**Electronic supplementary materials** *Mendeleev Commun*., 2009, **19**, 159–160

# A new protocol for the construction of pyrrolo[4,3,2-*de*]quinolinones

**Maksim S. Slezkin* and Sergey N. Mantrov**

*Characteristics for compounds:*

For **13c**: yield 30%, mp 196–198 °C. $^1$H NMR ([$^2H_6$]DMSO) δ: 3.78 (d, 1H, $CH_2$, $^3J$ 17.3 Hz), 4.38 (d, 1H, $CH_2$, $^3J$ 18.5 Hz), 6.46 (s, 1H, OH), 7.24 (d, 1H, $C^7H$, $^3J$ 7.2 Hz), 7.53 (m, 4H, $C^5H$, $C^6H$, $C^3HPh$, $C^5HPh$), 7.88 (d, 2H, $C^2HPh$, $C^6HPh$, $^3J$ 7.6 Hz), 10.89 (s, 1H, NH).

For **13d**: yield 41%, mp 205–206 °C. $^1$H NMR ([$^2H_6$]DMSO) δ: 3.72 (d, 1H, $CH_2$, $^3J$ 16.4 Hz), 3.83 (s, 3H, Me), 4.33 (d, 1H, $CH_2$, $^3J$ 17.3 Hz), 6.39 (s, 1H, OH), 7.00 (d, 2H, $C^3HPh$, $C^5HPh$, $^3J$ 7.8 Hz, $^3J_{AB}$ 11.5 Hz), 7.23 (d, 1H, $C^7H$, $^3J$ 7.6 Hz), 7.50 (m, 2H, $C^5H$, $C^6H$), 7.84 (d, 2H, $C^2HPh$, $C^6HPh$, $^3J$ 8.5 Hz, $^3J_{AB}$ 11.5 Hz), 10.83 (s, 1H, NH).

For **13e**: yield 46%, mp 205–207 °C. $^1$H NMR ([$^2H_6$]DMSO) δ: 3.78 (d, 1H, $CH_2$, $^3J$ 18.5 Hz), 4.36 (d, 1H, $CH_2$, $^3J$ 16.9 Hz), 6.44 (s, 1H, OH), 7.23 (d, 1H, $C^7H$, $^3J$ 6.3 Hz), 7.5 (m, 2H, $C^5H$, $C^6H$), 7.71 (d, 2H, $C^3HPh$, $C^5HPh$, $^3J$ 8.5 Hz, $^3J_{AB}$ 9.0 Hz), 7.8 (d, 2H, $C^2HPh$, $C^6HPh$, $^3J$ 8.7 Hz, $^3J_{AB}$ 9.0 Hz), 10.6 (s, 1H, NH).

For **13f**: yield 34%, mp 214–215 °C. $^1$H NMR ([$^2H_6$]DMSO) δ: 3.82 (d, 1H, $CH_2$, $^3J$ 18.7 Hz), 4.34 (d, 1H, $CH_2$, $^3J$ 19.3 Hz), 6.47 (s, 1H, OH), 7.24 (d, 1H, $C^7H$, $^3J$ 7.0 Hz), 7.52 (m, 2H, $C^5H$, $C^6H$), 7.77 (d, 1H, $C^5HPh$, $^3J$ 7.2 Hz), 7.84 (d, 1H, $C^6HPh$, $^3J$ 9.7 Hz), 8.30 (s, 1H, $C^2HPh$), 10.65 (s, 1H, NH).

For **13k**: yield 34%, mp 204–207 °C. $^1$H NMR ([$^2H_6$]DMSO) δ: 3.92 (d, 1H, $CH_2$, $^3J$ 16.7 Hz), 4.41 (d, 1H, $CH_2$, $^3J$ 16.5 Hz), 6.47 (s, 1H, OH), 7.22 (d, 1H, $C^7H$, $^3J$ 7.2 Hz), 7.53 (m, 4H, $H_{arom}$), 8.00 (m, 5H, $H_{arom}$), 10.67 (s, 1H, NH).

For **1c**: yield 85%, mp 255–257 °C. $^1$H NMR ([$^2H_6$]DMSO) δ: 7.00 (d, 1H, $C^7H$, $^3J$ 5.5 Hz), 7.61 (d, 2H, $C^3HPh$, $C^5HPh$, $^3J$ 8.4 Hz, $J_{AB}$ 13.5 Hz), 7.7 (q, 2H, $C^6H$, $C^8H$, $^3J$ 22.2 Hz), 8.33 (t, 2H, $C^6HPh$, $C^2HPh$, $^3J$ 14.1 Hz, $J_{AB}$ 13.5 Hz), 8.51 (s, 1H, $C^3H$), 11.04 (s,

1H, NH). MS, *m*/*z*: 280 [$M^+$]. Found (%): C, 68.09; H, 4.12; N, 9.76. Calc. for $C_{16}H_{11}ClN_2O$ (%): C, 67.97; H, 3.92; N, 9.91.

For **1d**: yield 48%, mp 211–213 °C. $^1$H NMR ([$^2H_6$]DMSO) δ: 2.4 (s, 3H, Me), 6.97 (d, 1H, $C^7$H, $^3J$ 6.0 Hz), 7.35 (d, 2H, $C^3$HPh, $C^5$HPh, $^3J$ 8.8 Hz, $J_{AB}$ 11.7 Hz), 7.69 (q, 2H, $C^6$H, $C^8$H, $^3J$ 23.5 Hz), 8.20–8.31 (dd, 2H, $C^2$HPh, $C^6$HPh, $^3J$ 9.0 Hz, $J_{AB}$ 11.7 Hz), 8.44 (s, 1H, $C^3$H), 11.03 (s, 1H, NH). MS, *m*/z: 260 [$M^+$]. Found (%): C, 77.68; H, 5.12; N, 10.85. Calc. for $C_{17}H_{14}N_2O$ (%): C, 77.84; H, 5.38; N, 10.68.

For **1e**: yield 66%, mp 243–245 °C. $^1$H NMR ([$^2H_6$]DMSO) δ: 7.02 (d, 1H, $C^7$H, $^3J$ 7.2 Hz), 7.72 (m, 4H, $C^2$HPh, $C^6$HPh, $C^6$H, $C^8$H, $J_{AB}$ 19.5 Hz), 8.28 (d, 2H, $C^3$HPh, $C^5$HPh, $^3J$ 9.9 Hz, $J_{AB}$ 19.5 Hz), 8.51 (s, 1H, $C^3$H), 11.01 (s, 1H, NH). MS, *m*/*z*: 325 [$M^+$]. Found (%): C, 58.95; H, 3.52; N, 8.74. Calc. for $C_{16}H_{11}BrN_2O$ (%): C, 58.74; H, 3.39; N, 8.56.

For **1f**: yield 19%, mp 265–267 °C. $^1$H NMR ([$^2H_6$]DMSO) δ: 7.08 (d, 1H, $C^7$H, $^3J$ 7.2 Hz), 7.64 (d, 2H, $C^5$HPh, $C^6$HPh, $^3J$ 9.2 Hz), 7.73 (q, 2H, $C^7$H, $C^8$H, $^3J$ 25.4 Hz), 7.83 (s, 1H, $C^3$HPh), 8.13 (s, 1H, $C^3$H), 11.12 (s, 1H, NH). MS, *m*/*z*: 314 [$M^+$]. Found (%): C, 60.69; H, 2.98; N, 9.02. Calc. for $C_{16}H_{10}Cl_2N_2O$ (%): C, 60.59; H, 3.18; N, 8.83.

For **1g**: yield 32%, mp 178–180 °C. $^1$H NMR ([$^2H_6$]DMSO) δ: 3.85 (s, 3H, OMe), 6.96 (d, 1H, $C^7$H, $^3J$ 7.8 Hz), 7.12 (d, 2H, $C^3$HPh, $C^5$HPh, $^3J$ 9.2 Hz, $J_{AB}$ 19.5 Hz), 6.7 (q, 2H, $C^6$H, $C^8$H, $^3J$ 24.6 Hz), 8.27 (d, 2H, $C^2$HPh, $C^6$HPh, $^3J$ 8.3 Hz, $J_{AB}$ 19.5 Hz), 8.43 (s, 1H, $C^3$H), 10.94 (s, 1H, NH). MS, *m*/*z*: 276 [$M^+$]. Found (%): C, 73.12; H, 4.86; N, 9.85. Calc. for $C_{17}H_{14}N_2O_2$: C, 73.37; H, 5.07; N, 10.07.

For **1h**: yield 21%, mp 170–172 °C. $^1$H NMR ([$^2H_6$]DMSO) δ: 3.85 (s, 3H, *p*-OMe), 3.90 (s, 3H, *p*-OMe), 6.95 (d, 1H, $C^7$H, $^3J$ 3.9 Hz), 7.13 (d, 1H, $C^2$HPh, $^3J$ 8.3 Hz), 7.67 (s, 2H, $C^5$HPh, $C^6$HPh), 7.92 (s, 2H, $C^6$H, $C^8$H), 8.50 (s, 1H, $C^3$H), 10.95 (s, 1H, NH). MS, *m*/*z*: 306 [$M^+$]. Found (%): C, 70.48; H, 5.12; N, 9.27. Calc. for $C_{18}H_{16}N_2O_3$ (%): C, 70.12; H, 5.23; N, 9.09.

For **1i**: yield 37%, mp 185–187 °C. $^1$H NMR ([$^2H_6$]DMSO) δ: 1.23 (m, 3H, Me), 2.68 (q, 2H, $CH_2$, $^3J$ 23.7 Hz), 6.97 (d, 1H, $C^7$H, $^3J$ 6.0 Hz), 7.37 (d, 2H, $C^3$HPh, $C^5$HPh, $^3J$ 7.4 Hz, $J_{AB}$ 25.0 Hz), 7.69 (q, 2H, $C^6$H, $C^8$H, $^3J$ 21.4 Hz), 8.23 (d, 2H, $C^2$HPh, $C^6$HPh, $^3J$ 10.0 Hz, $J_{AB}$ 25.0 Hz), 8.46 (s, 1H, $C^3$H), 11.02 (s, 1H, NH). MS, *m*/*z*: 274 [$M^+$]. Found (%): C, 78.38; H, 5.67; N, 9.86. Calc. for $C_{18}H_{16}N_2O$ (%): C, 78.24; H, 5.84; N, 10.14.

For **1j**: yield 61%, mp 233–235 °C. $^{1}$H NMR ([$^{2}H_6$]DMSO) δ: 4.32 (s, 4H, $CH_2CH_2$), 7.00 (s + t, 2H, $C^7H$, $C^2HPh$, $^{3}J$ 13.6 Hz), 7.65 (q, 2H, $C^5HPh$, $C^6HPh$, $^{3}J$ 25.1 Hz), 7.84 (d, 2H, $C^6H$, $C^8H$, $^{3}J$ 7.1 Hz), 8.40 (s, 1H, $C^3H$), 10.96 (s, 1H, NH). MS, *m*/*z*: 304 [$M^+$]. Found (%): C, 70.37; H, 4.42; N, 9.38. Calc. for $C_{18}H_{14}N_2O_3$ (%): C, 70.58; H, 4.61; N, 9.15.

For **1k**: yield 47%, mp 235–237 °C. $^{1}$H NMR ([$^{2}H_6$]DMSO) δ: 7.08 (d, 1H, $H_{arom}$, $^{3}J$ 7.4 Hz), 7.55 (m, 3H, $H_{arom}$), 7.7 (m, 3H, $H_{arom}$), 8.07 (m, 4H, $H_{arom}$), 11.08 (s, 1H, NH). MS, *m*/*z*: 296 [$M^+$]. Found (%): C, 79.68; H, 4.12; N, 9.05. Calc. for $C_{20}H_{12}N_2O$ (%): C, 81.07; H, 4.08; N, 9.45.