

Regioselective Coupling of 2-Arylquinazolinone C-H with Aldehyde and Benzyl Alcohol under Oxidative Condition

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Experimental

General information: ¹H and ¹³C NMR spectra were recorded using a 400 MHz NMR spectrometer. The chemical shifts were referenced to signals at 7.26 and 77.0 ppm, respectively, and CDCl₃ was used as the solvent with TMS as the internal standard. High resolution mass spectra were obtained with a HRMS Thermo-scientific Bruker Daltonic mass spectrometer ESI. Melting points were taken out in open glass capillary tubes and were uncorrected. The IR spectra were recorded Bruker–Tensor 37 attachment (Platinum ATR) IR spectrometer and only major peaks are reported in cm⁻¹. All 2-aryl-quinazolinones **1** were synthesized according to the literature (D. N. Garad, A. B. Viveki, and S. B. Mhaske, *J. Org. Chem.* 2017, **82**, 6366.). All other reagents and solvents were obtained from commercial sources and used without further purification unless otherwise stated. Column chromatography was performed by using Merck silica gel 100-200 mesh.

General procedure for the palladium catalyzed dehydrogenative coupling reaction of 2-arylquinazolinone with aldehydes: To a sealed tube was added 2-aryl-quinazolinone **1** (0.2 mmol), arylaldehyde **2** (0.4 mmol) followed by acetonitrile:chlorobenzene (1:4) 2.00 mL. To above mixture was added Pd(OAc)₂ (10 mol %) and ter-butyl hydroperoxide (3.0 equiv., TBHP solution 5.0-6.0 M in decane). The sealed tube was sealed with a screw cap and placed in a preheated oil bath at 120 °C. The progress of the reaction was monitored by TLC. The reaction mixture was cooled to room temperature after 36 h, diluted with ethyl acetate. Organic layer was washed with saturated aq. sodium bicarbonate and brine, and then organic layer was dried over Na₂SO₄. After that solvent was removed in vacuo, the compound was purified using silica gel column chromatography (hexane/ethyl acetate) to get pure product **3a-3aa**.

General procedure for the palladium catalyzed oxidative coupling reaction of 2-arylquinazolinone with benzyl alcohols: To a sealed tube was added 2-aryl-quinazolinone **1** (0.2 mmol), benzyl alcohol **4** (0.4 mmol) followed by trifluorotoluene (2.00 mL). To above mixture was added Pd(OAc)₂ (10 mol %) and *ter*-butyl hydroperoxide (4.0 equiv., TBHP solution 5.0-6.0 M in decane). The sealed tube was sealed with a screw cap and placed in a preheated oil bath at 120 °C. The progress of the reaction was monitored by TLC. The reaction mixture was cooled to room temperature after 36 h, diluted with ethyl acetate. Organic layer was washed with saturated aq. sodium bicarbonate and brine, and then organic layer was dried over Na₂SO₄. After that solvent was removed in vacuo, the compound was purified using silica gel column chromatography (hexane/ethyl acetate) to get pure product **3a**, **3c**, **3m**, **3o**, **3ab**.

2-(2-benzoylphenyl)-3-methylquinazolin-4(3H)-one (3a): Thick liquid; 48 mg (70%); ¹H NMR (400 MHz, CDCl₃): δ 8.29 (dd, *J* = 8.0, 1.3 Hz, 1H), 7.78 (dd, *J* = 8.1, 1.0 Hz, 2H), 7.73 (d, *J* = 7.5 Hz, 2H), 7.69 (dd, *J* = 7.4, 1.4 Hz, 1H), 7.64 (dd, *J* = 3.5, 1.4 Hz, 1H), 7.60 – 7.57 (m, 1H), 7.52 (d, *J* = 8.4 Hz, 2H), 7.46–7.39 (m, 3H), 3.48 (s, 3H); ¹³C NMR (101 MHz, CDCl₃) δ 196.2, 162.2, 155.7, 147.2, 137.6, 137.0, 136.1, 134.0, 133.1, 131.7, 130.7, 130.0, 129.2, 129.0, 128.3, 127.2, 126.9, 126.7, 120.6, 33.6; HRMS: *m/z* [M+H]⁺ calcd for C₂₂H₁₇N₂O₂ 341.1290, found 341.1289.

2-(2-benzoyl-4-chlorophenyl)-3-methylquinazolin-4(3H)-one (3b): White solid; m.p. 184-186 °C; 39 mg (52%); IR (neat): 1657, 1597, 1470, 774, 696 cm⁻¹; ¹H NMR (400 MHz, CDCl₃) δ 8.28 (dd, *J* = 8.0, 1.1 Hz, 1H), 7.79 (d, *J* = 1.2 Hz, 1H), 7.77 (d, *J* = 1.4 Hz, 1H), 7.72–7.65 (m, 3H), 7.59–7.59 (m, 2H), 7.52–7.42 (m, 1H), 3.49 (s, 1H); ¹³C NMR (101 MHz, CDCl₃) δ 194.8, 162.1, 154.5, 147.1, 139.5, 136.4, 135.5, 134.5, 134.1, 133.5, 131.5, 130.4, 130.3, 129.9, 128.5, 127.2, 127.1, 126.7, 120.6, 33.6; HRMS: *m/z* [M+H]⁺ calcd for C₂₂H₁₆ClN₂O₂ 375.0900, found 375.0900.

2-(2-benzoyl-4-bromophenyl)-3-methylquinazolin-4(3H)-one (3c): Thick liquid; 48 mg (57%); IR (neat): 1671, 1598, 1474, 1047, 772, 699 cm⁻¹; ¹H NMR (400 MHz, CDCl₃) δ 8.27 (dd, *J* = 8.0, 1.2 Hz, 1H), 7.87–7.84 (m, 2H), 7.78 (s, 1H), 7.76 (d, *J* = 1.4 Hz, 1H), 7.69–7.65 (m, 1H), 7.58–7.53 (m, 1H), 7.49 (dd, *J* = 6.4, 4.6 Hz, 2H), 7.47–7.40 (m, 3H), 3.49 (s, 3H); ¹³C NMR (101 MHz, CDCl₃) δ 194.7, 162.1, 154.5, 147.1, 139.7, 136.4, 134.9, 134.4, 134.1, 133.4, 133.2, 130.4, 129.9, 128.5, 127.3, 127.1, 126.7, 123.5, 120.6, 33.6; HRMS: *m/z* [M+H]⁺ calcd for C₂₂H₁₆BrN₂O₂ 419.0395, found 419.0393.

2-(2-benzoyl-4-(trifluoromethyl)phenyl)-3-methylquinazolin-4(3H)-one (3d): White solid; m.p. 142-144 °C; 38 mg (46%); IR (neat): 1669, 1593, 1473, 1021, 954 cm^{-1} , ^1H NMR (400 MHz, CDCl_3) δ 8.29 (dd, $J = 7.8, 1.0$ Hz, 1H), 7.99 (d, $J = 8.4$ Hz, 2H), 7.79 (s, 1H), 7.78–7.74 (m, 2H), 7.71–7.65 (m, 1H), 7.61–7.55 (m, 1H), 7.52–7.42 (m, 4H), 3.50 (s, 3H); ^{13}C NMR (101 MHz, CDCl_3): δ 194.8, 162.0, 154.1, 147.0, 139.4, 138.8, 136.2, 134.2, 133.6, 131.6 (d, $J_{\text{C-F}} = 33.4$), 129.9, 129.7, 128.6, 128.1 (d, $J_{\text{C-F}} = 3.5$), 127.3 (d, $J_{\text{C-F}} = 2.7$), 127.1 (d, $J_{\text{C-F}} = 3.4$), 126.7, 123.2 (d, $J_{\text{C-F}} = 272.8$), 120.7, 33.6. HRMS: m/z $[\text{M} + \text{H}]^+$ calcd for $\text{C}_{24}\text{H}_{16}\text{F}_3\text{N}_2\text{O}_2$ 409.1164, found 409.1163.

2-(2-benzoyl-4-fluorophenyl)-3-ethylquinazolin-4(3H)-one (3e): White Solid; m.p. 184-186 °C; 34 mg (46%); IR (neat): 1657, 1577, 1459, 1076, 973, cm^{-1} , ^1H NMR (400 MHz, CDCl_3): δ 8.28 (dd, $J = 8.0, 1.1$ Hz, 1H), 7.80–7.75 (m, 2H), 7.66 (dd, $J = 9.1, 2.2$ Hz, 1H), 7.63 (dd, $J = 6.2, 3.0$ Hz, 1H), 7.56 (dd, $J = 10.6, 4.3$ Hz, 1H), 7.48 (d, $J = 4.0$ Hz, 1H), 7.45 (dd, $J = 4.5, 3.7$ Hz, 3H), 7.41 (d, $J = 8.1$ Hz, 2H), 4.04 (q, $J = 4$ Hz, 2H), 1.32 (t, $J = 7.1$ Hz, 3H); ^{13}C NMR (101 MHz, CDCl_3): δ 194.8, 162.2 (d, $J_{\text{C-F}} = 253.5$), 161.7, 154.5, 147.0, 140.1 (d, $J_{\text{C-F}} = 6.5$), 136.4, 134.0, 133.4, 132.2 (d, $J_{\text{C-F}} = 3.9$), 130.9 (d, $J_{\text{C-F}} = 8.1$), 130.0, 128.4, 127.2, 126.9, 126.7, 121.0, 118.2 (d, $J_{\text{C-F}} = 21.8$), 117.6 (d, $J_{\text{C-F}} = 23.1$), 41.9, 13.7; HRMS: m/z $[\text{M} + \text{H}]^+$ calcd for $\text{C}_{23}\text{H}_{18}\text{FN}_2\text{O}_2$ 373.1352, found 373.1349.

2-(2-benzoyl-4,5-dichlorophenyl)-3-ethylquinazolin-4(3H)-one (3f): White solid; m.p. 156-158 °C; 41 mg (48%); IR (neat): 1690, 1589, 1469, 691, cm^{-1} , ^1H NMR (400 MHz, CDCl_3) δ 8.29 (dd, $J = 8.5, 1.5$ Hz, 1H), 7.79 (s, 1H), 7.78 (d, $J = 1.1$ Hz, 1H), 7.76 (d, $J = 1.4$ Hz, 1H), 7.74 (s, 1H), 7.70–7.64 (m, 1H), 7.61–7.56 (m, 1H), 7.49 (d, $J = 5.0$ Hz, 1H), 7.47 (d, $J = 1.2$ Hz, 1H), 7.45 (dd, $J = 4.3, 3.1$ Hz, 2H), 4.04 (q, $J = 8$ Hz, 2H), 1.34 (t, $J = 7.1$ Hz, 3H); ^{13}C NMR (101MHz, CDCl_3): δ 193.9, 161.5, 153.2, 146.9, 137.3, 136.3, 136.0, 135.6, 134.1, 133.8, 133.6, 132.1, 130.9, 130.0, 128.6, 127.2, 127.2, 126.7, 121.1, 42.0, 13.8; HRMS: m/z $[\text{M} + \text{H}]^+$ calcd for $\text{C}_{23}\text{H}_{17}\text{Cl}_2\text{N}_2\text{O}_2$ 423.0667, found 423.0666.

2-(2-benzoyl-4-methoxyphenyl)-3-methylquinazolin-4(3H)-one (3g): White solid; m.p. 152-154 °C; 55 mg (74%); IR (neat): 1648, 1596, 1466, 1287, 1022 cm^{-1} , ^1H NMR (400 MHz, CDCl_3): δ 8.24 (d, $J = 7.8$ Hz, 1H), 7.76 (d, $J = 7.5$ Hz, 2H), 7.64 (t, $J = 7.4$ Hz, 1H), 7.52-7.47 (m, 3H), 7.43 (d, $J = 7.5$ Hz, 1H), 7.37 (t, $J = 7.5$ Hz, 2H), 7.20 (d, $J = 10.0$ Hz, 2H), 3.90 (s, 3H), 3.48 (s, 3H); ^{13}C NMR (101 MHz, CDCl_3) δ 196.0, 162.3, 160.0, 155.3, 147.2, 139.6, 137.0, 133.9, 133.0, 130.3, 129.8, 128.3, 128.2, 127.2, 126.7, 126.6, 120.5, 116.5, 116.2, 55.8, 33.7. HRMS: m/z $[\text{M} + \text{H}]^+$ calcd for $\text{C}_{23}\text{H}_{19}\text{N}_2\text{O}_3$ 371.1396, found 371.1393.

2-(2-benzoyl-4-methoxyphenyl)-3-ethylquinazolin-4(3H)-one (3h): White solid; m.p. 134-136 °C; 60 mg (79%); IR (neat): 1666, 1599, 1469, 1287, 1031 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ

8.26 (d, $J = 7.0$ Hz, 1H), 7.80–7.75 (m, 2H), 7.66–7.61 (m, 1H), 7.55 (d, $J = 9.2$ Hz, 1H), 7.51 (d, $J = 7.4$ Hz, 1H), 7.48 (d, $J = 8.1$ Hz, 1H), 7.43 (dd, $J = 8.9, 1.5$ Hz, 1H), 7.39 (d, $J = 7.5$ Hz, 2H), 7.21 (dd, $J = 6.0, 2.6$ Hz, 2H), 4.05 (q, $J = 1.6$ Hz, 2H), 3.90 (s, 3H), 1.31 (t, $J = 7.0$ Hz, 3H); ^{13}C NMR (101 MHz, CDCl_3): δ 196.0, 161.9, 159.8, 155.3, 147.2, 139.4, 137.0, 133.9, 133.0, 130.2, 130.0, 128.4, 128.2, 127.1, 126.6, 126.6, 121.0, 116.3, 116.2, 55.8, 41.9, 13.8; HRMS: m/z $[\text{M}+\text{H}]^+$ calcd for $\text{C}_{24}\text{H}_{21}\text{N}_2\text{O}_3$ 385.1552, found 385.1552.

2-(2-benzoyl-4,5-dimethoxyphenyl)-3-methylquinazolin-4(3H)-one (3i): Thick liquid; 65 mg (81%); IR (neat): 1658, 1591, 1468, 1270, 1021 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ 8.26 (dd, $J = 8.0, 1.2$ Hz, 1H), 7.76–7.72 (m, 2H), 7.71–7.66 (m, 1H), 7.59 (d, $J = 8.0$ Hz, 1H), 7.49–7.43 (m, 2H), 7.40–7.36 (m, 2H), 7.25 (s, 1H), 7.05 (s, 1H), 4.01 (s, 3H), 3.93 (s, 3H), 3.44 (s, 3H); ^{13}C NMR (101 MHz, CDCl_3): δ 195.3, 162.2, 155.6, 151.9, 149.1, 147.2, 137.5, 134.0, 132.7, 129.9, 129.9, 129.7, 128.2, 127.2, 126.8, 126.6, 120.6, 113.9, 111.6, 56.4, 56.4, 33.4. HRMS: m/z $[\text{M} + \text{H}]^+$ calcd for $\text{C}_{24}\text{H}_{21}\text{N}_2\text{O}_4$ 401.1501, found 401.1504.

2-(2-benzoyl-4-(tert-butyl)phenyl)-3-ethylquinazolin-4(3H)-one (3j): Thick liquid; 56 mg (68%); IR (neat): 1670, 1597, 1471, 1379, 1061 cm^{-1} . ^1H NMR (400 MHz, CDCl_3) δ 8.28 (dd, $J = 8.0, 1.1$ Hz, 1H), 7.74 (dd, $J = 10.3, 2.9$ Hz, 2H), 7.71 (dd, $J = 6.4, 2.5$ Hz, 2H), 7.66 (d, $J = 8.4$ Hz, 1H), 7.61 (dd, $J = 10.8, 4.5$ Hz, 2H), 7.52 (d, $J = 7.9$ Hz, 1H), 7.45 (d, $J = 8.0$ Hz, 1H), 7.42 (d, $J = 8.5$ Hz, 2H), 4.03 (br d, 2H), 1.33–1.26 (m, 12H); ^{13}C NMR (101 MHz, CDCl_3): δ 195.9, 161.7, 156.9, 155.6, 147.2, 137.7, 136.1, 134.4, 133.9, 131.2, 130.7, 130.1, 129.0, 128.9, 127.2, 126.7, 126.6, 125.3, 35.1, 31.0, 13.7; HRMS: m/z $[\text{M}+\text{H}]^+$ calcd for $\text{C}_{27}\text{H}_{27}\text{N}_2\text{O}_2$ 411.2073, found 411.2070.

2-(2-benzoyl-4-bromophenyl)-3-methoxyquinazolin-4(3H)-one (3k): White solid; m.p. 184–186 $^\circ\text{C}$; 51 mg (59%); IR (neat): 1691, 1591, 1469, 1284, 685 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ 8.25 (d, $J = 7.8$ Hz, 1H), 7.84 (d, $J = 8.4$ Hz, 1H), 7.81 (d, $J = 6.8$ Hz, 3H), 7.75 (d, $J = 8.2$ Hz, 1H), 7.72–7.68 (m, 1H), 7.54 (d, $J = 8.2$ Hz, 2H), 7.48 (d, $J = 7.6$ Hz, 1H), 7.45–7.41 (m, 2H), 3.83 (s, 3H); ^{13}C NMR (101 MHz, CDCl_3): δ 194.4, 157.4, 152.0, 146.3, 141.0, 136.29, 134.4, 133.8, 133.3, 132.4, 132.2, 131.5, 130.0, 128.4, 127.8, 127.2, 126.7, 124.3, 122.7, 64.1; HRMS: m/z $[\text{M}+\text{H}]^+$ calcd for $\text{C}_{22}\text{H}_{16}\text{BrN}_2\text{O}_3$ 435.0344, found 435.0343.

2-(2-benzoylphenyl)-7-fluoro-3-methylquinazolin-4(3H)-one (3l): Thick liquid; 36 mg (51%); IR (neat): 1664, 1578, 1467, 1130, 1031 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ 8.28 (dd, $J = 9.6, 6.1$ Hz, 1H), 7.80–7.75 (m, 2H), 7.74–7.68 (m, 2H), 7.64–7.59 (m, 1H), 7.57 (dd, $J = 6.4, 2.3$ Hz, 1H), 7.54 (d, $J = 7.4$ Hz, 1H), 7.46–7.36 (m, 2H), 7.17–7.12 (m, 2H), 3.46 (s, 3H); ^{13}C NMR (101 MHz, CDCl_3): δ 196.0, 166.2 (d, $J_{\text{C-F}} = 253.7$), 161.4, 157.0, 149.2 (d, $J_{\text{C-F}} = 13.1$), 137.3, 136.8, 135.9, 133.1, 131.6, 130.7, 129.9, 129.3 (d, $J_{\text{C-F}} = 10.6$), 129.2, 128.7, 128.3, 117.3 (d, $J_{\text{C-F}} =$

1.8), 115.5 (d, $J_{C-F} = 23.6$), 112.3 (d, $J_{C-F} = 21.9$), 33.4; HRMS: m/z $[M+H]^+$ calcd for $C_{22}H_{16}FN_2O_2$ 359.1196, found 359.1192.

2-(2-benzoylphenyl)-6-chloro-3-methylquinazolin-4(3H)-one (3m): Thick liquid; 42 (56%); 1H NMR (400 MHz, $CDCl_3$): δ 8.21 (d, $J = 8.6$ Hz, 1H), 7.80–7.77 (m, 2H), 7.75–7.70 (m, 2H), 7.63 (d, $J = 7.6$ Hz, 1H), 7.61–7.53 (m, 2H), 7.51 (d, $J = 1.9$ Hz, 1H), 7.44 (t, $J = 7.7$ Hz, 2H), 7.39 (dd, $J = 8.6, 1.7$ Hz, 1H), 3.46 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$): δ 196.1, 161.6, 157.1, 148.2, 140.2, 137.4, 136.9, 136.0, 133.2, 131.7, 130.8, 130.1, 129.3, 128.8, 128.4, 128.2, 127.4, 126.8, 119.1, 33.6, 29.7; HRMS: m/z $[M+H]^+$ calcd for $C_{22}H_{16}ClN_2O_2$ 375.0900, Found 375.0907.

2-(2-benzoylphenyl)-3,5-dimethylquinazolin-4(3H)-one (3n): Thick liquid; 42 mg (59%); IR (neat): 1661, 1594, 1468, 1031 cm^{-1} ; 1H NMR (400 MHz, $CDCl_3$): δ 7.80 (d, $J = 7.2$ Hz, 1H), 7.72 (dd, $J = 7.1, 6.4$ Hz, 1H), 7.64–7.57 (m, 1H), 7.54 (d, $J = 7.5$ Hz, 1H), 7.52–7.47 (m, 1H), 7.43 (t, $J = 7.6$ Hz, 2H), 7.36 (d, $J = 8.0$ Hz, 1H), 7.20 (d, $J = 7.3$ Hz, 1H), 3.43 (s, 3H), 2.91 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$): δ 196.2, 162.8, 155.3, 148.8, 140.9, 137.6, 137.0, 136.3, 133.1, 133.0, 131.6, 130.6, 130.0, 129.4, 129.1, 129.0, 128.3, 125.5, 119.2, 33.5, 23.1; HRMS: m/z $[M+H]^+$ calcd for $C_{23}H_{19}N_2O_2$ 355.1447, found 355.1445.

2-(2-benzoylphenyl)-3,6-dimethylquinazolin-4(3H)-one (3o): Thick liquid; 43 mg (61%); 1H NMR (400 MHz, $CDCl_3$): δ 7.81–7.77 (m, 2H), 7.71 (t, $J = 6.9$ Hz, 2H), 7.61–7.56 (m, 2H), 7.54–7.50 (m, 1H), 7.47 (d, $J = 7.6$ Hz, 1H), 7.41 (t, $J = 7.6$ Hz, 2H), 7.35 (d, $J = 8.0$ Hz, 1H), 7.19 (d, $J = 7.3$ Hz, 1H), 3.42 (s, 3H), 2.90 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$): δ 196.2, 162.7, 155.3, 148.8, 140.9, 137.6, 137.0, 136.3, 133.1, 133.0, 131.8, 130.6, 130.0, 129.4, 129.1, 129.0, 128.3, 125.5, 119.2, 33.5, 23.1; HRMS: m/z $[M+H]^+$ calcd for $C_{23}H_{19}N_2O_2$ 355.1447, found 355.1453.

2-(2-benzoylphenyl)-7-methoxy-3-methylquinazolin-4(3H)-one (3p): Thick liquid; 47 mg (63%); IR (neat): 1666, 1595, 1458, 1273, 1076 cm^{-1} ; 1H NMR (400 MHz, $CDCl_3$): δ 7.88 (dd, $J = 8.1, 1.2$ Hz, 1H), 7.82 (d, $J = 4.3$ Hz, 1H), 7.81 (d, $J = 8.0$ Hz, 1H), 7.73–7.67 (m, 2H), 7.61 (d, $J = 1.1$ Hz, 1H), 7.59 (d, $J = 8.0$ Hz, 1H), 7.57–7.53 (m, 1H), 7.43 (dd, $J = 10.9, 5.0$ Hz, 2H), 7.38 (d, $J = 8.0$ Hz, 1H), 7.12 (dd, $J = 8.0, 1.0$ Hz, 1H), 3.83 (s, 3H), 3.47 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$): δ 196.3, 162.2, 154.6, 154.5, 138.1, 137.8, 137.2, 136.5, 132.9, 131.6, 130.7, 130.1, 129.5, 129.1, 128.2, 127.1, 121.9, 118.0, 114.1, 56.1, 33.7; HRMS: m/z $[M+H]^+$ calcd for $C_{23}H_{19}N_2O_3$ 371.1396, found 371.1394.

2-(2-benzoylphenyl)-6,7-dimethoxy-3-methylquinazolin-4(3H)-one (3q): Thick liquid; 54 mg (68%); IR (neat): 1661, 1498, 1277, 1036 cm^{-1} ; 1H NMR (400 MHz, $CDCl_3$): δ 7.77 (d, $J = 7.1$ Hz, 2H), 7.75–7.68 (m, 2H), 7.60 (s, 1H), 7.58 (d, $J = 8.0$ Hz, 1H), 7.57–7.52 (m, 1H), 7.43–7.39 (m,

2H), 6.95 (s, 1H), 4.00 (s, 3H), 3.91 (s, 3H), 3.47 (s, 1H); ^{13}C NMR (101 MHz, CDCl_3): δ 196.1, 161.6, 154.7, 154.3, 149.2, 143.5, 137.5, 137.1, 136.3, 133.0, 131.6, 130.70, 129.9, 129.1, 128.3, 114.0, 107.7, 105.6, 56.3, 56.2, 33.6. HRMS: m/z $[\text{M}+\text{Na}]^+$ calcd for $\text{C}_{24}\text{H}_{20}\text{N}_2\text{NaO}_4$, 423.1321, found 423.1315.

2-(2-(4-bromobenzoyl)phenyl)-3-methylquinazolin-4(3H)-one (3r): Thick liquid; 49 mg (59%); IR (neat): 1667, 1586, 1470, 760 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ 8.31 (dd, $J = 8.0, 1.1$ Hz, 1H), 7.75-7.71 (m, 1H), 7.68 (dd, $J = 5.2, 3.2$ Hz, 2H), 7.67 (d, $J = 1.9$ Hz, 2H), 7.63 (dd, $J = 7.5, 1.1$ Hz, 1H), 7.60 (d, $J = 8.1$ Hz, 2H), 7.57 (d, $J = 1.7$ Hz, 1H), 7.51 (d, $J = 7.9$ Hz, 1H), 7.49-7.44 (m, 1H), 3.48 (s, 3H); ^{13}C NMR (101 MHz, CDCl_3) δ 195.1, 162.2, 155.4, 147.2, 137.2, 136.3, 135.7, 134.1, 131.8, 131.7, 131.5, 130.3, 129.2, 129.1, 128.4, 127.2, 127.0, 126.7, 120.7, 33.56; HRMS: m/z $[\text{M}+\text{H}]^+$ calcd for $\text{C}_{22}\text{H}_{16}\text{BrN}_2\text{O}_2$ 419.0395, found 419.0389.

2-(2-(4-chlorobenzoyl)phenyl)-3-methylquinazolin-4(3H)-one (3s): Thick liquid; 42 mg (56%); ^1H NMR (400 MHz, CDCl_3) δ 8.31 (d, $J = 7.9$ Hz, 1H), 7.74 (dd, $J = 11.3, 8.5$ Hz, 3H), 7.67 (dd, $J = 10.4, 4.3$ Hz, 2H), 7.64 (d, $J = 7.5$ Hz, 1H), 7.60 (d, $J = 7.5$ Hz, 1H), 7.51 (d, $J = 8.1$ Hz, 1H), 7.49-7.45 (m, 1H), 7.41 (d, $J = 8.4$ Hz, 2H), 3.48 (s, 3H); ^{13}C NMR (101 MHz, CDCl_3): δ 195.0, 162.2, 155.4, 147.2, 139.7, 137.3, 136.3, 135.2, 134.1, 131.8, 131.5, 130.3, 129.2, 129.1, 128.7, 127.2, 126.9, 126.7, 120.7, 33.6; HRMS: m/z $[\text{M}+\text{Na}]^+$ calcd for $\text{C}_{22}\text{H}_{15}\text{ClN}_2\text{NaO}_2$, 397.0720, found 397.0715.

3-methyl-2-(2-(4-methylbenzoyl)phenyl)quinazolin-4(3H)-one (3t): Thick liquid; 43 mg (60%); IR (neat): 1664, 1597, 1466, 1036 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ 8.29 (dd, $J = 8.0, 1.3$ Hz, 1H), 7.73-7.68 (m, 4H), 7.65 (dd, $J = 7.1, 1.3$ Hz, 1H), 7.62 (dd, $J = 7.3, 1.4$ Hz, 1H), 7.59-7.56 (m, 1H), 7.53 (d, $J = 8.0$ Hz, 1H), 7.47-7.42 (m, 1H), 7.22 (d, $J = 8.0$ Hz, 2H), 3.47 (s, 3H), 2.39 (s, 3H); ^{13}C NMR (101 MHz, CDCl_3) δ 195.8, 162.2, 155.7, 147.3, 144.1, 137.8, 136.2, 134.3, 134.0, 131.5, 130.6, 130.3, 129.1, 129.0, 128.9, 127.3, 126.8, 126.7, 120.7, 33.6, 21.7; HRMS: m/z $[\text{M}+\text{H}]^+$ calcd for $\text{C}_{23}\text{H}_{19}\text{N}_2\text{O}_2$ 355.1447, found 355.1442.

2-(2-(4-methoxybenzoyl)phenyl)-3-methylquinazolin-4(3H)-one (3u): Thick liquid; 48 mg (65%); IR (neat): 1672, 1599, 1257, 750 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ 8.30 (dd, $J = 8.0, 1.1$ Hz, 1H), 7.83-7.79 (m, 2H), 7.73-7.66 (m, 3H), 7.64-7.60 (m, 1H), 7.60-7.56 (m, 1H), 7.53 (d, $J = 8.0$ Hz, 1H), 7.48-7.43 (m, 1H), 6.93-6.89 (m, 2H), 3.86 (s, 3H), 3.48 (s, 3H); ^{13}C NMR (101 MHz, CDCl_3): δ 194.7, 163.7, 162.2, 155.7, 147.3, 138.2, 136.1, 133.9, 132.5, 131.1, 130.2, 129.8, 129.0, 128.9, 127.2, 126.7, 126.7, 120.7, 113.6, 55.5, 33.5; HRMS: m/z $[\text{M}+\text{H}]^+$ calcd for $\text{C}_{23}\text{H}_{19}\text{N}_2\text{O}_3$ 371.1396, Found 371.1402.

2-(2-(4-hydroxy-3-methoxybenzoyl)phenyl)-3-methylquinazolin-4(3H)-one (3v): Thick liquid; 42 mg (54%); IR (neat): 3327, 1655, 1443, 1261, 1023 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3)

δ 8.32 (dd, $J = 8.0, 1.2$ Hz, 1H), 7.73 – 7.65 (m, 3H), 7.63–7.60 (m, 1H), 7.59–7.53 (m, 2H), 7.50–7.44 (m, 1H), 7.41–7.33 (m, 2H), 6.90 (d, $J = 8.2$ Hz, 1H), 6.45 (s, 1H), 3.86 (s, 3H), 3.48 (s, 3H); ^{13}C NMR (101 MHz, CDCl_3): δ 194.6, 162.2, 155.9, 150.8, 147.2, 146.7, 137.8, 136.1, 134.0, 131.3, 130.3, 129.3, 129.0, 128.9, 127.2, 126.8, 126.7, 126.6, 120.7, 113.7, 111.5, 56.0, 33.6. HRMS: m/z $[\text{M}+\text{H}]^+$ calcd for $\text{C}_{23}\text{H}_{19}\text{N}_2\text{O}_4$ 387.1345, Found 387.1345.

2-(2-(2-hydroxybenzoyl)phenyl)-3-methylquinazolin-4(3H)-one (3w): Thick liquid; 36 mg (50%); IR (neat): 3301, 2945, 1663, 1020 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3): δ 11.53 (s, 1H), 8.32 (dd, $J = 8.3, 1.4$ Hz, 1H), 7.73 (dd, $J = 7.2, 1.8$ Hz, 1H), 7.72–7.69 (m, 1H), 7.69–7.66 (m, 2H), 7.66–7.61 (m, 2H), 7.51–7.45 (m, 3H), 6.99 (dd, $J = 8.4, 0.8$ Hz, 1H), 6.92–6.87 (m, 1H), 3.54 (s, 3H); ^{13}C NMR (101 MHz, CDCl_3): δ 200.9, 162.9, 162.3, 154.9, 147.1, 137.5, 136.7, 135.6, 134.2, 133.3, 131.2, 129.9, 129.7, 127.3, 127.1, 126.7, 120.6, 119.5, 118.8, 118.3, 33.8. HRMS: m/z $[\text{M}+\text{H}]^+$ calcd for $\text{C}_{22}\text{H}_{17}\text{N}_2\text{O}_3$ 357.1239, Found 357.1237.

2-(2-(benzo[d][1,3]dioxole-5-carbonyl)phenyl)-3-methylquinazolin-4(3H)-one (3x): Thick liquid; 45 mg (58%); IR (neat): 1658, 1445, 1021, 772 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3): δ 8.30 (d, $J = 8.0$ Hz, 1H), 7.73–7.66 (m, 4H), 7.61 (d, $J = 7.3$ Hz, 1H), 7.58 (d, $J = 2.6$ Hz, 1H), 7.57–7.54 (m, 1H), 7.45 (t, $J = 7.6$ Hz, 1H), 7.39 (dd, $J = 8.1, 1.6$ Hz, 1H), 6.02 (s, 2H), 3.48 (s, 3H); ^{13}C NMR (101 MHz, CDCl_3): δ 194.3, 162.2, 155.6, 152.0, 148.0, 147.3, 138.0, 136.1, 133.9, 131.5, 131.2, 130.1, 129.0, 128.9, 127.2, 127.2, 126.8, 126.7, 120.7, 109.6, 107.9, 101.9, 33.6; HRMS: m/z $[\text{M}+\text{H}]^+$ calcd for $\text{C}_{23}\text{H}_{17}\text{N}_2\text{O}_4$ 385.1188, Found 385.1193.

2-(2-(benzo[d][1,3]dioxole-5-carbonyl)phenyl)-3-ethylquinazolin-4(3H)-one (3y): Thick liquid; 48 mg (60%); ^1H NMR (400 MHz, CDCl_3) δ 8.31 (dd, $J = 8.0, 1.2$ Hz, 1H), 7.73–7.65 (m, 3H), 7.65–7.59 (m, 2H), 7.51 (d, $J = 7.8$ Hz, 1H), 7.48–7.43 (m, 1H), 7.40 (dd, $J = 8.1, 1.7$ Hz, 1H), 7.31–7.29 (m, 1H), 6.83 (d, $J = 8.1$ Hz, 1H), 6.04 (s, 2H), 4.04 (br d, 2H), 1.31 (t, $J = 7.1$ Hz, 3H); ^{13}C NMR (101 MHz, CDCl_3) δ 194.3, 161.8, 155.5, 152.0, 148.0, 147.2, 138.1, 136.0, 133.7, 131.6, 130.8, 130.0, 128.9, 128.9, 127.3, 127.2, 126.7, 126.7, 121.14, 109.6, 107.7, 101.9, 41.9, 13.6; HRMS: m/z $[\text{M}+\text{H}]^+$ calcd for $\text{C}_{24}\text{H}_{19}\text{N}_2\text{O}_4$ 399.1345, Found 399.1347.

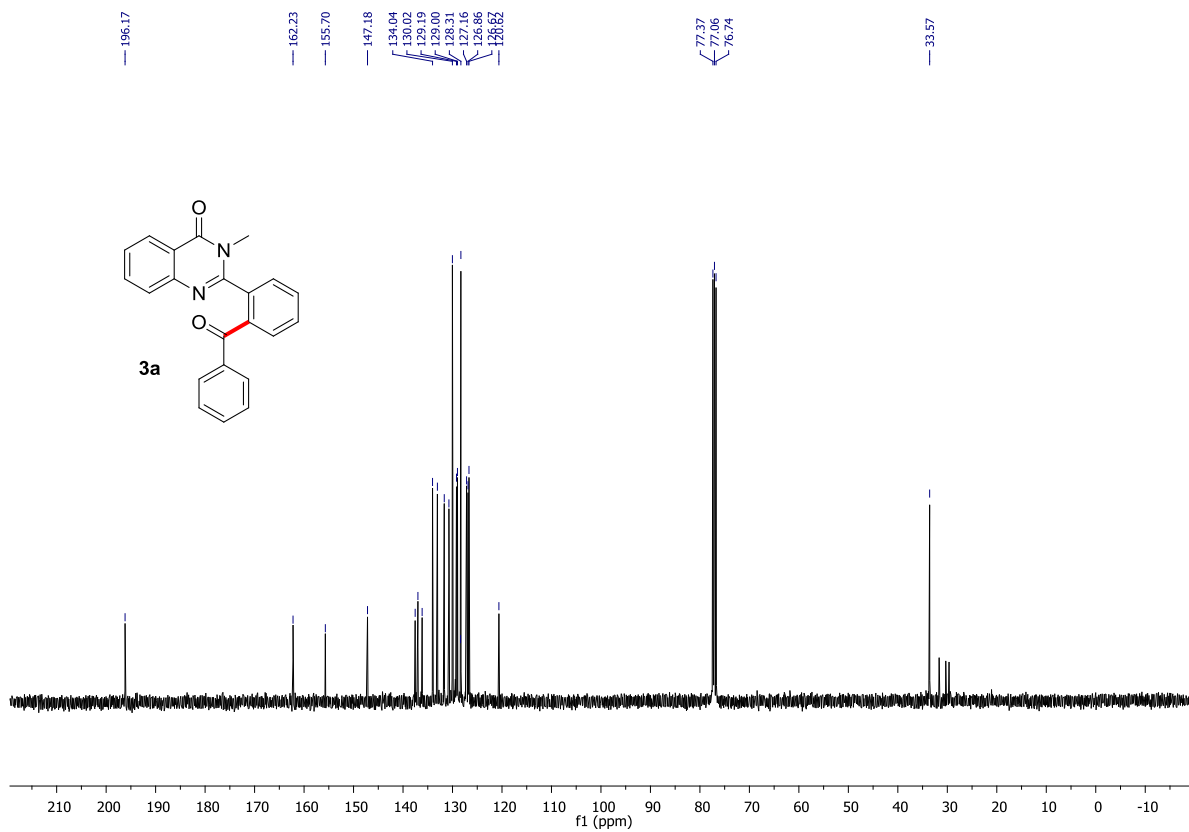
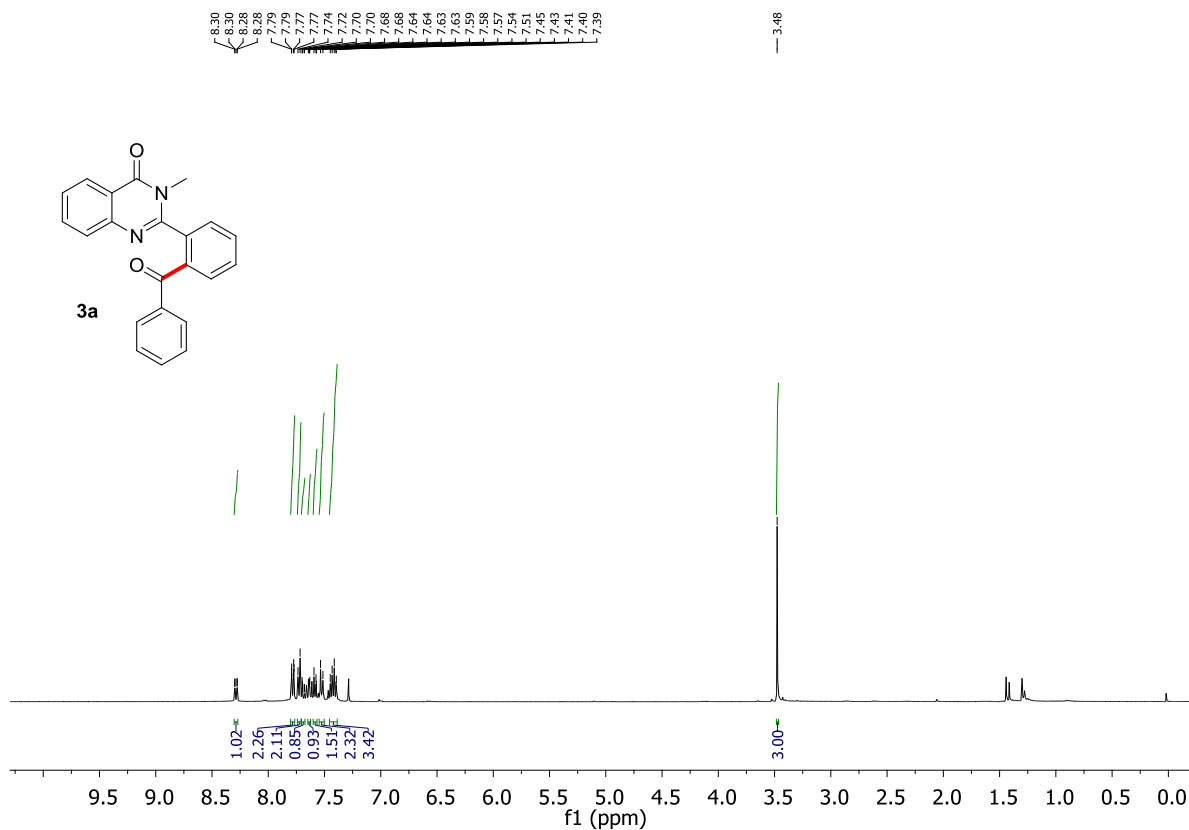
2-(2-(furan-2-carbonyl)phenyl)-3-methylquinazolin-4(3H)-one (3z): Thick liquid; 27 mg (41%); IR (neat): 1671, 1214, 749 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3): δ 8.34 (dd, $J = 8.0, 1.2$ Hz, 1H), 8.00 (dd, $J = 7.7, 1.0$ Hz, 1H), 7.74–7.70 (m, 1H), 7.68 (ddd, $J = 7.5, 4.2, 1.0$ Hz, 3H), 7.59–7.55 (m, 2H), 7.51–7.45 (m, 1H), 7.23 (d, $J = 3.6$ Hz, 1H), 6.57 (dd, $J = 3.6, 1.7$ Hz, 1H), 3.48 (s, 3H); ^{13}C NMR (101 MHz, CDCl_3): δ 182.0, 162.3, 155.7, 152.0, 147.6, 147.3, 136.4, 136.1, 134.0, 132.0, 130.1, 129.4, 129.1, 127.2, 126.9, 126.8, 121.2, 120.8, 112.5, 29.7; HRMS: m/z $[\text{M}+\text{H}]^+$ calcd for $\text{C}_{20}\text{H}_{15}\text{N}_2\text{O}_3$ 331.1083, Found 331.1088.

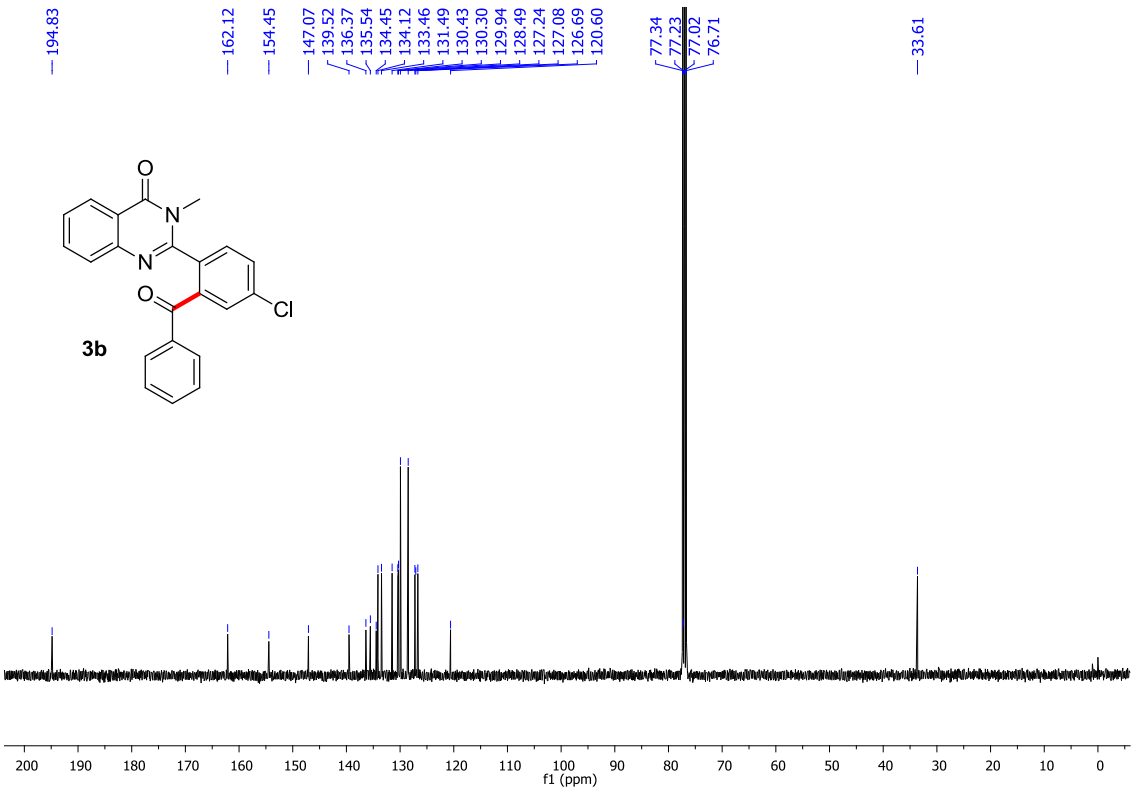
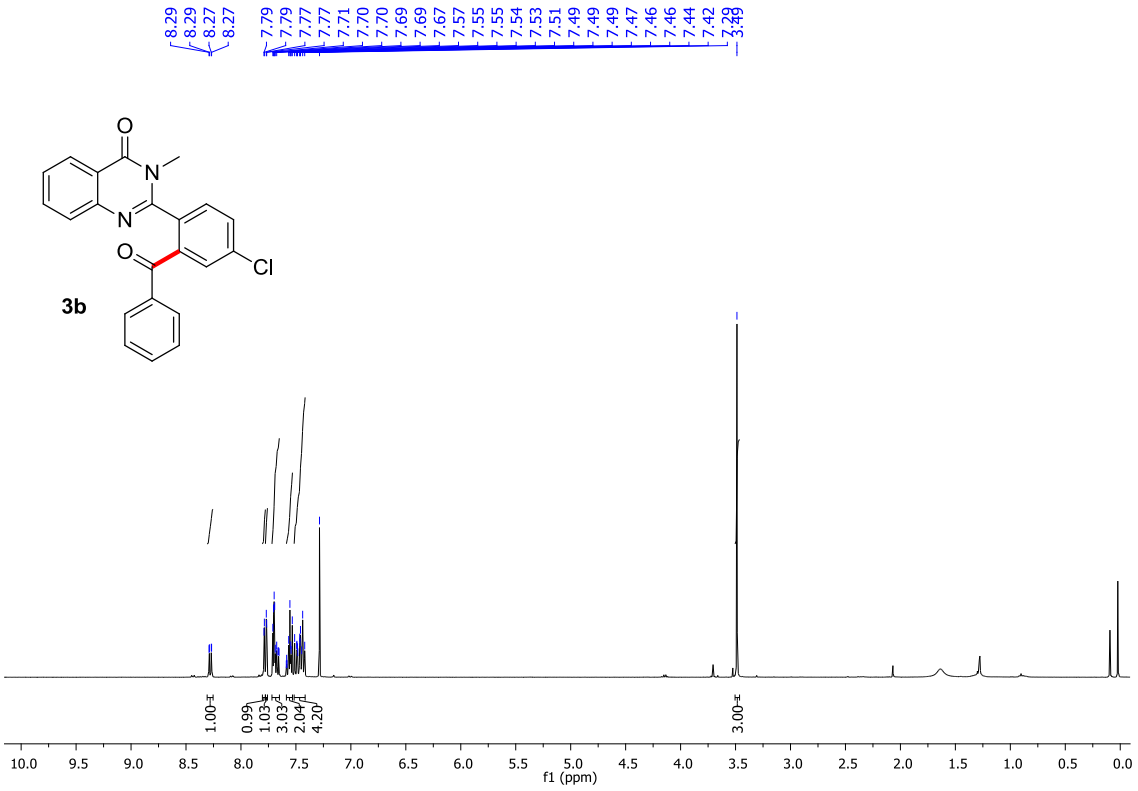
3-methyl-2-(2-(thiophene-2-carbonyl)phenyl)quinazolin-4(3H)-one (3aa): Thick liquid; 42 mg (60%); IR (neat): 1671, 1633, 769 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ 8.33 (d, $J = 8.0$ Hz, 1H), 7.92 (d, $J = 7.7$ Hz, 1H), 7.72 (dd, $J = 7.6, 2.5$ Hz, 2H), 7.70–7.63 (m, 3H), 7.61–7.53 (m, 2H), 7.48 (t, $J = 7.5$ Hz, 1H), 7.19–7.14 (m, 1H), 3.48 (s, 3H); ^{13}C NMR (101 MHz, CDCl_3): δ 187.5, 162.3, 155.6, 147.3, 143.4, 137.3, 136.0, 135.5, 135.0, 134.0, 131.8, 130.0, 129.24, 129.16, 128.1, 127.3, 126.9, 126.8, 120.8, 33.6; HRMS: m/z $[\text{M}+\text{H}]^+$ calcd for $\text{C}_{20}\text{H}_{15}\text{SN}_2\text{O}_2$ 347.0854, Found 347.0856.

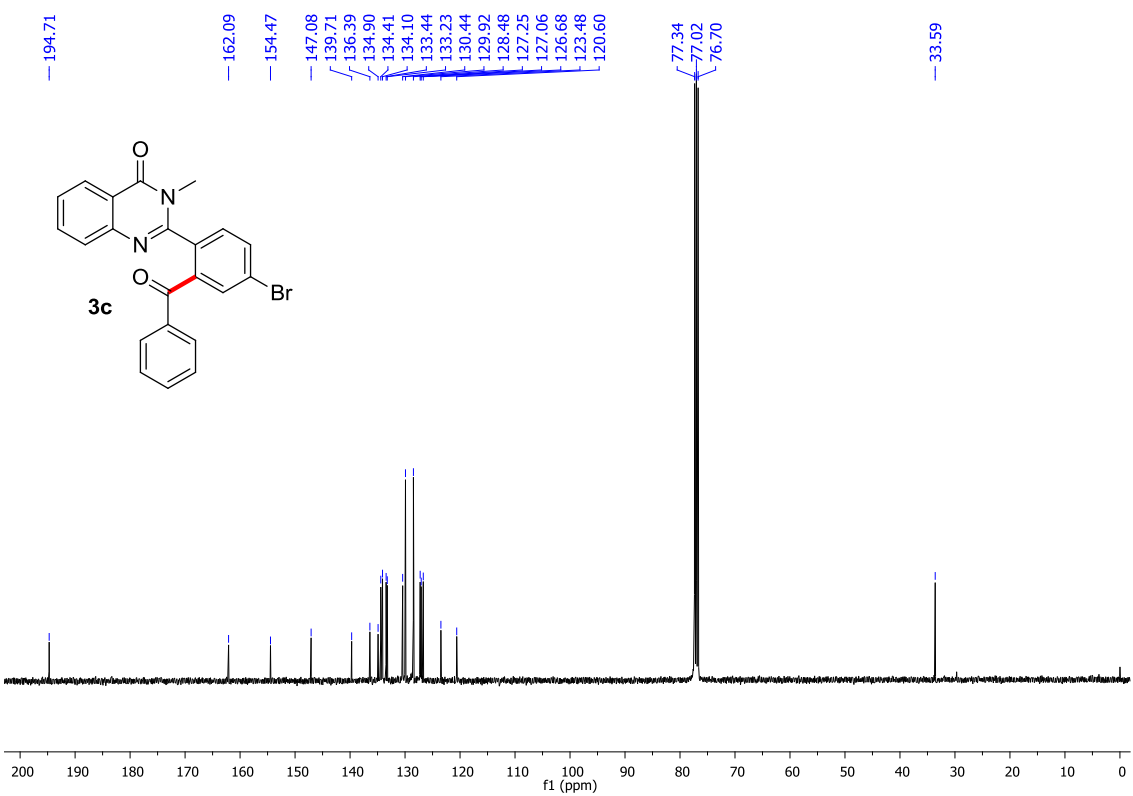
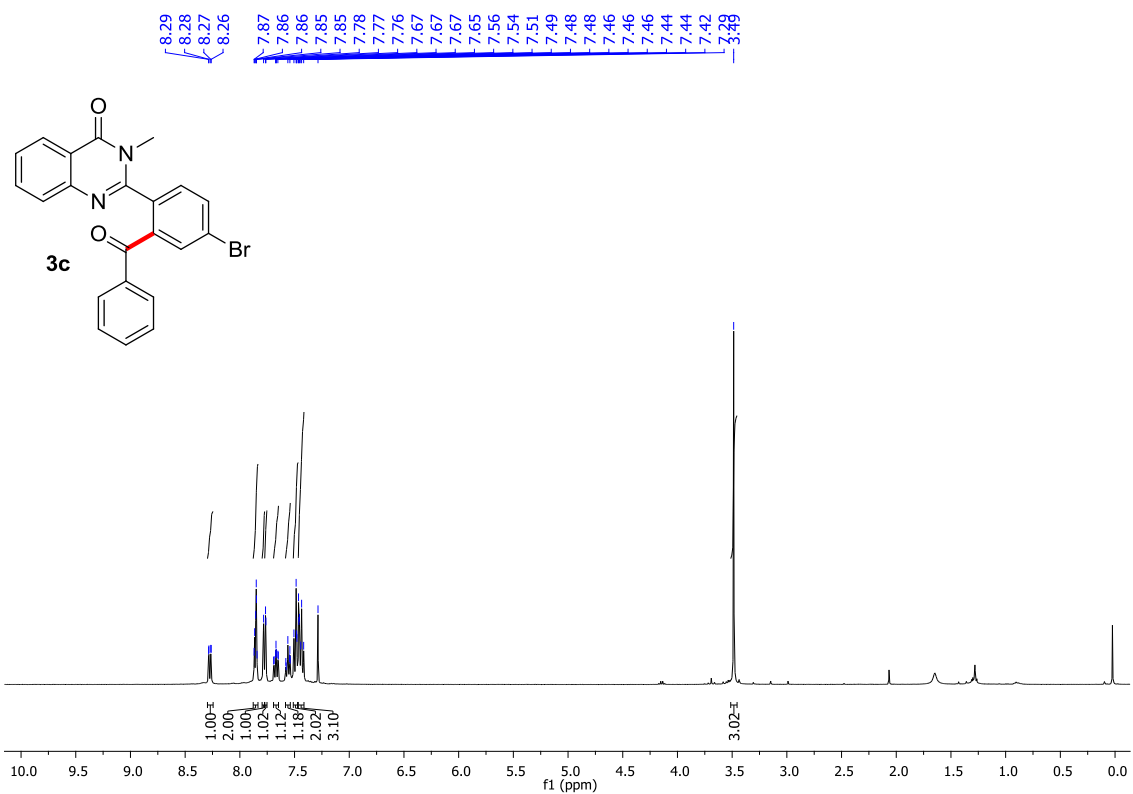
2-(2-(2-chlorobenzoyl)phenyl)-3-methylquinazolin-4(3H)-one (1ab): Thick liquid; 38 mg (51%); ^1H NMR (400 MHz, CDCl_3): δ 8.34 – 8.30 (m, 1H), 7.76 (d, $J = 7.5$ Hz, 1H), 7.74 – 7.69 (m, 2H), 7.66 (d, $J = 7.8$ Hz, 1H), 7.62 (d, $J = 7.5$ Hz, 1H), 7.57 (t, $J = 7.3$ Hz, 1H), 7.49 (dd, $J = 7.8, 7.2$ Hz, 1H), 7.41 – 7.32 (m, 3H), 7.26 – 7.20 (m, 1H), 3.43 (s, 3H); ^{13}C NMR (101 MHz, CDCl_3): δ 194.7, 162.1, 155.7, 147.4, 137.6, 136.2, 135.8, 134.1, 133.1, 132.1, 131.8, 131.7, 130.2, 130.1, 129.9, 129.2, 127.3, 126.9, 126.7, 126.6, 120.8, 33.2. HRMS: m/z $[\text{M}+\text{Na}]^+$ calcd for $\text{C}_{22}\text{H}_{15}\text{ClN}_2\text{NaO}_2$, 397.0720, found 397.0718.

2,2,6,6-tetramethylpiperidin-1-yl benzoate (5): Off-white solid, ^1H NMR (400 MHz, CDCl_3): δ 8.08 (dd, $J = 8, 4$ Hz, 2H), 7.57 (m, 1H), 7.45 (m, 2H), 1.83–1.66 (m, 3H), 1.62–1.54 (m, 2H), 1.49–1.42 (m, H), 1.12 (s, 6H), 1.27 (s, 6H); ^{13}C NMR (101 MHz, CDCl_3): δ 166.3, 132.8, 129.7, 129.5, 128.4, 60.3, 39.0, 31.9, 20.8, 17.0. HRMS: m/z $[\text{M}+\text{H}]^+$ calcd for $\text{C}_{16}\text{H}_{24}\text{NO}_2$, 262.1807, found 262.1804.

Spectral data:

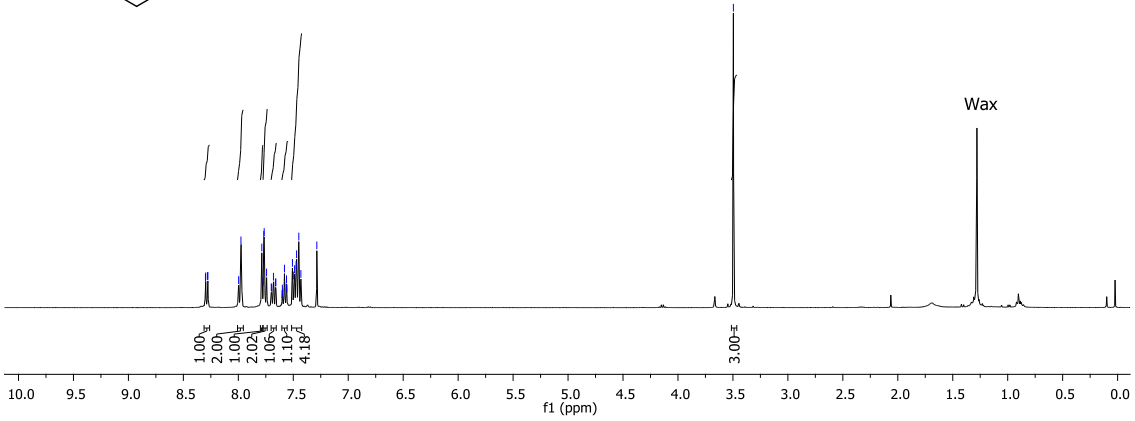
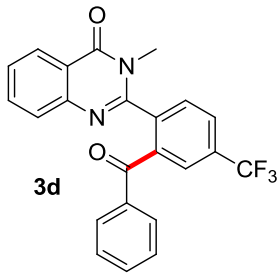






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