅, C, 76.24; H, 6.21; N, 2.61; found C, 76.35; H, 6.25; N, 2.55.

4h

IR (KBr, ν , cm⁻¹): 3066, 2957, 2866, 1687, 1652, 1562, 1511, 1363, 1225, 1102, 860, 701; ¹H NMR (DMSO-*d*₆) (δ , ppm): 7.61–7.53 (m, 3H, ArH), 7.51–7.47 (m, 3H, ArH), 7.35–7.32 (m, 1H, ArH), 7.19–7.21 (m, 2H, ArH), 7.04–7.00 (m, 1H, ArH), 5.22 (s, 1H, CH), 5.18 (d, 1H, CH, $J = 7.6$ Hz), 2.37–2.22 (m, 2H, CH₂), 2.03–1.98 (m, 2H, CH₂), 0.93 (s, 3H, CH₃), 0.83 (1s, 3H, CH₃); Anal calcd. for C₃₁H₂₅Cl₂NO₂, C, 72.38; H, 4.90; N, 2.72; found C, 72.31; H, 4.82; N, 2.69.

4i

IR (KBr, ν , cm⁻¹): 3025, 2956, 1694, 1635, 1589, 1561, 1453, 1365, 1224, 1100, 889, 742; ¹H NMR (DMSO-*d*₆) (δ , ppm): 8.14 (d, 2H, ArH, $J = 8.4$ Hz), 7.82–7.78 (m, 2H, ArH), 7.71–7.61 (m, 3H, ArH, $J = 8.0$ Hz), 7.53–7.50 (m, 2H, ArH), 7.43–7.40 (m, 2H, ArH), 7.25 (d, 1H, ArH, $J = 6.8$ Hz), 7.20 (t, 1H, ArH, $J = 7.4$ Hz), 7.05 (t, 2H, ArH, $J = 8.0$ Hz), 5.24 (d, 1H, ArH, $J = 7.6$ Hz), 4.96 (s, 1H, CH), 2.50 (s, 3H, CH₃), 2.43 (d, 1H, CH₂, $J = 17.6$ Hz), 2.29 (d, 1H, CH₂, $J = 17.6$ Hz), 2.07 (d, 1H, CH₂, $J = 16.4$ Hz), 2.02 (d, 1H, CH₂, $J = 16.4$ Hz), 0.96 (s, 3H, CH₃), 0.82 (1s, 3H, CH₃); Anal calcd. for C₃₈H₃₀N₂O₃, C, 81.12; H, 5.37; N, 4.98; found C, 81.08; H, 5.48; N, 5.03.

4j

IR (KBr, ν , cm⁻¹): 2954, 1677, 1621, 1556, 1497, 773; ¹H NMR (DMSO-*d*₆) (δ , ppm): 7.55 (d, 2H, ArH, $J = 8.4$ Hz), 7.49 (d, 2H, ArH, $J = 8.4$ Hz), 7.46–7.45 (m, 2H, ArH), 7.18–7.14 (m, 1H, ArH), 5.35 (d, 1H, ArH, $J = 7.6$ Hz), 4.02 (s, 1H, CH), 3.19–3.16 (m, 2H, CH₂), 2.48 (s, 3H, CH₃), 2.31–2.30 (m, 2H, CH₂), 1.53–1.44 (m, 4H, CH₂), 0.97–0.95 (m, 2H, CH₂), 0.93–0.92 (m, 3H, CH₃), 0.89 (s, 6H, CH₃); Anal calcd. for C₂₉H₃₁NO₂, C, 81.85; H, 7.34; N, 3.29; found C, 81.94; H, 7.42; N, 3.18.

4k

IR (KBr, ν , cm⁻¹): 2954, 2924, 2851, 1679, 1663, 1620, 1556, 1483, 1265, 1176, 772, 697; ¹H NMR (DMSO-*d*₆) (δ , ppm): 7.55 (d, 2H, ArH, $J = 8.4$ Hz), 7.48 (d, 2H, ArH, $J = 8.4$ Hz), 7.46–7.44 (m, 2H, ArH), 7.17–7.15 (m, 1H, ArH), 5.34 (d, 1H, ArH, $J = 7.6$ Hz), 4.02 (s, 1H, CH), 3.17–3.13 (m, 2H, CH₂), 2.30–2.29 (m, 2H, CH₂), 1.53–1.42 (m, 4H, CH₂), 1.27–1.19 (m, 16H, CH₂), 0.88–0.86 (m, 6H, CH₃), 0.85 (s, 3H, CH₃); Anal calcd. for C₃₅H₄₃NO₂, C, 82.47; H, 8.50; N, 2.75; found C, 82.58; H, 8.43; N, 2.67.

4l

IR (KBr, ν , cm⁻¹): 3070, 2954, 2872, 1686, 1646, 1633, 1547, 1456, 1397, 1364, 1223, 1102, 886, 725; ¹H NMR (DMSO-*d*₆) (δ , ppm): 8.20–8.18 (m, 1H, ArH), 8.06–8.03 (m, 1H, ArH), 7.89 (d, 1H, ArH, $J = 7.6$ Hz), 7.74–7.73 (m, 5H, ArH), 7.63–7.59 (m, 1H, ArH), 7.26–7.19 (m, 2H, ArH), 7.04–7.00 (m, 1H, ArH), 5.12 (d, 1H, ArH, $J = 7.6$ Hz), 5.01 (s, 1H, CH), 2.44 (d, 1H, CH₂, $J = 17.6$ Hz), 2.30 (d, 1H, CH₂, $J = 16.4$ Hz), 2.08 (d, 1H, CH₂, $J = 16.4$ Hz), 2.00 (d, 1H, CH₂, $J = 17.6$ Hz), 0.96 (s, 3H, CH₃), 0.87 (s, 3H, CH₃); Anal calcd. for C₃₀H₂₄N₂O₄, C, 75.61; H, 5.08; N, 5.88; found C, 75.58; H, 5.18; N, 5.79.

4m

IR (KBr, ν , cm⁻¹): 2951, 1693, 1640, 1586, 1560, 1366, 1256, 887; ¹H 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, CH₃), 2.42 (d, 1H, CH₂, $J = 17.6$ Hz), 2.27 (d, 1H, CH₂, $J = 16.4$ Hz), 2.05 (d, 1H, CH₂, $J = 16.4$ Hz), 1.98 (d, 1H, CH₂, $J = 17.6$ Hz), 0.94 (s, 3H, CH₃), 0.81 (s, 3H, CH₃); Anal calcd. for C₃₁H₂₇NO₃, C, 80.67; H, 5.90; N, 3.03; found C, 80.81; H, 5.82; N, 3.11.

4n

IR (KBr, ν , cm⁻¹): 3269, 3049, 2960, 1679, 1647, 1626, 1587, 1511, 1400, 1363, 1268, 1225, 888, 761. ¹H NMR (DMSO-*d*₆) (δ , ppm): 8.78 (s, 1H, OH), 7.71–7.67 (m, 5H, ArH), 7.24 (d, 1H, ArH, $J = 6.4$ Hz), 7.17 (t, 1H, ArH, $J = 7.4$ Hz), 6.98 (t, 1H, ArH, $J = 7.4$ Hz), 6.86 (s, 1H, ArH), 6.75–6.73 (m, 1H, ArH), 6.67 (d, 1H, ArH, $J = 8.0$ Hz), 5.08 (d, 1H, ArH, $J = 7.6$ Hz), 4.76 (s, 1H, CH), 3.76 (s, 3H, CH₃), 2.41 (d, 1H, CH₂, $J = 17.2$ Hz), 2.27 (d, 1H, CH₂, $J = 16.4$ Hz), 2.06 (d, 1H, CH₂, $J = 16.4$ Hz), 2.00 (d, 1H, CH₂, $J = 17.2$ Hz), 0.95 (s, 3H, CH₃), 0.82 (s, 3H, CH₃); Anal calcd. for C₃₁H₂₇NO₄, C, 77.97; H, 5.70; N, 2.93; found C, 77.89; H, 5.85; N, 2.99.

4o

IR (KBr, ν , cm⁻¹): 3062, 3025, 2955, 2871, 1690, 1634, 1559, 1454, 1392, 1254, 1171, 1101, 887, 762. ¹H NMR (DMSO-*d*₆) (δ , ppm): 7.75–7.67 (m, 5H, ArH), 7.38 (d, 2H, ArH, $J = 7.6$ Hz), 7.30–7.22 (m, 3H, ArH), 7.20–7.13 (m, 2H, ArH), 7.01–3.97 (m, 1H, ArH), 5.09 (d, 1H, ArH, $J = 7.6$ Hz), 4.86 (s, 1H, CH), 2.42 (d, 1H, CH₂, $J = 17.6$ Hz), 2.27 (d, 2H, CH₂, $J = 16.4$ Hz), 2.05 (d, 1H, CH₂, $J = 16.4$ Hz), 1.99 (d, 1H, CH₂, $J = 17.6$ Hz), 0.94 (s, 3H, CH₃), 0.81 (s, 3H, CH₃); Anal calcd. for C₃₀H₂₅NO₂, C, 83.50; H, 5.84; N, 3.25; found C, 83.63; H, 5.92; N, 3.21.

4p

IR (KBr, ν , cm⁻¹): 3066, 2950, 2867, 1696, 1643, 1590, 1491, 1391, 1256, 885; ¹H 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, CH₂, $J = 17.2$ Hz), 2.33 (d, 1H, CH₂, $J = 16.4$ Hz), 2.14 (d, 1H, CH₂, $J = 16.4$ Hz), 1.94 (d, 1H, CH₂, $J = 17.2$ Hz), 0.96 (s, 3H, CH₃), 0.84 (s, 3H, CH₃). Anal calcd. for C₂₈H₂₃NO₂S, 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.

4q

IR (KBr, ν , cm⁻¹): 3055, 2959, 2871, 1686, 1647, 1632, 1587, 1558, 1394, 1363, 1225, 887, 765; ¹H NMR (DMSO-*d*₆) (δ , ppm): 7.71–7.70 (m, 5H, ArH), 7.47 (d, 2H, ArH, $J = 8.4$ Hz), 7.35 (d, 2H, ArH, $J = 8.4$ Hz), 7.25–7.18 (m, 2H, ArH), 7.02–6.98 (m, 1H, ArH), 5.10 (d, 1H, ArH, $J = 7.6$ Hz), 4.84 (s, 1H, CH), 2.41 (d, 1H, CH₂, $J = 17.2$ Hz), 2.27 (d, 2H, CH₂, $J = 16.0$ Hz), 2.06 (d, 1H, CH₂, $J = 16.4$ Hz), 2.00 (d, 1H, CH₂, $J = 17.2$ Hz), 0.94 (s, 3H, CH₃), 0.81 (s, 3H, CH₃); Anal calcd. for C₃₀H₂₄BrNO₂, C, 70.59; H, 4.74; N, 2.74; found C, 70.68; H, 4.69; N, 2.73.

4r

IR (KBr, ν , cm⁻¹): 2959, 1685, 1648, 1563, 1485, 889, 765; ¹H 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, CH₂), 2.23–2.16 (m, 2H, CH₂), 1.91–1.89 (m, 1H, CH₂), 1.75–1.71 (m, 1H, CH₂); Anal calcd. for C₂₈H₂₀ClNO₂, C, 76.80; H, 4.60; N, 3.20; found C, 76.92; H, 4.51; N, 3.17.

4s

IR (KBr, ν , cm⁻¹): 2946, 2830, 1684, 1633, 1590, 1509, 1396, 1264, 1177, 1137, 1029, 893, 759; ¹H 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, CH₃), 3.70 (s, 3H, CH₃), 2.50 (s, 3H, CH₃), 2.49–2.40 (m, 1H, CH₂), 2.33–2.16 (m, 3H, CH₂), 1.97–1.90 (m, 1H, CH₂), 1.77–1.71 (m, 1H, CH₂); Anal calcd. for C₃₂H₂₉NO₄, C, 78.19; H, 5.95; N, 2.85; found C, 78.35; H, 5.91; N, 2.89.

7a.

IR (KBr, ν , cm⁻¹): 3033, 2956, 2929, 2870, 1634, 1575, 1484, 1363, 1223, 1009, 840, 763; ¹H NMR (DMSO-*d*₆) (δ , ppm): 7.44–7.40 (m, 5H, ArH), 7.25 (d, 3H, ArH, $J = 8.0$ Hz), 4.99 (s, 1H, CH), 2.42 (s, 3H, CH₃), 2.33–2.00 (m, 5H, CH₂), 1.98–1.84 (m, 4H, CH₂), 0.88 (s, 3H, CH₃), 0.78 (d, 3H, CH₃, $J = 6.4$ Hz), 0.66 (s, 3H, CH₃); Anal calcd. for C₂₉H₃₀BrNO₂, C, 69.05; H, 5.99; N, 2.78; found C, 69.17; H, 5.91; N, 2.84.

7b.

IR (KBr, ν , cm⁻¹): 3031, 2956, 2773, 1639, 1575, 1485, 1368, 1221, 1039, 925, 817; ¹H NMR (DMSO-*d*₆) (δ , ppm): 7.40 (d, 3H, ArH, $J = 7.6$ Hz), 7.18–7.17 (m, 1H, ArH), 6.79–6.76 (m, 3H, ArH), 5.94 (s, 2H, CH₂), 4.95 (s, 1H, CH), 2.42 (s, 3H,

CH₃), 2.30–2.02 (m, 5H, CH₂), 2.00–1.71 (m, 4H, CH₂), 0.89 (s, 3H, CH₃), 0.80 (d, 3H, CH₃, *J* = 6.4 Hz), 0.69 (s, 3H, CH₃); Anal calcd. for C₃₀H₃₁NO₄, C, 76.73; H, 6.65; N, 2.98; found C, 76.64; H, 6.59; N, 3.08.

7c.

IR (KBr, ν , cm⁻¹): 3228, 3040, 2959, 2929, 1654, 1637, 1602, 1527, 1367, 1145, 1003, 823, 694; ¹H NMR (DMSO-*d*₆) (δ , ppm): 10.74 (s, 1H, OH), 7.76–7.75 (m, 1H, ArH), 7.50–7.41 (m, 4H, ArH), 7.24–7.22 (m, 1H, ArH), 7.04 (d, 1H, ArH, *J* = 8.4 Hz), 4.97 (s, 1H, CH), 2.42 (s, 3H, CH₃), 2.33–2.10 (m, 5H, CH₂), 2.01–1.78 (m, 4H, CH₂), 0.89 (s, 3H, CH₃), 0.79 (d, 3H, CH₃, *J* = 6.4 Hz), 0.68 (s, 3H, CH₃); Anal calcd. for C₂₉H₃₀N₂O₅, C, 71.59; H, 6.21; N, 5.76; found C, 71.74; H, 6.17; N, 5.73.

7d.

IR (KBr, ν , cm⁻¹): 3057, 2954, 2938, 2867, 1645, 1574, 1492, 1362, 1150, 985, 850; ¹H NMR (DMSO-*d*₆) (δ , ppm): 7.59–7.56 (m, 4H, ArH), 7.54–7.46 (m, 2H, ArH), 7.36–7.31 (m, 2H, ArH), 7.20–7.09 (m, 5H, ArH), 5.27 (s, 1H, CH), 2.56–2.52 (m, 2H, CH₂), 2.41–2.26 (m, 4H, CH₂), 2.25–2.21 (m, 1H, CH₂), 2.09–1.97 (m, 1H, CH₂), 1.72–1.67 (m, 1H, CH₂), 0.88 (s, 3H, CH₃), 0.70 (s, 3H, CH₃); Anal calcd. for C₃₃H₂₉Cl₂NO₂, C, 73.06; H, 5.39; N, 2.58; found C, 72.89; H, 5.34; N, 2.51.

7e

IR (KBr, ν , cm⁻¹): 3057, 2957, 2888, 1641, 1572, 1493, 1364, 1223, 1142, 1018, 830, 750; ¹H NMR (DMSO-*d*₆) (δ , ppm): 8.08 (d, 2H, ArH, *J* = 8.4 Hz), 7.82–7.78 (m, 2H, ArH), 7.61–7.51 (m, 7H, ArH), 7.43–7.41 (m, 2H, ArH), 7.19–7.11 (m, 5H, ArH), 5.19 (s, 1H, CH), 2.70–2.63 (m, 2H, CH₂), 2.41–2.24 (m, 5H, CH₂), 2.05–2.01 (m, 1H, CH₂), 1.77–1.72 (m, 1H, CH₂), 0.91 (s, 3H, CH₃), 0.68 (s, 3H, CH₃); Anal calcd. for C₄₀H₃₄N₂O₃, C, 81.33; H, 5.80; N, 4.74; found C, 81.49; H, 5.75; N, 4.71.

7f.

IR (KBr, ν , cm⁻¹): 3031, 1638, 1575, 1512, 1360, 1279, 1217, 1145, 994, 834, 762; ¹H NMR (DMSO-*d*₆) (δ , ppm): 7.38–7.36 (m, 1H, thiophenyl-H), 7.35–7.34 (m, 2H, ArH), 7.25–7.16 (m, 8H, ArH), 6.86–6.74 (m, 2H, thiophenyl-H), 5.39 (s, 1H, CH), 2.73–2.69 (m, 1H, CH₂), 2.39–2.22 (m, 6H, CH₂), 2.05–1.99 (m, 1H, CH₂), 1.76–1.72 (m, 1H, CH₂), 0.93 (s, 3H, CH₃), 0.77 (s, 3H, CH₃); Anal calcd. for C₃₁H₂₉NO₂S, C, 77.63; H, 6.09; N, 2.92; S, 6.69; found C, 77.72; H, 6.04; N, 2.97; S, 6.60.

8a

IR (KBr, ν , cm⁻¹): 3459, 3321, 3214, 2959, 2870, 2179, 1651, 1592, 1564, 1374, 1258, 1042, 871, 832, 743; ¹H NMR (DMSO-*d*₆) (δ , ppm): 7.62–7.53 (m, 4H, ArH), 7.47–7.40 (m, 4H, ArH), 5.34 (s, 2H, NH₂), 4.99 (s, 1H, CH), 2.42 (d, 1H, CH₂, *J* = 17.6 Hz), 2.18 (d, 1H, CH₂, *J* = 16.4 Hz), 1.97 (d, 1H, CH₂, *J* = 16.4 Hz), 1.75 (d, 1H, CH₂, *J* = 17.6 Hz), 0.89 (s, 3H, CH₃), 0.80 (s, 3H, CH₃); Anal calcd. For C₂₄H₂₁Cl₂N₃O, C, 65.76; H, 4.83; N, 9.59; found C, 65.81; H, 4.79; N, 9.56.

8b

IR (KBr, ν , cm⁻¹): 3450, 3323, 3223, 2181, 1656, 1570, 1459, 1291, 1033, 925, 816, 621; ¹H NMR (DMSO-*d*₆) (δ , ppm): 7.36 (d, 2H, ArH, *J* = 7.6 Hz), 7.14–7.11 (m, 2H, ArH), 6.81–6.78 (m, 3H, ArH), 5.96 (s, 2H, CH₂), 5.54 (s, 2H, NH₂), 4.65 (s, 1H, CH), 2.40 (s, 3H, CH₃), 2.38 (d, 1H, CH₂, *J* = 17.2 Hz), 2.24 (d, 1H, CH₂, *J* = 16.4 Hz), 2.04 (d, 1H, CH₂, *J* = 16.4 Hz), 1.96 (d, 1H, CH₂, *J* = 17.2 Hz), 0.94 (s, 3H, CH₃), 0.83 (1s, 3H, CH₃); Anal calcd. for C₂₆H₂₅N₃O₃, C, 73.05; H, 5.89; N, 9.83; found C, 72.89; H, 5.93; N, 9.78.

8c

IR (KBr, ν , cm⁻¹): 3459, 3321, 3214, 2959, 2870, 2179, 1651, 1592, 1564, 1374, 1258, 1042, 871, 832, 743; ¹H NMR (DMSO-*d*₆) (δ , ppm): 8.23 (d, 2H, ArH, *J* = 8.4 Hz), 7.62–7.60 (m, 3H, ArH), 7.56 (d, 2H, ArH, *J* = 8.4 Hz), 7.477.45 (m, 2H, ArH), 5.51 (s, 2H, NH₂), 4.62 (s, 1H, CH), 2.40 (d, 1H, CH₂, *J* = 17.6 Hz), 2.20 (d, 1H, CH₂, *J* = 16.4 Hz), 2.06 (d, 1H, CH₂, *J* = 16.4 Hz), 1.73 (d, 1H, CH₂, *J* = 17.6 Hz), 0.89 (s, 3H, CH₃), 0.74 (s, 3H, CH₃); Anal calcd. For C₂₅H₂₄N₄O₃, C, 70.08; H, 5.65; N, 13.08; found C, 70.21; H, 5.58; N, 13.11.

8d.

IR (KBr, ν , cm⁻¹): 3476, 3329, 3210, 2952, 2927, 2891, 2180, 1637, 1562, 1488, 1373, 1269, 1136, 1003, 830, 789; ¹H NMR (DMSO-*d*₆) (δ , ppm): 7.38 (d, 4H, ArH, *J* = 8.4 Hz), 7.29 (d, 4H, ArH, *J* = 8.4 Hz), 5.36 (s, 2H, NH₂), 4.98 (s, 1H, CH), 2.40 (s, 3H, CH₃), 2.28–2.20 (m, 3H, CH₂), 1.92–1.80 (m, 2H, CH₂), 1.65–1.60 (m, 1H, CH₂); Anal calcd. For C₂₃H₂₀ClN₃O, C, 70.85; H, 5.17; N, 10.78; found C, 70.69; H, 5.23; N, 10.84.

8e

IR (KBr, ν , cm⁻¹): 3480, 3381, 2177, 1639, 1567, 1529, 1351, 1269, 1002, 774; ¹H NMR (DMSO-*d*₆) (δ , ppm): 8.09 (d, 2H, ArH, *J* = 6.4 Hz), 7.77 (d, 1H, ArH, *J* = 7.6 Hz), 7.68–7.64 (m, 1H, ArH), 7.41–7.30 (m, 4H, ArH), 5.52 (s, 2H, NH₂), 4.67

(s, 1H, CH), 2.40 (s, 3H, CH₃), 2.27–2.19 (m, 3H, CH₂), 1.93–1.66 (m, 2H, CH₂), 1.64–1.58 (m, 1H, CH₂); Anal calcd. for C₂₃H₂₀N₄O₃, C, 68.99; H, 5.03; N, 13.99; found C, 69.08; H, 4.99; N, 13.91.

8f

IR (KBr, ν , cm⁻¹): 3466, 3329, 3215, 2960, 2870, 2179, 1651, 1591, 1566, 1374, 1256, 1072, 901, 810, 734; ¹H NMR (DMSO-*d*₆) (δ , ppm): 8.10–8.09 (m, 2H, ArH), 7.78 (d, 1H, ArH, $J = 7.6$ Hz), 7.687.57 (m, 4H, ArH), 7.44 (d, 2H, ArH, $J = 7.6$ Hz), 5.44 (s, 2H, NH₂), 4.68 (s, 1H, CH), 2.23–2.20 (m, 3H, CH₂), 1.91–1.81 (m, 2H, CH₂), 1.64–1.60 (m, 1H, CH₂); Anal calcd. For C₂₂H₁₈N₄O₃, C, 68.38; H, 4.70; N, 14.50; found C, 68.49; H, 4.68; N, 14.40.

9a

IR (KBr, ν , cm⁻¹): 2957, 1692, 1633, 1587, 1364, 1205, 1073, 889, 733; ¹H NMR (DMSO-*d*₆) (δ , ppm): 7.56–7.50 (m, 4H, ArH), 7.49–7.47 (m, 4H, ArH) 7.26 (s, 2H, ArH), 7.18–7.15 (m, 6H, ArH), 7.00–6.99 (m, 2H, ArH), 5.18 (d, 2H, ArH, $J = 7.6$ Hz), 4.83 (s, 1H, CH), 4.80 (s, 1H, CH), 2.50 (s, 6H, CH₃), 2.35–2.39 (m, 2H, CH₂), 2.20–2.25 (m, 2H, CH₂), 2.06–2.10 (m, 2H, CH₂), 1.98–2.02 (m, 2H, CH₂), 0.93(s, 6H, CH₃), 0.77 (s, 6H, CH₃); Anal calcd. for C₅₆H₄₈N₂O₄, C, 82.73; H, 5.95; N, 3.45; found C, 82.85; H, 5.83; N, 3.40.

9b

IR (KBr, ν , cm⁻¹): 3050, 2955, 2869, 1687, 1649, 1588, 1365, 1174, 1101, 942, 888, 731; ¹H NMR (DMSO-*d*₆) (δ , ppm): 7.70–7.62 (m, 10H, ArH), 7.28–7.26 (m, 3H, ArH), 7.26–7.15 (m, 5H, ArH), 7.02–6.94 (m, 2H, ArH), 5.09 (d, 1H, ArH, $J = 7.6$ Hz), 5.04 (d, 1H, ArH, $J = 7.6$ Hz), 4.84 (s, 1H, CH), 4.82 (s, 1H, CH), 2.46–2.39 (m, 2H, CH₂), 2.24–1.95 (m, 6H, CH₂), 0.92 (s, 6H, CH₃), 0.80 (s, 3H, CH₃), 0.76 (s, 3H, CH₃); Anal calcd. For C₅₄H₄₄N₂O₄, C, 82.63; H, 5.65; N, 3.57; found C, 82.49; H, 5.71; N, 3.61.

9c

IR (KBr, ν , cm⁻¹): 3061, 2957, 2870, 1693, 1646, 1589, 1365, 1223, 1101, 941, 887, 699; ¹H NMR (DMSO-*d*₆) (δ , ppm): 7.69–7.60 (m, 9H, ArH), 7.58–7.56 (m, 1H, ArH), 7.27–7.25 (m, 3H, ArH), 7.24–7.13 (m, 5H, ArH), 6.98–6.95 (m, 2H, ArH), 5.08 (d, 1H, ArH, $J = 7.6$ Hz), 5.02 (d, 1H, ArH, $J = 7.6$ Hz), 4.84 (s, 1H, CH), 4.81 (s, 1H, CH), 2.46–2.39 (m, 2H, CH₂), 2.24–2.00 (m, 6H, CH₂), 0.93 (s, 6H, CH₃), 0.79 (s, 3H, CH₃), 0.71 (s, 3H, CH₃); C₅₄H₄₄N₂O₄, C, 82.63; H, 5.65; N, 3.57; found C, 82.72; H, 5.56; N, 3.43.