

Supporting Information

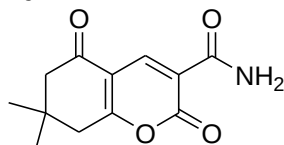
Application of stable fused dienolates for diversity oriented synthesis of 2,5-dioxo-5,6,7,8-tetrahydro-2H-chromene-3-carboxamides

Maria A. Vodolazhenko, Nikolay Yu. Gorobets,* Sergey A. Yermolayev, Vladimir V. Musatov, Valentin A. Chebanov* and Sergey M. Desenko

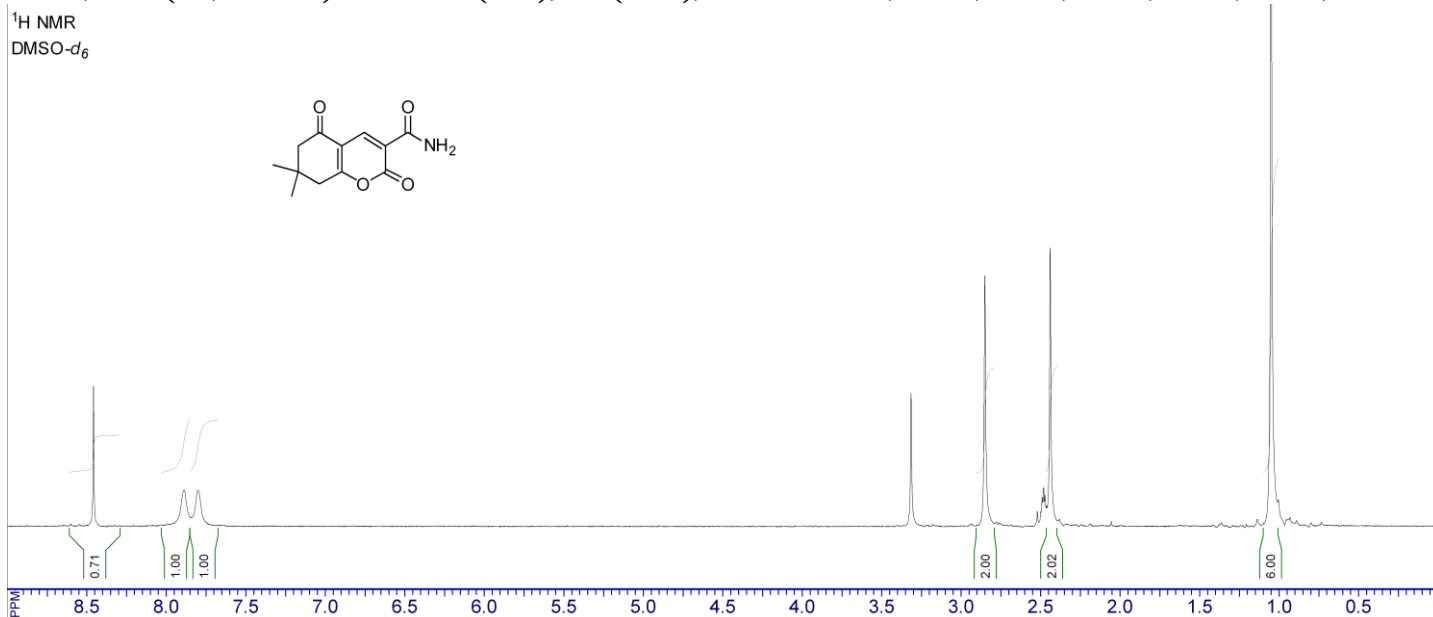
^aSSI “Institute for Single Crystals” of National Academy of Sciences of Ukraine, Lenin Ave. 60, Kharkiv 61001, Ukraine, fax: +38(057)3409343; e-mail: gorobets@isc.kharkov.com; chebanov@isc.kharkov.com

Characterization Data. All compounds were obtained as white or light yellow solids.

7,7-Dimethyl-2,5-dioxo-5,6,7,8-tetrahydro-2H-chromene-3-carboxamide (22{1,1})

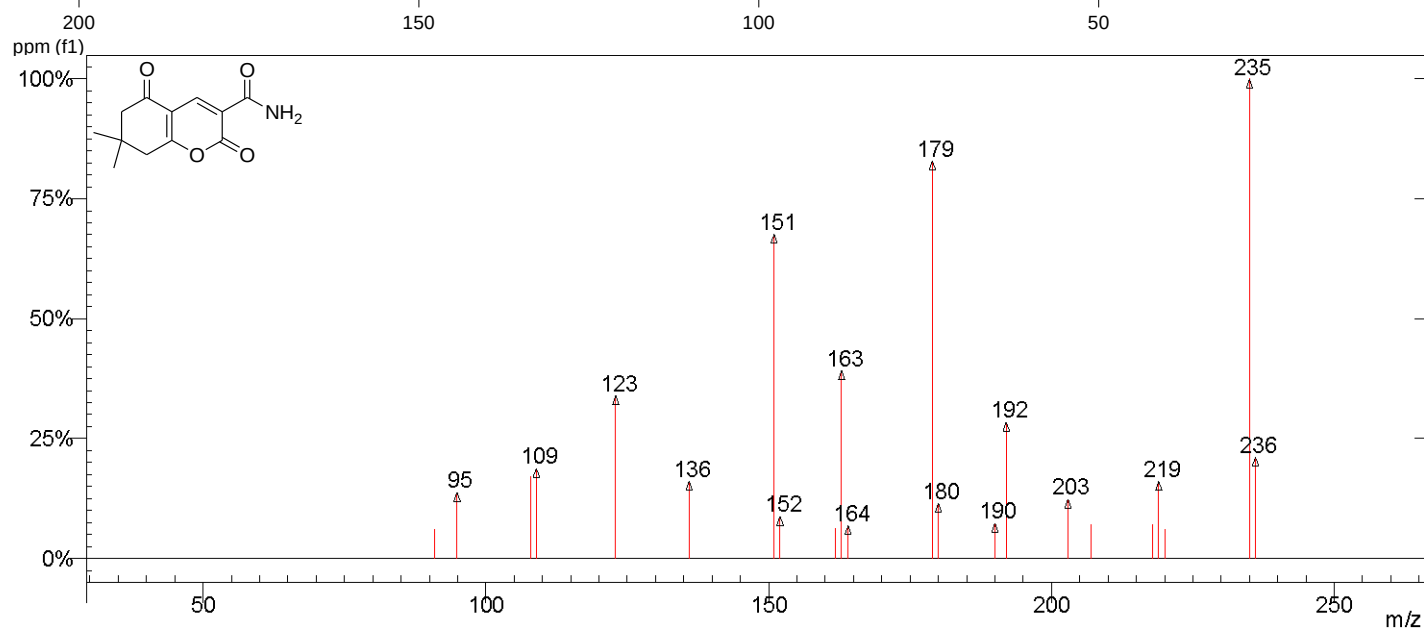
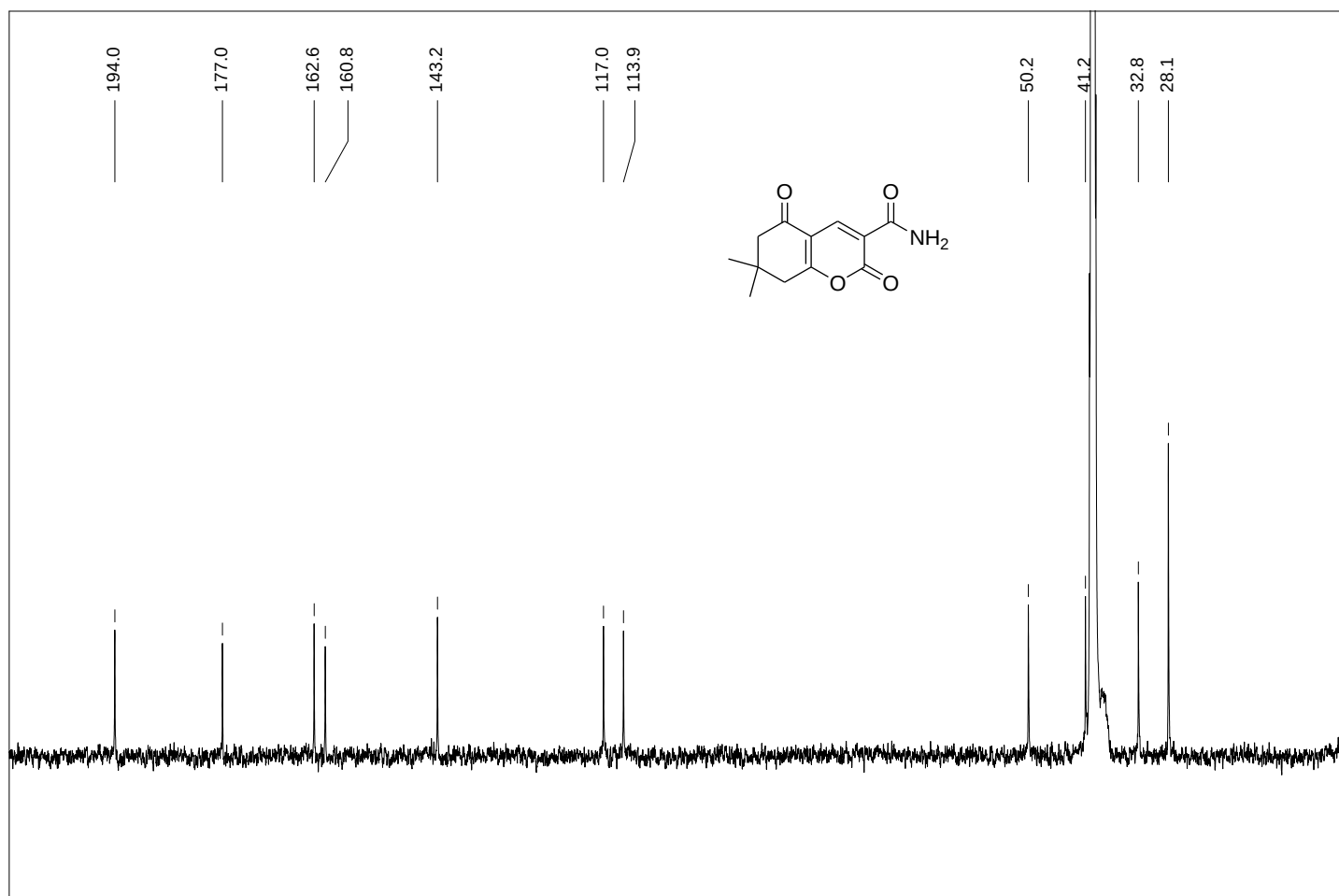


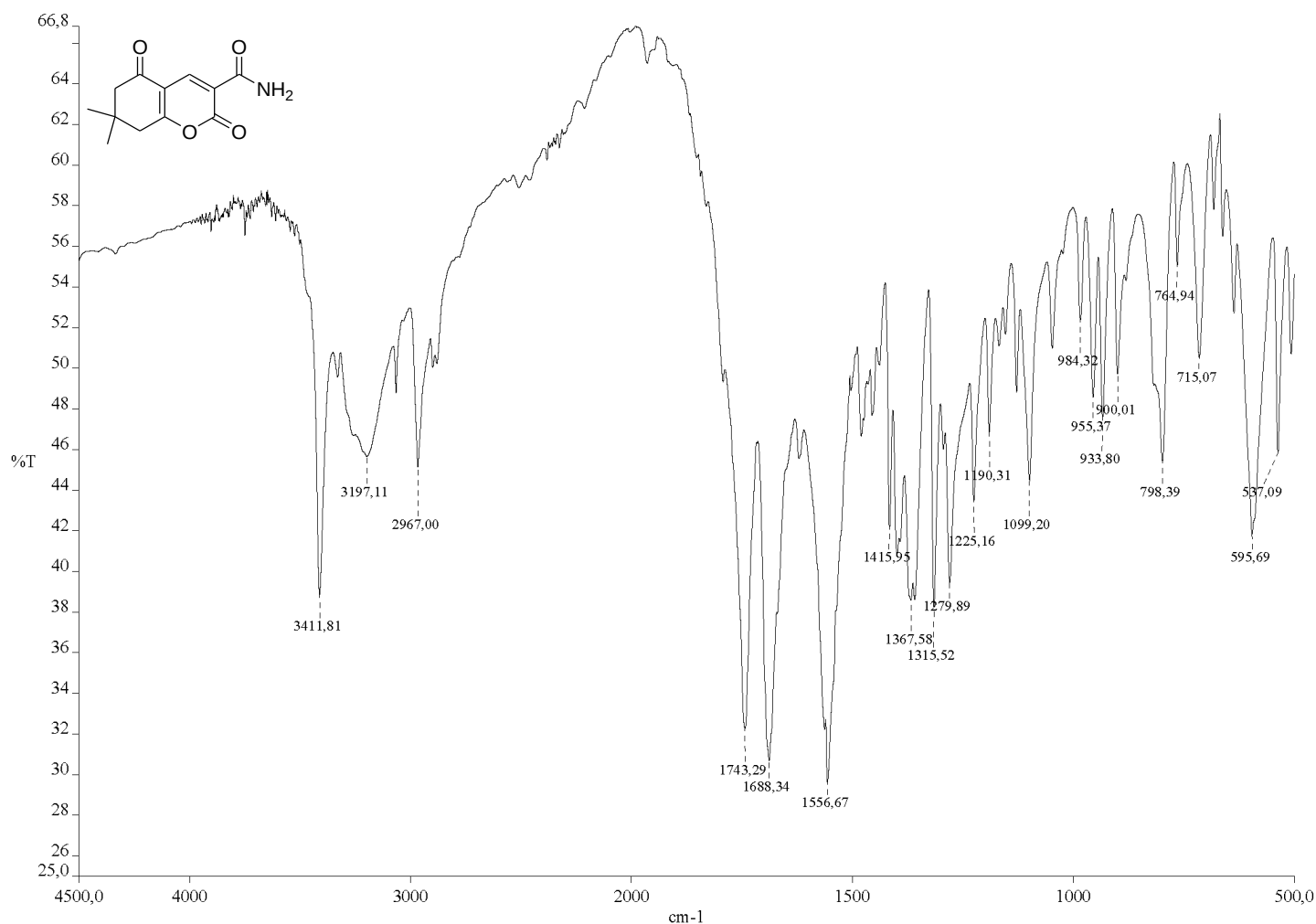
Yield 70%. Mp 205°C (reference [1] mp 207-209°C dec., reference [2] mp 215°C from ethyl acetate).¹ Anal. Calcd (C₁₂H₁₃O₄N): C, 61.3; H, 5.6; N, 6.0. Found: C, 61.3; H, 6.5; N, 5.8; ¹H NMR (200 MHz, DMSO-d₆) δ 1.05 (s, 6H), 2.44 (s, 2H), 2.85 (s, 2H), 7.80 (br. s, 1H), 7.89 (br. s, 1H), 8.46 (s, 1H); ¹³C NMR (125 MHz, DMSO-d₆) δ 28.1, 32.8, 41.2, 50.2, 113.9, 117.0, 143.2, 160.8, 162.6, 177.0, 194.0; MS (EI, 70 eV) m/z 235 (M⁺); IR (KBr), cm⁻¹: ν 3412, 3197, 2967, 1743, 1688, 1610, 1557.



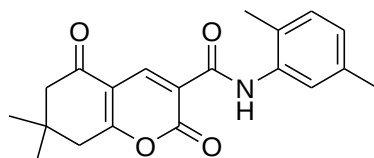
¹ [1] T. Pakhurova, J. Paulins, E. Gudriniece, S. Dashkevich and M. Ablovatskaya, *Chem. Heterocycl. Comp.*, 1982, **18**, 1217 (translated from *Khimiya Geterotsiklicheskikh Soedinenii*, 1982, **18**, 1562-1563).

[2] L. Mosti, P. Schenone and C. Menozzi, *J. Heterocycl. Chem.*, 1985, **22**, 1503-1509.



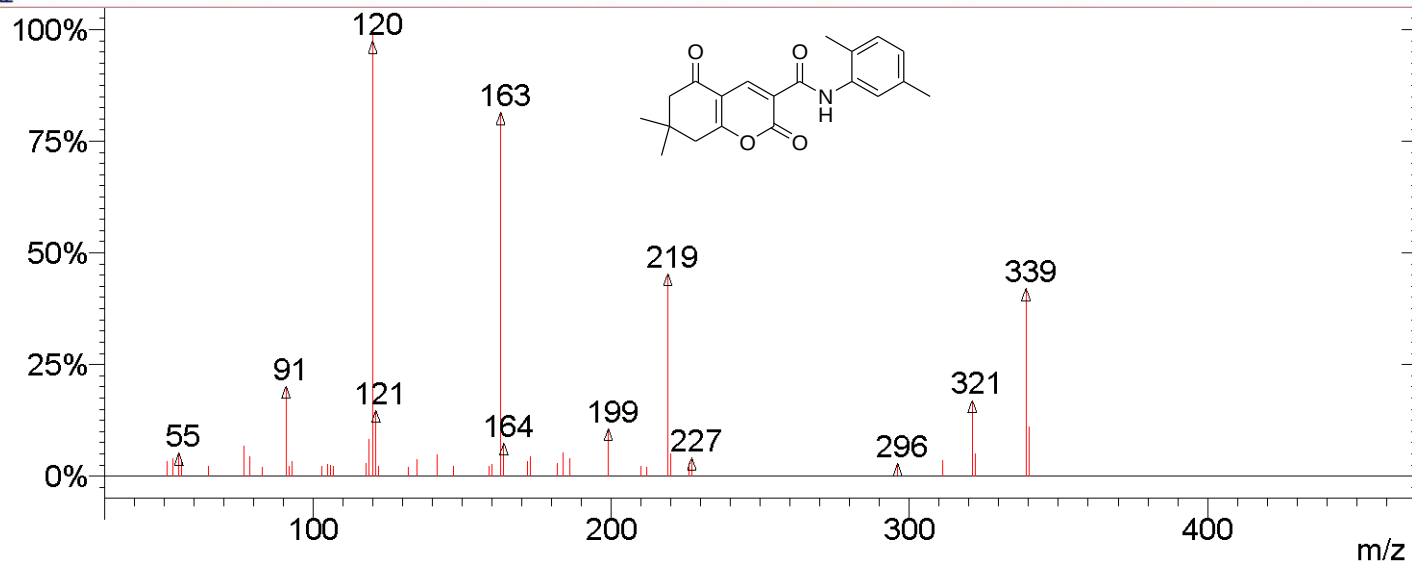
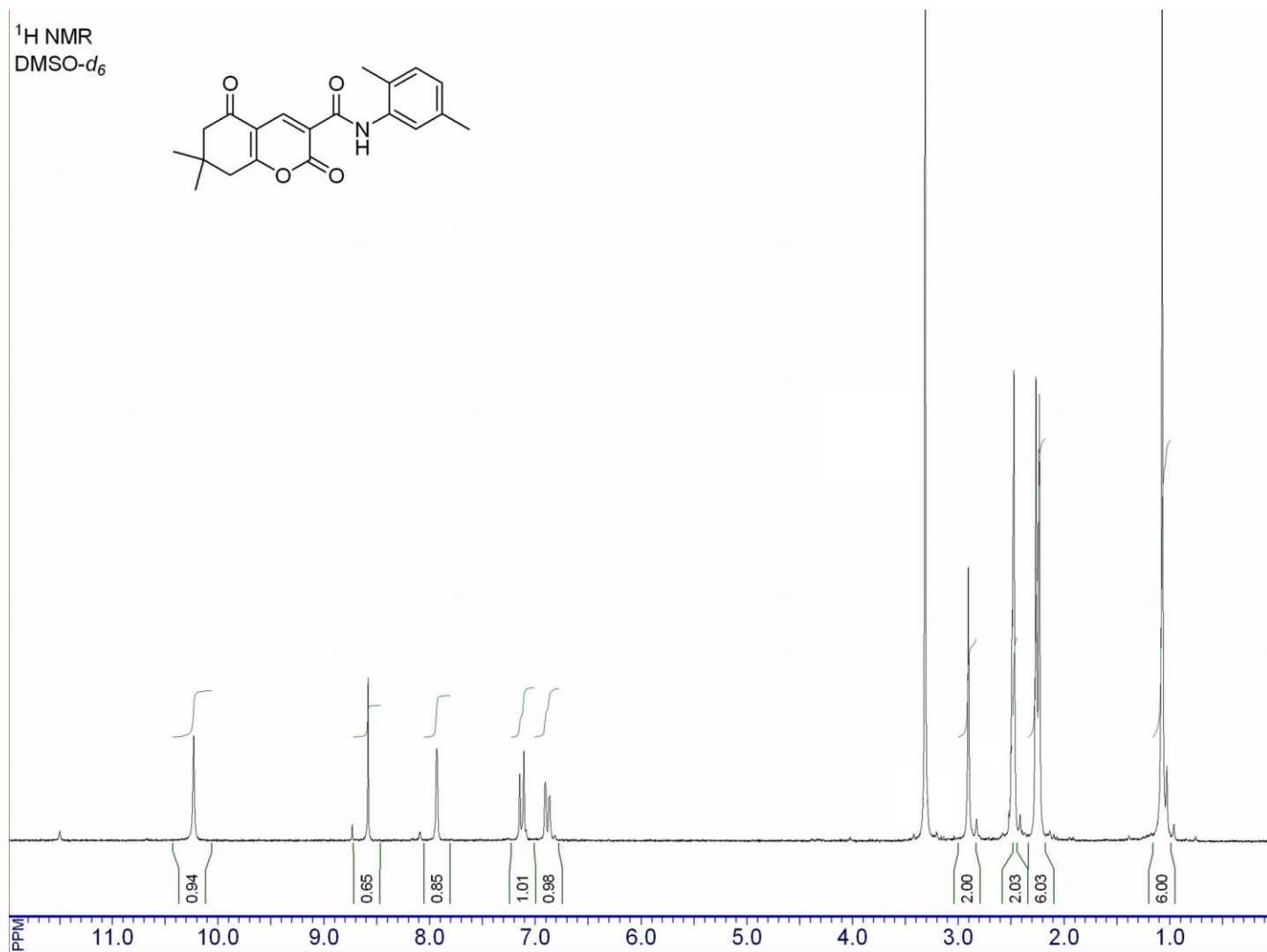
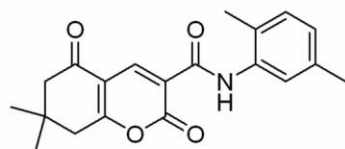


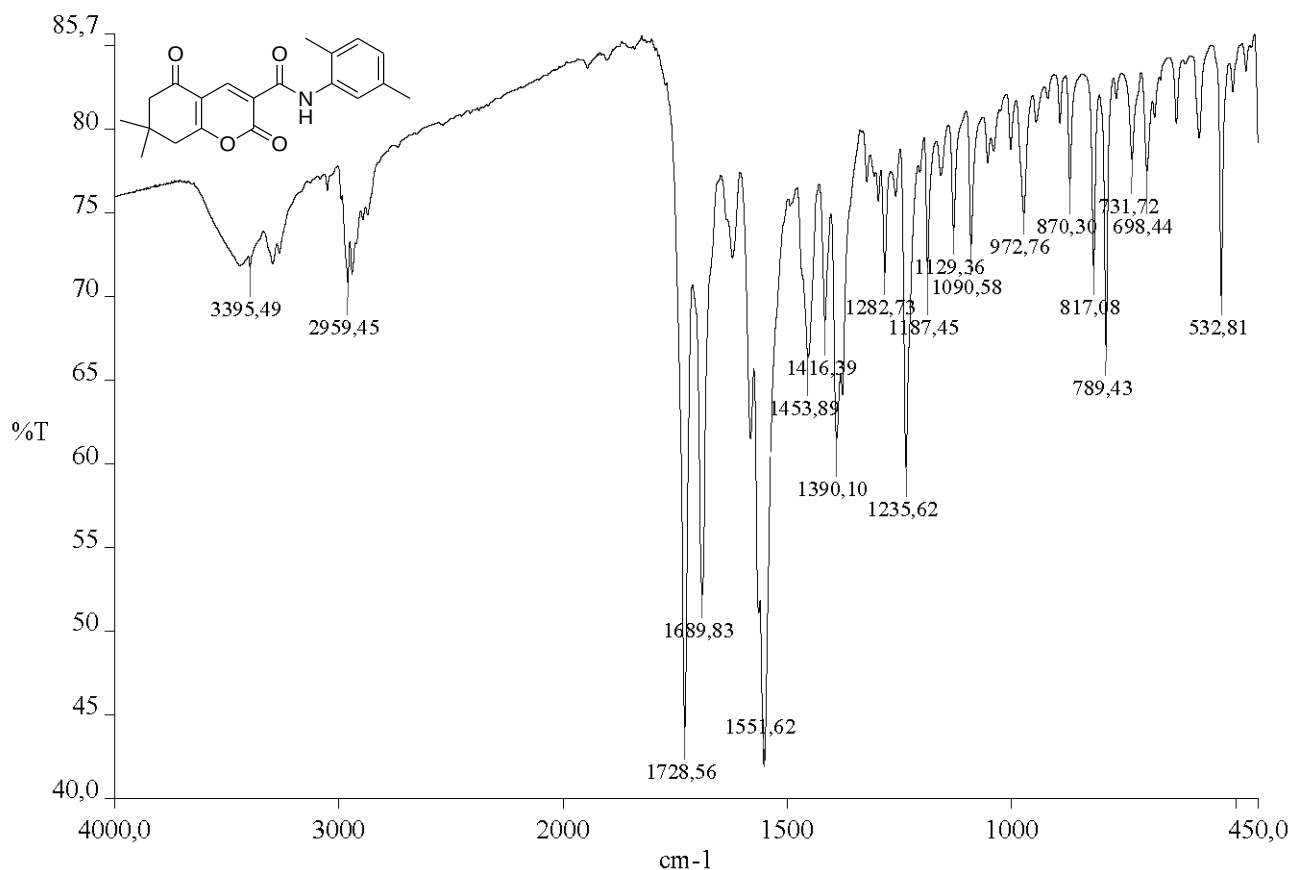
***N*-(2,5-Dimethylphenyl)-7,7-dimethyl-2,5-dioxo-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{1,2})**



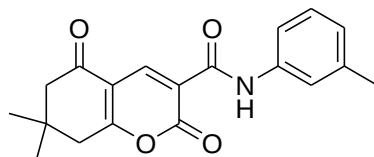
Yield 68%. Mp 210°C. ^1H NMR (200 MHz, DMSO- d_6) δ 1.08 (s, 6H), 2.24 (s, 3H), 2.27 (s, 3H), 2.48 (s, 2H), 2.91 (s, 2H), 6.88 (d, $J = 7.7$ Hz, 2H), 7.14 (d, $J = 7.7$ Hz, 2H), 7.94 (s, 1H), 8.58 (s, 1H), 10.23 (s, 1H); MS (EI, 70 eV) m/z 339 (M^+); IR (KBr), cm^{-1} : ν 3395, 2959, 1729, 1690, 1610, 1552.

^1H NMR
DMSO- d_6



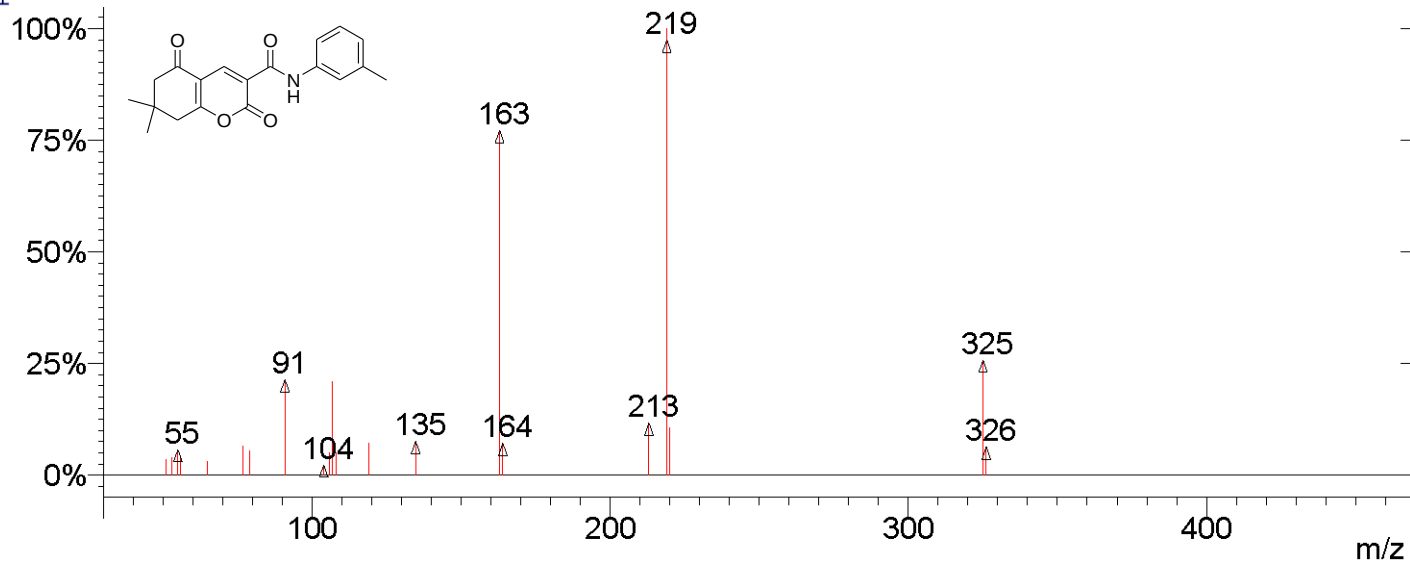
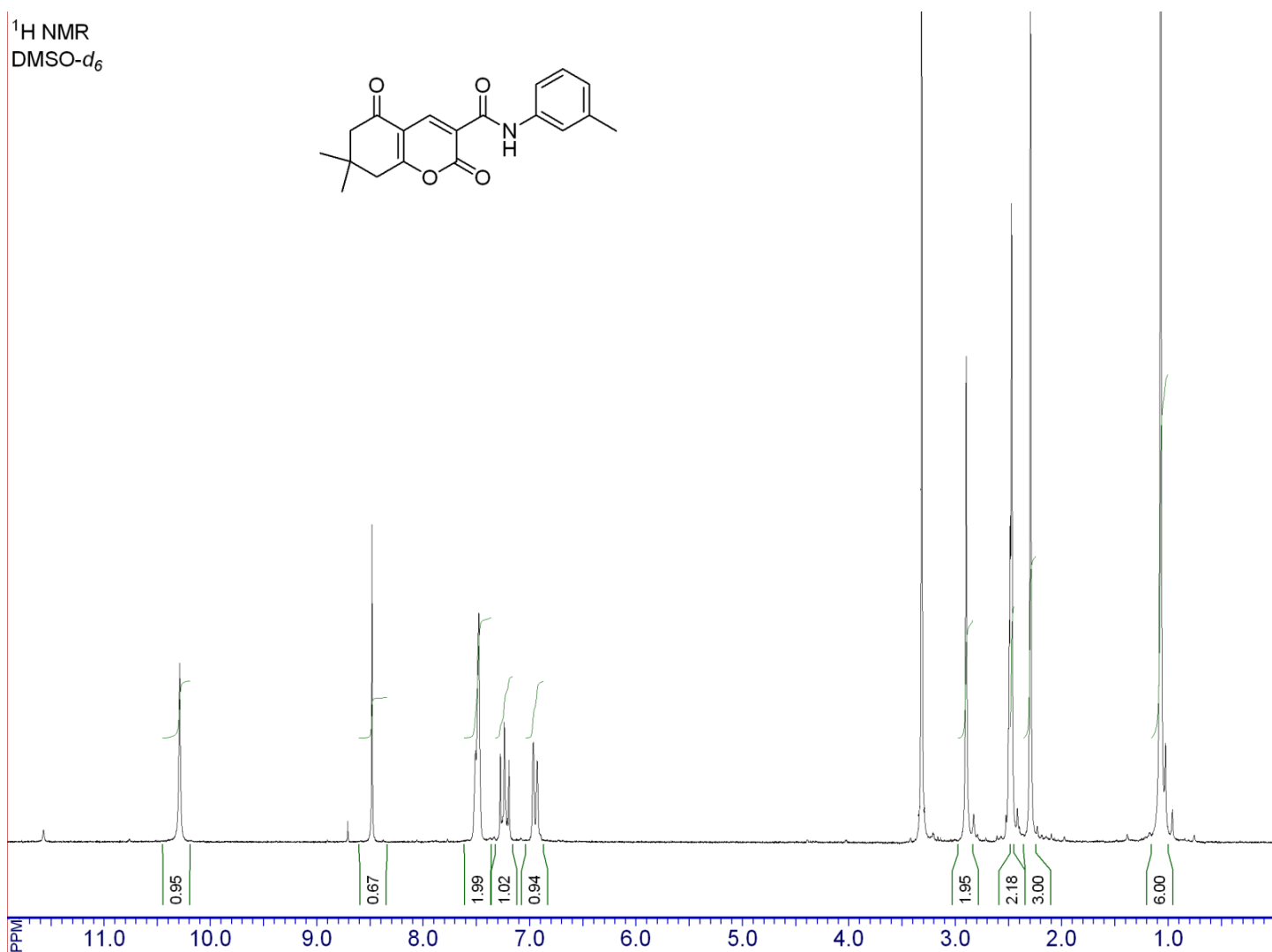
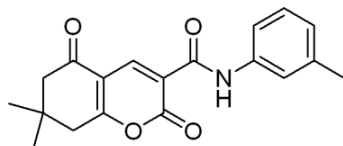


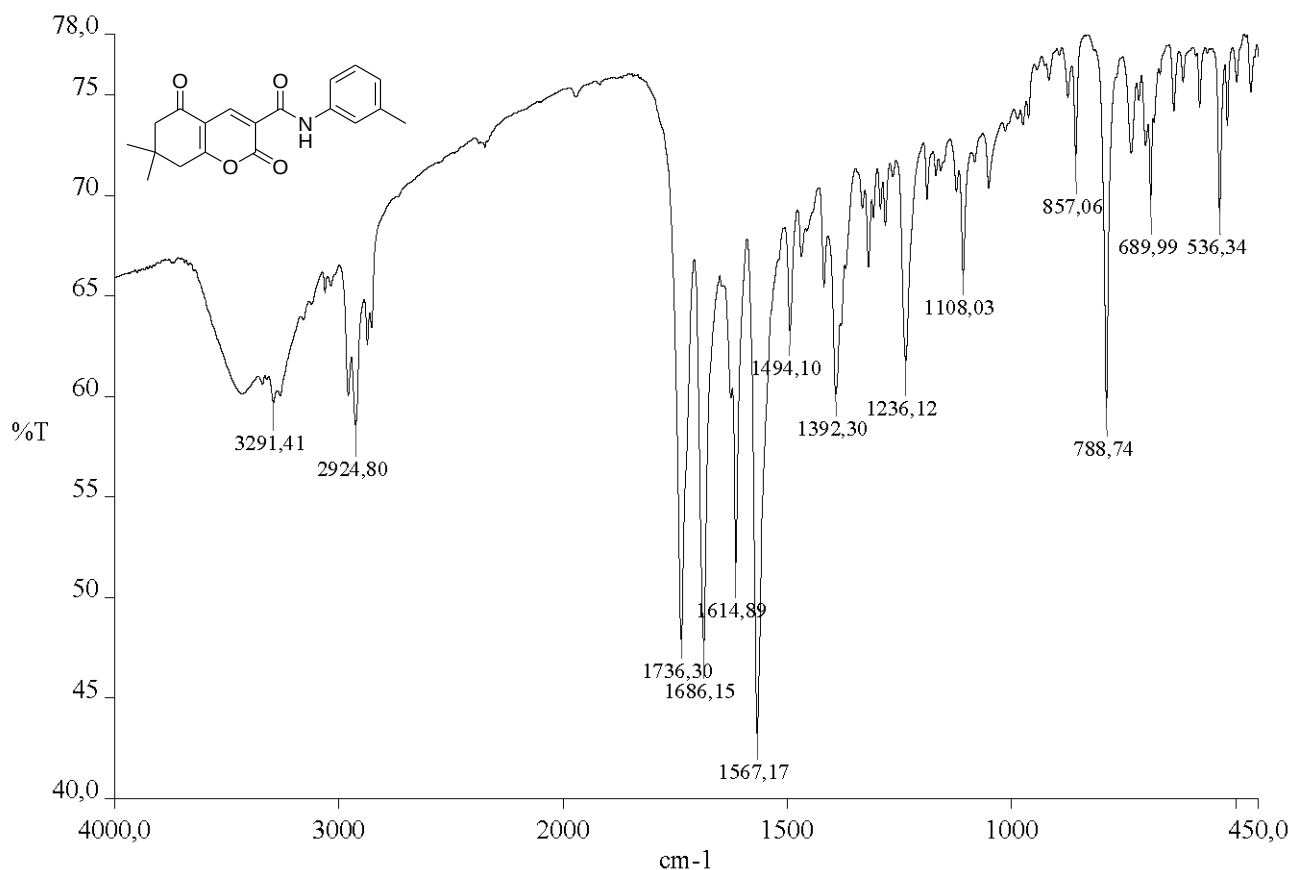
7,7-Dimethyl-2,5-dioxo-N-m-tolyl-5,6,7,8-tetrahydro-2H-chromene-3-carboxamide (22{1,3})



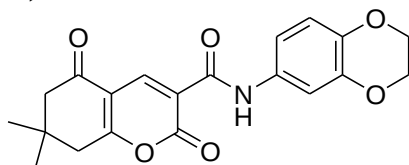
Yield 55%. Mp 195°C. ¹H NMR (200 MHz, DMSO-d₆) δ 1.07 (s, 6H), 2.30 (s, 3H), 2.47 (s, 2H), 2.90 (s, 2H), 6.95 (d, J = 8.1 Hz, 1H), 7.24 (t, J = 7.5 Hz, 1H), 7.43-7.57 (m, 2H), 8.48 (s, 1H), 10.29 (s, 1H); MS (EI, 70 eV) m/z 325 (M⁺); IR (KBr), cm⁻¹: ν 3291, 2927, 1736, 1686, 1614, 1567.

^1H NMR
DMSO- d_6



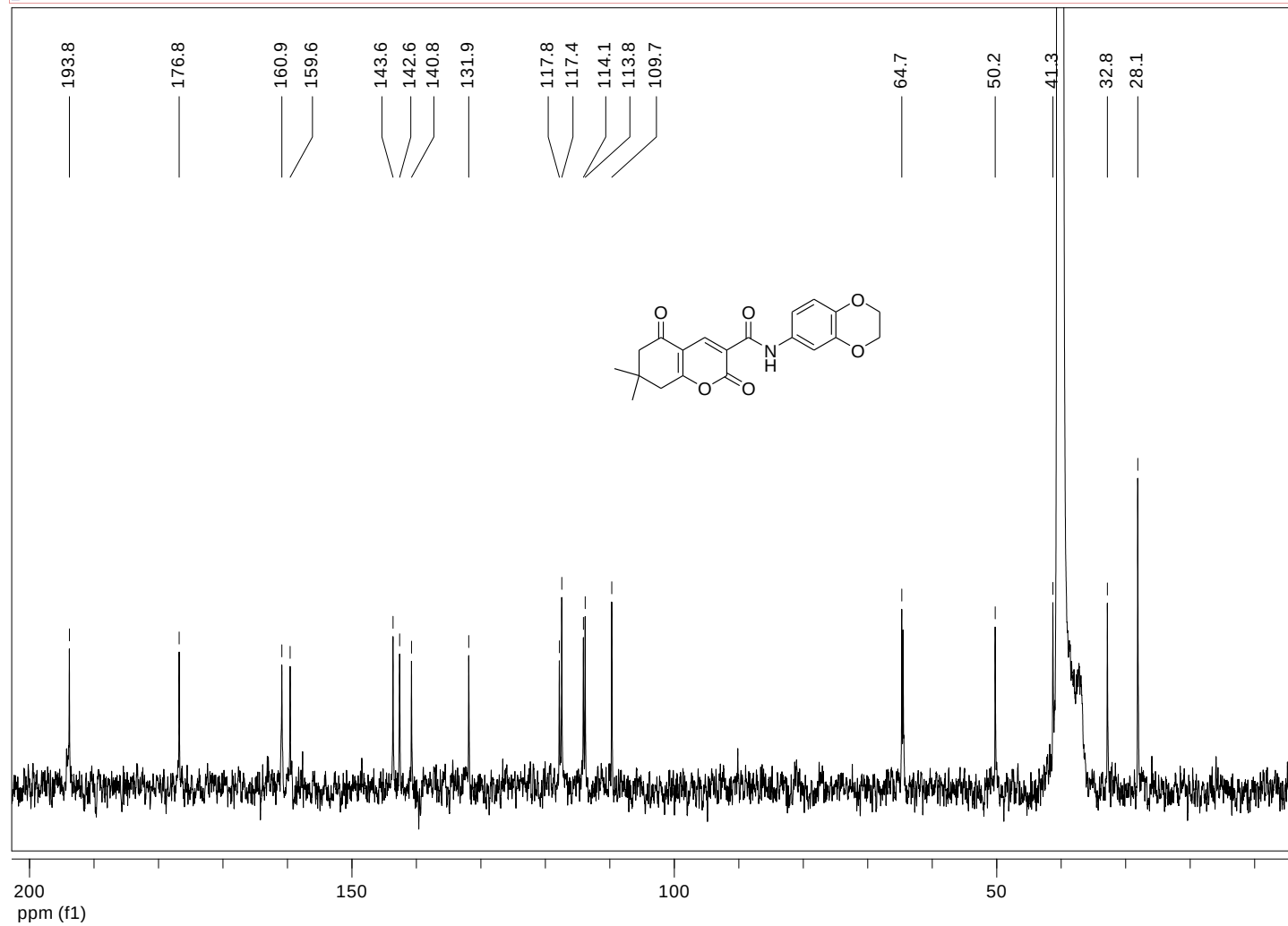
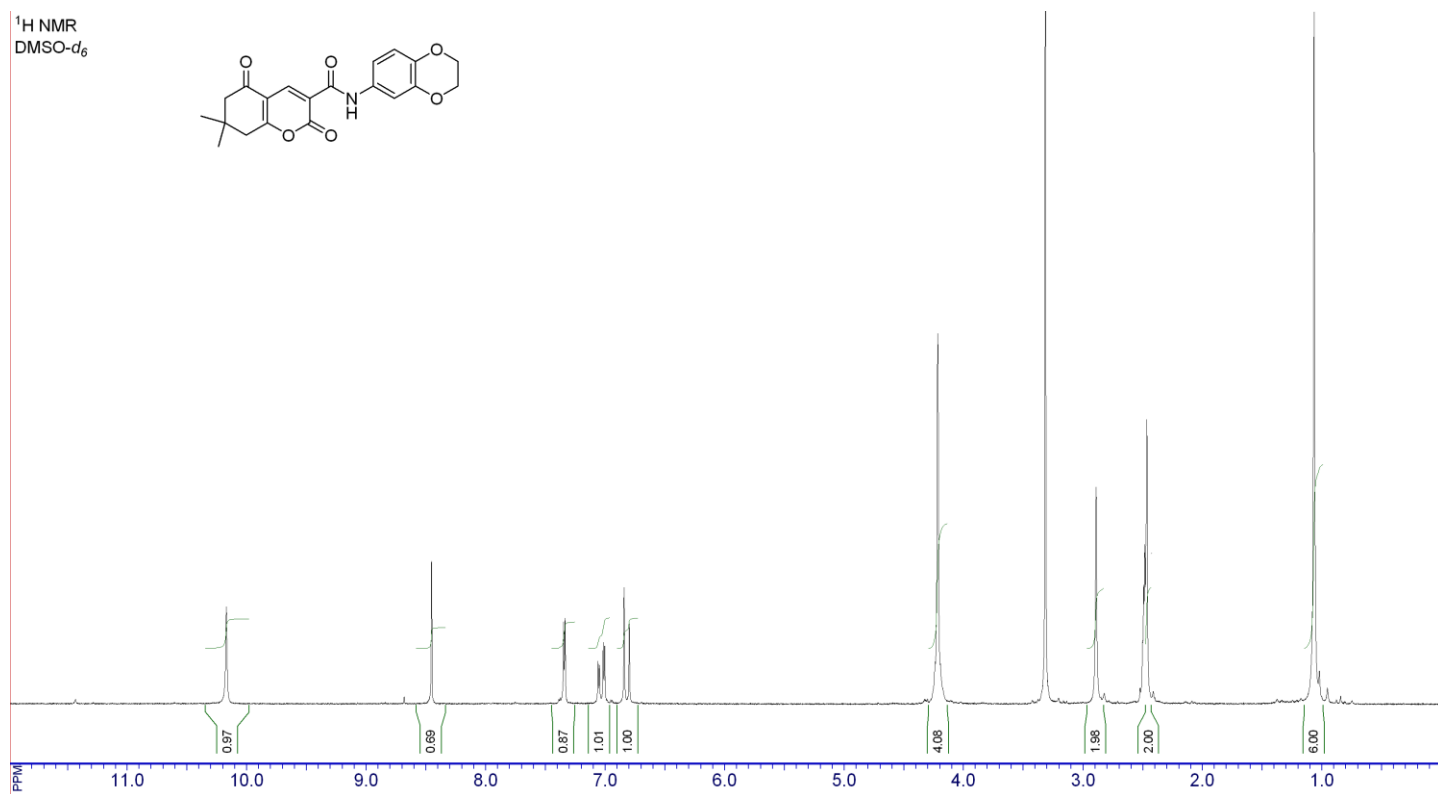
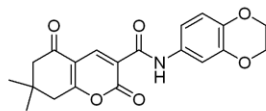


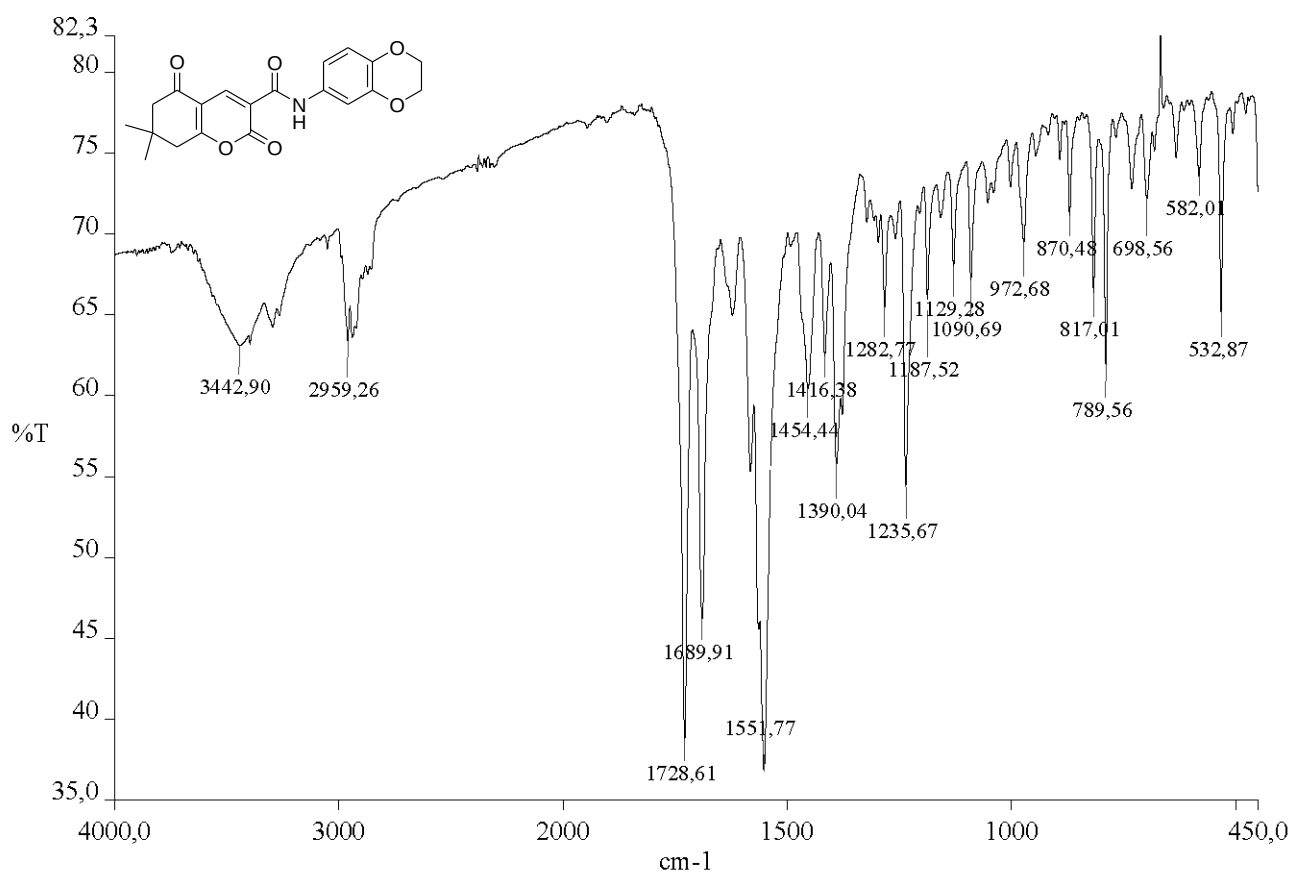
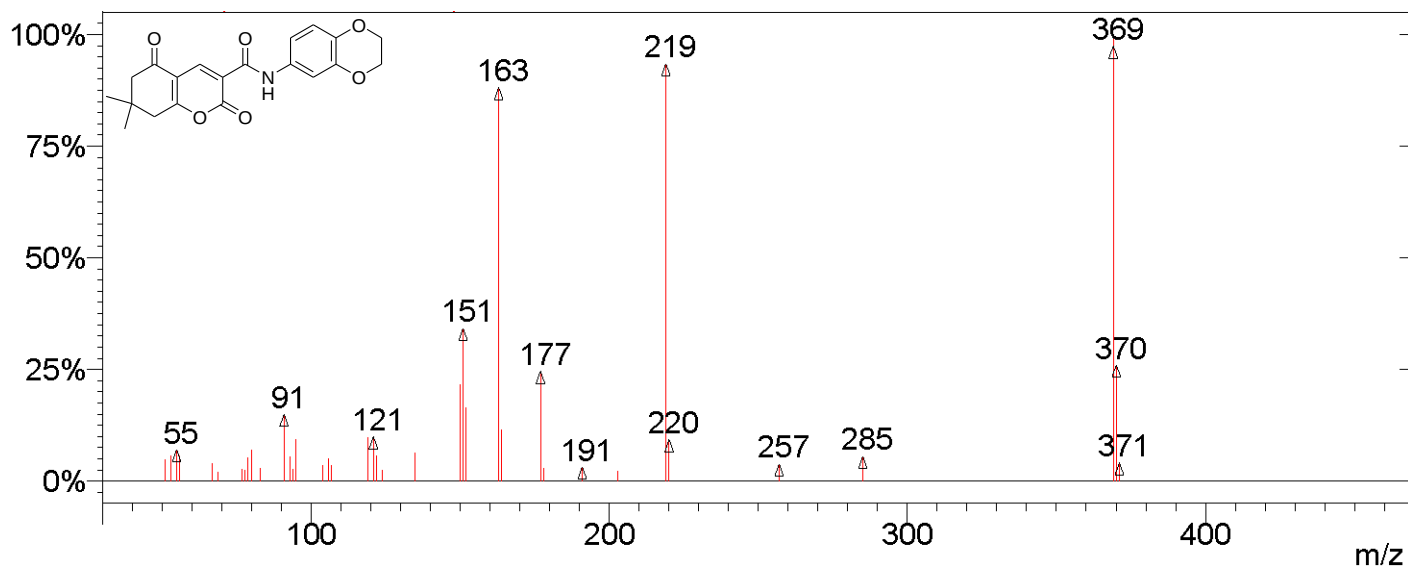
***N*-(2,3-Dihydrobenzo[*b*][1,4]dioxin-6-yl)-7,7-dimethyl-2,5-dioxo-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{1,4})**



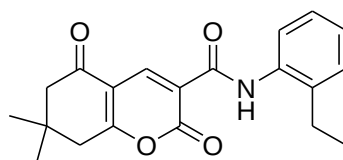
Yield 65%. Mp 219°C. ^1H NMR (200 MHz, DMSO-d_6) δ 1.07 (s, 6H), 2.47 (s, 2H), 2.89 (s, 2H), 4.22 (s, 4H), 6.82 (d, $J = 8.6$ Hz, 1H), 7.03 (dd, $J = 8.6$ Hz, $J = 2.4$ Hz, 1H), 7.34 (d, $J = 2.4$ Hz, 1H), 8.45 (s, 1H), 10.17 (s, 1H); ^{13}C NMR (125 MHz, DMSO-d_6) δ 28.1, 32.8, 41.3, 50.2, 64.7, 109.7, 113.8, 114.1, 117.5, 117.8, 131.9, 140.8, 142.6, 143.6, 159.6, 160.9, 176.8, 193.8; MS (EI, 70 eV) m/z 369 (M^+); IR (KBr), cm^{-1} : ν 3443, 2959, 1729, 1690, 1610, 1552.

¹H NMR
DMSO-*d*₆



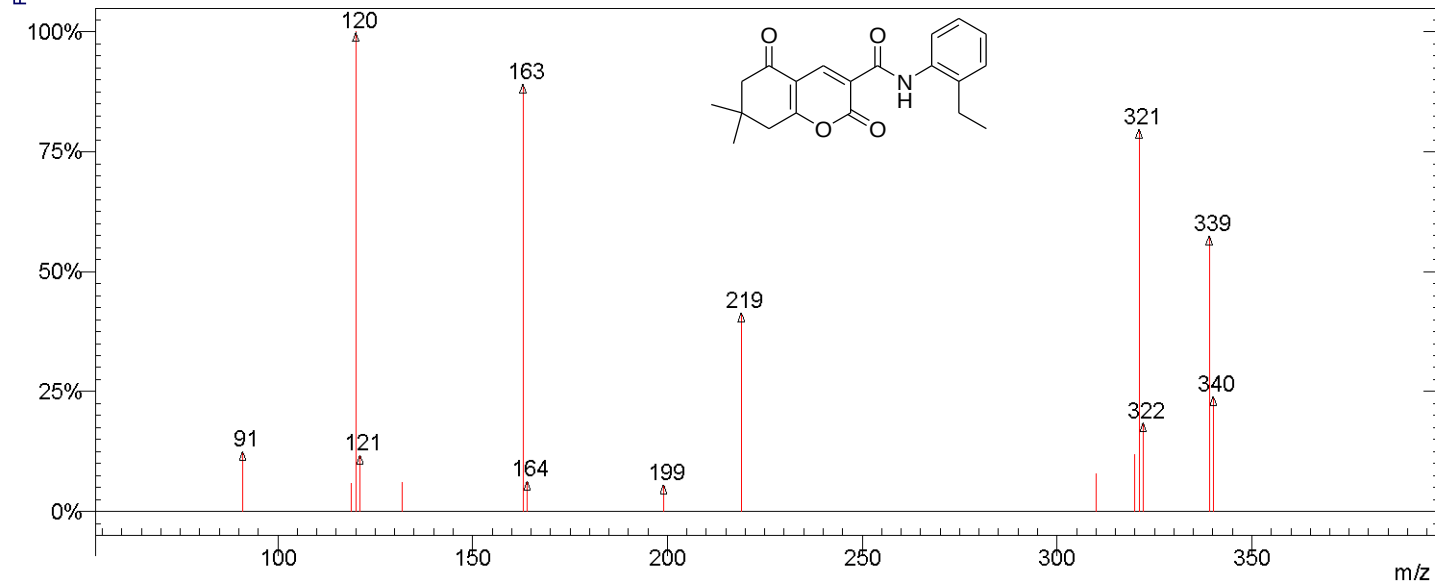
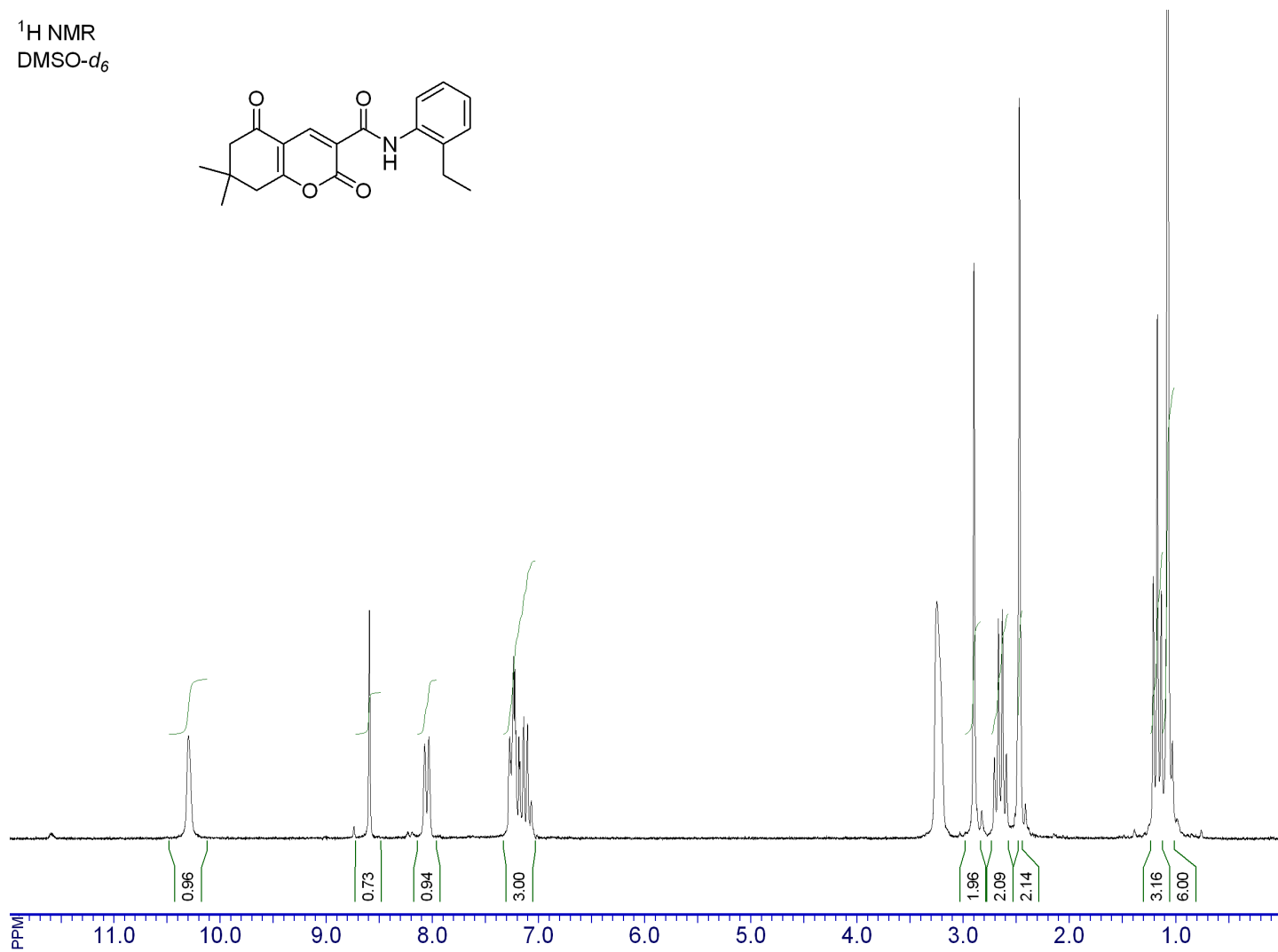
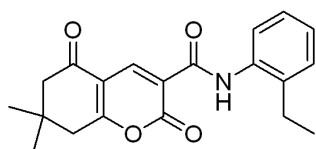


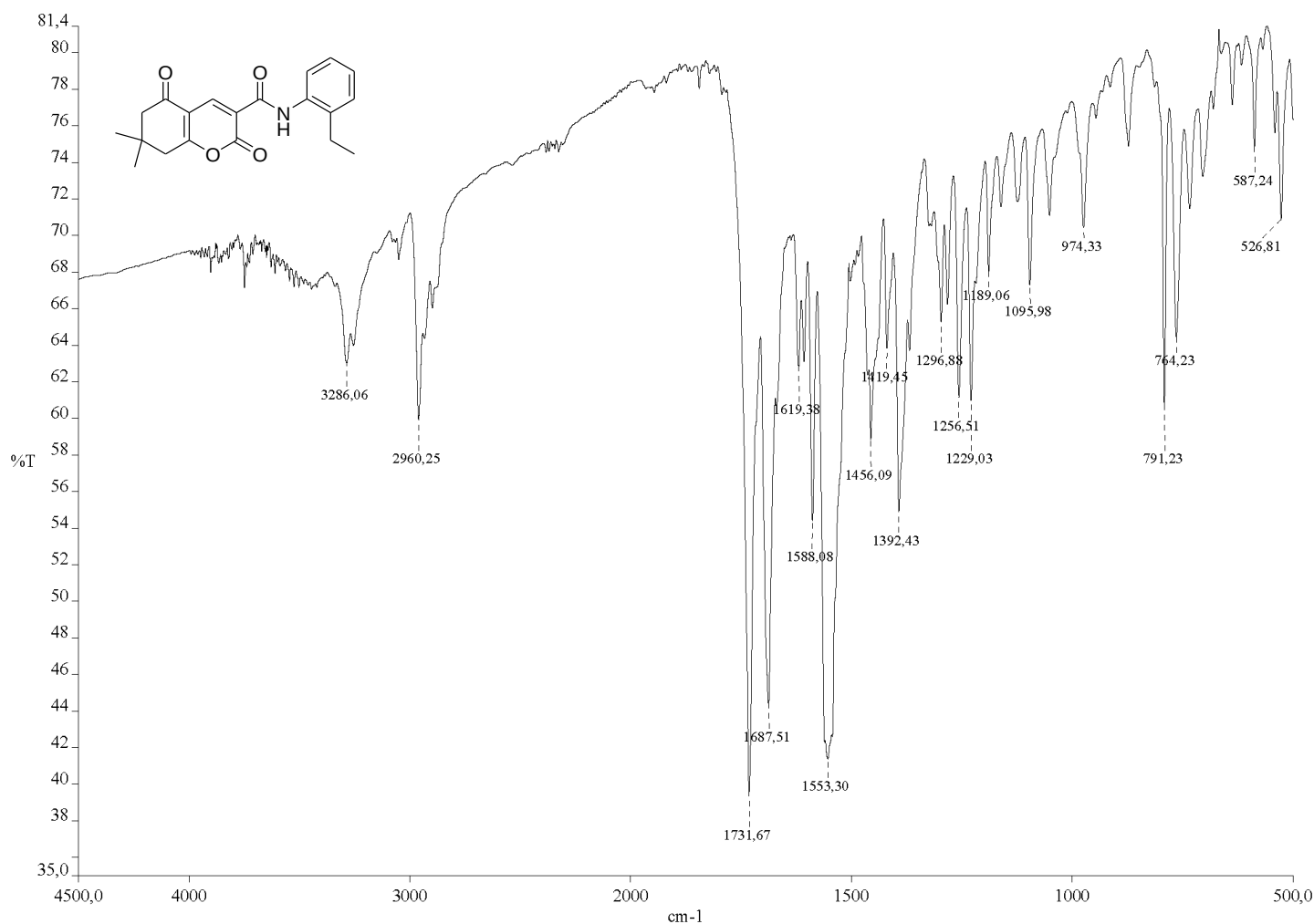
***N*-(2-Ethylphenyl)-7,7-dimethyl-2,5-dioxo-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{1,5})**



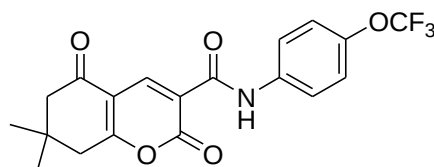
Yield 70%. Mp 240°C. Anal. Calcd ($\text{C}_{20}\text{H}_{21}\text{O}_4\text{N}$): C, 70.8; H, 6.2; N, 4.1. Found: C, 70.5; H, 6.9; N, 4.5; ^1H NMR (200 MHz, DMSO-d_6) δ 1.08 (s, 6H), 1.18 (t, $J = 7.5$ Hz, 3H), 2.48 (s, 2H), 2.65 (q, $J = 7.5$ Hz, 2H), 2.90 (s, 2H), 7.00–7.37 (m, 3H), 8.06 (d, $J = 7.3$ Hz, 1H), 8.59 (s, 1H), 10.30 (br. s, 1H); MS (EI, 70 eV) m/z 339 (M^+); IR (KBr), cm^{-1} : ν 3286, 2960, 1732, 1687, 1619, 1588, 1553.

^1H NMR
DMSO- d_6



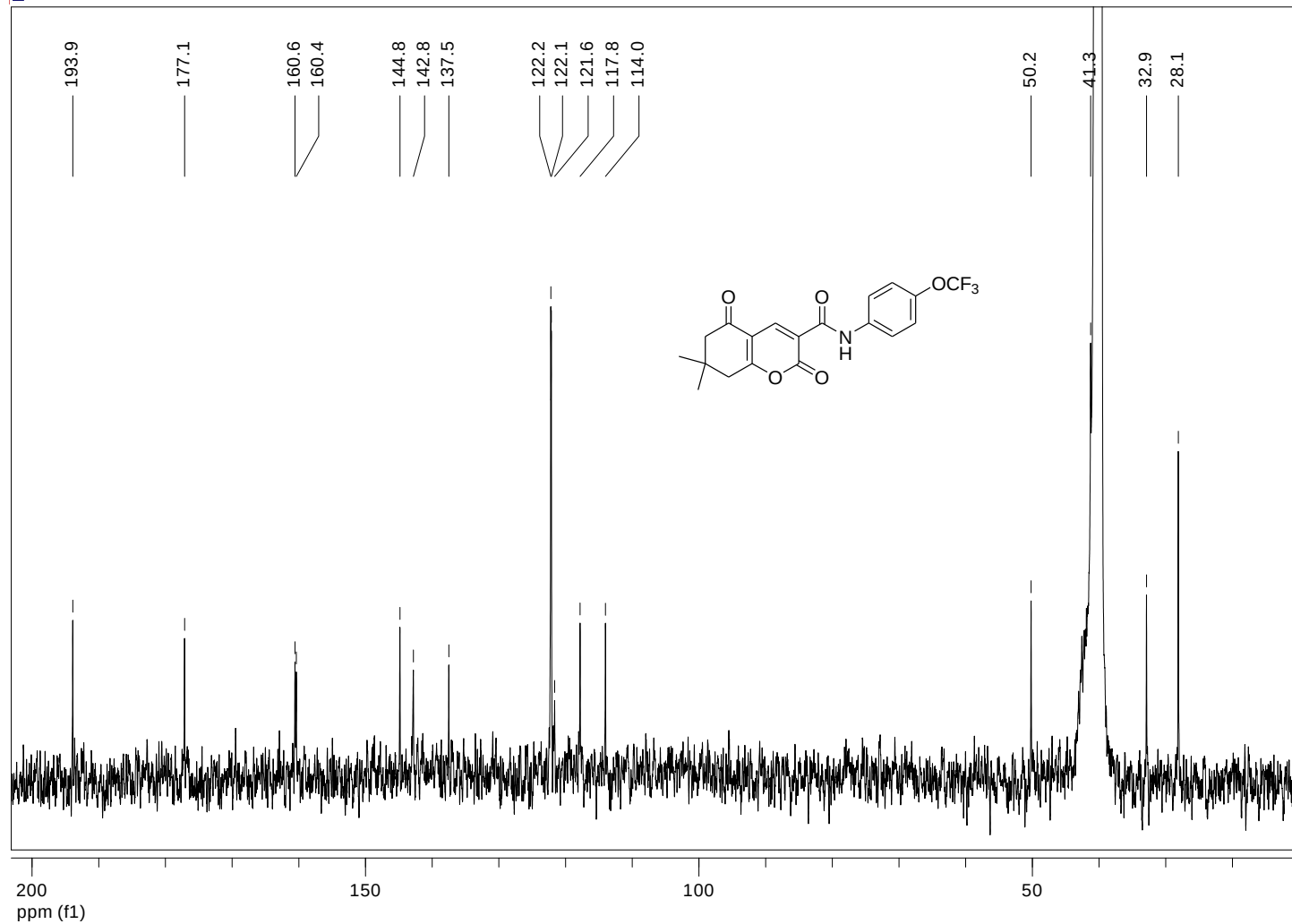
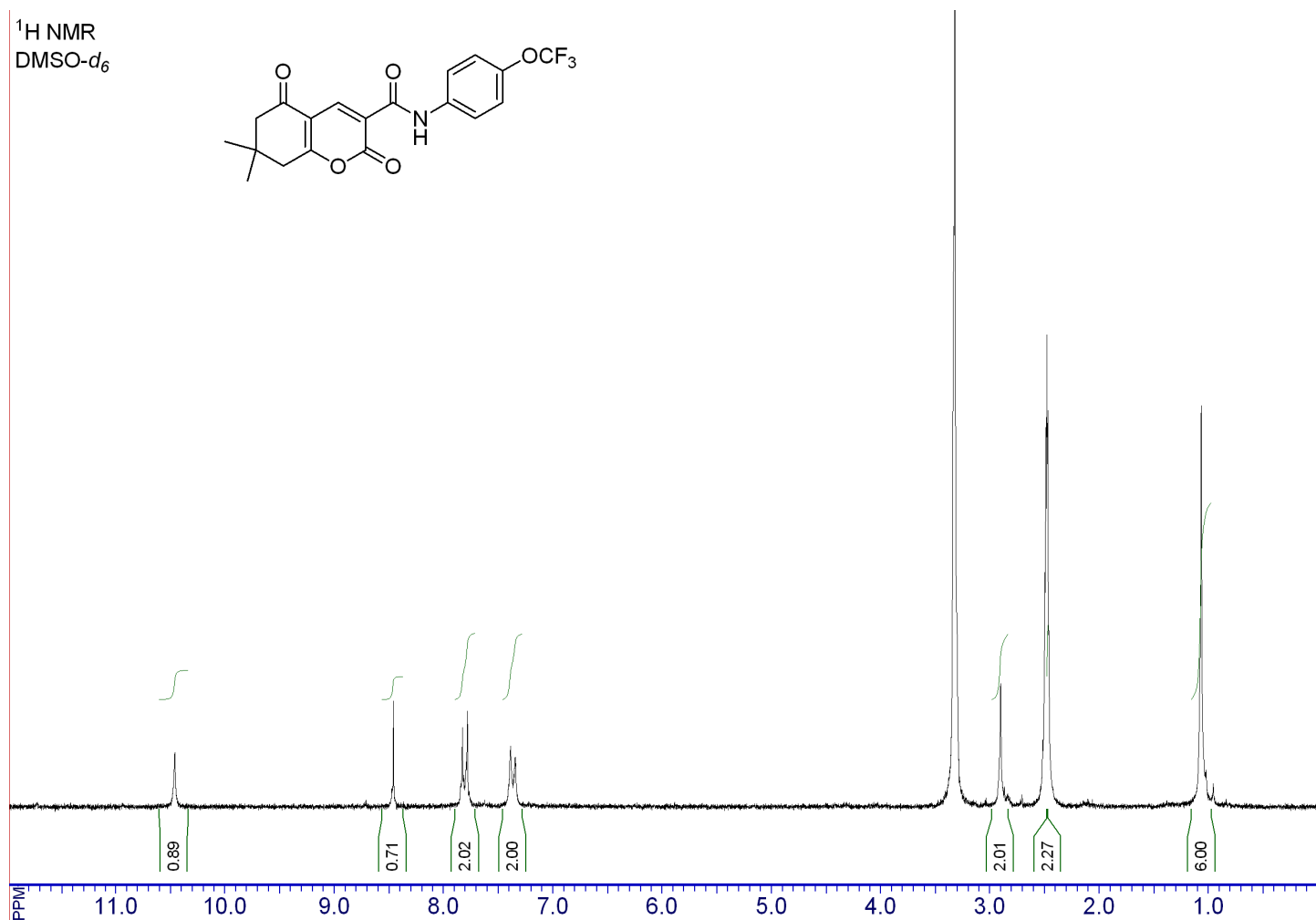
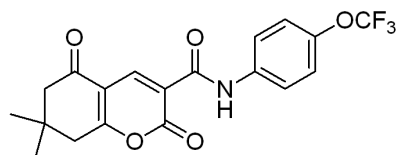


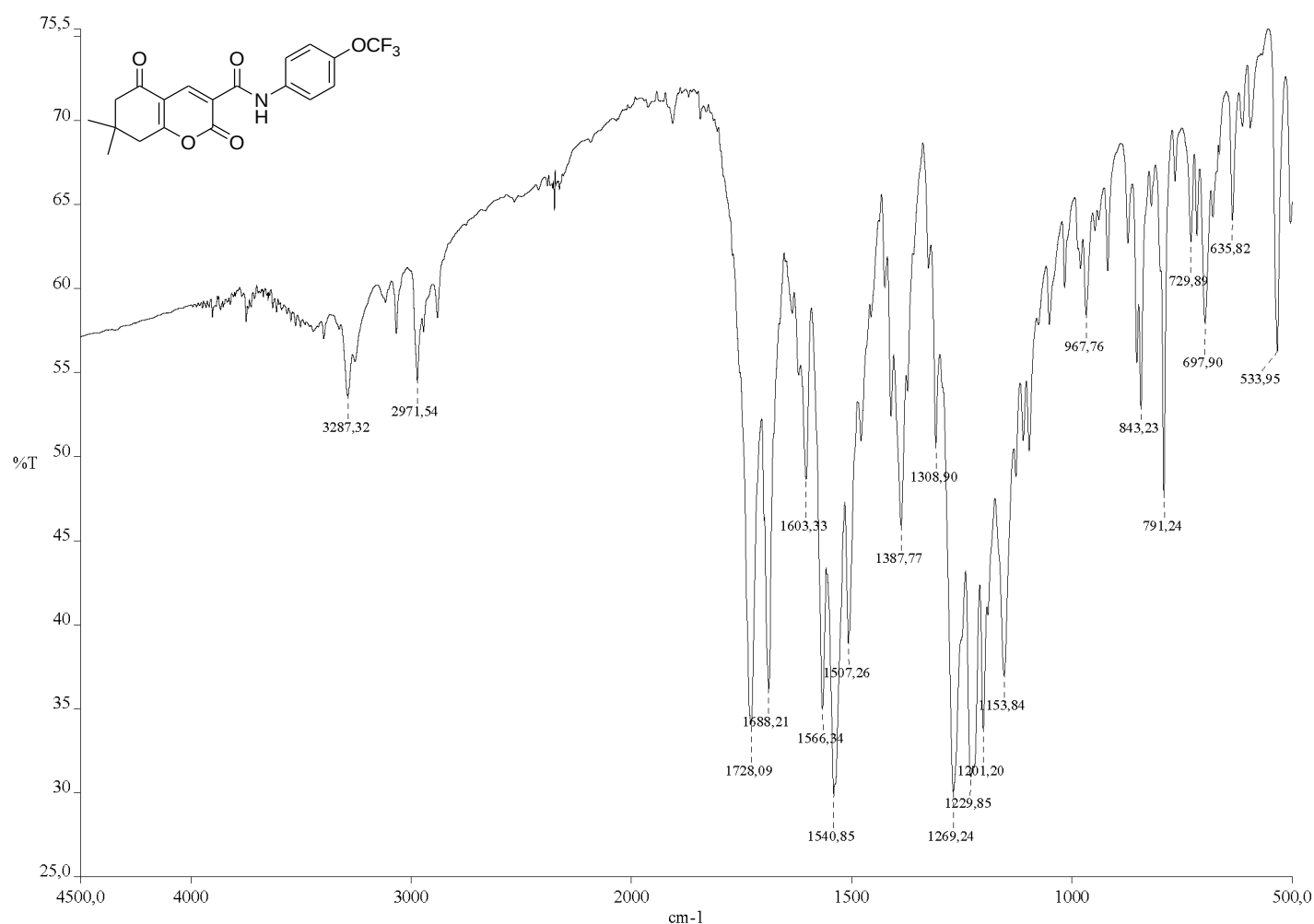
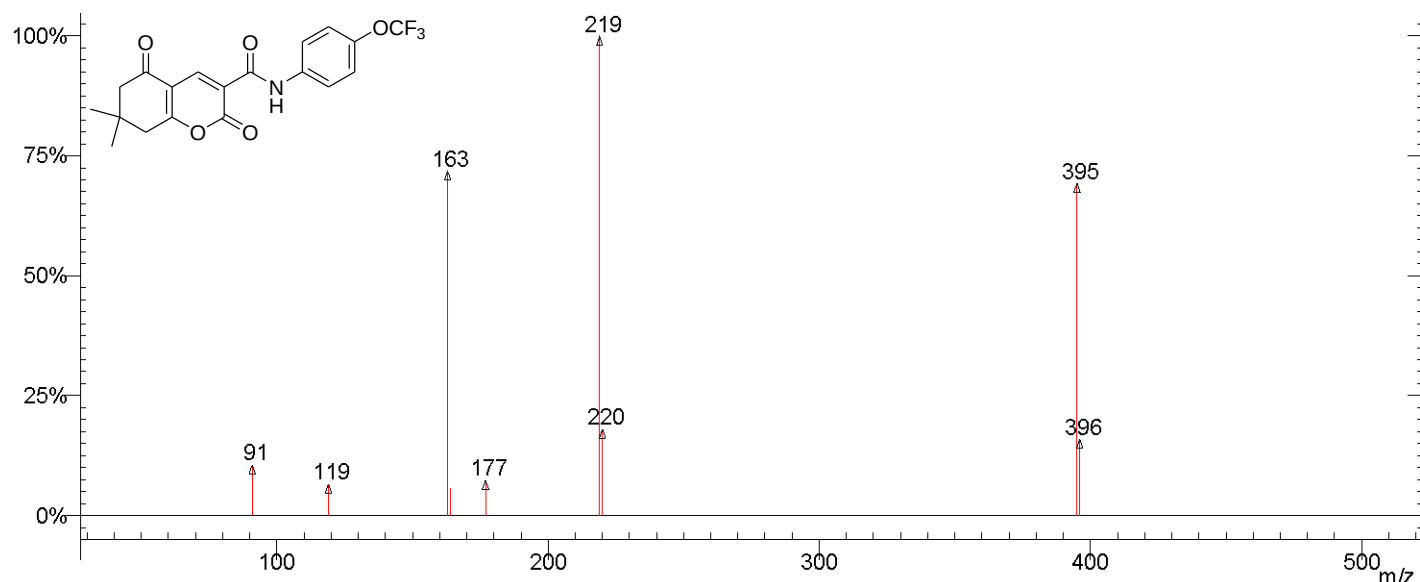
7,7-Dimethyl-2,5-dioxo-N-(4-(trifluoromethoxy)phenyl)-5,6,7,8-tetrahydro-2H-chromene-3-carboxamide (22{1,6})



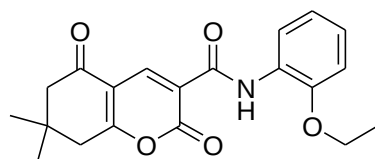
Yield 58%. Mp 200°C. Anal. Calcd ($\text{C}_{19}\text{H}_{16}\text{O}_5\text{NF}_3$): C, 57.7; H, 4.1; N, 3.5. Found: C, 58.0; H, 4.4; N, 3.8; ^1H NMR (200 MHz, DMSO-d_6) δ 1.07 (s, 6H), 2.48 (s, 2H), 2.90 (s, 2H), 7.36 (d, J = 8.2 Hz, 2H), 7.80 (d, J = 8.2 Hz, 2H), 8.46 (s, 1H), 10.46 (s, 1H); ^{13}C NMR (125 MHz, DMSO-d_6) δ 28.1, 32.9, 41.3, 50.2, 114.0, 117.8, 121.6, 122.1, 122.2, 137.5, 142.8, 144.8, 160.4, 160.6, 177.1, 193.9; MS (EI, 70 eV) m/z 395 (M^+); IR (KBr), cm^{-1} : ν 3287, 2972, 1728, 1688, 1603, 1566, 1541.

^1H NMR
DMSO- d_6



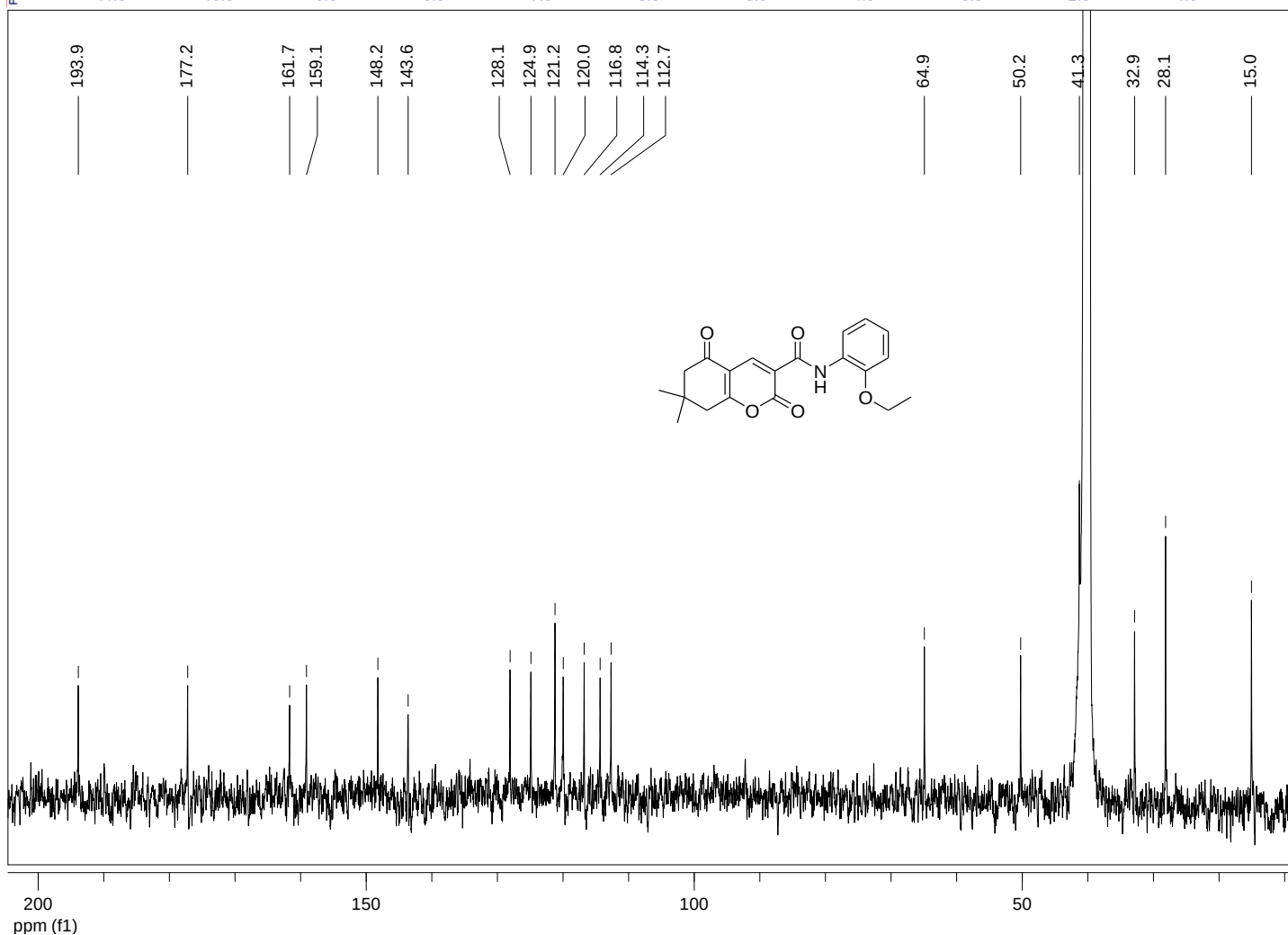
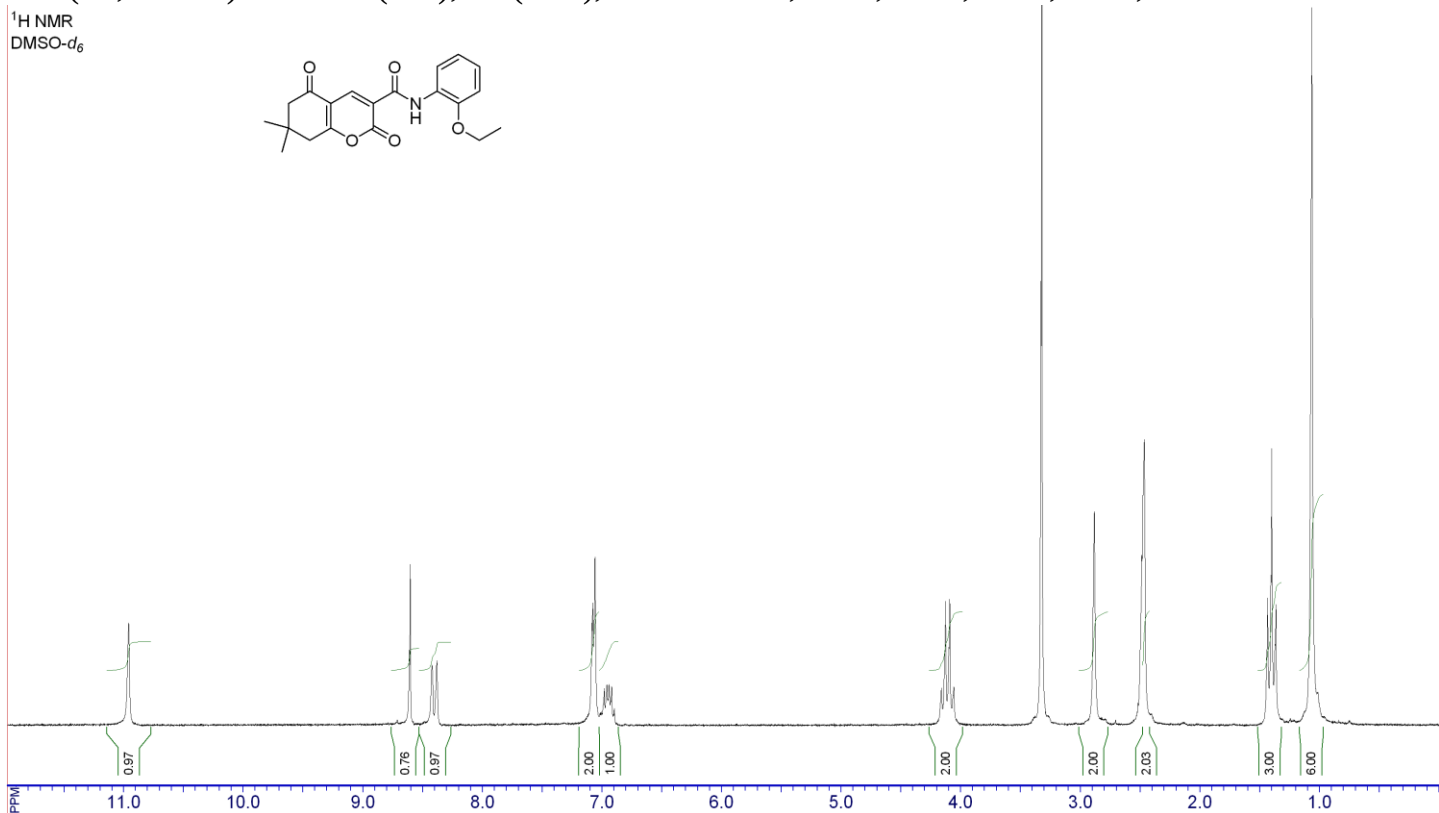


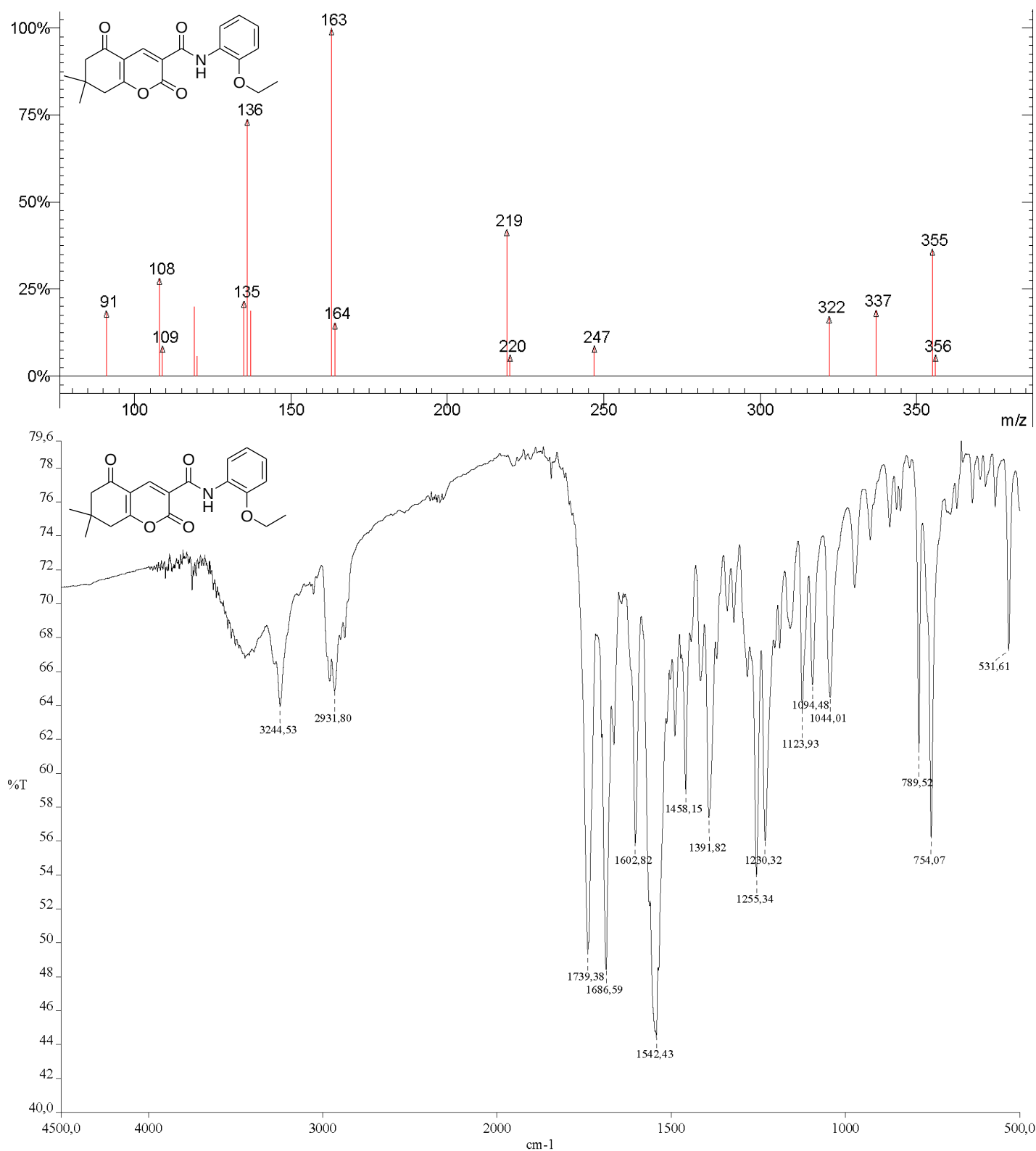
***N*-(2-Ethoxyphenyl)-7,7-dimethyl-2,5-dioxo-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{1,7})**



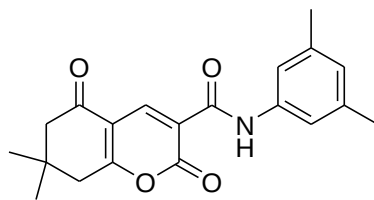
Yield 65%. Mp 232°C. Anal. Calcd ($\text{C}_{20}\text{H}_{21}\text{NO}_5$): C, 67,6; H, 6,0; N, 3,9. Found: C, 67,3; H, 6,4; N, 4,1; ^1H NMR (200 MHz, DMSO-d_6) δ 1.07 (s, 6H), 1.40 (t, J = 7,0 Hz, 3H), 2.47 (s, 2H), 2.89 (s, 2H), 4.12 (q, J = 7.0 Hz, 2H), 6.90-7.03(m, 1H), 7.03-7.08 (m, 2H), 8.40 (d, J = 8.1 Hz, 1H), 8.60 (s, 1H), 10.96 (s, 1H); ^{13}C NMR (125 MHz, DMSO-d_6) δ 15.1, 28.1, 32.9, 41.3, 50.2,

64.9, 112.7, 114.3, 116.8, 120.0, 121.2, 124.9, 128.1, 143.6, 143.6, 148.2, 159.1, 161.7, 177.2;
MS (EI, 70 eV) m/z 395 (M⁺); IR (KBr), cm^{-1} : ν 3245, 2932, 1739, 1687, 1603, 1542.



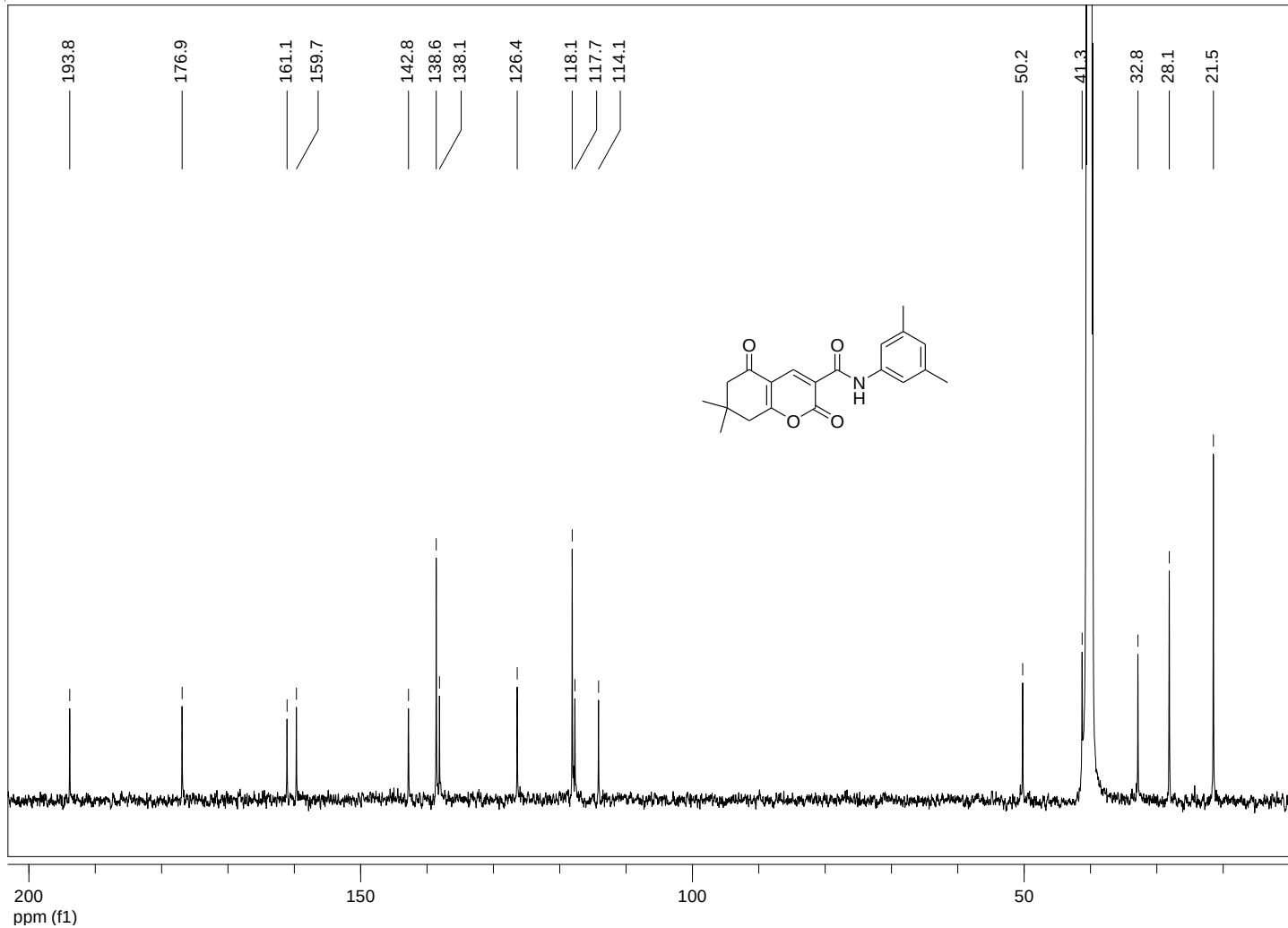
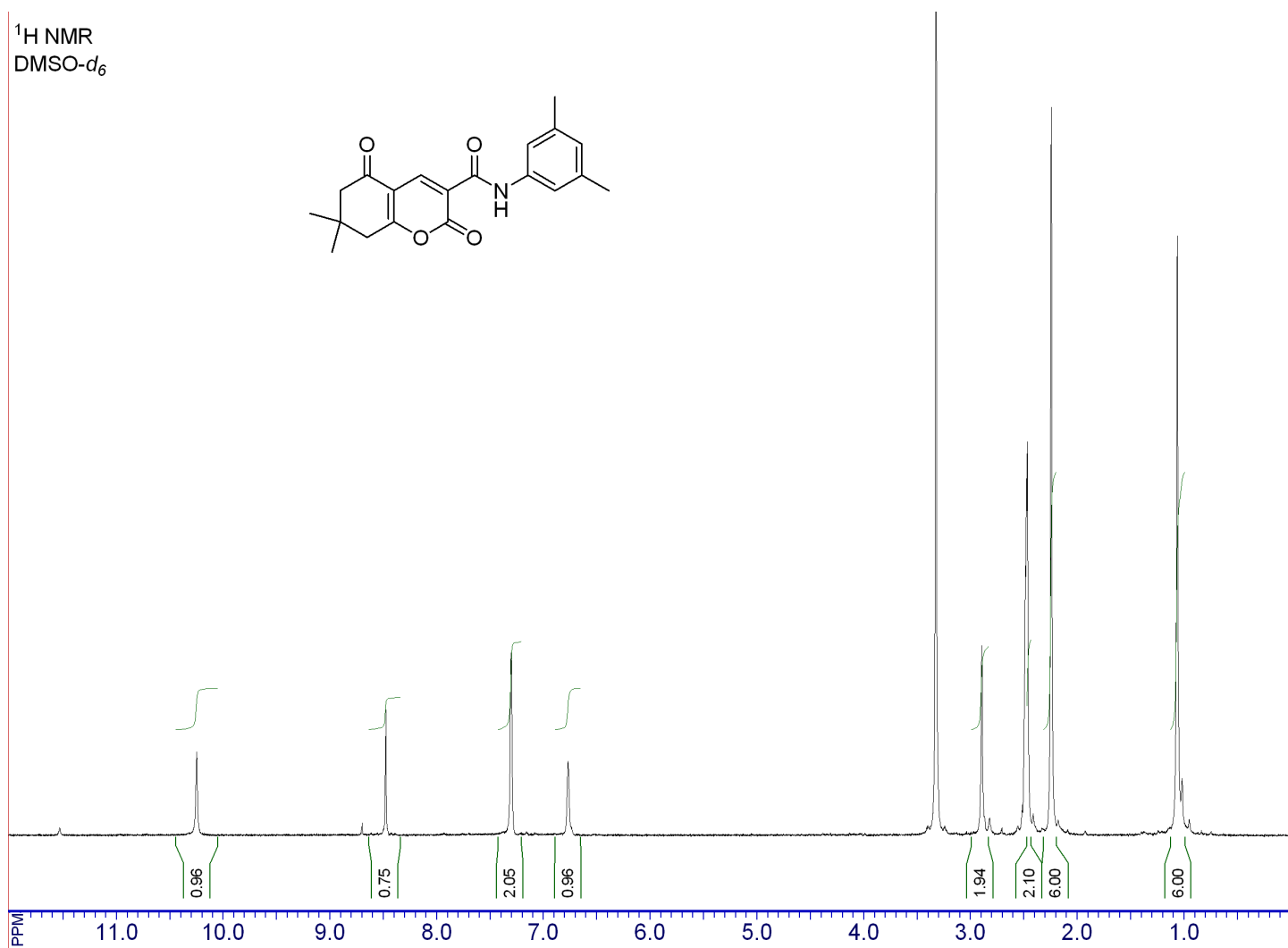
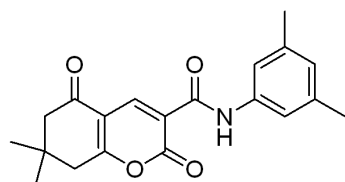


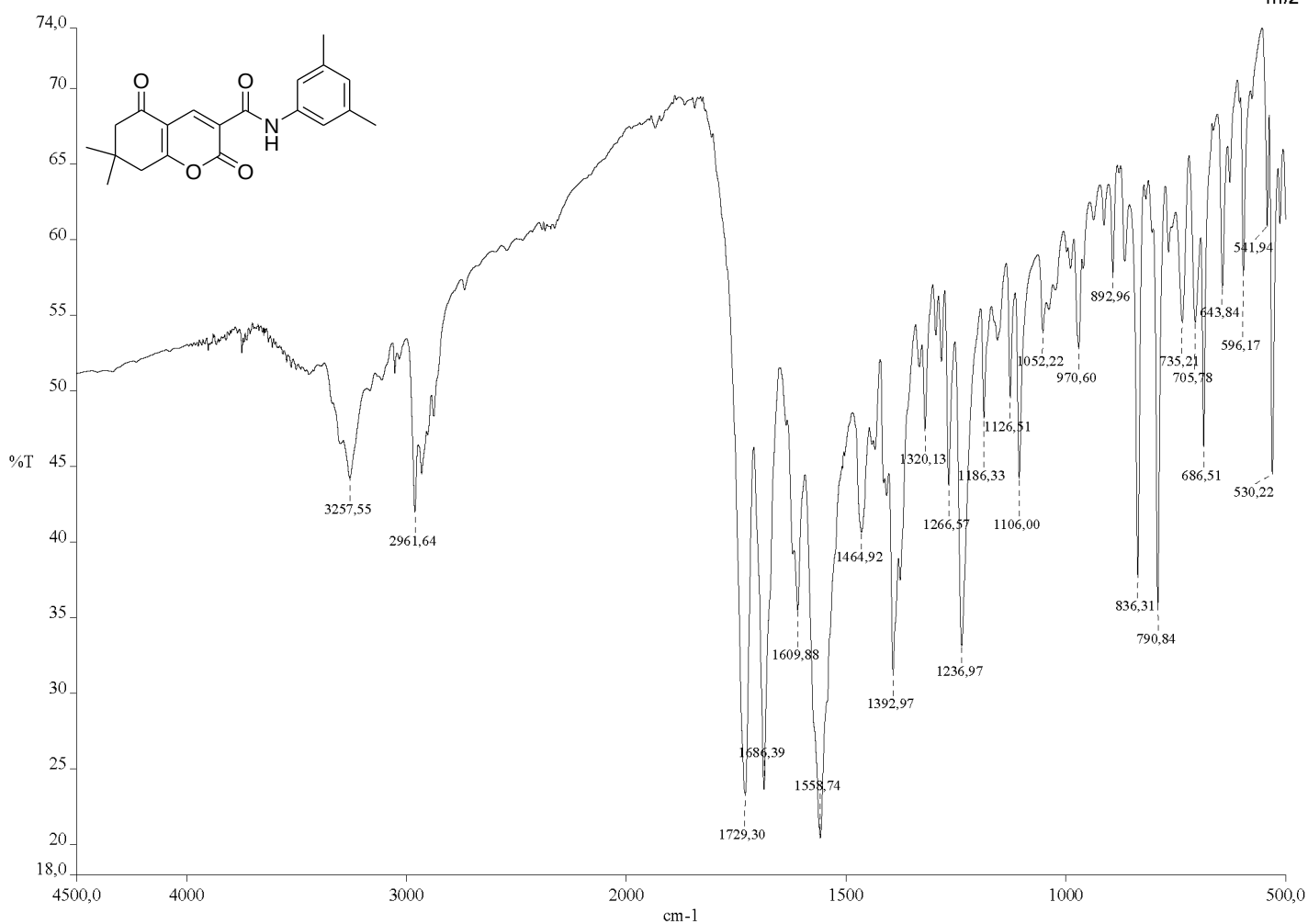
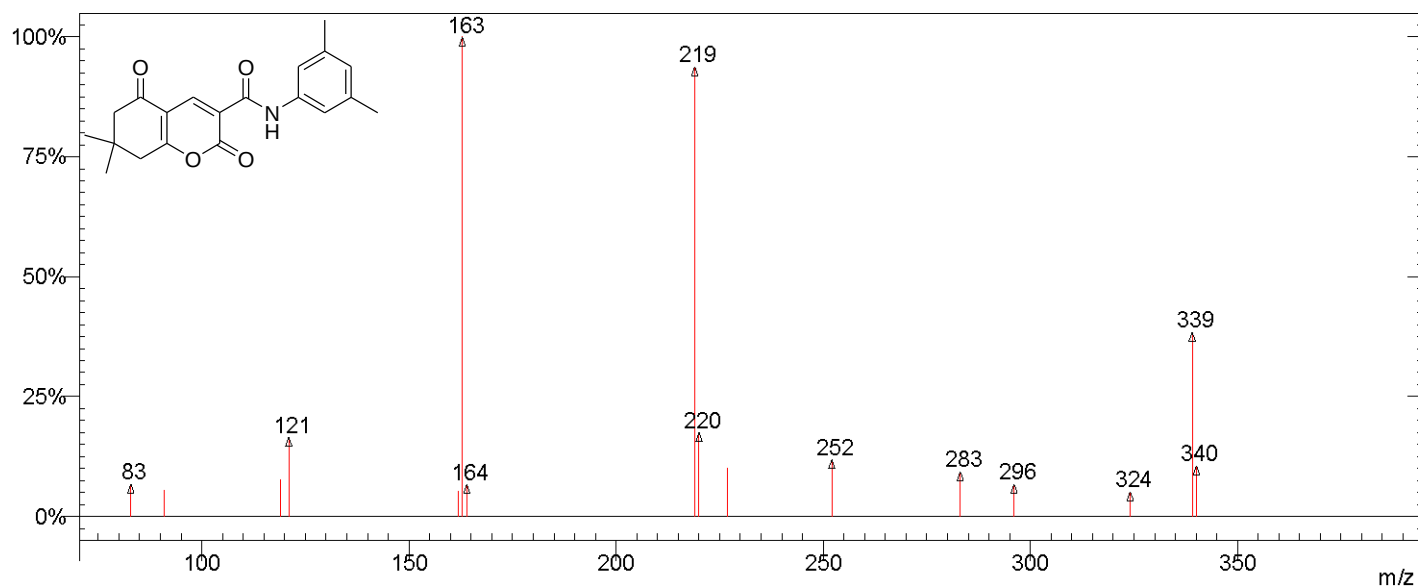
***N*-(3,5-Dimethylphenyl)-7,7-dimethyl-2,5-dioxo-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{1,8})**



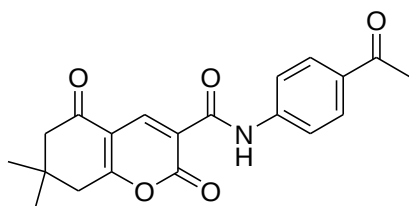
Yield 60%. Mp 230°C. ¹H NMR (200 MHz, DMSO-*d*₆) δ 1.07 (s, 6H), 2.25 (s, 6H), 2.47 (s, 2H), 2.90 (s, 2H), 6.77 (s, 1H), 7.31 (s, 2H), 8.48 (s, 1H), 10.25 (s, 1H); ¹³C NMR (125 MHz, DMSO-*d*₆) δ 21.5, 28.1, 32.8, 41.3, 50.2, 114.1, 117.7, 118.1, 126.4, 138.1, 138.6, 142.8, 159.7, 161.1, 176.9, 193.8; MS (EI, 70 eV) *m/z* 339 (M⁺); IR (KBr), cm⁻¹: ν 3258, 2962, 1729, 1686, 1610, 1559.

^1H NMR
DMSO- d_6



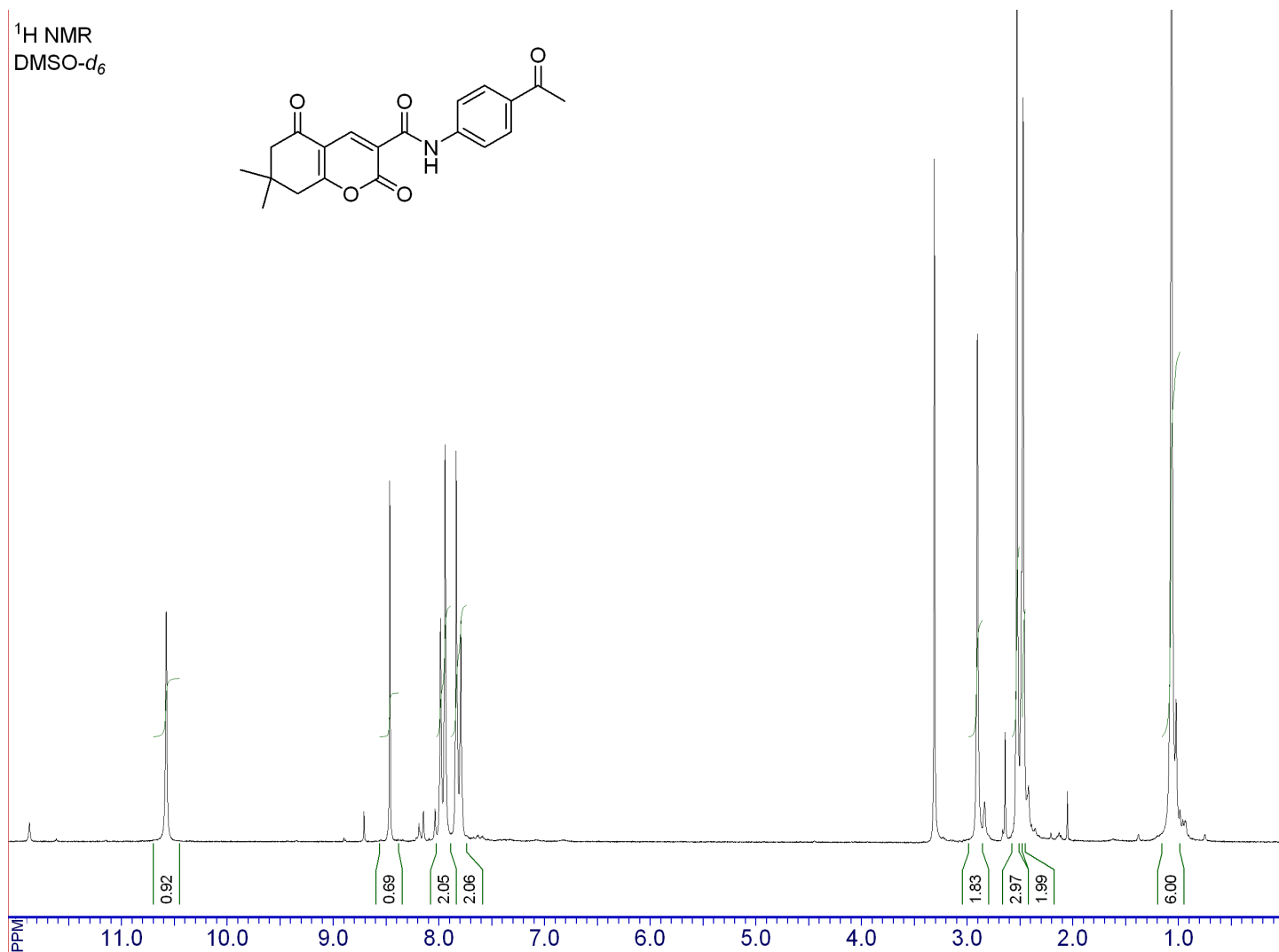
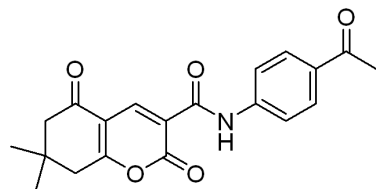


***N*-(4-Acetylphenyl)-7,7-dimethyl-2,5-dioxo-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{1,9})**

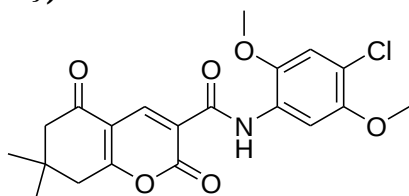


Yield 70%. ^1H NMR (200 MHz, DMSO-d_6) δ 1.07 (s, 6H), 2.48 (s, 2H), 2.53 (s, 3H), 2.91 (s, 2H), 7.82 (d, J = 8.8 Hz, 2H), 7.97 (d, J = 8.8 Hz, 2H), 8.47 (s, 1H), 10.58 (s, 1H).

¹H NMR
DMSO-*d*₆

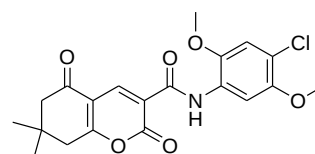
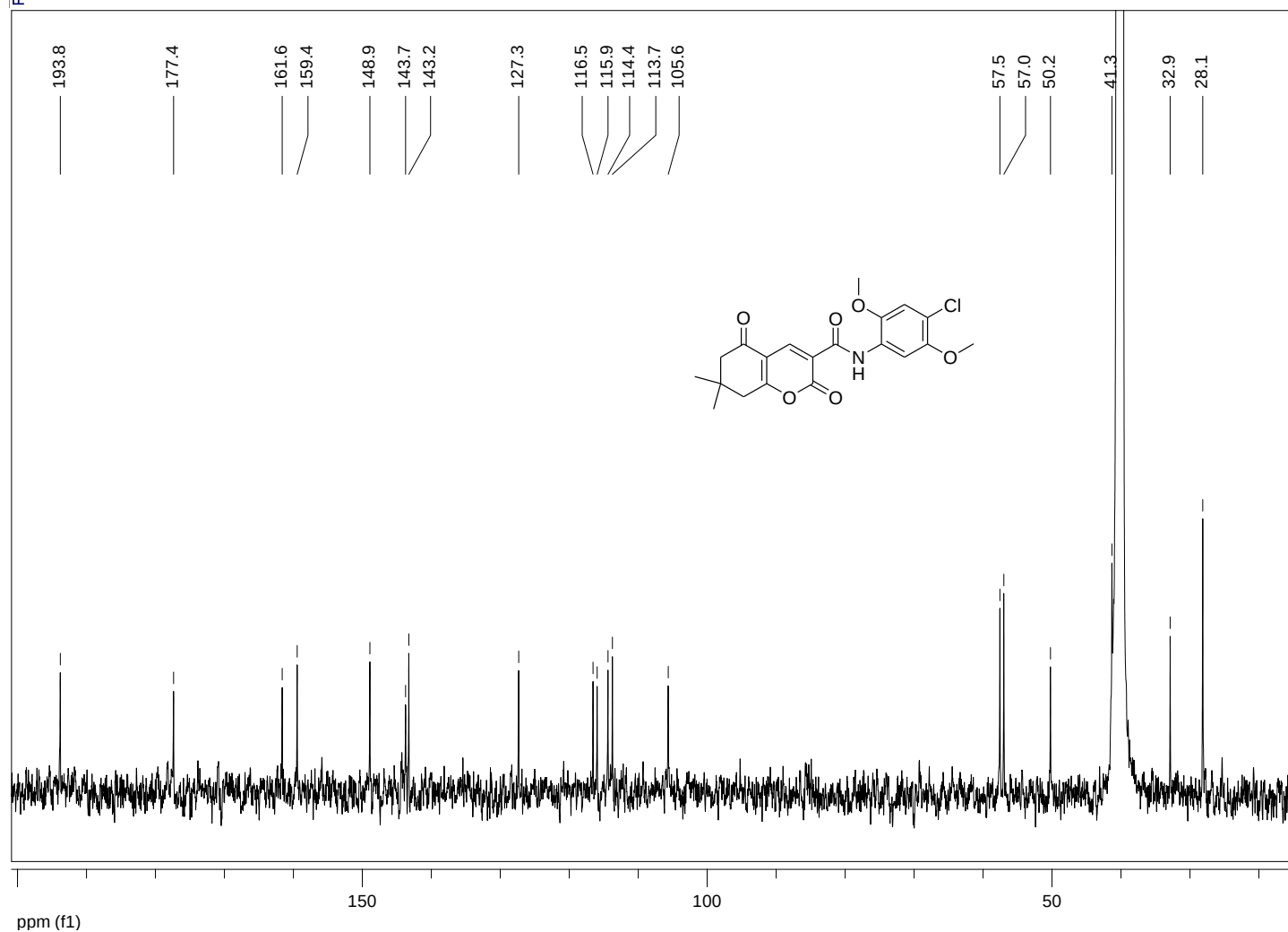
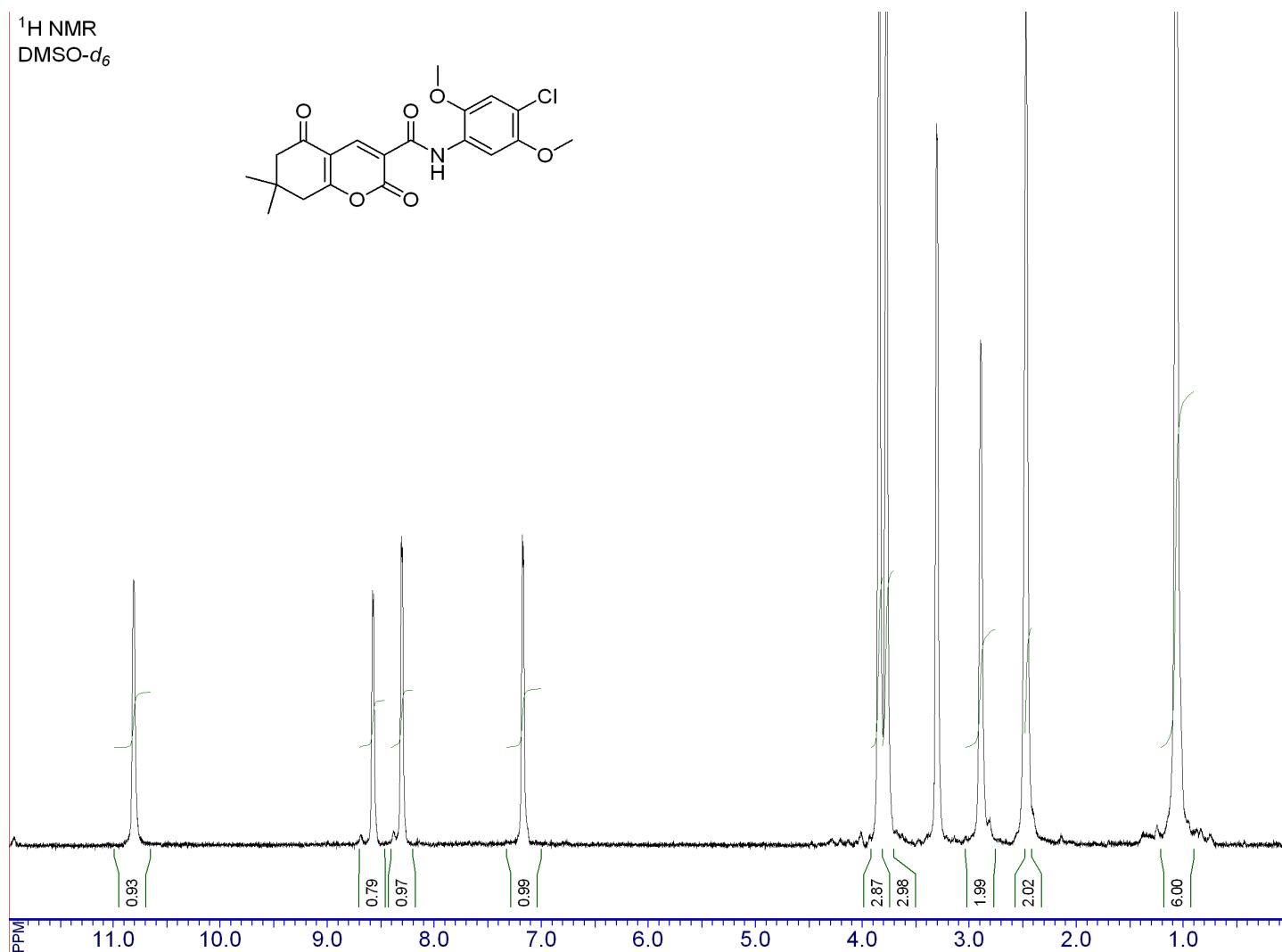
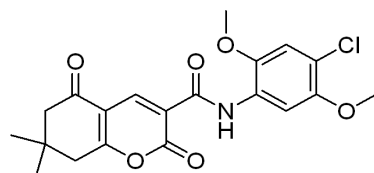


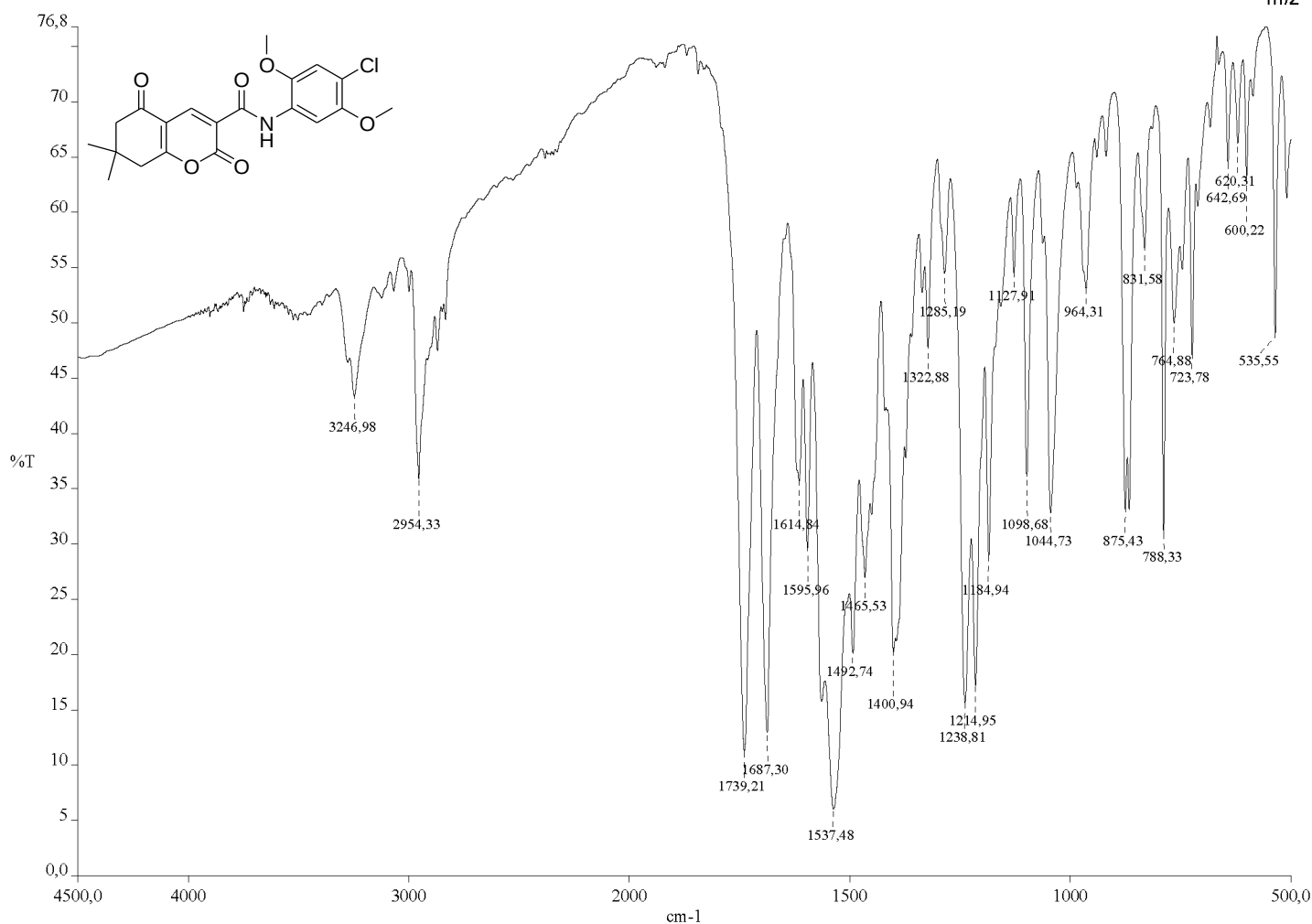
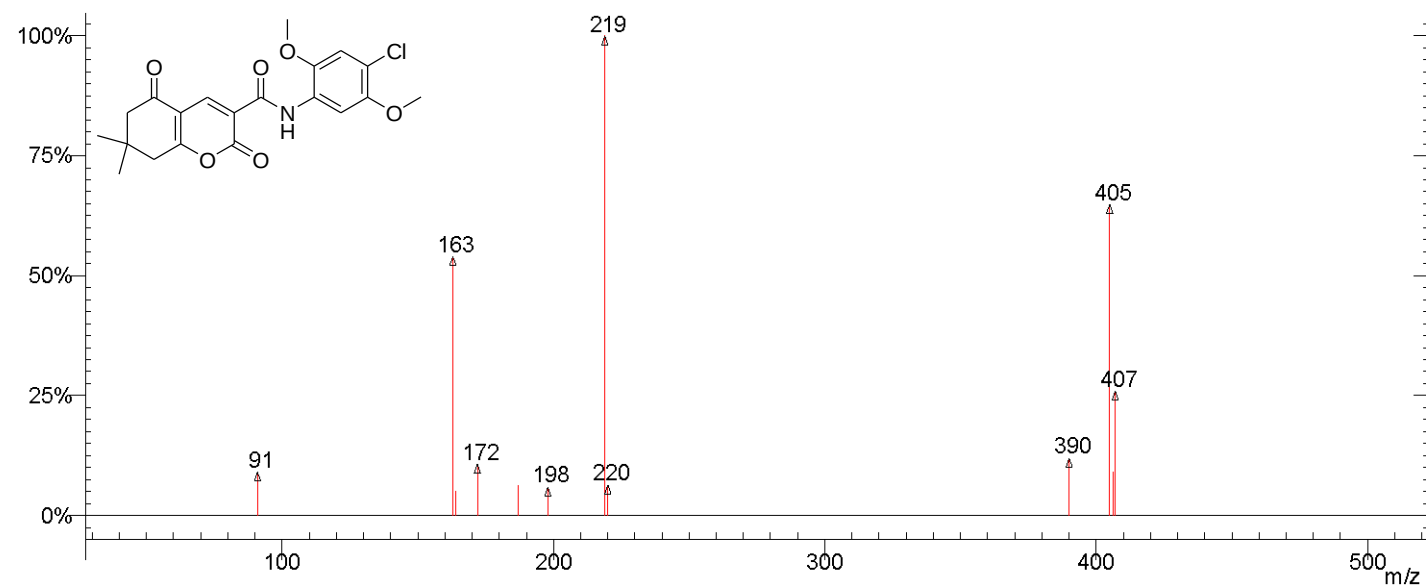
***N*-(4-Chloro-2,5-dimethoxyphenyl)-7,7-dimethyl-2,5-dioxo-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{1,10})**



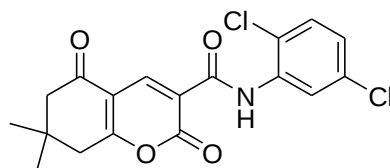
Yield 73%. Mp 241°C. ¹H NMR (200 MHz, DMSO-*d*₆) δ 1.07 (s, 6H), 2.47 (s, 2H), 2.90 (s, 2H), 3.78 (s, 3H), 3.84 (s, 3H), 7.17 (s, 1H), 8.30 (s, 1H), 8.58 (s, 1H), 10.81 (s, 1H); ¹³C NMR (125 MHz, DMSO-*d*₆) δ 28.1, 32.9, 41.3, 50.2, 57.0, 57.5, 105.6, 113.7, 114.4, 115.9, 116.5, 127.3, 143.2, 143.7, 148.9, 159.4, 161.6, 177.4, 193.8; MS (EI, 70 eV) *m/z* 405 (M⁺); IR (KBr), cm⁻¹: ν 3247, 2954, 1739, 1687, 1615, 1596, 1538.

^1H NMR
DMSO- d_6



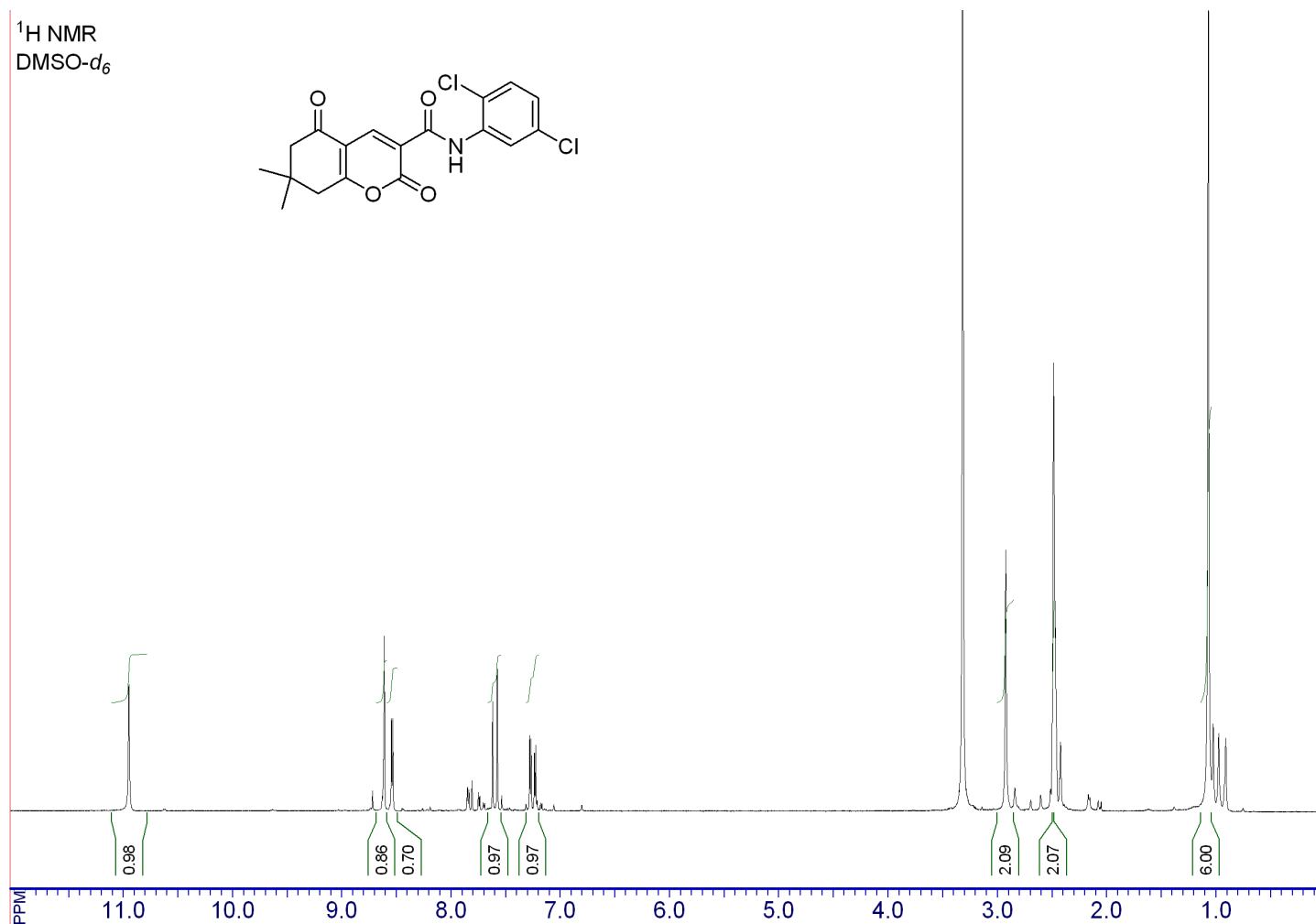
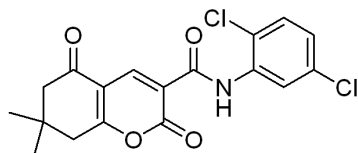


***N*-(2,5-Dichlorophenyl)-7,7-dimethyl-2,5-dioxo-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{1,11})**

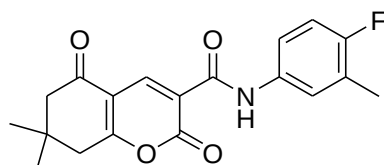


Yield 56%. ^1H NMR (200 MHz, DMSO-d_6) δ 1.08 (s, 6H), 2.48 (s, 2H), 2.93 (s, 2H), 7.26 (dd, J = 8.6 Hz, J = 2.6 Hz, 1H), 7.60 (d, J = 8.6 Hz, 1H), 8.54 (d, J = 2.6 Hz, 1H), 8.62 (s, 1H), 10.95 (s, 1H).

¹H NMR
DMSO-*d*₆

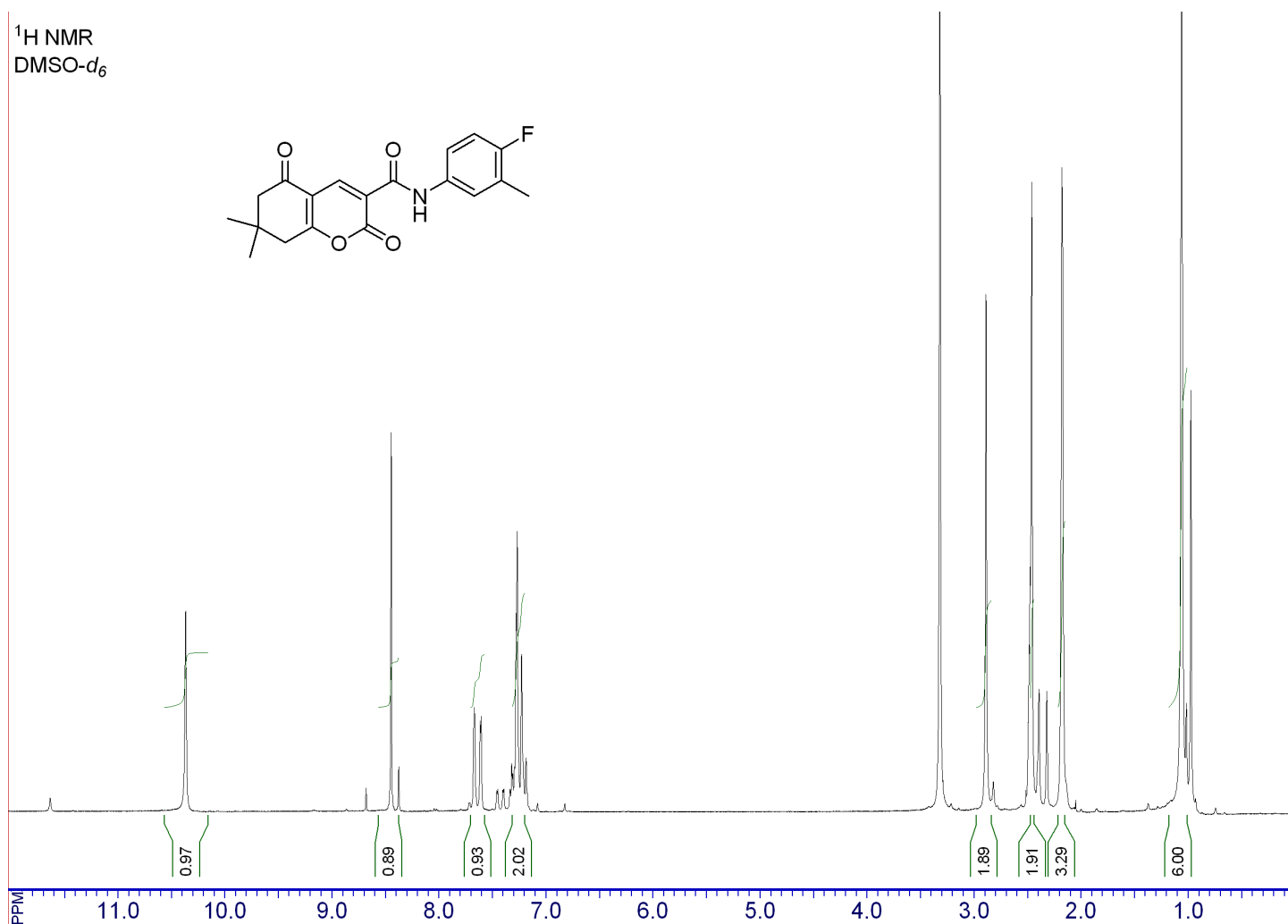


***N*-(4-Fluoro-3-methylphenyl)-7,7-dimethyl-2,5-dioxo-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{1,12})**

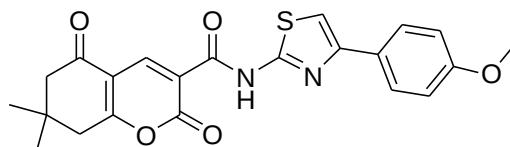


Yield 74%. ¹H NMR (200 MHz, DMSO-*d*₆) δ 1.07 (s, 6H), 2.19 (s, 3H), 2.47 (s, 2H), 2.90 (s, 2H), 7.17-7.31 (m, 2H), 7.65 (d, *J* = 11.9 Hz, 1H), 8.45 (s, 1H), 10.37 (s, 1H).

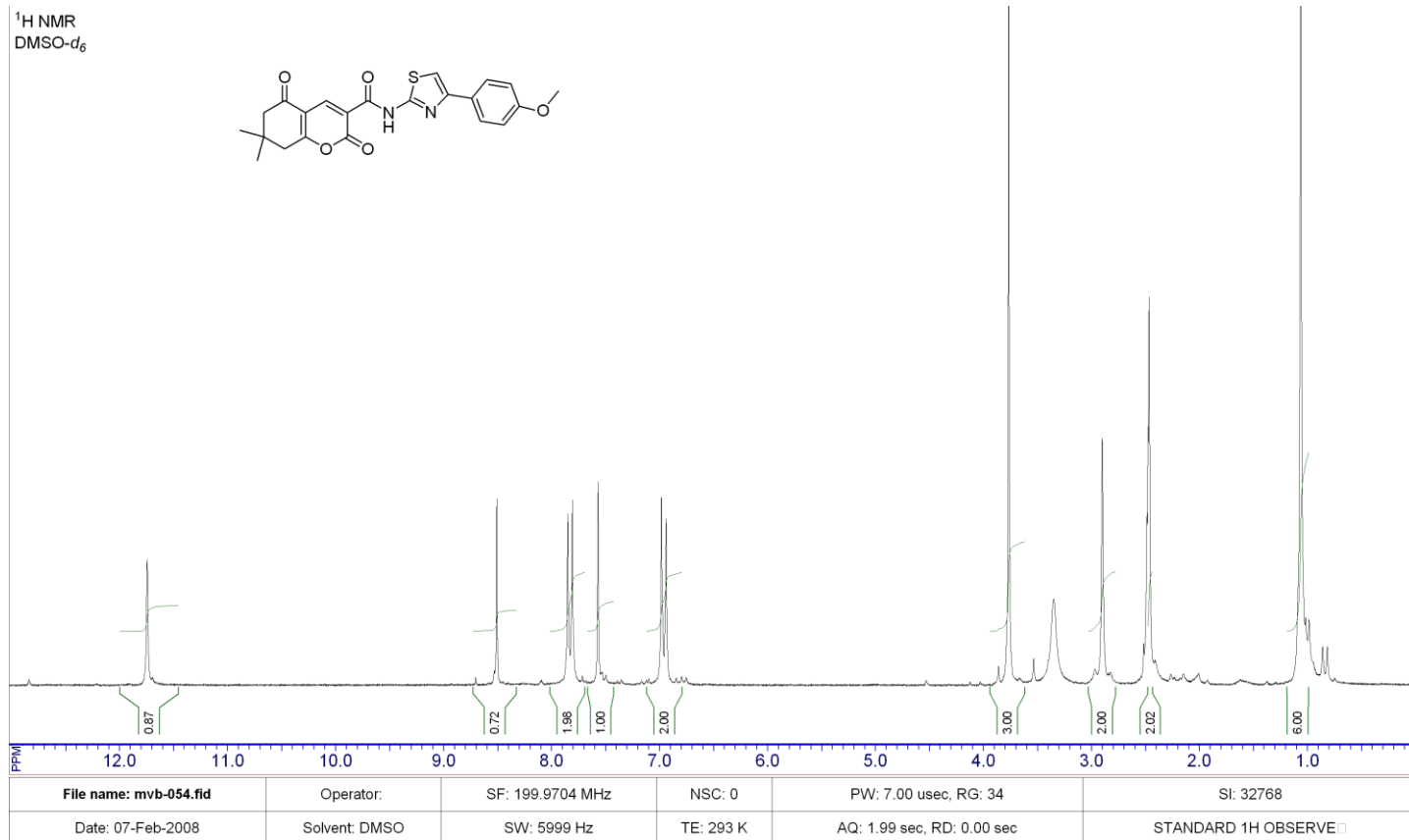
¹H NMR
DMSO-*d*₆



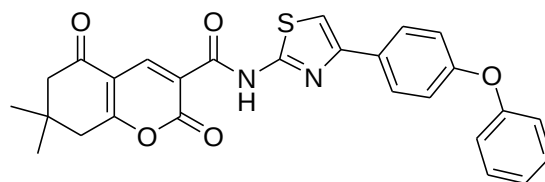
N-(4-(4-Methoxyphenyl)thiazol-2-yl)-7,7-dimethyl-2,5-dioxo-5,6,7,8-tetrahydro-2H-chromene-3-carboxamide (22{1,13})



Yield 70%. ¹H NMR (200 MHz, DMSO-*d*₆) δ 1.07 (s, 6H), 2.47 (s, 2H), 2.91 (s, 2H), 3.77 (s, 3H), 6.97 (d, *J* = 8.8 Hz, 2H), 7.58 (s, 1H), 7.84 (d, *J* = 8.8 Hz, 2H), 8.52 (s, 1H), 11.75 (s, 1H).

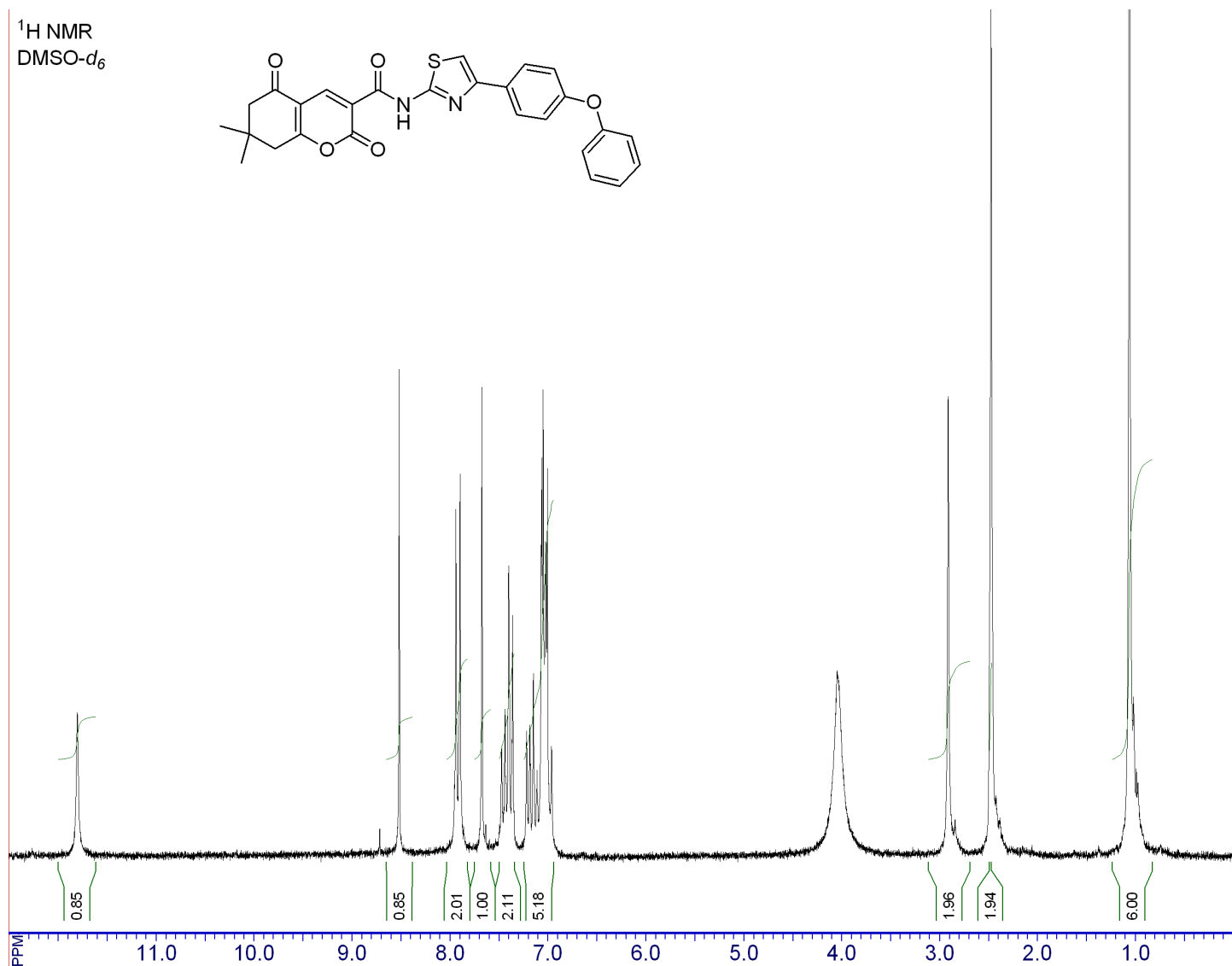
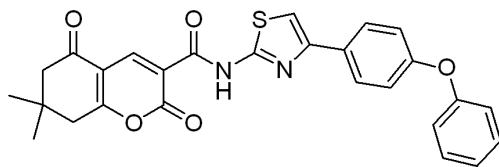


7,7-Dimethyl-2,5-dioxo-N-(4-(4-phenoxyphenyl)thiazol-2-yl)-5,6,7,8-tetrahydro-2H-chromene-3-carboxamide (22{1,14})

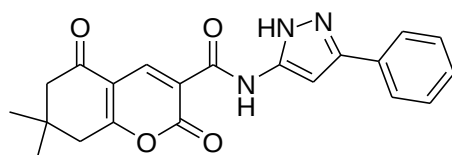


Yield 80%. ¹H NMR (200 MHz, DMSO-d₆) δ 1.07 (s, 6H), 2.48 (s, 2H), 2.92 (s, 2H), 6.95-7.25 (m, 5H), 7.34-7.51 (m, 2H), 7.68 (s, 1H), 7.93 (d, J = 9.1 Hz, 2H), 8.53 (s, 1H), 11.81 (s, 1H).

¹H NMR
DMSO-*d*₆

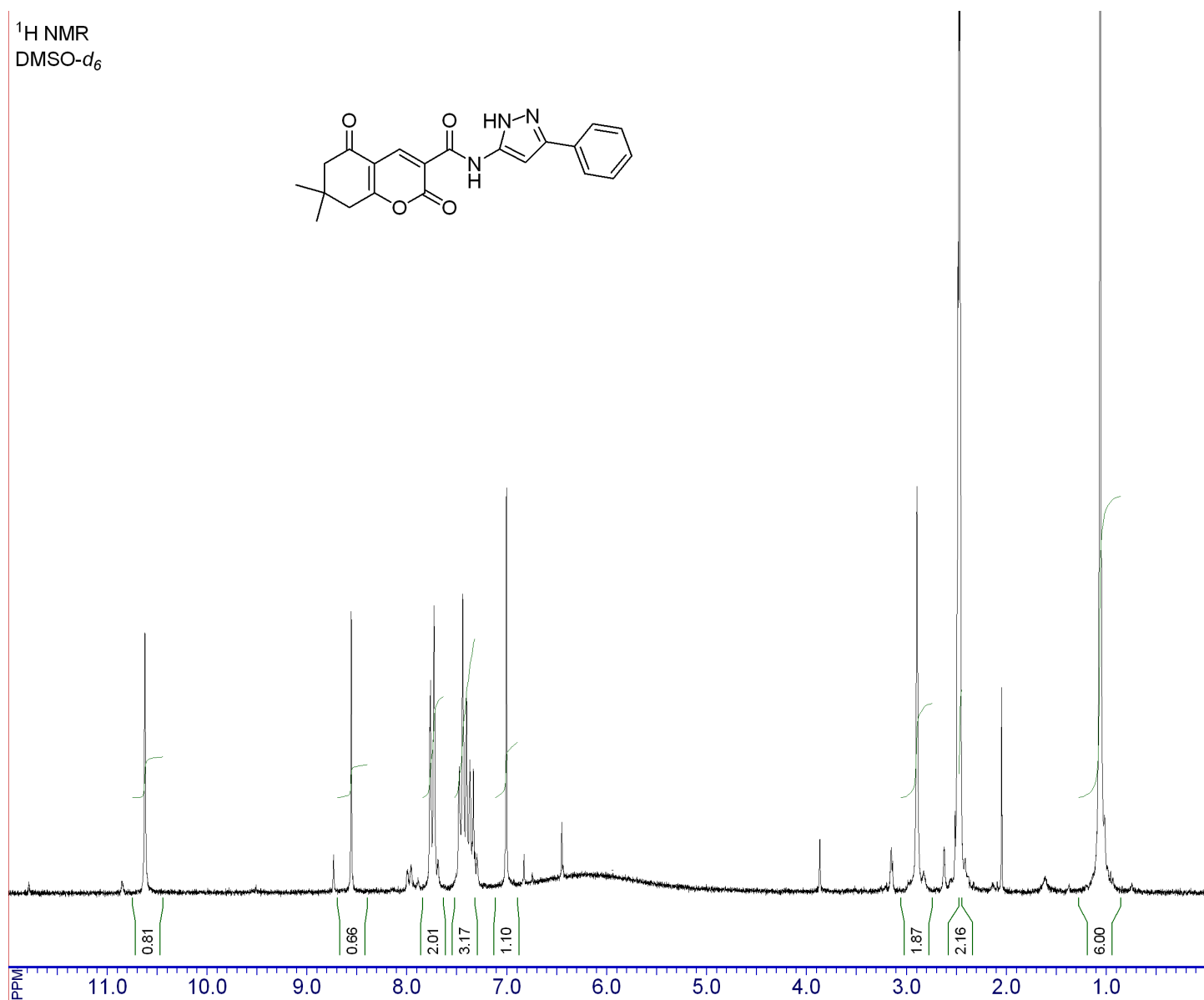
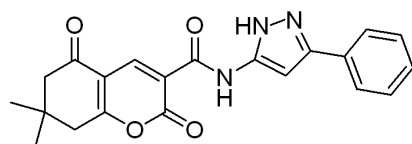


7,7-Dimethyl-2,5-dioxo-N-(3-phenyl-1*H*-pyrazol-5-yl)-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{1,15})

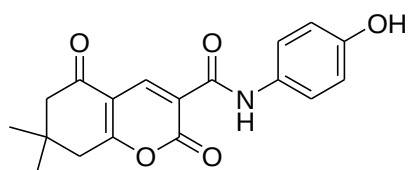


Yield 65%. ¹H NMR (200 MHz, DMSO-*d*₆) δ 1.07 (s, 6H), 2.47 (s, 2H), 2.90 (s, 2H), 7.01 (s, 1H), 7.32-7.54 (m, 3H), 7.75 (d, *J* = 7.9 Hz, 2H), 8.56 (s, 1H), 10.62 (s, 1H).

^1H NMR
DMSO- d_6

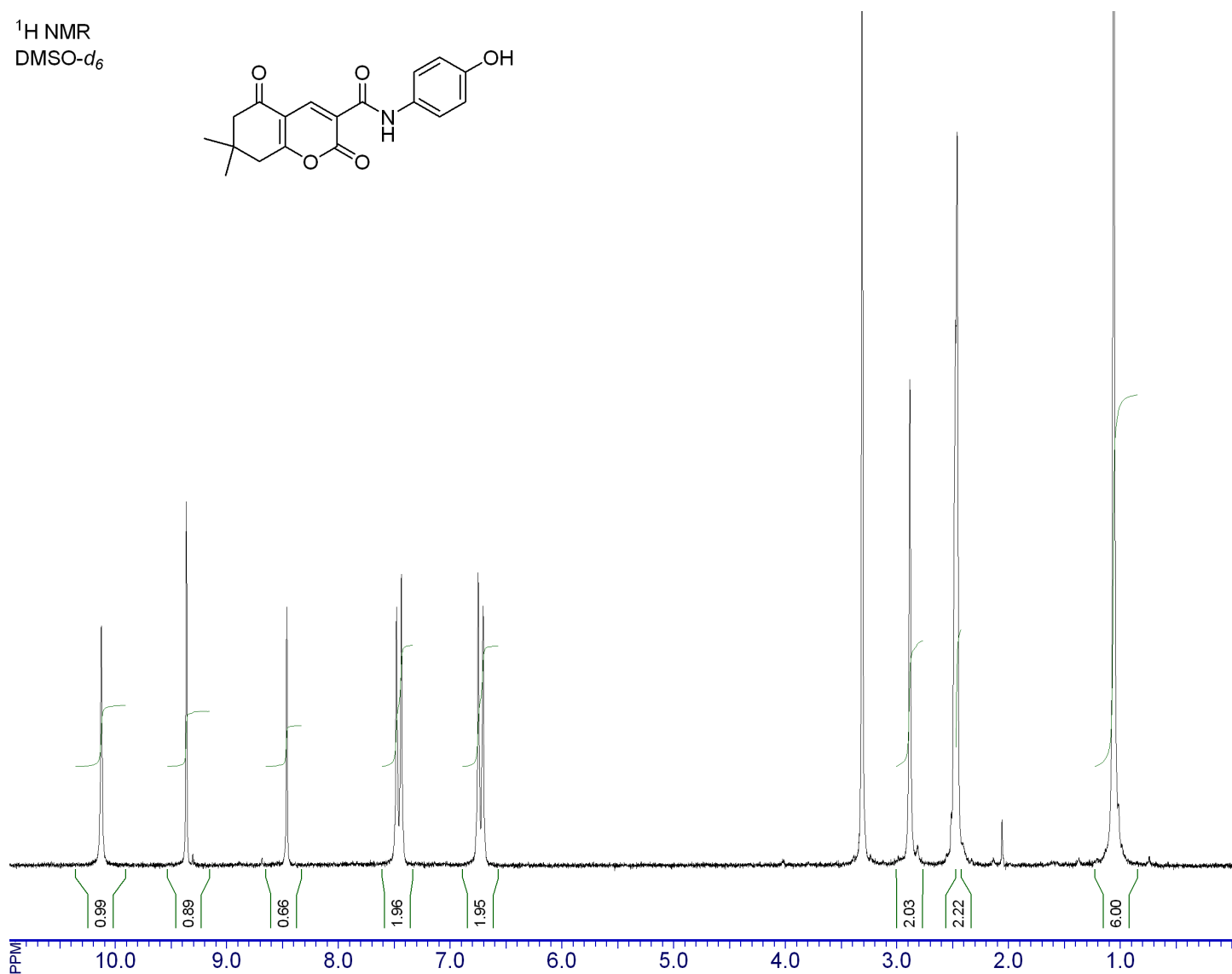
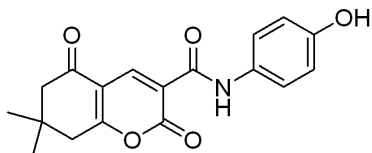


***N*-(4-Hydroxyphenyl)-7,7-dimethyl-2,5-dioxo-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{1,16})**

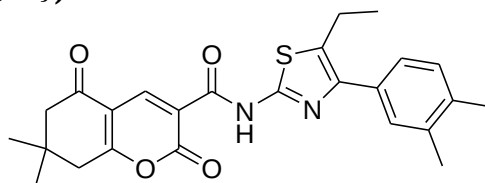


Yield 55%. ^1H NMR (200 MHz, DMSO- d_6) δ 1.07 (s, 6H), 2.47 (s, 2H), 2.89 (s, 2H), 6.74 (d, J = 8.6 Hz, 2H), 7.47 (d, J = 8.6 Hz, 2H), 8.47 (s, 1H), 9.36 (s, 1H), 10.12 (s, 1H).

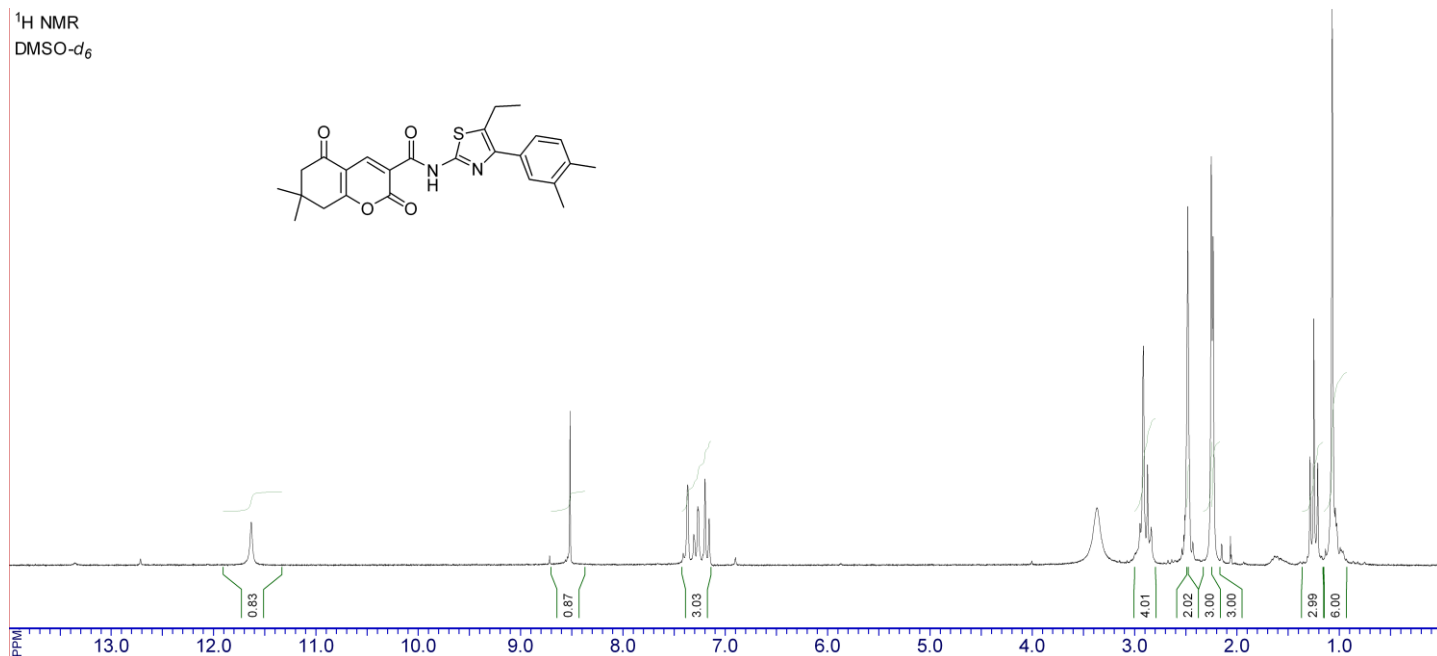
^1H NMR
DMSO- d_6



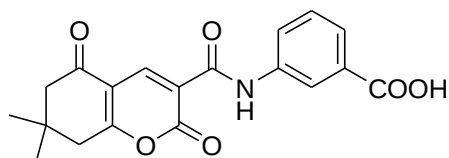
***N*-(4-(3,4-Dimethylphenyl)-5-ethylthiazol-2-yl)-7,7-dimethyl-2,5-dioxo-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{1,17})**



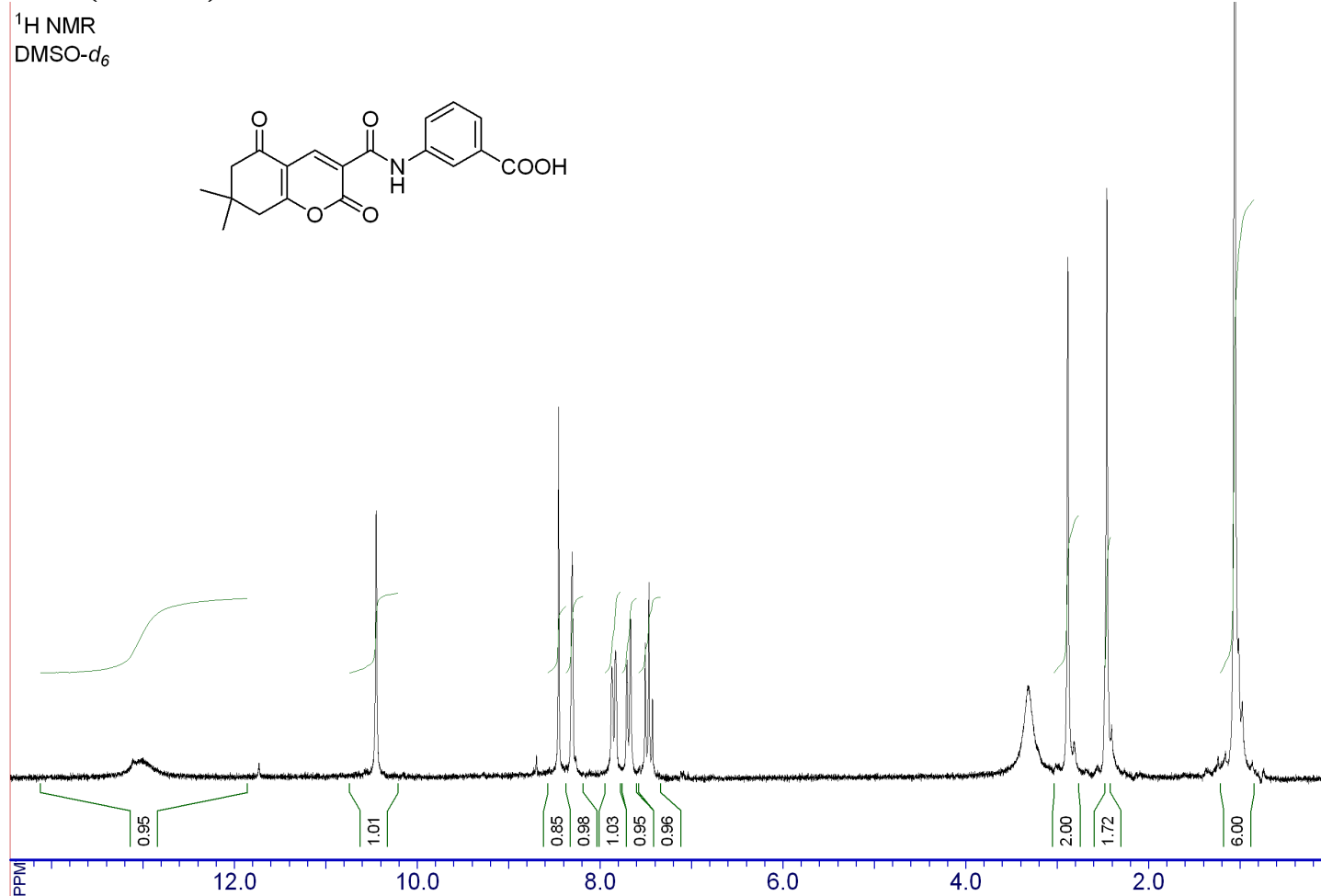
Yield 75%. ^1H NMR (200MHz, DMSO- d_6) δ 1.07 (s, 6H), 1.25 (t, J = 7.5 Hz, 3H), 2.23 (s, 3H), 2.52 (s, 3H), 2.48 (s, 2H), 2.80-2.99 (m, 4H), 7.11-7.45 (m, 3H), 8.52 (s, 1H), 11.63 (s, 1H).



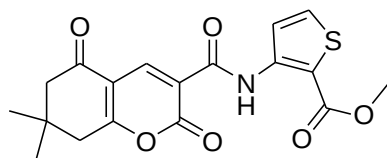
3-(7,7-Dimethyl-2,5-dioxo-5,6,7,8-tetrahydro-2H-chromene-3-carboxamido)benzoic acid (22{1,18})



Yield 72%. ¹H NMR (200 MHz, DMSO-*d*₆) δ 1.07 (s, 6H), 2.47 (s, 2H), 2.90 (s, 2H), 7.48 (t, *J* = 7.8 Hz, 1H), 7.70 (d, *J* = 7.8 Hz, 1H), 7.86 (d, *J* = 7.8 Hz, 1H), 8.31 (s, 1H), 8.46 (s, 1H), 10.46 (s, 1H), 13.05 (br. s, 1H).

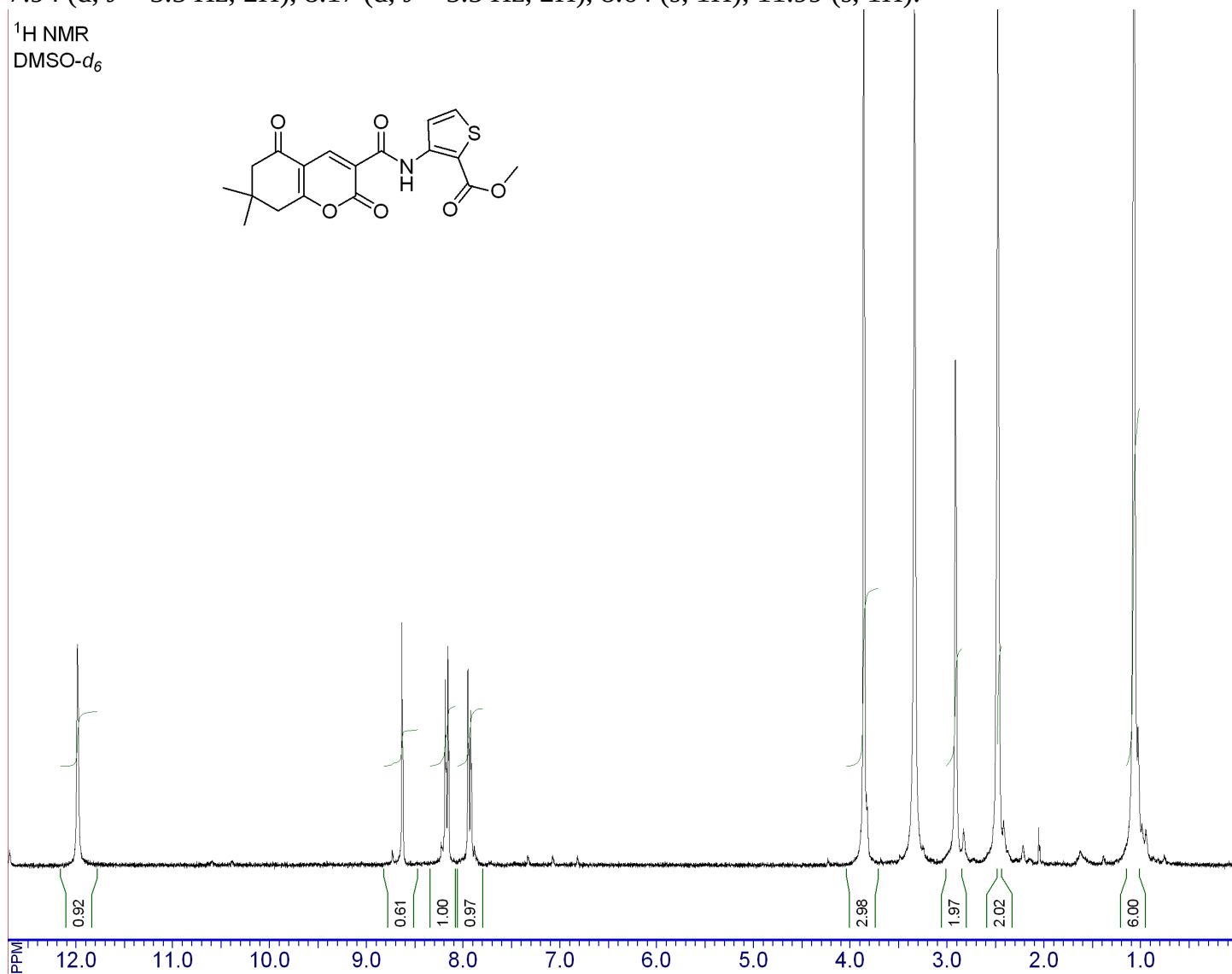


Methyl 3-(7,7-dimethyl-2,5-dioxo-5,6,7,8-tetrahydro-2H-chromene-3-carboxamido)thiophene-2-carboxylate (22{1,19})

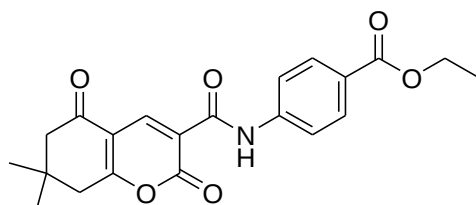


Yield 90%. ^1H NMR (200 MHz, $\text{DMSO}-d_6$) δ 1.08 (s, 6H), 2.48 (s, 2H), 2.92 (s, 2H), 3.87 (s, 3H), 7.94 (d, $J = 5.5$ Hz, 2H), 8.17 (d, $J = 5.5$ Hz, 2H), 8.64 (s, 1H), 11.99 (s, 1H).

^1H NMR
 $\text{DMSO}-d_6$

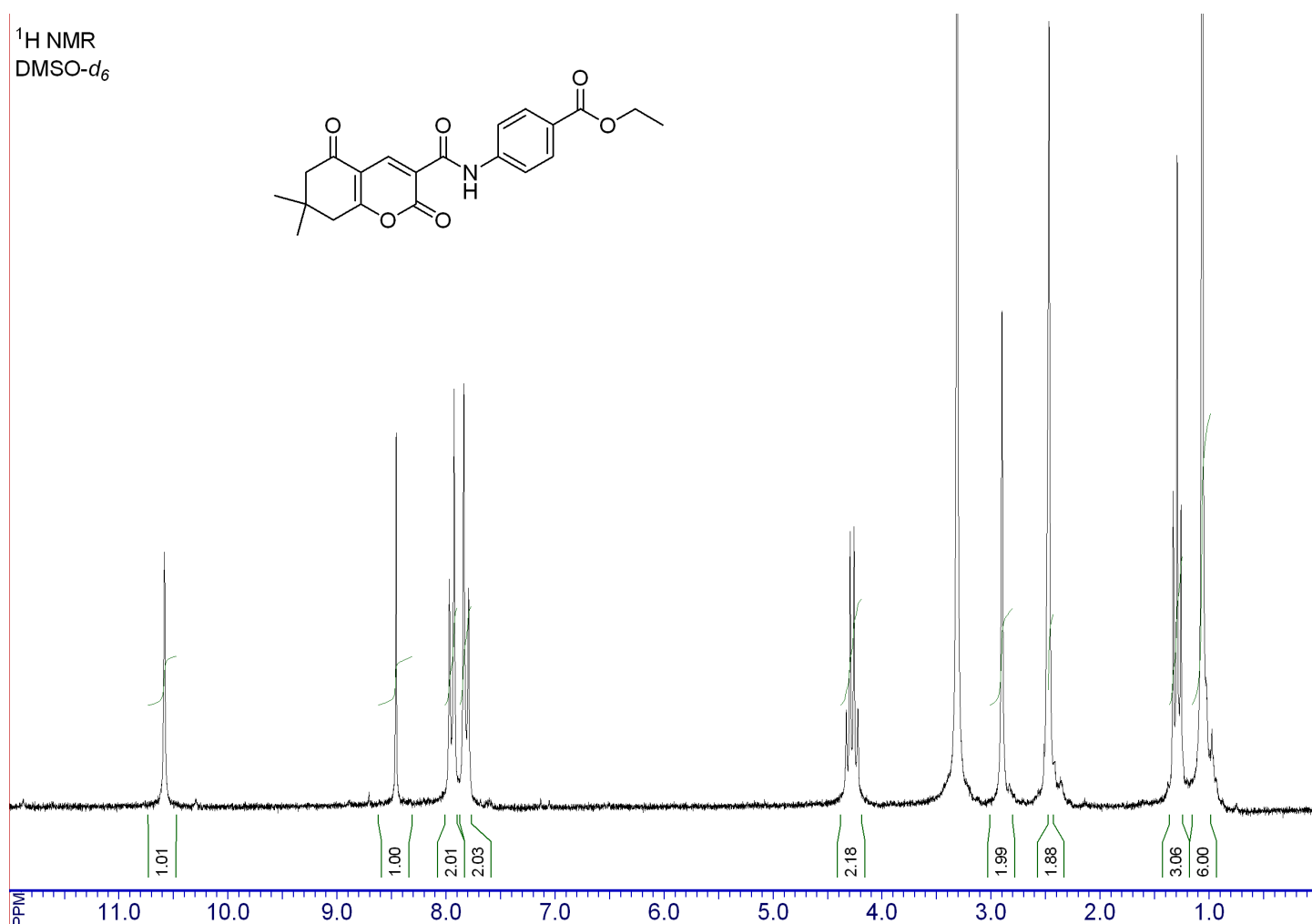
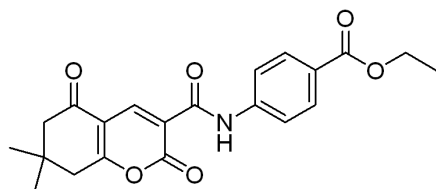


Ethyl 4-(7,7-dimethyl-2,5-dioxo-5,6,7,8-tetrahydro-2H-chromene-3-carboxamido)benzoate (22{1,20})

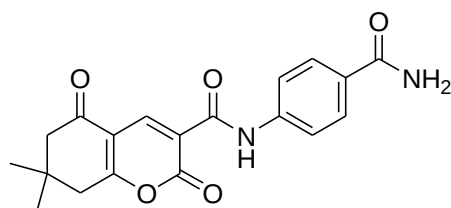


Yield 60%. ^1H NMR (200 MHz, $\text{DMSO}-d_6$) δ 1.08 (s, 6H), 1.31 (t, $J = 7.1$ Hz, 3H), 2.48 (s, 2H), 2.92 (s, 2H), 4.30 (q, $J = 7.1$ Hz, 2H), 7.83 (d, $J = 8.8$ Hz, 2H), 7.97 (d, $J = 8.8$ Hz, 2H), 8.46 (s, 1H), 10.59 (s, 1H).

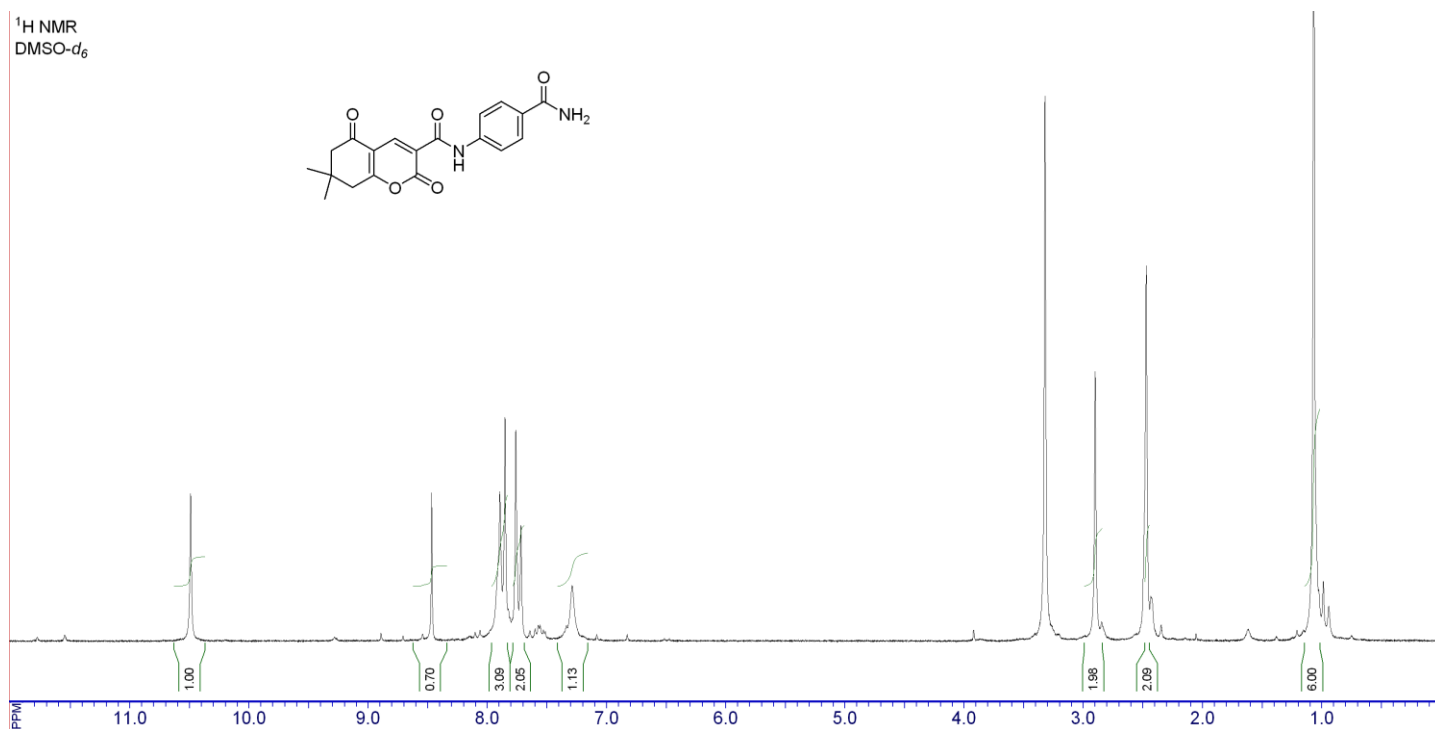
¹H NMR
DMSO-*d*₆



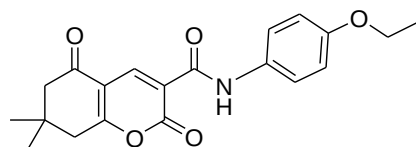
***N*-(4-Carbamoylphenyl)-7,7-dimethyl-2,5-dioxo-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{1,21})**



Yield 80%. ¹H NMR (200 MHz, DMSO-*d*₆) δ 1.07 (s, 6H), 2.48 (s, 2H), 2.91 (s, 2H), 7.29 (br. s, 1H), 7.74 (d, *J* = 8.7 Hz, 2H), 7.83-7.97 (m, 3H), 8.47 (s, 1H), 10.49 (s, 1H).

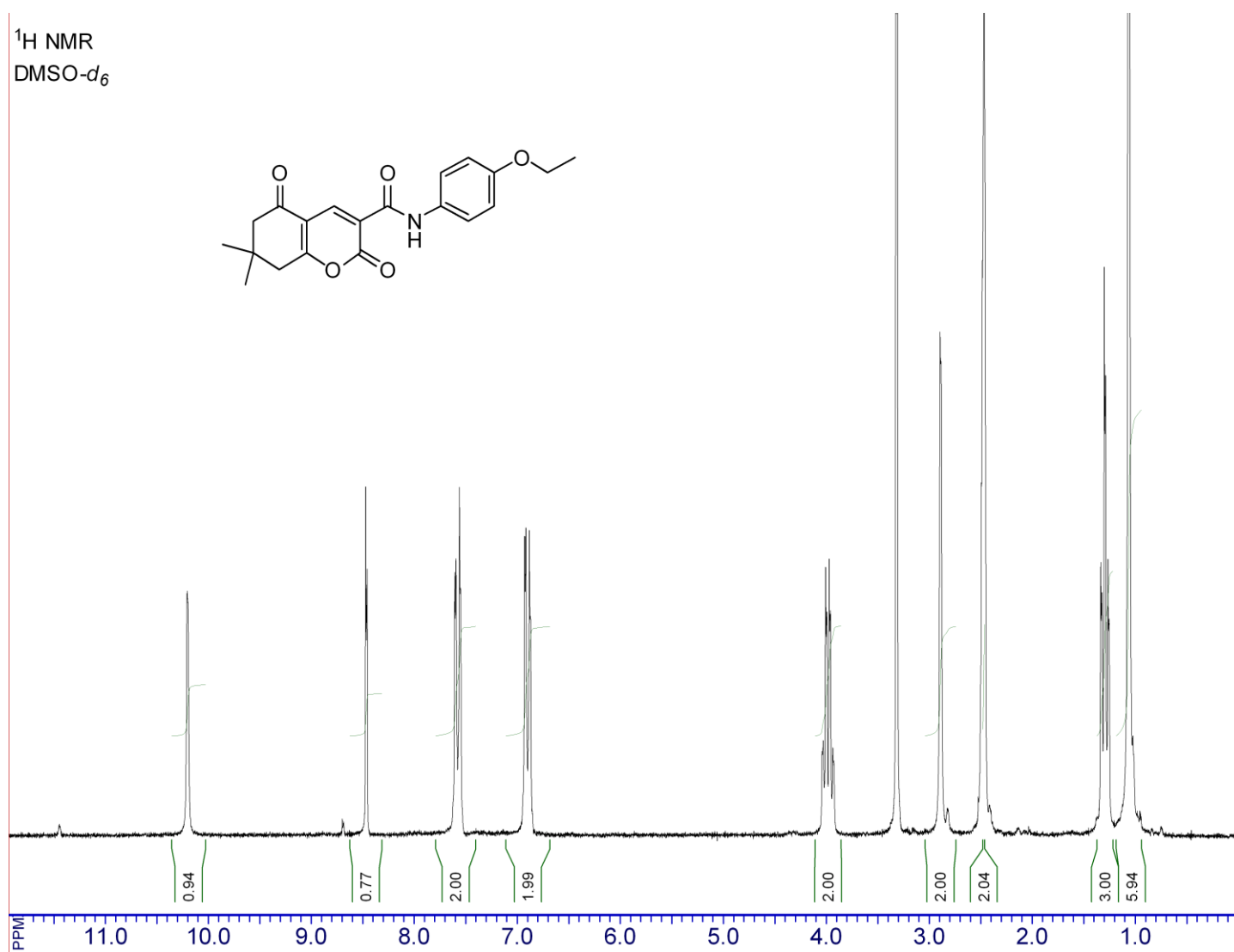
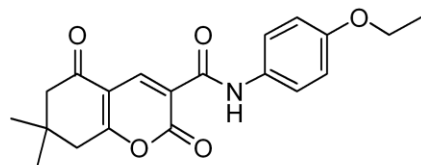


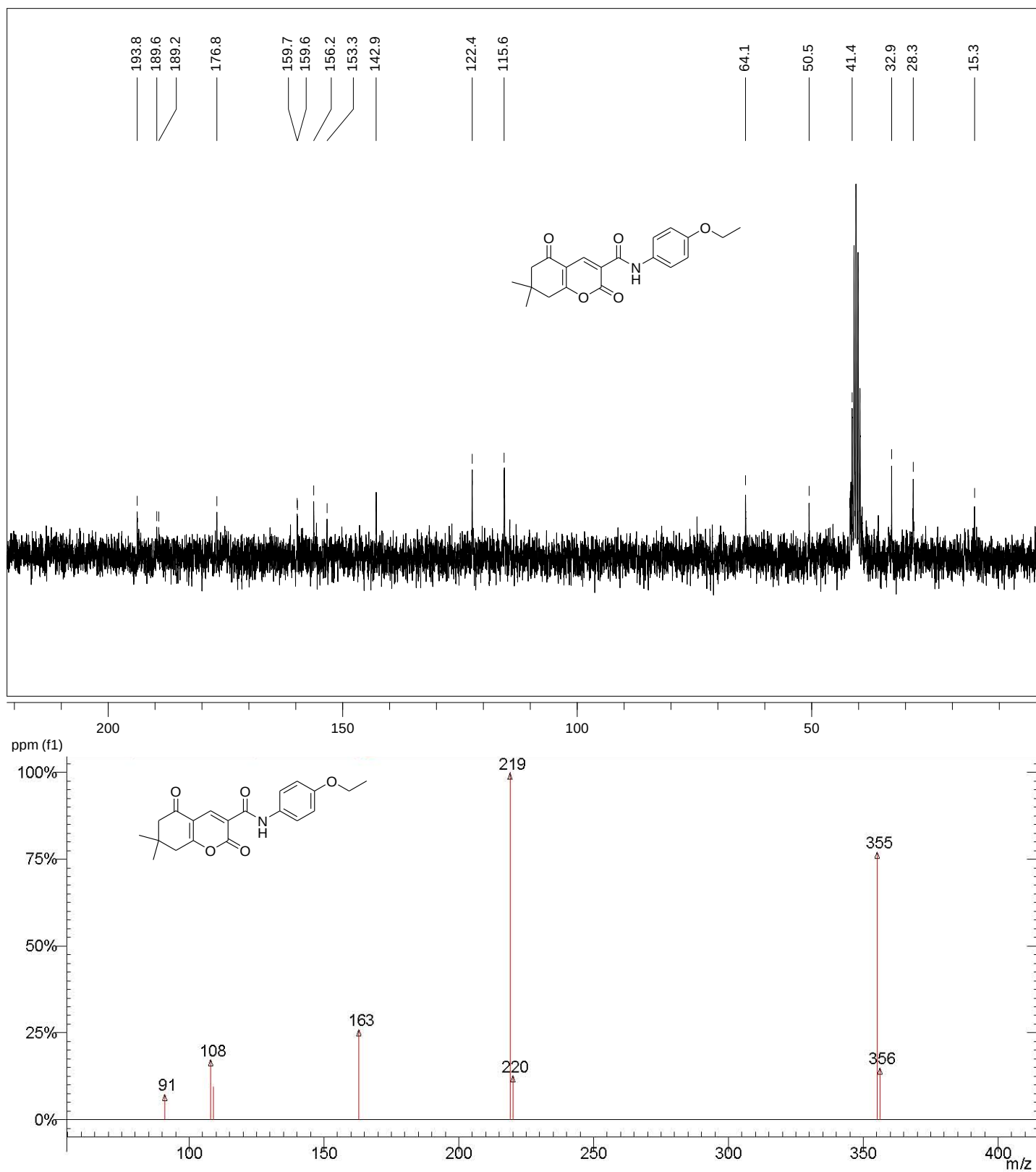
***N*-(4-Ethoxyphenyl)-7,7-dimethyl-2,5-dioxo-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{1,22})**

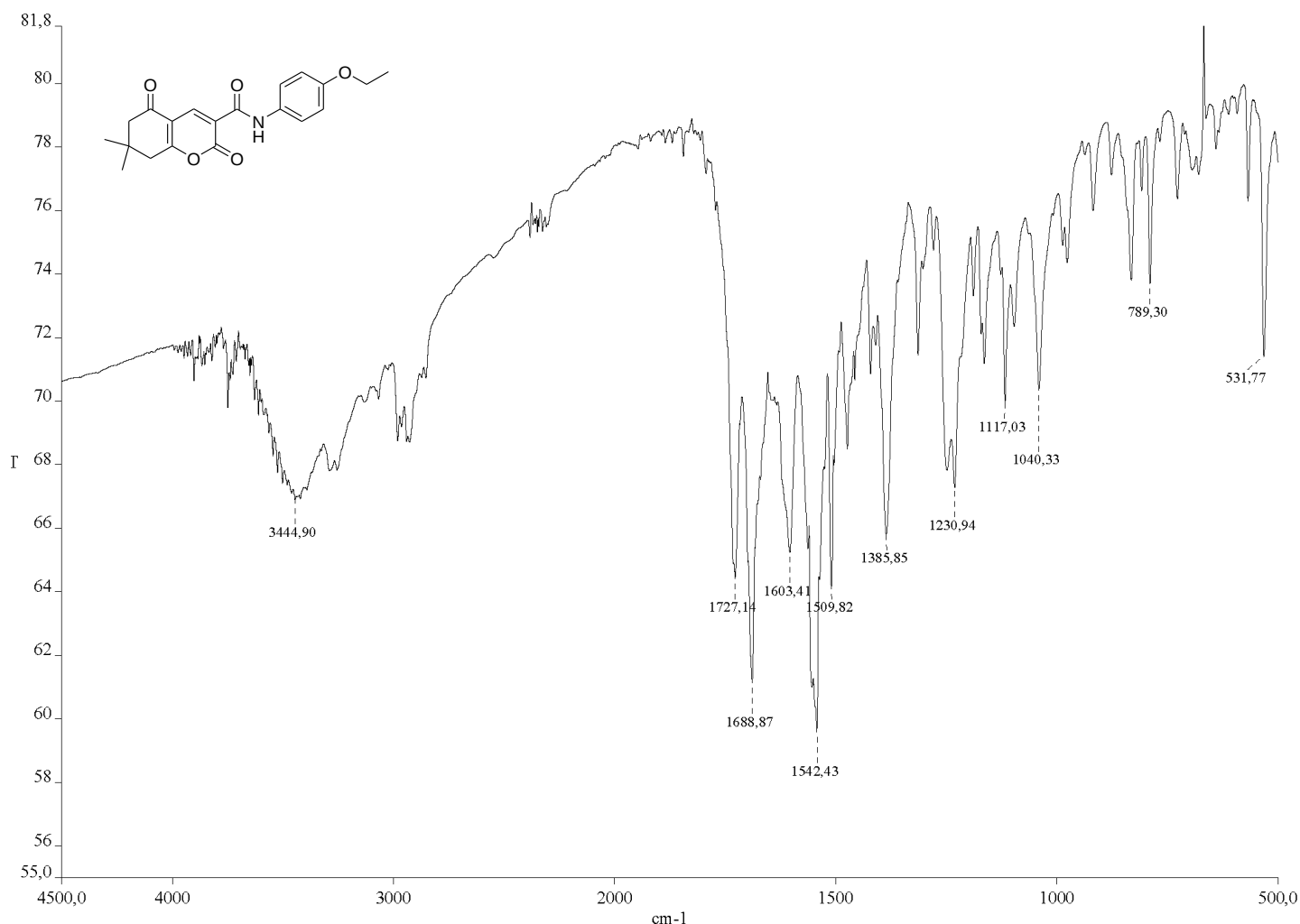


Yield 70%. Mp 182°C. ¹H NMR (200 MHz, DMSO-d₆) δ 1.07 (s, 6H), 1.30 (t, *J* = 7.0 Hz, 3H), 2.47 (s, 2H), 2.89 (s, 2H), 3.98 (q, *J* = 7.0 Hz, 2H), 6.89 (d, *J* = 8.4 Hz, 2H), 7.57 (d, *J* = 8.4 Hz, 2H), 8.47 (s, 1H), 10.20 (s, 1H); ¹³C NMR (50 MHz, DMSO-d₆) δ 15.3, 28.3, 32.9, 41.4, 50.5, 64.1, 115.6, 122.4, 142.9, 153.3, 156.2, 159.6, 159.7, 176.8, 189.2, 189.6, 193.8; MS (EI, 70 eV) *m/z* 355 (M⁺); IR (KBr), cm⁻¹: ν 3445, 2950, 1727, 1689, 1603, 1542.

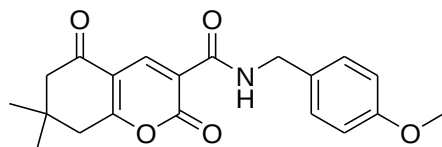
^1H NMR
DMSO- d_6





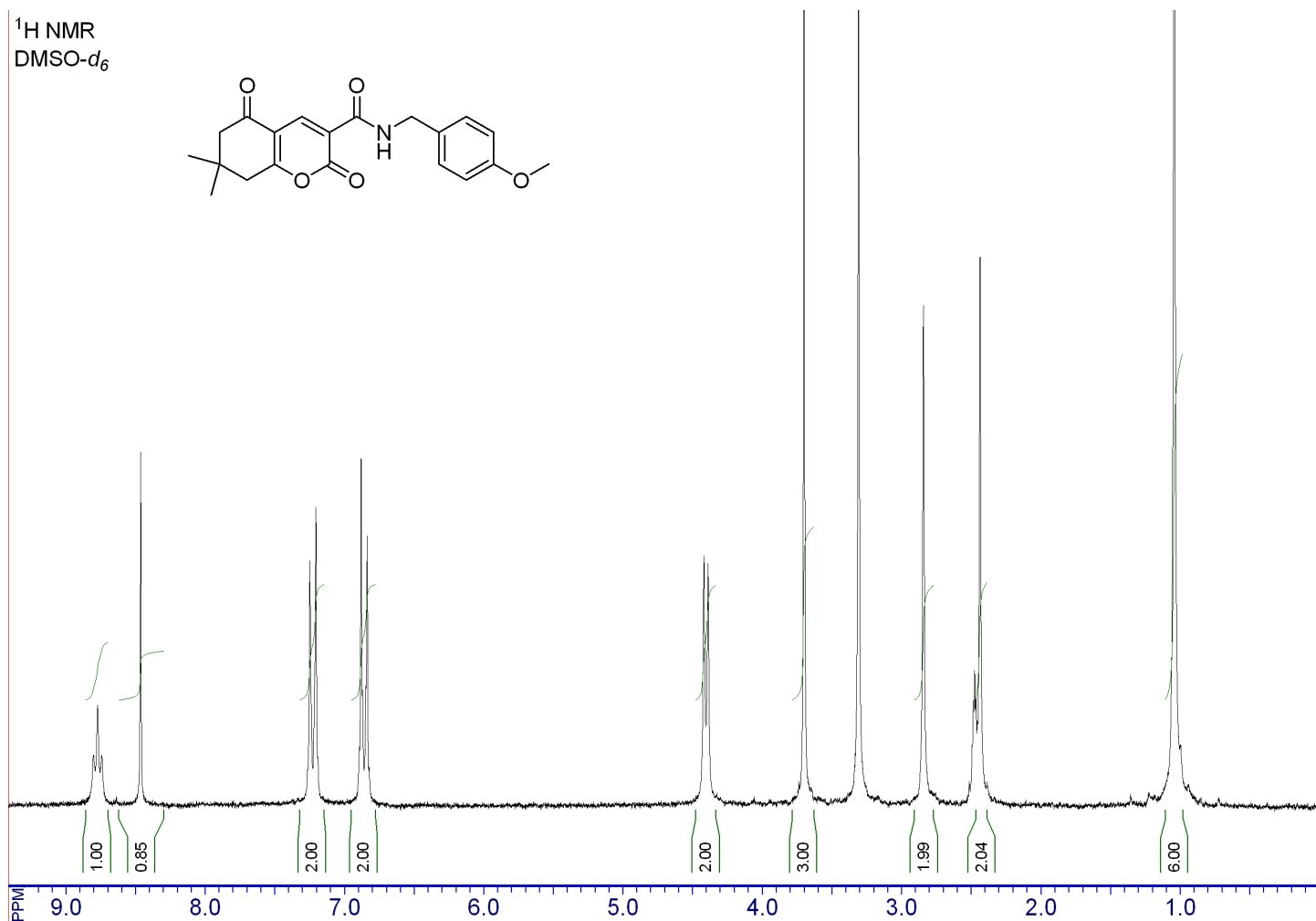
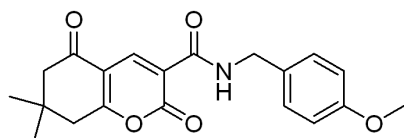


***N*-(4-Methoxybenzyl)-7,7-dimethyl-2,5-dioxo-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{1,23})**

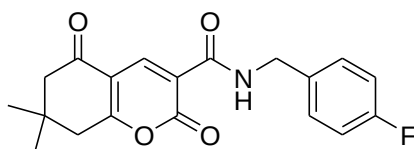


Yield 53%. ^1H NMR (200 MHz, DMSO- d_6) δ 1.05 (s, 6H), 2.44 (s, 2H), 2.85 (s, 2H), 3.70 (s, 3H), 4.41 (d, J = 6.0 Hz, 2H), 6.87 (d, J = 8.5 Hz, 2H), 7.24 (d, J = 8.5 Hz, 2H), 8.47 (s, 1H), 8.78 (t, J = 6.0 Hz, 1H).

¹H NMR
DMSO-*d*₆

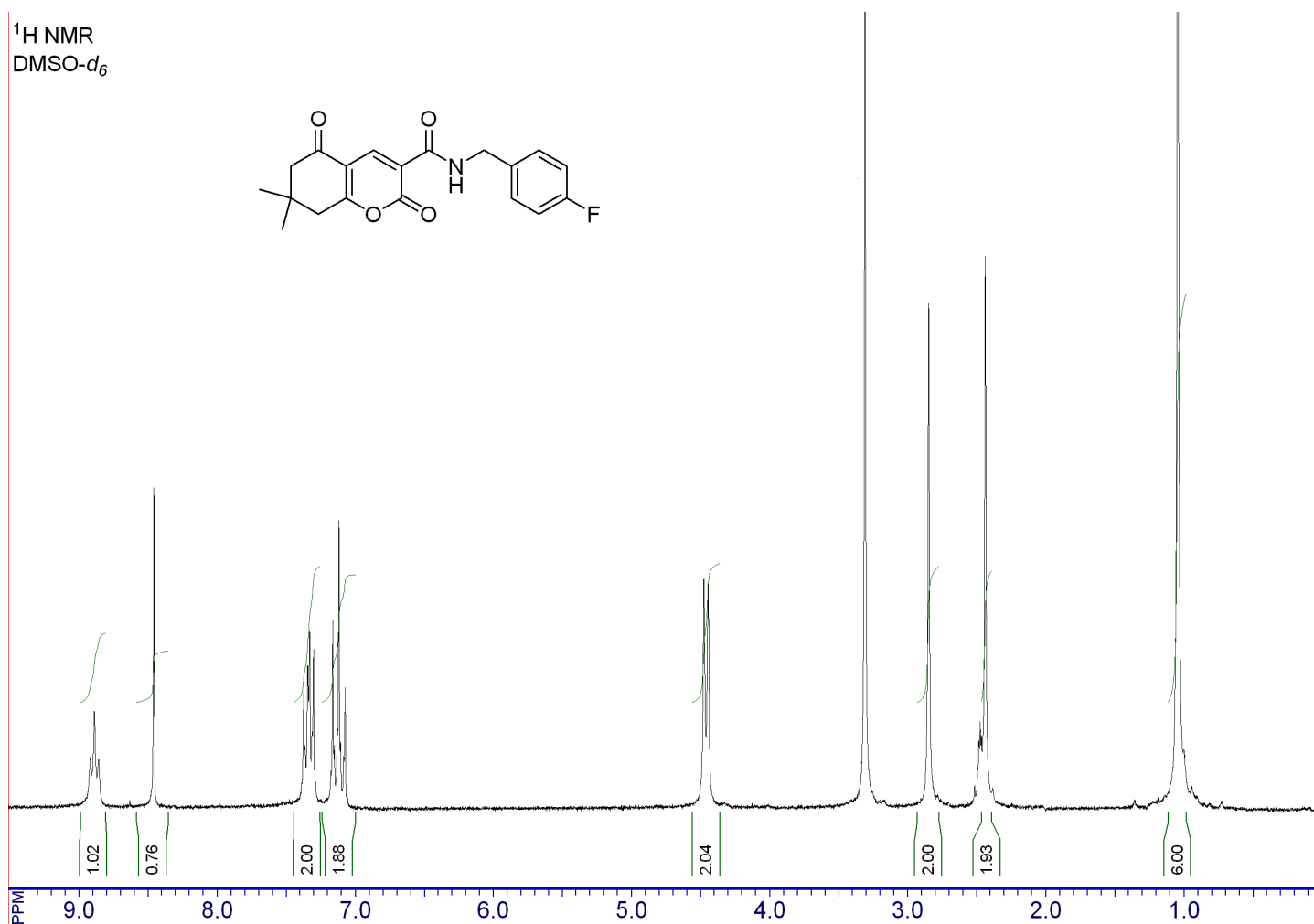


***N*-(4-Fluorobenzyl)-7,7-dimethyl-2,5-dioxo-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{1,24})**

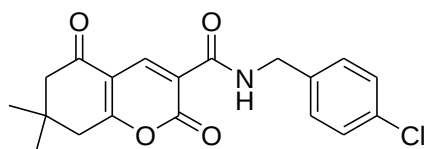


Yield 62%. ¹H NMR (200 MHz, DMSO-*d*₆) δ 1.05 (s, 6H), 2.44 (s, 2H), 2.86 (s, 2H), 4.47 (d, *J* = 6.1 Hz, 2H), 7.12 (t, *J* = 8.9 Hz, 2H), 7.34 (t, *J* = 7.1 Hz, 2H), 8.46 (s, 1H), 8.89 (t, *J* = 6.1 Hz, 1H).

¹H NMR
DMSO-*d*₆

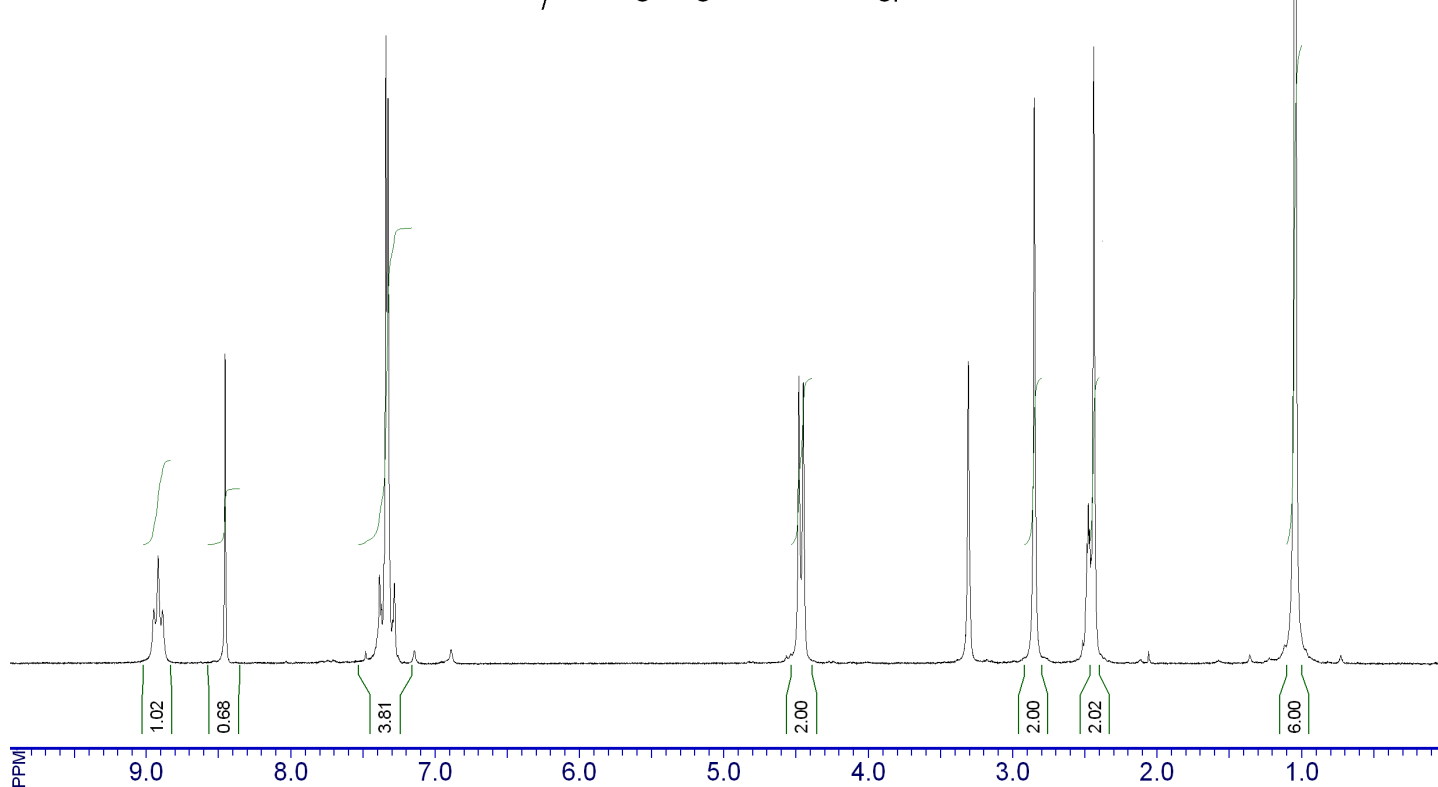
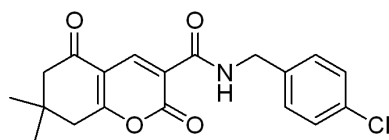


***N*-(4-Chlorobenzyl)-7,7-dimethyl-2,5-dioxo-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{1,25})**

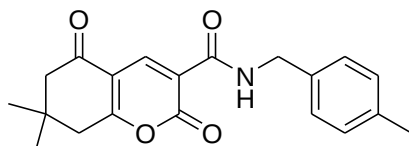


Yield 50%. ¹H NMR (200 MHz, DMSO-*d*₆) δ 1.05 (s, 6H), 2.45 (s, 2H), 2.86 (s, 2H), 4.47 (d, *J* = 6.0 Hz, 2H), 7.20-7.52 (m, 4H), 8.46 (s, 1H), 8.92 (t, *J* = 6.0 Hz, 1H).

^1H NMR
DMSO- d_6

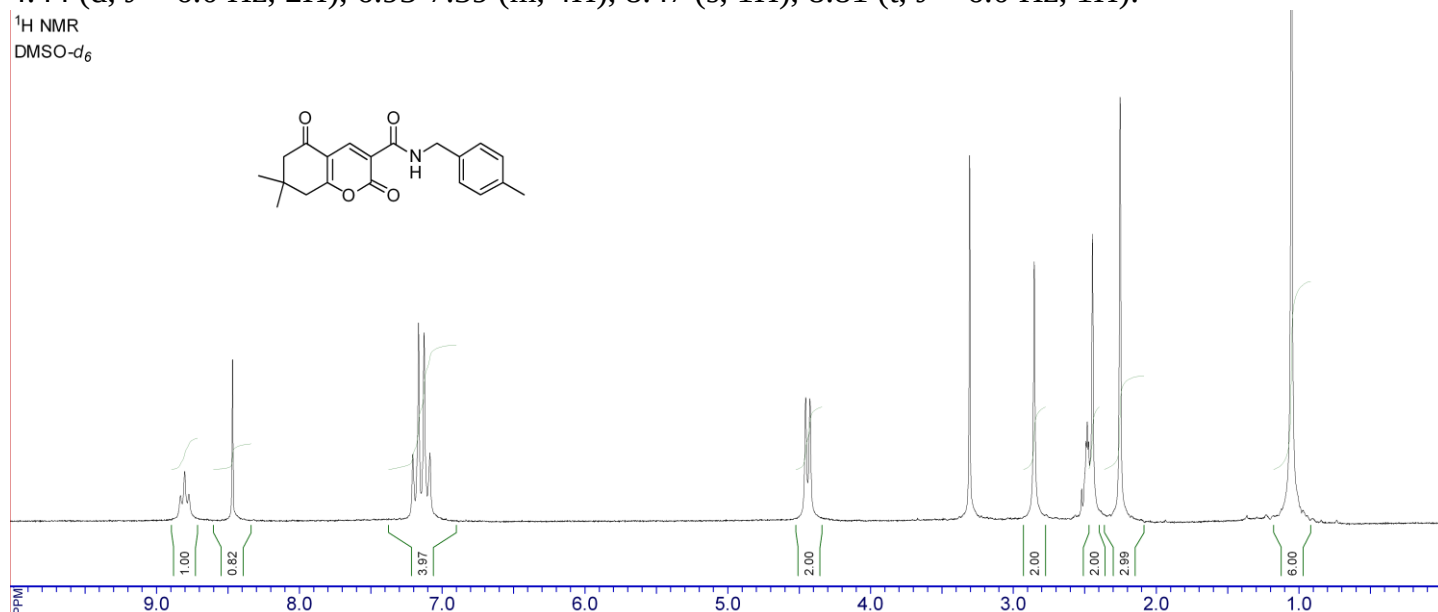


***N*-(4-Methylbenzyl)-7,7-dimethyl-2,5-dioxo-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{1,26})**

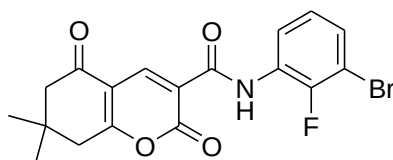


Yield 46%. ^1H NMR (200 MHz, DMSO- d_6) δ 1.06 (s, 6H), 2.26 (s, 3H), 2.45 (s, 2H), 2.86 (s, 2H), 4.44 (d, J = 6.0 Hz, 2H), 6.93-7.39 (m, 4H), 8.47 (s, 1H), 8.81 (t, J = 6.0 Hz, 1H).

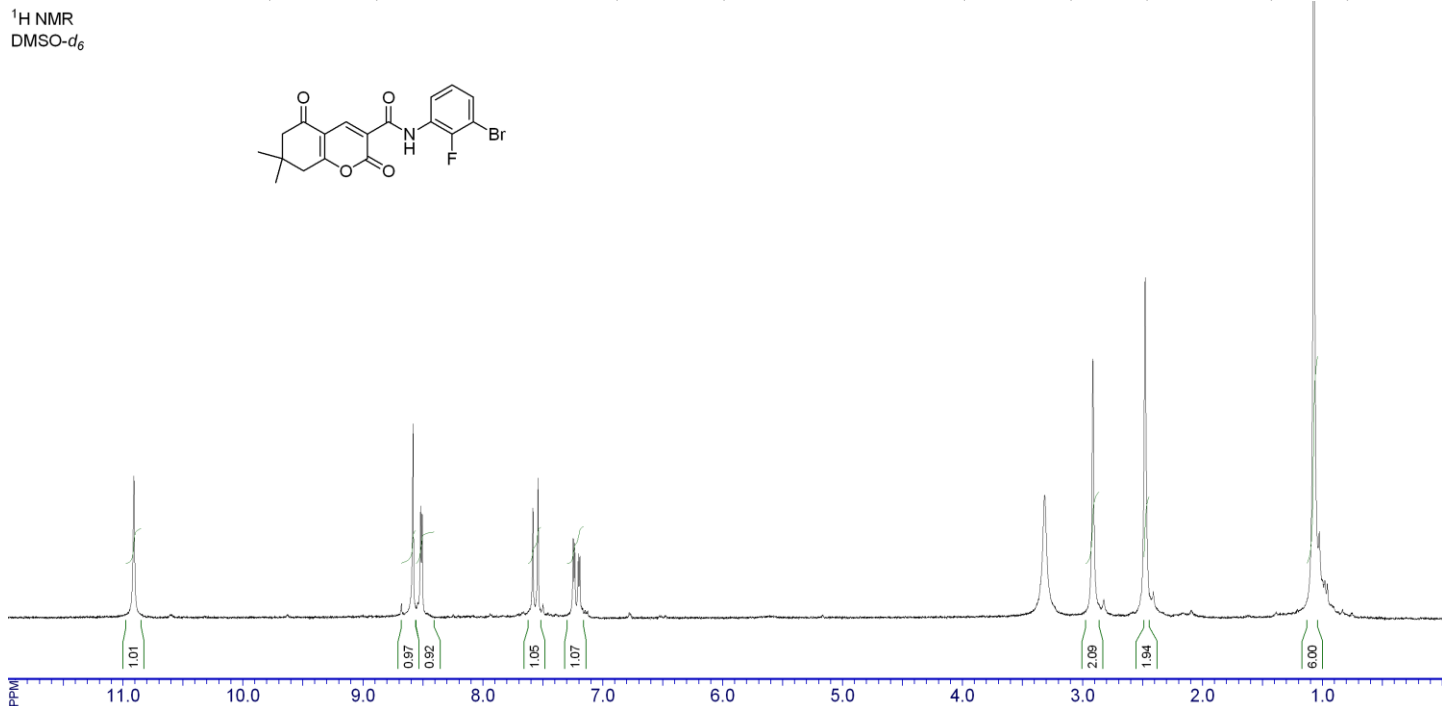
^1H NMR
DMSO- d_6



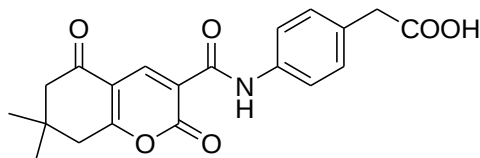
***N*-(3-Bromo-2-fluorophenyl)-7,7-dimethyl-2,5-dioxo-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{1,27})**



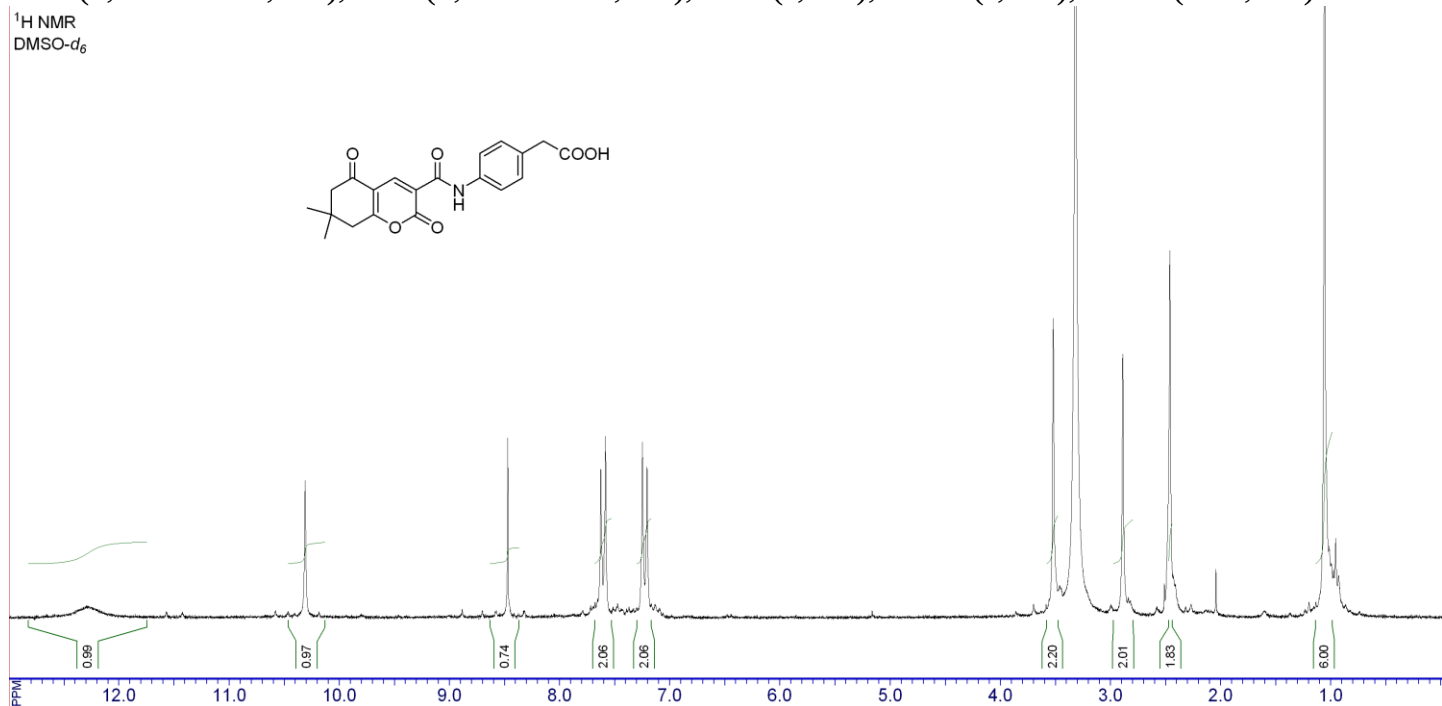
Yield 67%. ^1H NMR (200 MHz, $\text{DMSO}-d_6$) δ 1.08 (s, 6H), 2.48 (s, 2H), 2.92 (s, 2H), 7.23 (dd, $J = 8.5$ Hz, $J = 2.4$ Hz, 1H), 7.57 (d, $J = 8.5$ Hz, 1H), 8.52 (d, $J = 2.4$ Hz, 1H), 8.59 (s, 1H), 10.91 (s, 1H).



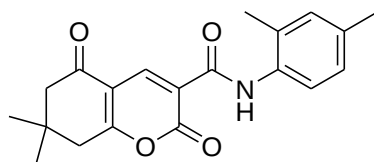
2-(4-(7,7-Dimethyl-2,5-dioxo-5,6,7,8-tetrahydro-2H-chromene-3-carboxamido)phenyl)acetic acid (22{1,28})



Yield 44%. ^1H NMR (200 MHz, $\text{DMSO}-d_6$) δ 1.06 (s, 6H), 2.47 (s, 2H), 2.89 (s, 2H), 3.53 (s, 2H), 7.24 (d, $J = 8.2$ Hz, 2H), 7.61 (d, $J = 8.2$ Hz, 2H), 8.47 (s, 1H), 10.32 (s, 1H), 12.30 (br. s, 1H).

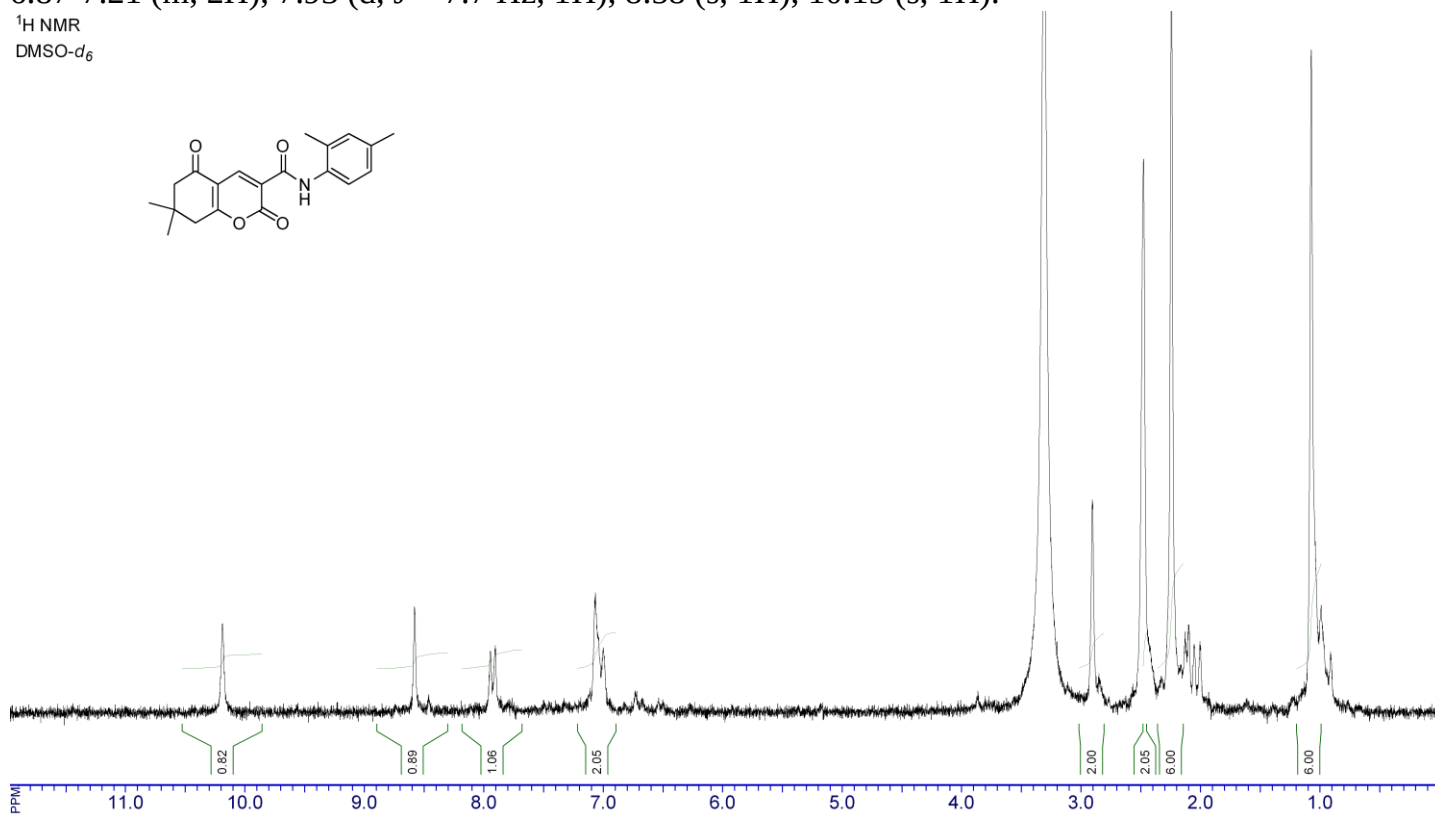
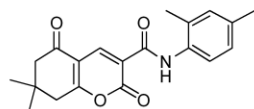


***N*-(2,4-Dimethylphenyl)-7,7-dimethyl-2,5-dioxo-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{1,29})**

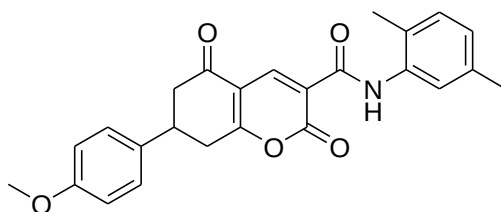


Yield 63%. ^1H NMR (200 MHz, $\text{DMSO}-d_6$) δ 1.07 (s, 6H), 2.25 (s, 6H), 2.47 (s, 2H), 2.91 (s, 2H), 6.87-7.21 (m, 2H), 7.93 (d, $J = 7.7$ Hz, 1H), 8.58 (s, 1H), 10.19 (s, 1H).

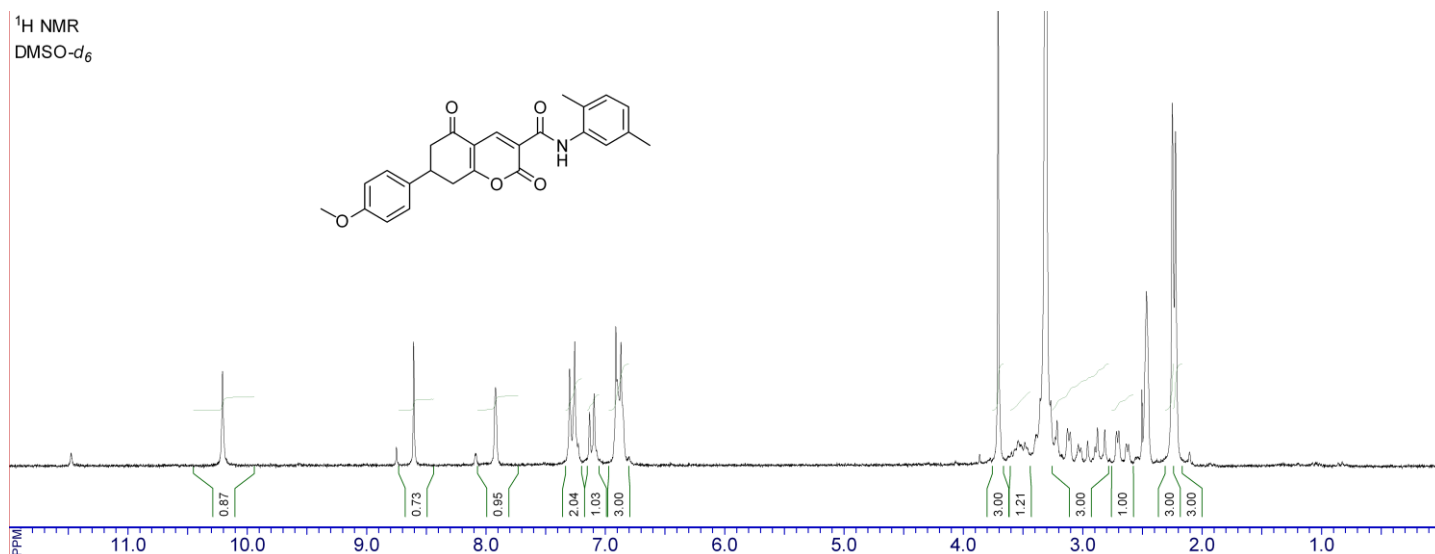
^1H NMR
 $\text{DMSO}-d_6$



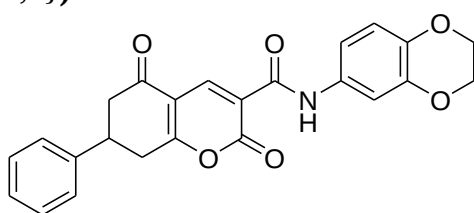
***N*-(2,5-Dimethylphenyl)-7-(4-methoxyphenyl)-2,5-dioxo-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{2,2})**



Yield 55%. ^1H NMR (200 MHz, $\text{DMSO}-d_6$) δ 2.23 (s, 3H), 2.59 (s, 3H), 2.67 (dd, $J = 16.3$ Hz, $J = 2.7$ Hz, 1H), 2.76-3.25 (m, 3H), 3.44-3.66 (m, 1H), 3.71 (s, 3H), 6.76-7.00 (m, 3H), 7.13 (d, $J = 7.6$ Hz, 1H), 7.28 (d, $J = 8.5$ Hz, 2H), 7.93 (s, 1H), 8.61 (s, 1H), 10.21 (s, 1H).

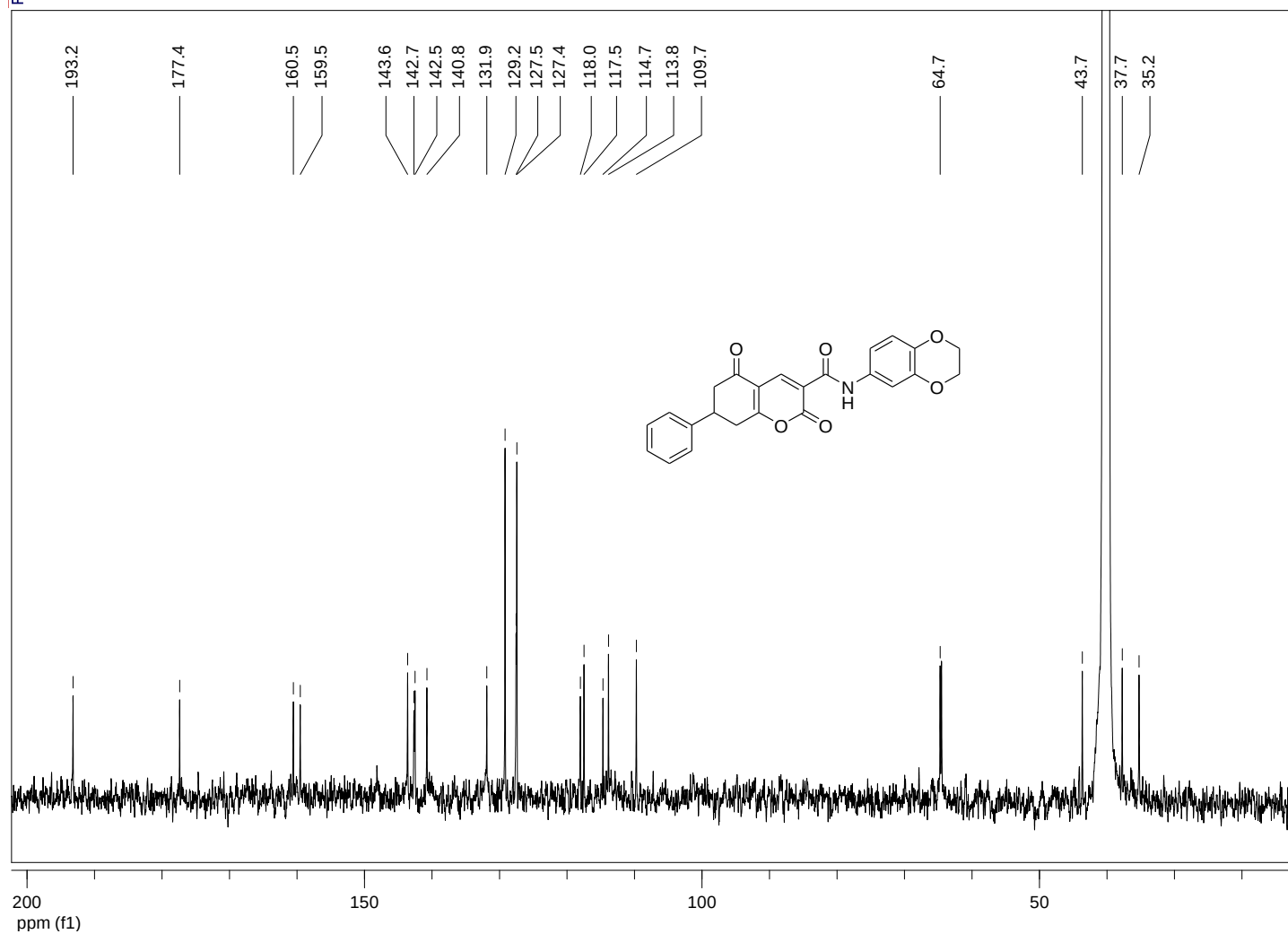
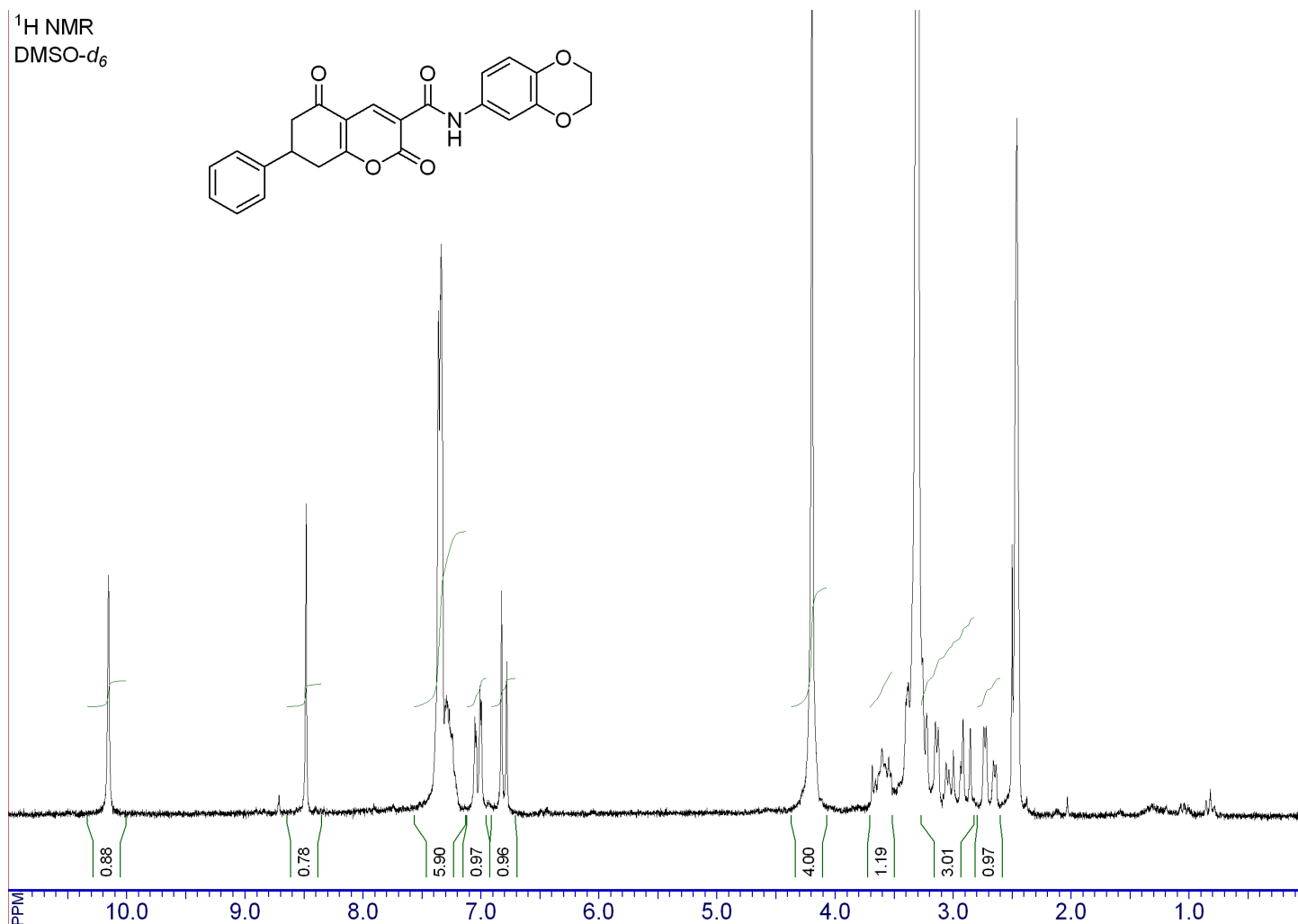
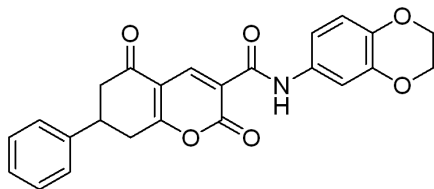


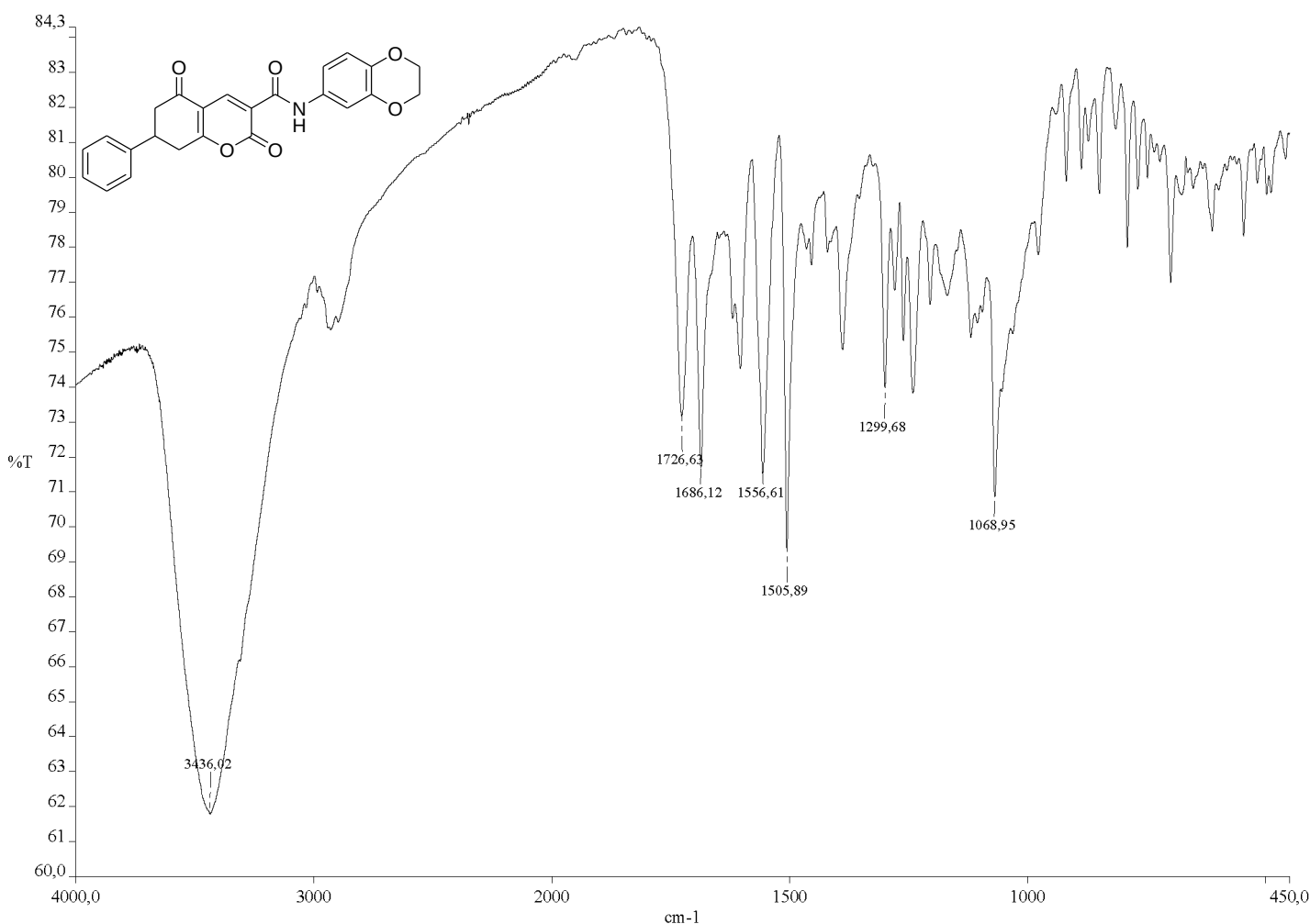
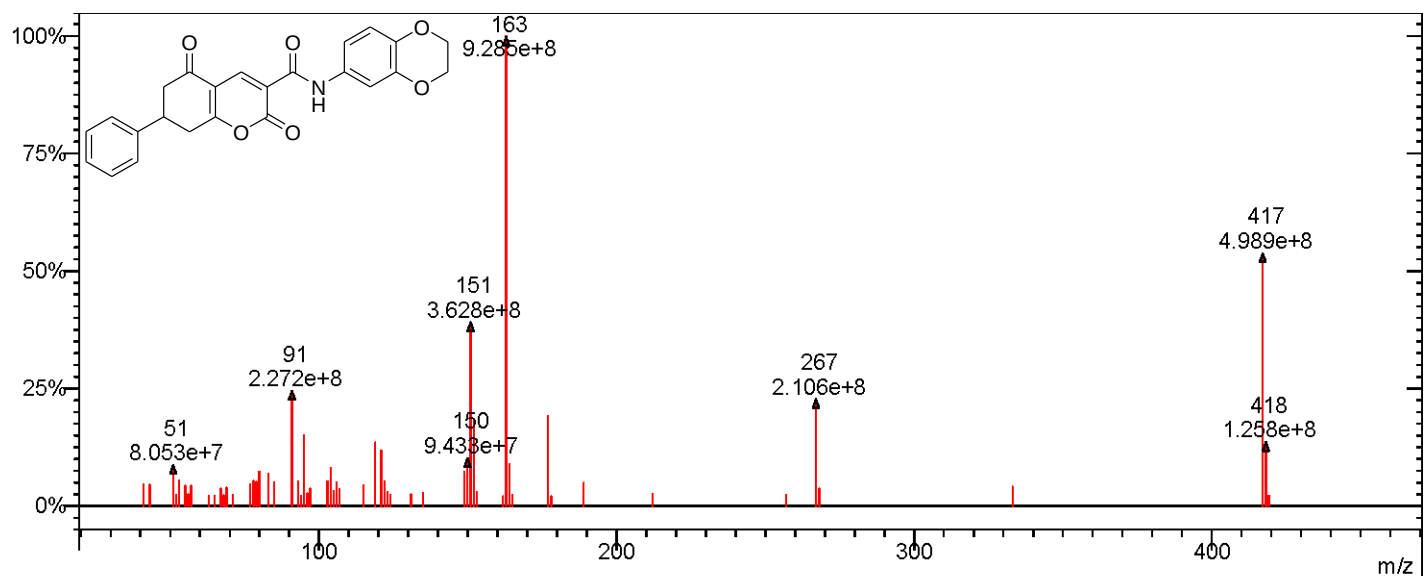
***N*-(2,3-Dihydrobenzo[*b*][1,4]dioxin-6-yl)-2,5-dioxo-7-phenyl-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{3,4})**



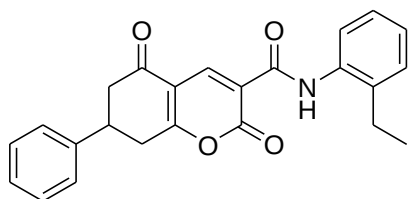
Yield 90%. Mp 243°C. ¹H NMR (200 MHz, DMSO-d₆) δ 2.72 (dd, *J* = 15.9 Hz, *J* = 3.8 Hz, 1H), 2.83-3.38 (m, 3H), 3.51-3.71 (m, 1H), 4.20 (s, 4H), 6.81 (d, *J* = 8.8 Hz, 1H), 7.03 (dd, *J* = 8.8 Hz, *J* = 2.3 Hz, 1H), 7.18-7.47 (m, 6H), 8.49 (s, 1H), 10.16 (s, 1H); ¹³C NMR (125 MHz, DMSO-d₆) δ 35.2, 37.7, 43.7, 64.5, 64.7, 109.7, 113.8, 114.7, 117.5, 118.0, 127.4, 127.5, 129.2, 131.9, 140.8, 142.5, 142.7, 143.6, 159.5, 160.5, 177.4, 193.2; MS (EI, 70 eV) *m/z* 417 (M⁺); IR (KBr), cm⁻¹: ν 3436, 2965, 1727, 1686, 1610, 1557, 1506.

^1H NMR
DMSO- d_6





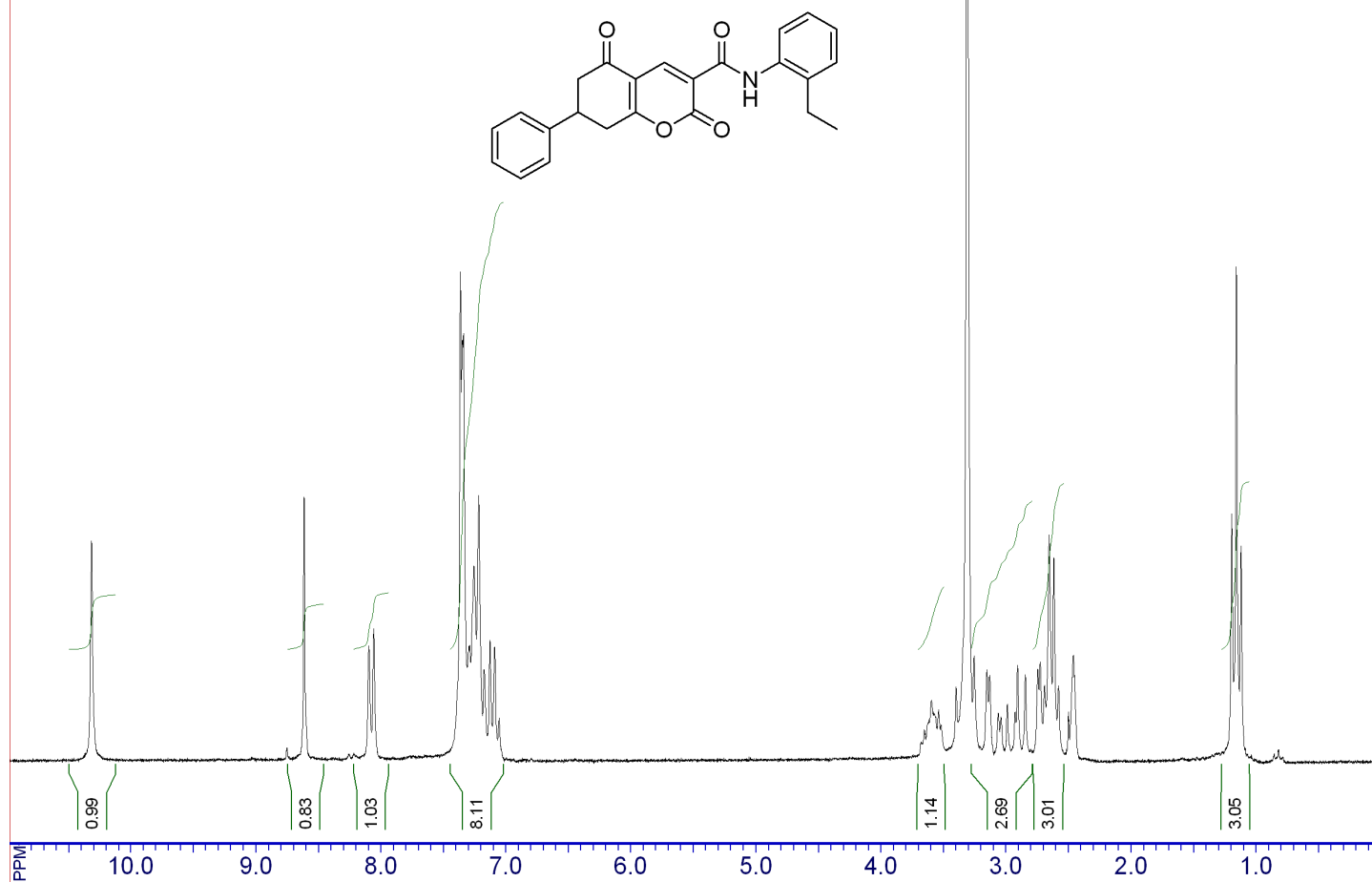
***N*-(2-Ethylphenyl)-2,5-dioxo-7-phenyl-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{3,5})**

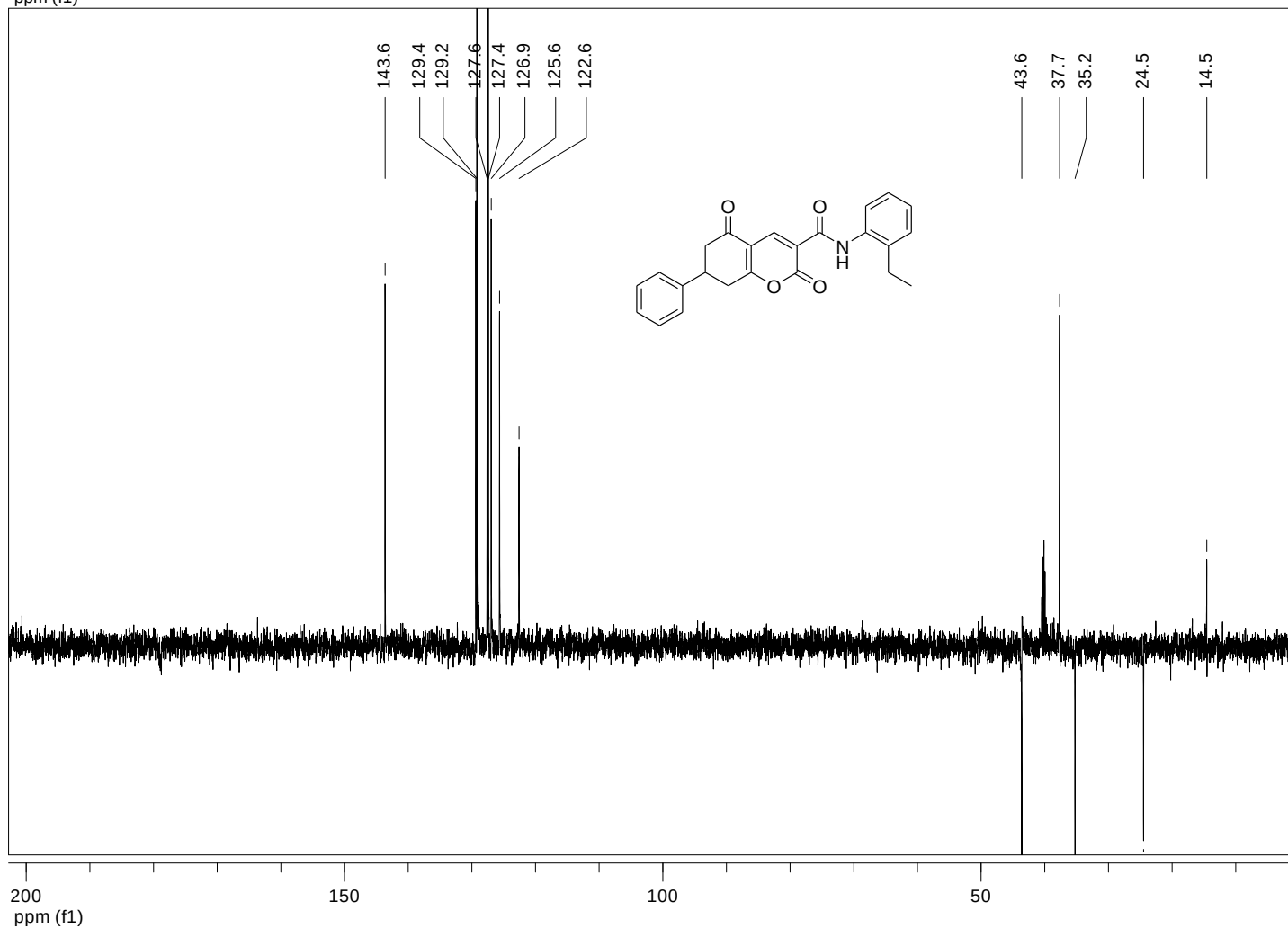
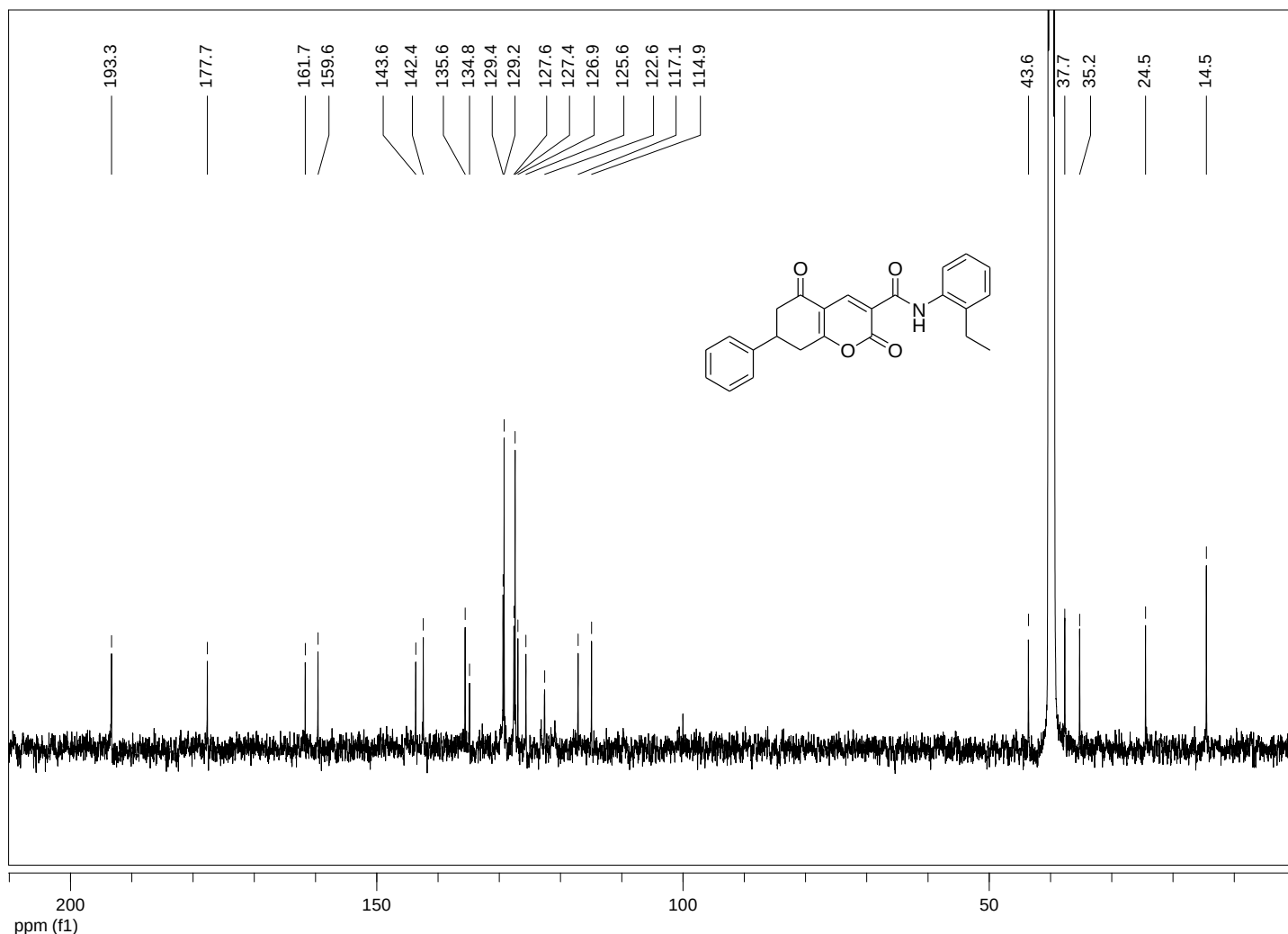


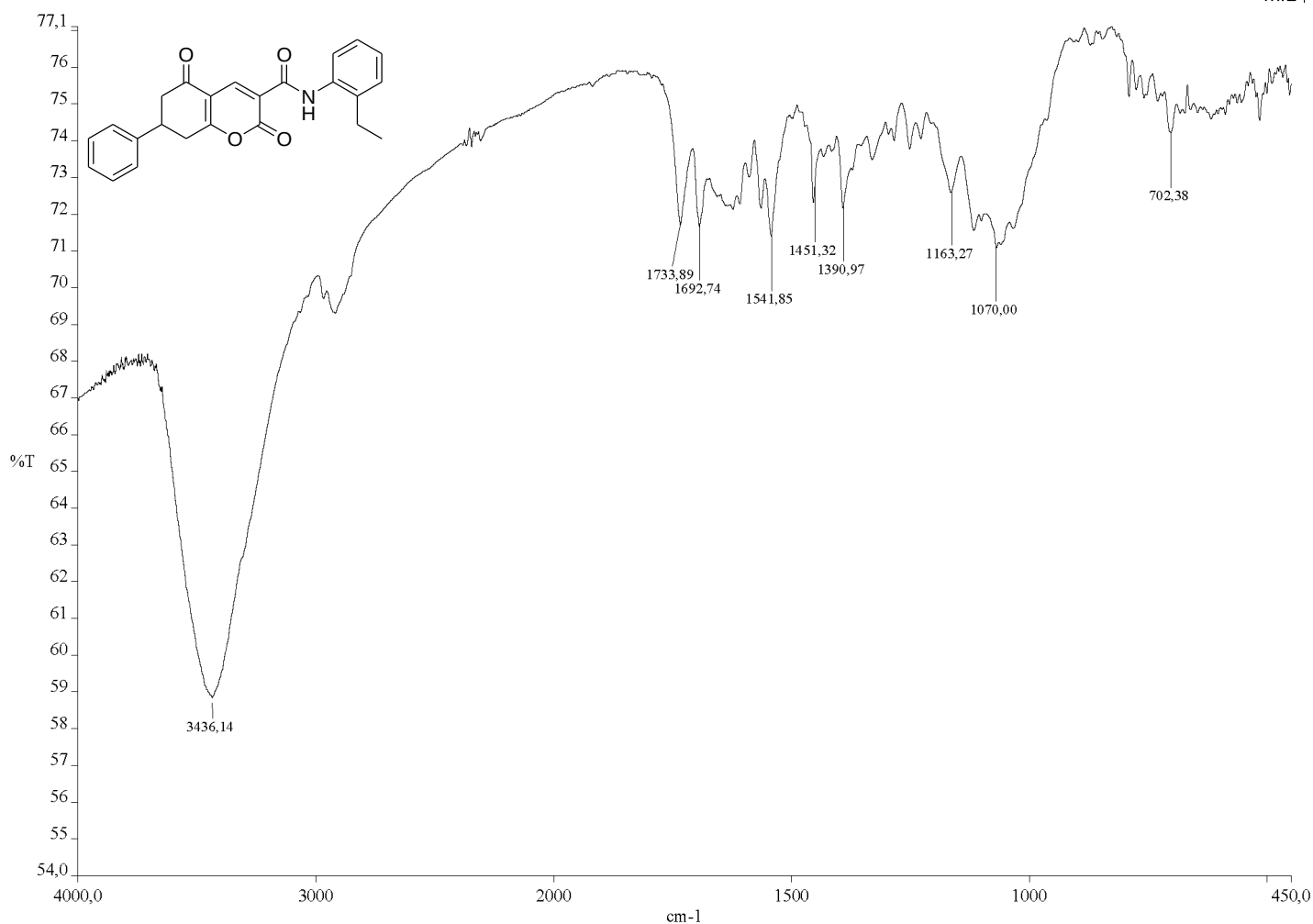
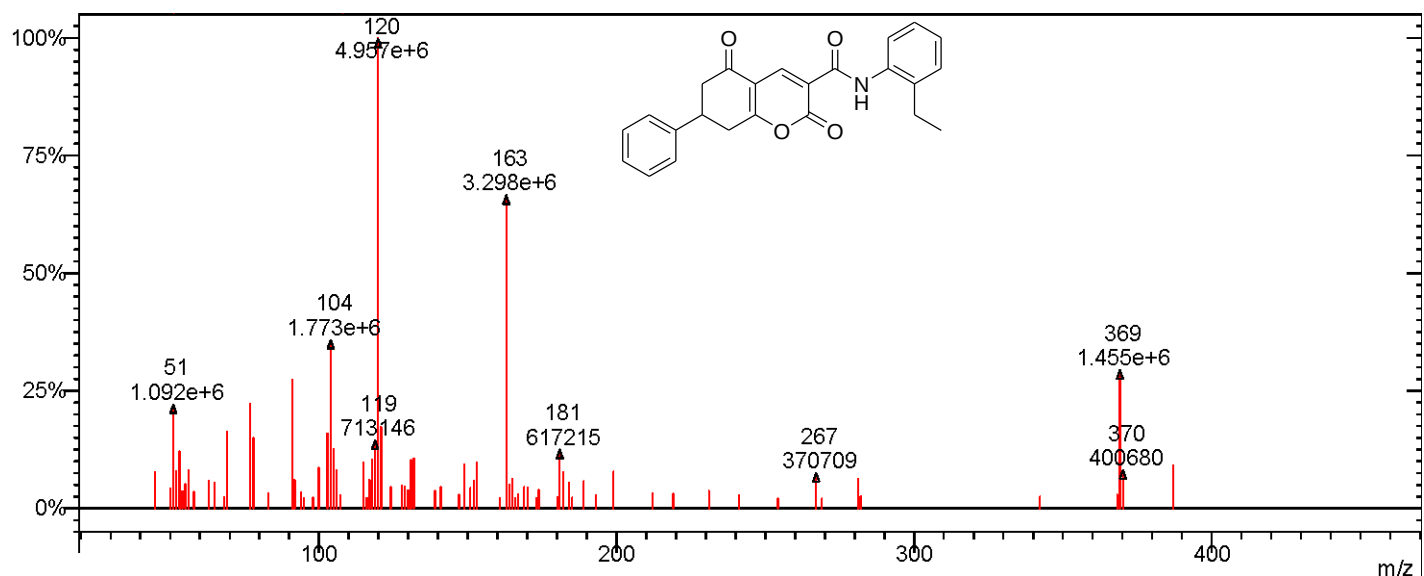
Yield 89%. Mp 153°C. ¹H NMR (200 MHz, DMSO-*d*₆) δ 1.16 (t, *J* = 7.3 Hz, 3H), 2.54-2.79 (m, 3H), 2.79-3.29 (m, 3H), 3.50-3.70 (m, 1H), 7.01-7.45 (m, 8H), 8.08 (d, *J* = 7.8 Hz, 1H), 8.62 (s, 1H), 10.32 (s, 1H); ¹³C NMR, DEPT (125 MHz, DMSO-*d*₆) δ 14.5 (CH₃), 24.5 (CH₂), 35.2 (CH₂), 37.7 (CH), 43.6 (CH₂), 114.9, 117.1, 122.6 (CH), 125.6 (CH), 126.9 (CH), 127.4 (CH),

127.6 (CH), 129.2 (CH), 129.4 (CH), 134.8, 135.6, 142.4, 143.6 (CH), 159.6, 161.7, 177.7, 193.3; MS (EI, 70 eV) m/z 387 (M⁺); IR (KBr), cm^{-1} : ν 3436, 2967, 1734, 1693, 1610, 1542.

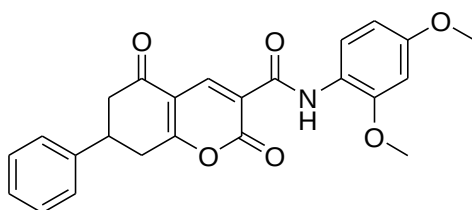
¹H NMR
DMSO-*d*₆







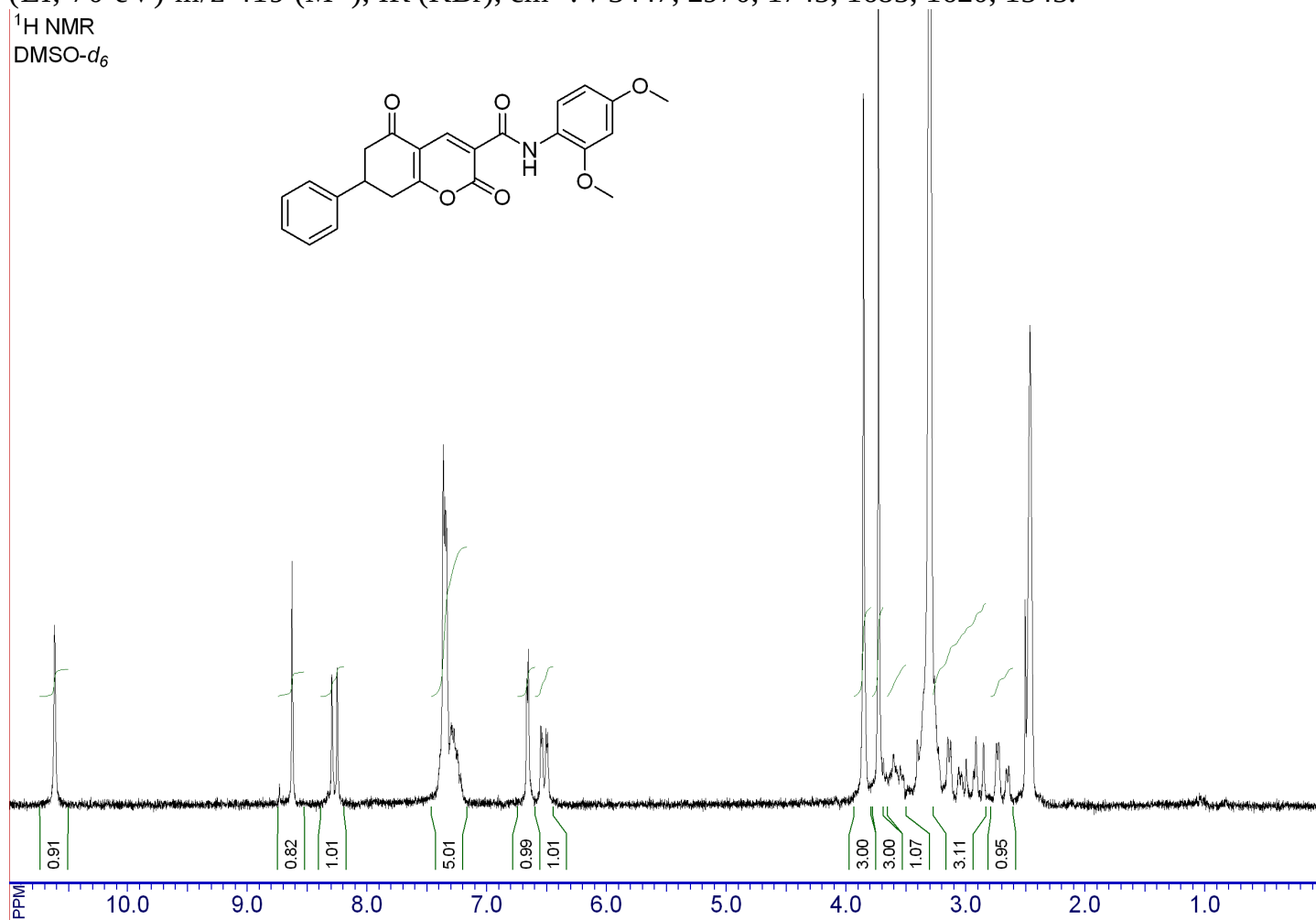
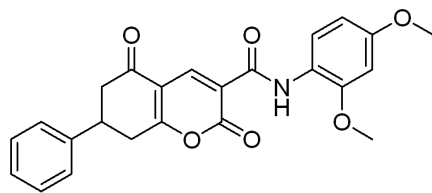
***N*-(2,4-Dimethoxyphenyl)-2,5-dioxo-7-phenyl-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{3,30})**

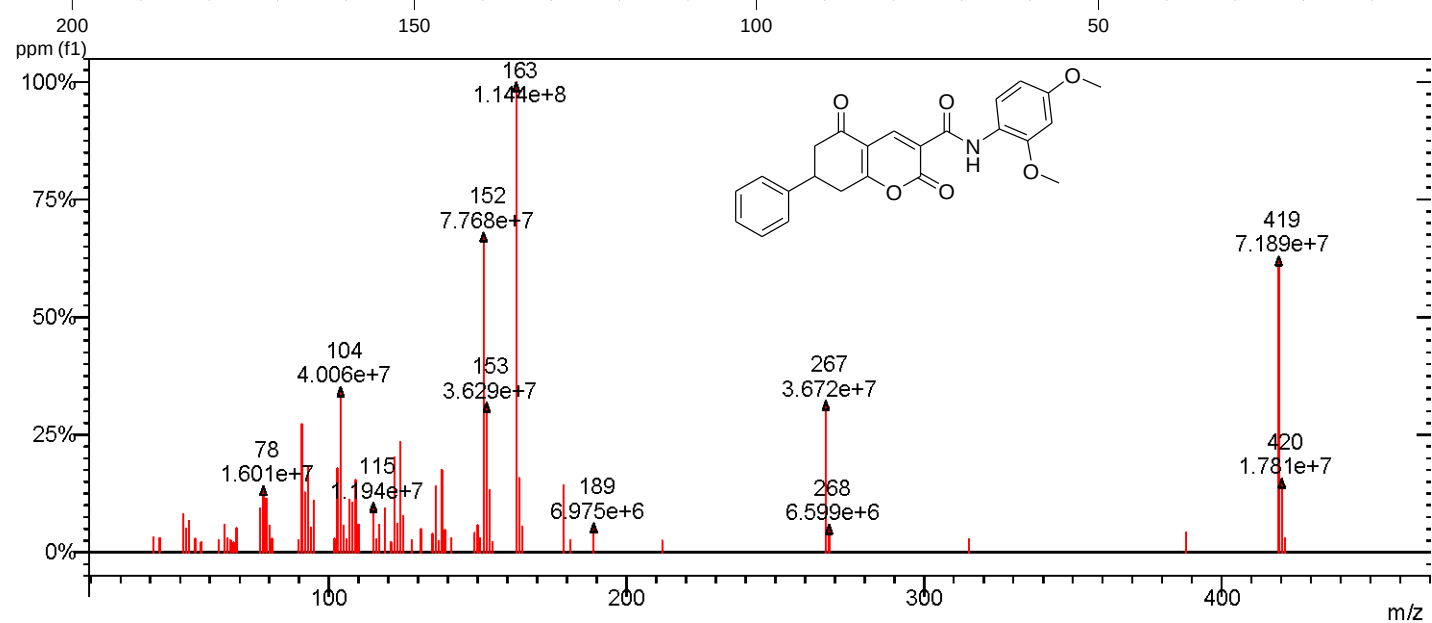
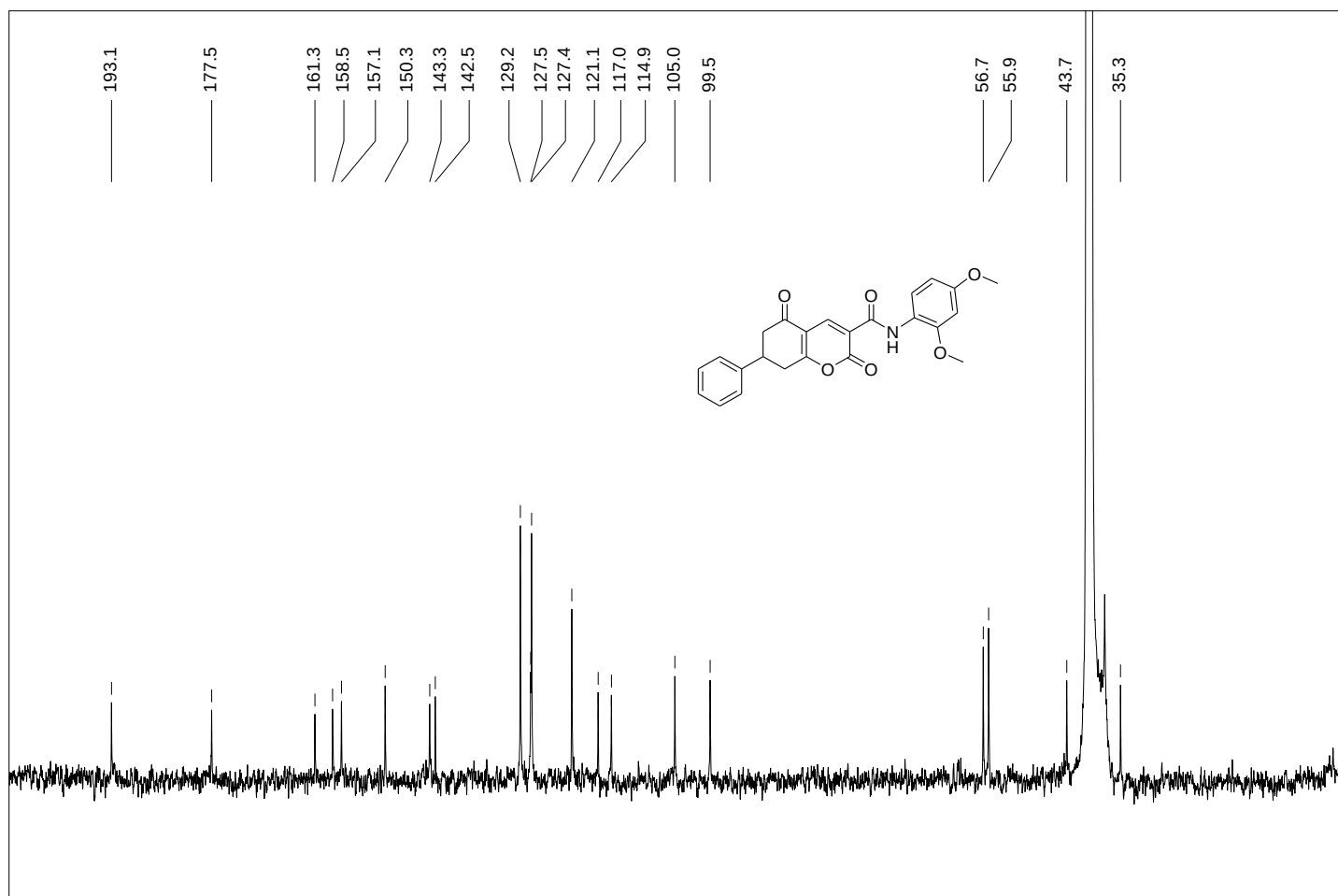


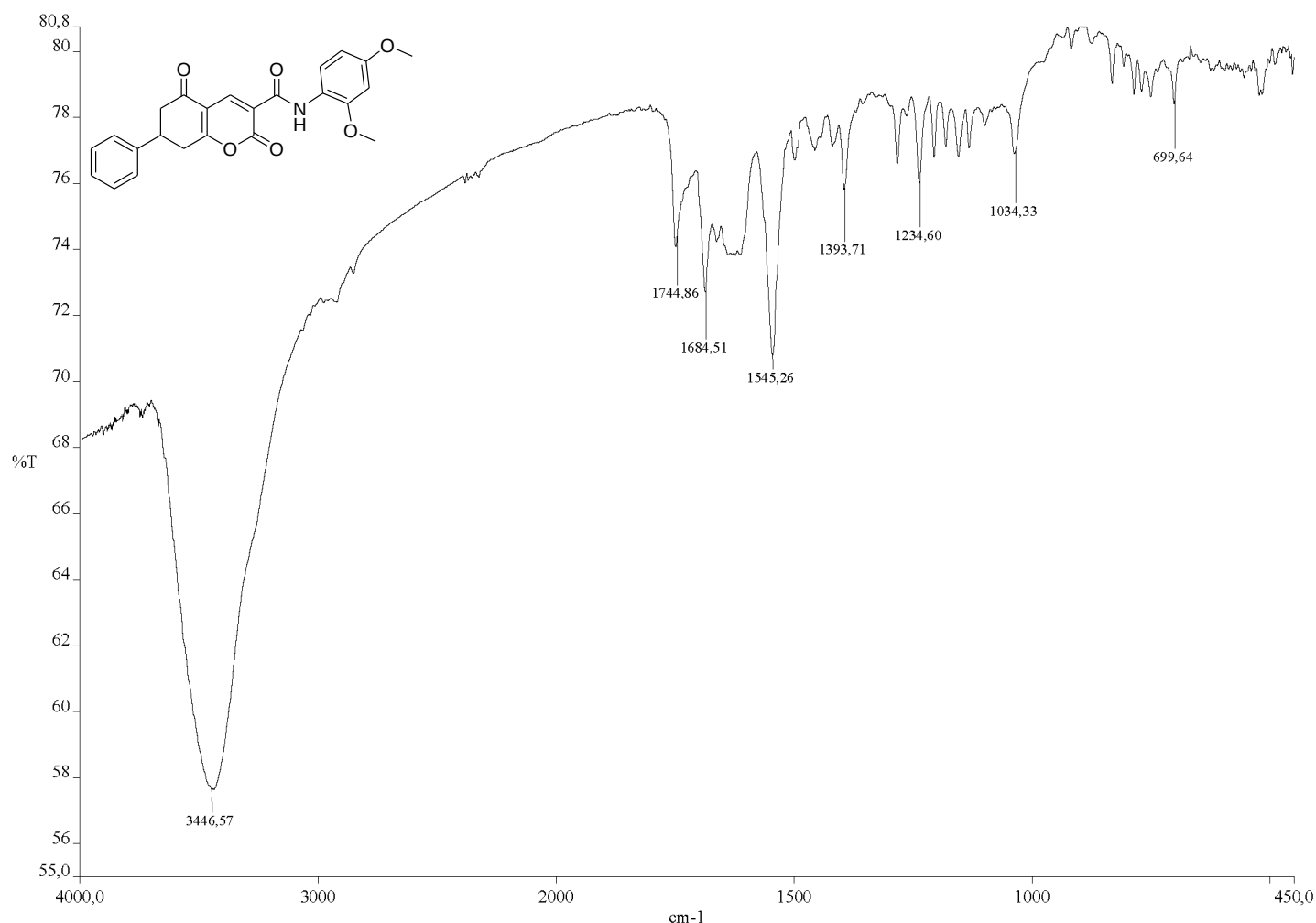
Yield 71%. Mp 220°C. ¹H NMR (200 MHz, DMSO-d₆) δ 2.70 (dd, *J* = 15.6 Hz, *J* = 3.8 Hz, 1H), 2.84-3.28 (m, 3H), 3.51-3.67 (m, 1H), 3.74 (s, 3H), 3.87 (s, 3H), 6.53 (dd, *J* = 9.0 Hz, *J* = 2.6 Hz, 1H), 6.66 (d, *J* = 2.6 Hz, 1H), 7.17-7.43 (m, 5H), 8.27 (d, *J* = 9.0 Hz, 1H), 8.63 (s, 1H), 10.61 (s, 1H); ¹³C NMR (125 MHz, DMSO-d₆) δ 35.3, 43.7, 55.9, 56.7, 99.5, 105.0, 114.9,

117.0, 121.1, 127.4, 127.5, 129.2, 142.5, 143.3, 150.3, 157.1, 158.5, 161.3, 177.5, 193.1; MS (EI, 70 eV) m/z 419 (M^+); IR (KBr), cm^{-1} : ν 3447, 2970, 1745, 1685, 1620, 1545.

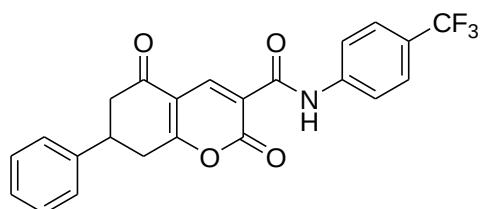
^1H NMR
DMSO- d_6





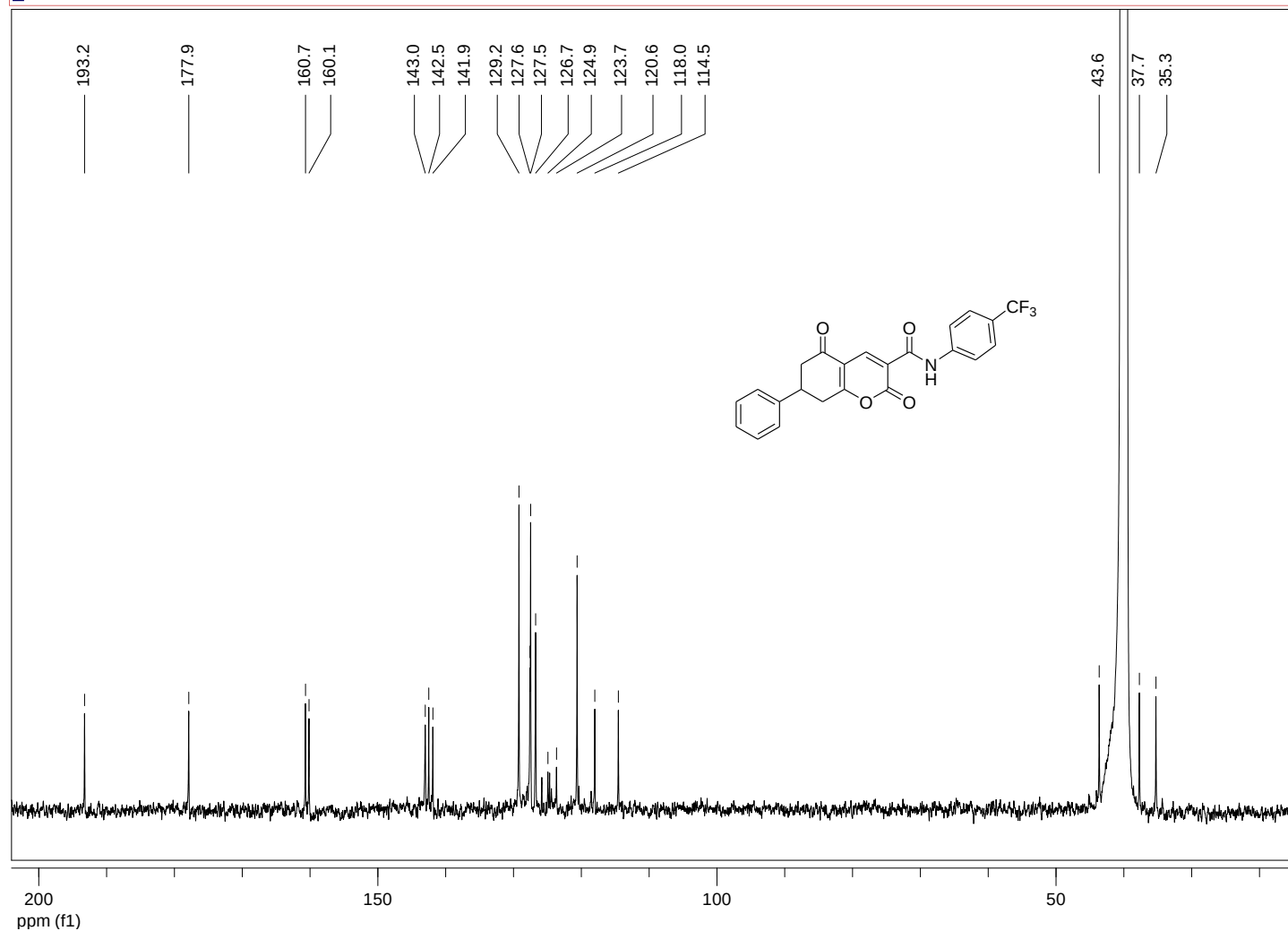
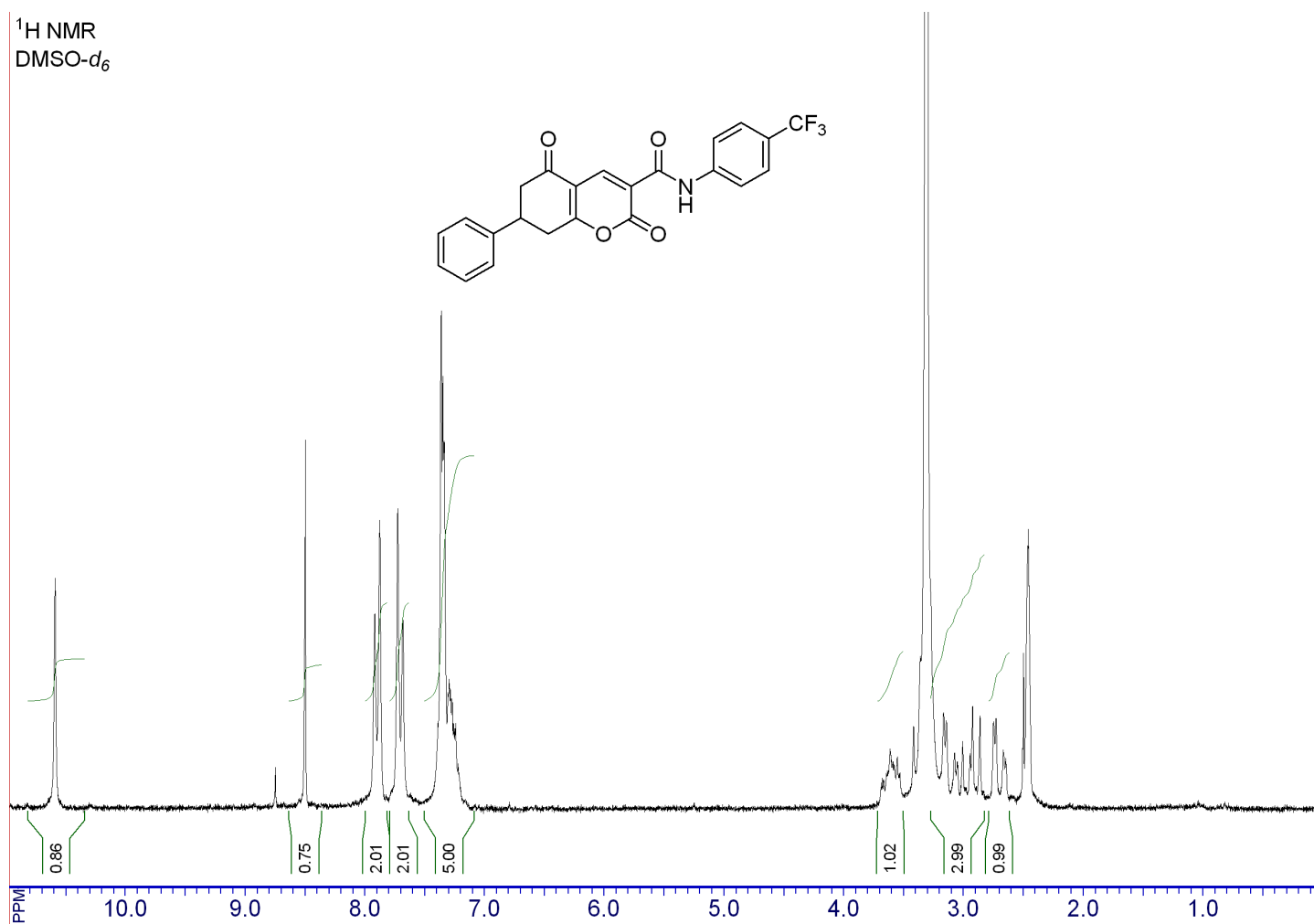


2,5-Dioxo-7-phenyl-N-(4-(trifluoromethyl)phenyl)-5,6,7,8-tetrahydro-2H-chromene-3-carboxamide (22{3,31})

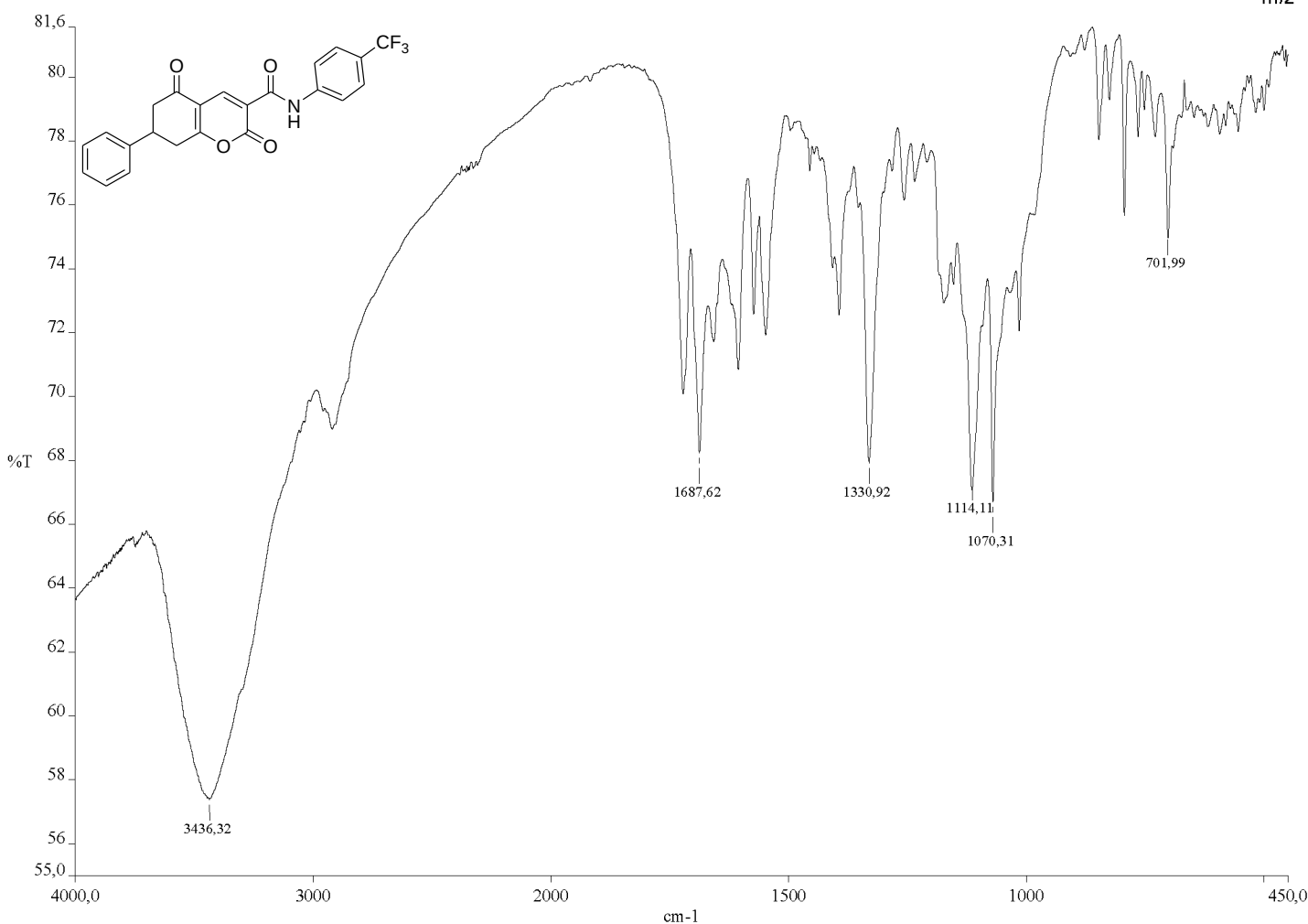
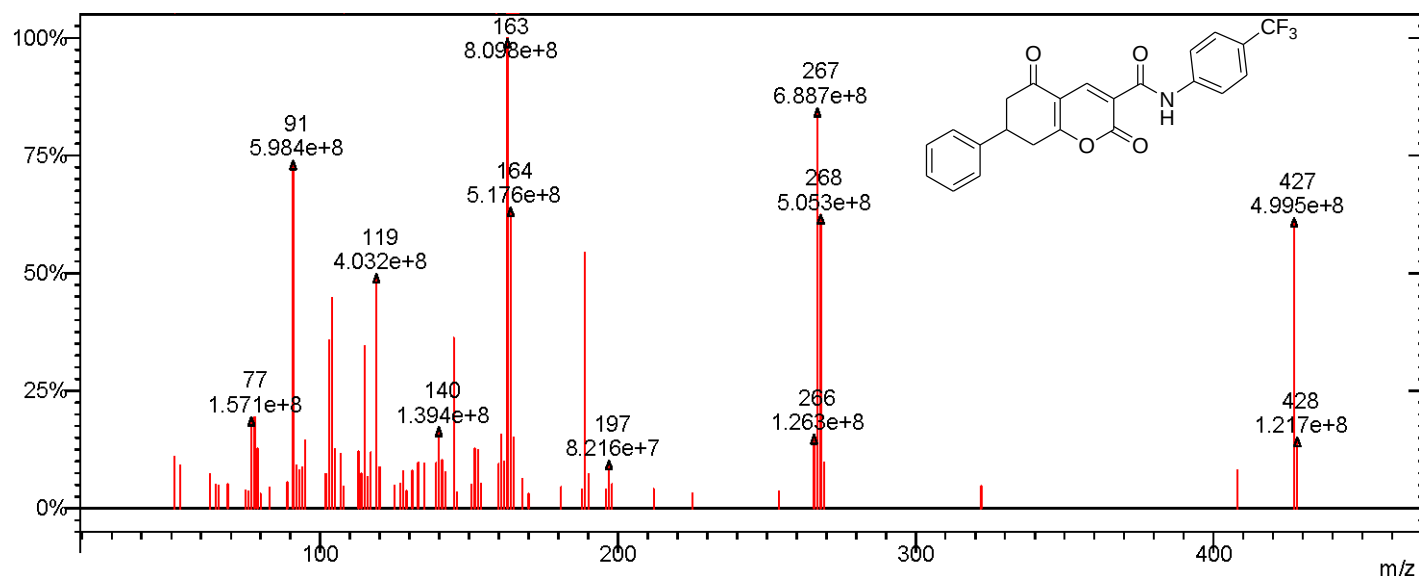


Yield 90%. Mp 254°C. ^1H NMR (200 MHz, DMSO- d_6) δ 2.71 (dd, J = 16.2 Hz, J = 4.0 Hz, 1H), 2.83-3.29 (m, 3H), 3.51-3.73 (m, 1H), 7.17-7.47 (m, 5H), 7.71 (d, J = 8.5 Hz, 2H), 7.90 (d, J = 8.5 Hz, 2H), 8.50 (s, 1H), 10.59 (s, 1H); ^{13}C NMR (125 MHz, DMSO- d_6) δ 35.3, 37.7, 43.6, 114.5, 118.0, 120.6, 123.7, 124.9, 126.7, 127.5, 127.6, 129.2, 141.9, 142.5, 143.0, 160.2, 160.7, 177.9, 193.2; MS (EI, 70 eV) m/z 427 (M^+); IR (KBr), cm^{-1} : ν 3436, 2972, 1735, 1688, 1629, 1543.

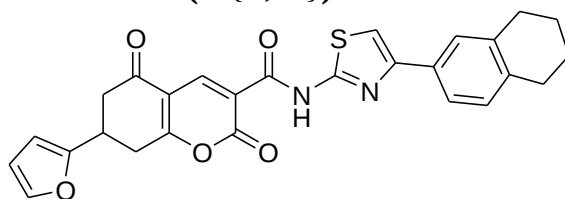
^1H NMR
DMSO- d_6



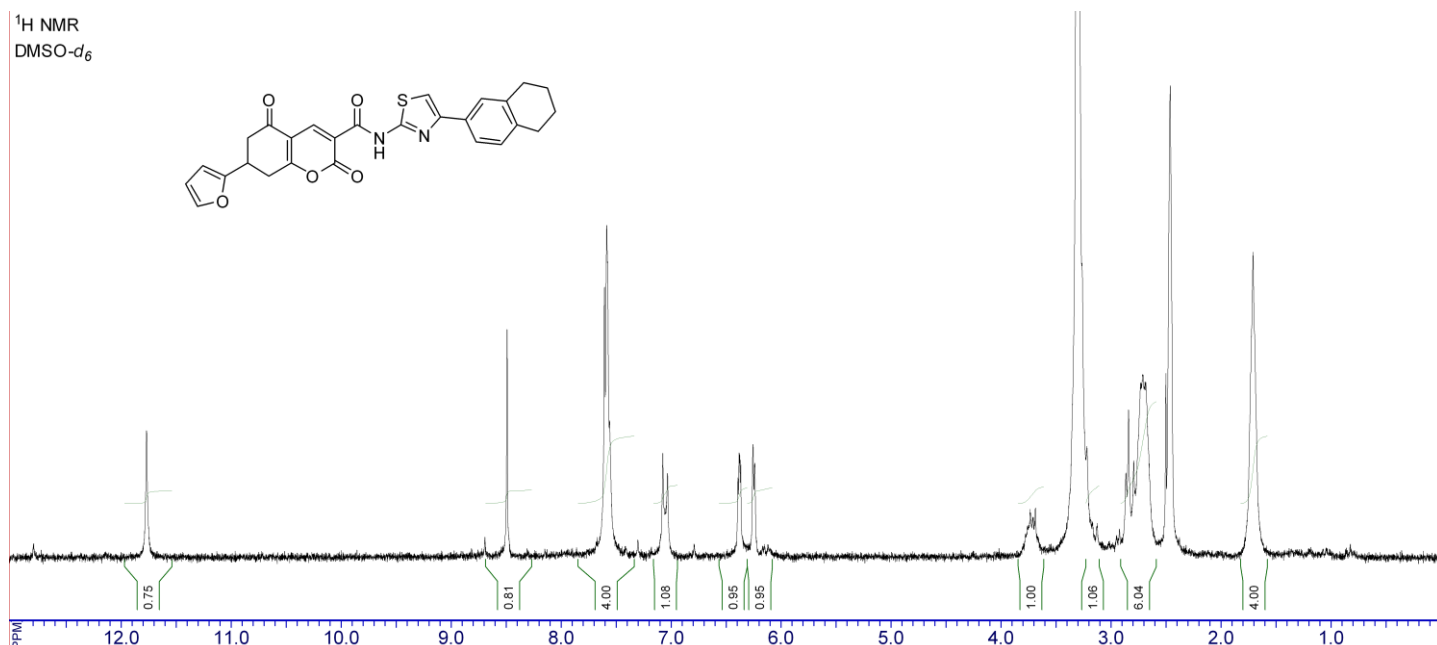
ppm (f1)



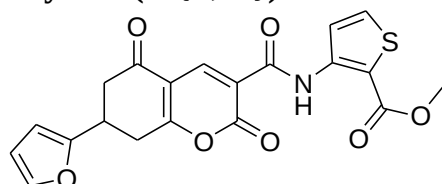
7-(Furan-2-yl)-2,5-dioxo-N-(4-(5,6,7,8-tetrahydronaphthalen-2-yl)thiazol-2-yl)-5,6,7,8-tetrahydro-2H-chromene-3-carboxamide (22{4,32})



Yield 85%. Mp 261°C. ¹H NMR (200 MHz, DMSO-d₆) δ 1.63-1.79 (m, 4H), 2.59-2.91 (m, 6H), 3.11-3.23 (m, 2H), 3.65-3.83 (m, 1H), 6.25 (d, J = 3.2 Hz, 1H), 6.38 (dd, J = 3.2 Hz, J = 2.1 Hz, 1H), 7.06 (d, J = 8.4 Hz, 1H), 7.49-7.67 (m, 4H), 8.49 (s, 1H), 11.77 (s, 1H). 1H is probably overlapped with the water proton signal at 3.31 ppm.

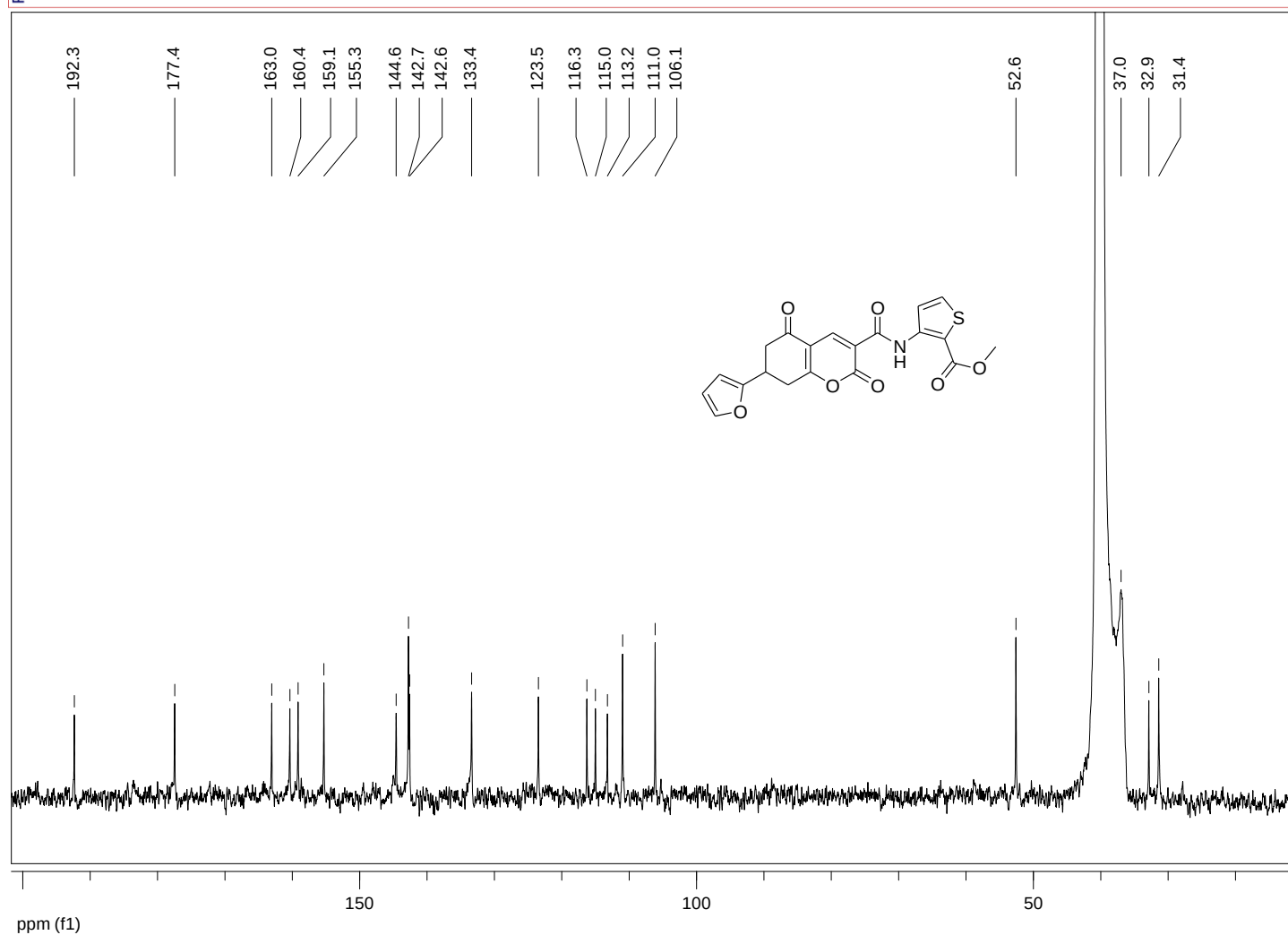
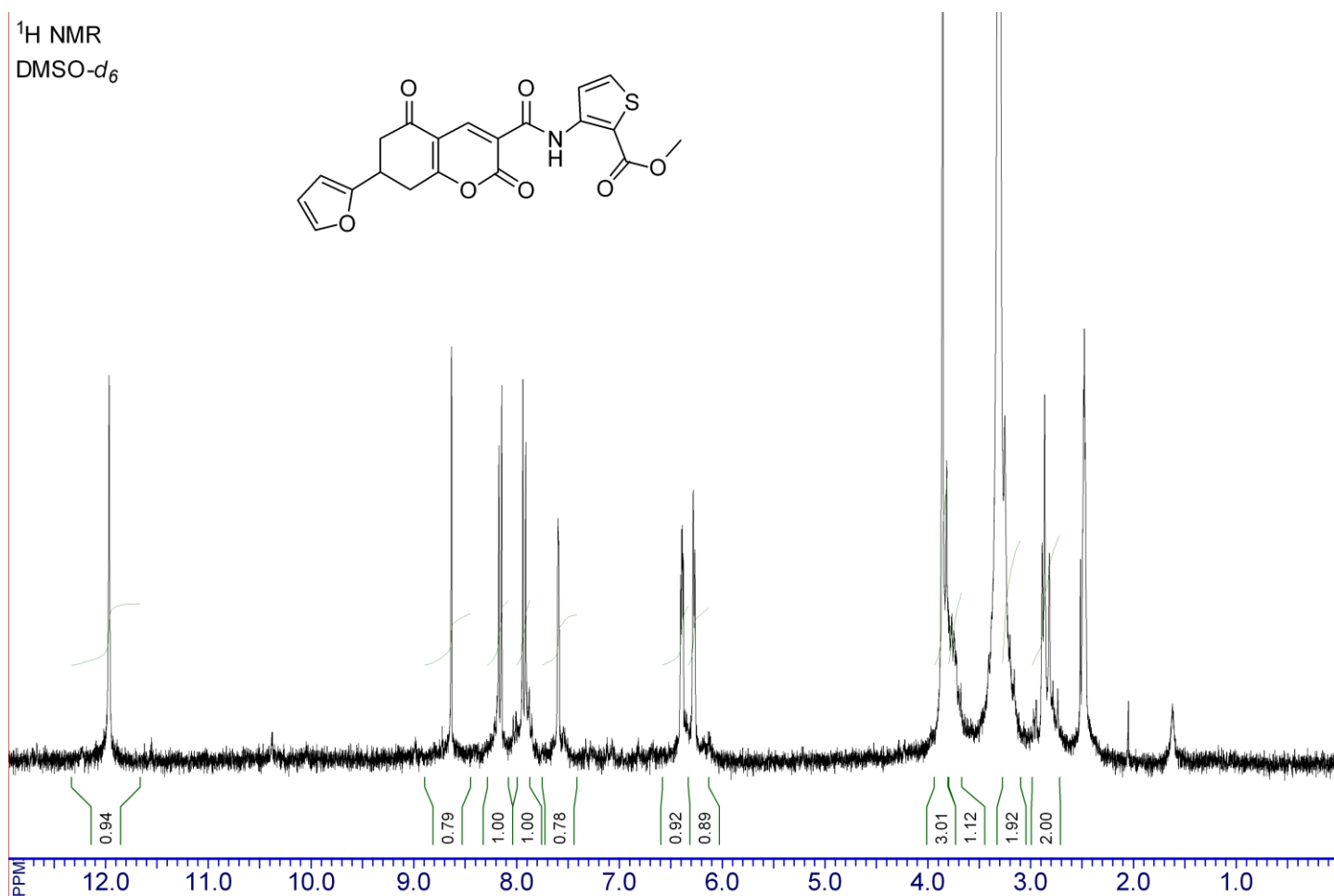
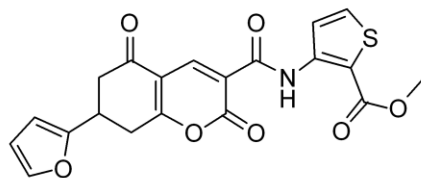


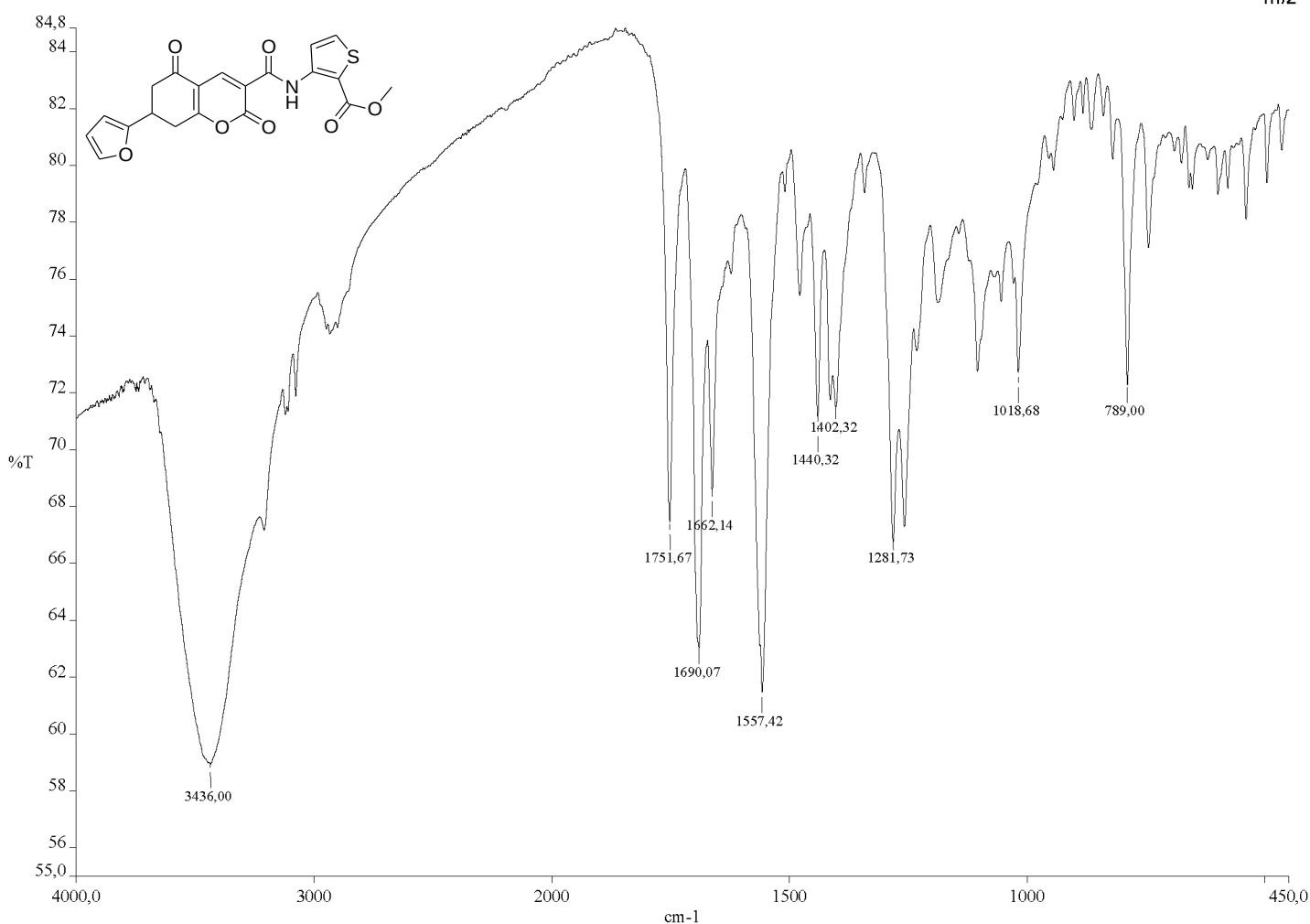
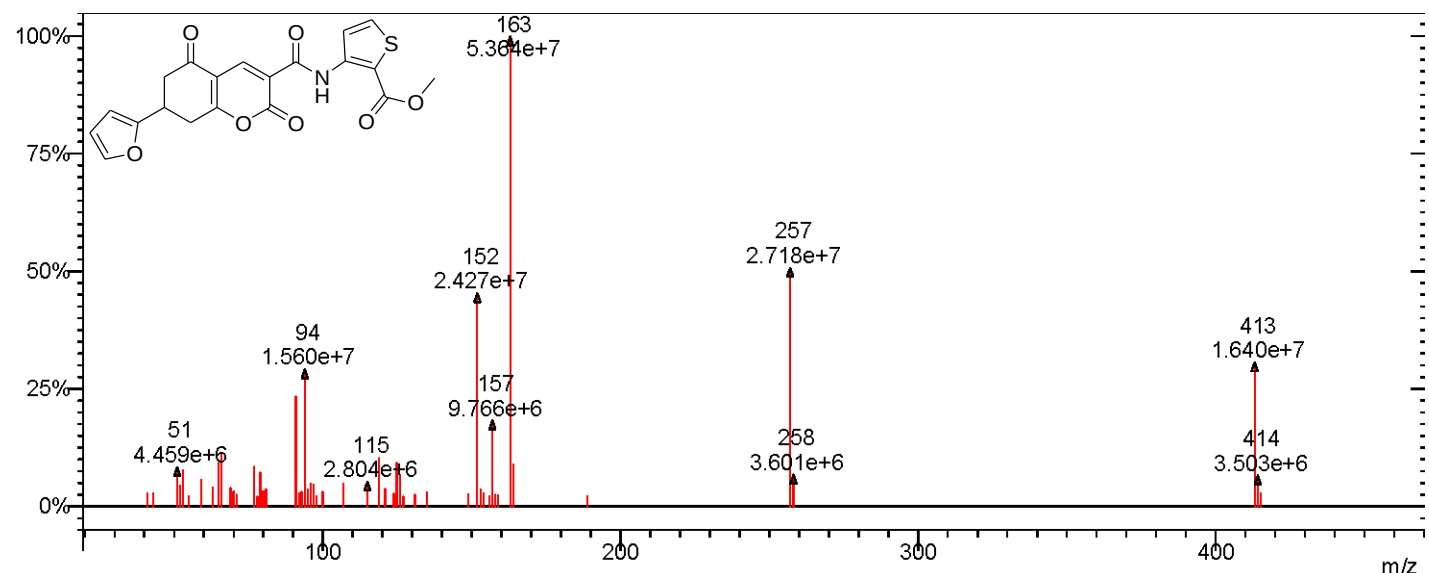
Methyl 3-(7-(furan-2-yl)-2,5-dioxo-5,6,7,8-tetrahydro-2H-chromene-3-carboxamido)thiophene-2-carboxylate (22{4,19})



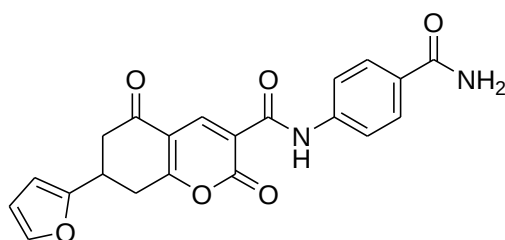
Yield 86%. Mp 246°C. ¹H NMR (200 MHz, DMSO-d₆) δ 2.72-2.99 (m, 2H), 3.10-3.27 (m, 2H), 3.67-3.80 (m, 1H), 3.86 (s, 3H), 6.28 (d, J = 3.5 Hz, 1H), 6.40 (dd, J = 3.5 Hz, J = 1.8 Hz, 1H), 7.60 (s, 1H), 7.93 (d, J = 5.5 Hz, 1H), 8.16 (d, J = 5.5 Hz, 1H), 8.64(s, 1H), 11.97(s, 1H); ¹³C NMR (125 MHz, DMSO-d₆) δ 31.4, 32.9, 37.0, 52.6, 106.1, 111.0, 113.2, 115.0, 116.3, 123.5, 133.4, 142.8, 142.8, 144.6, 155.3, 159.1, 160.4, 163.0, 177.4, 192.3; MS (EI, 70 eV) m/z 413 (M⁺); IR (KBr), cm⁻¹: ν 3436, 2985, 1752, 1690, 1662, 1557.

^1H NMR
DMSO- d_6





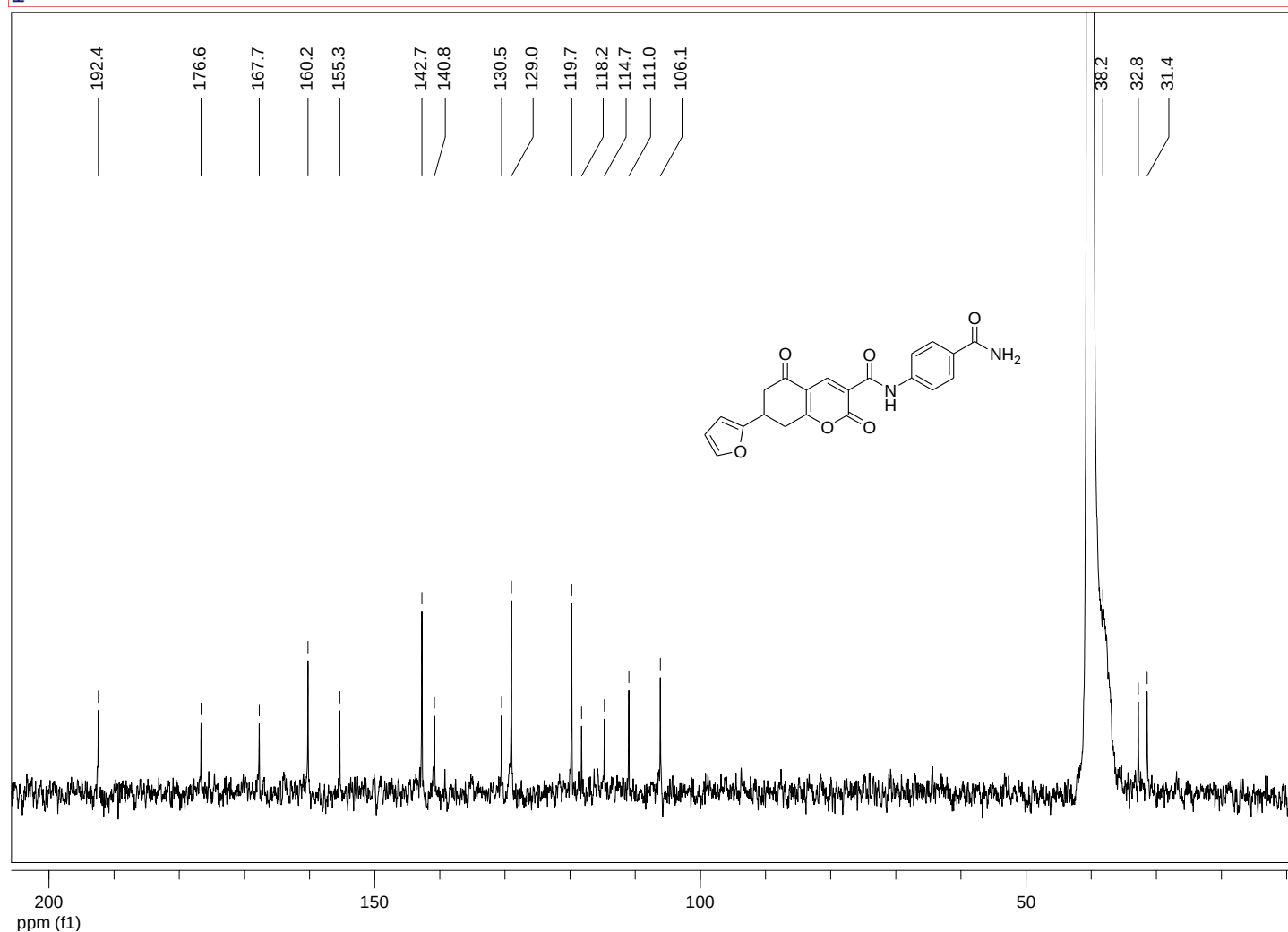
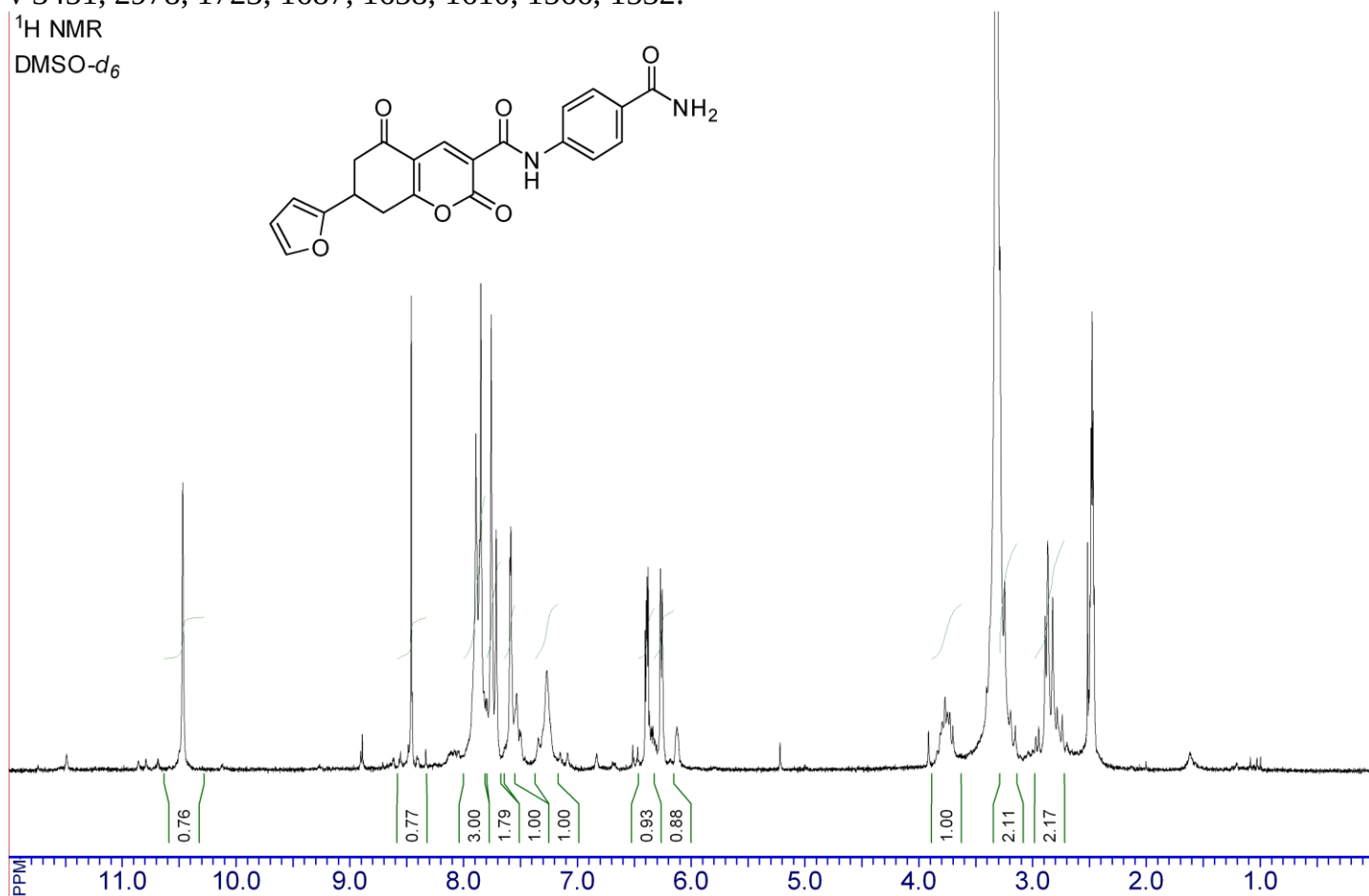
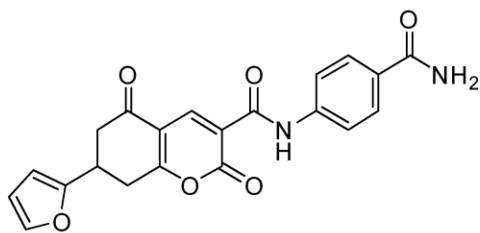
***N*-(4-Carbamoylphenyl)-7-(furan-2-yl)-2,5-dioxo-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{4,21})**

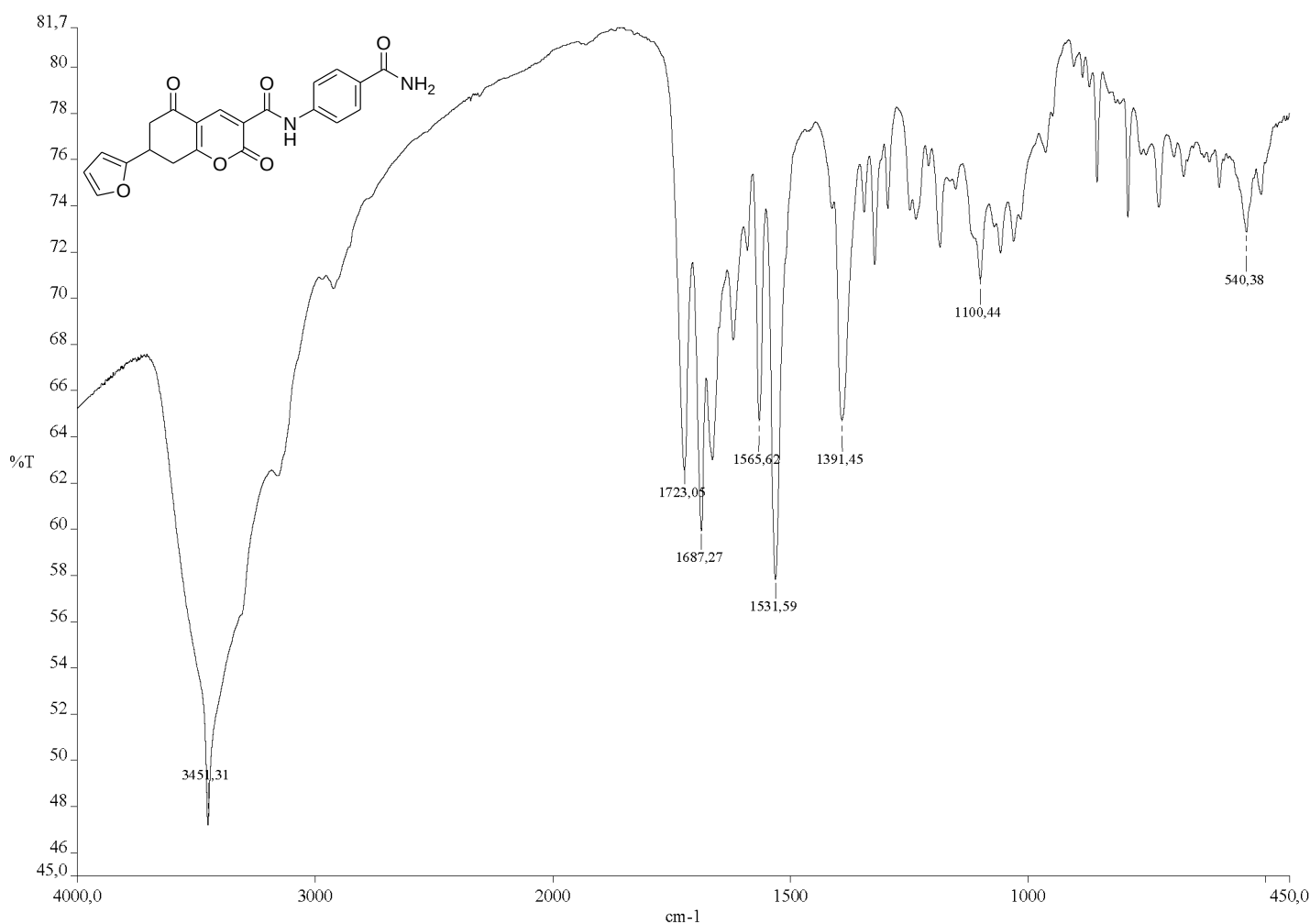
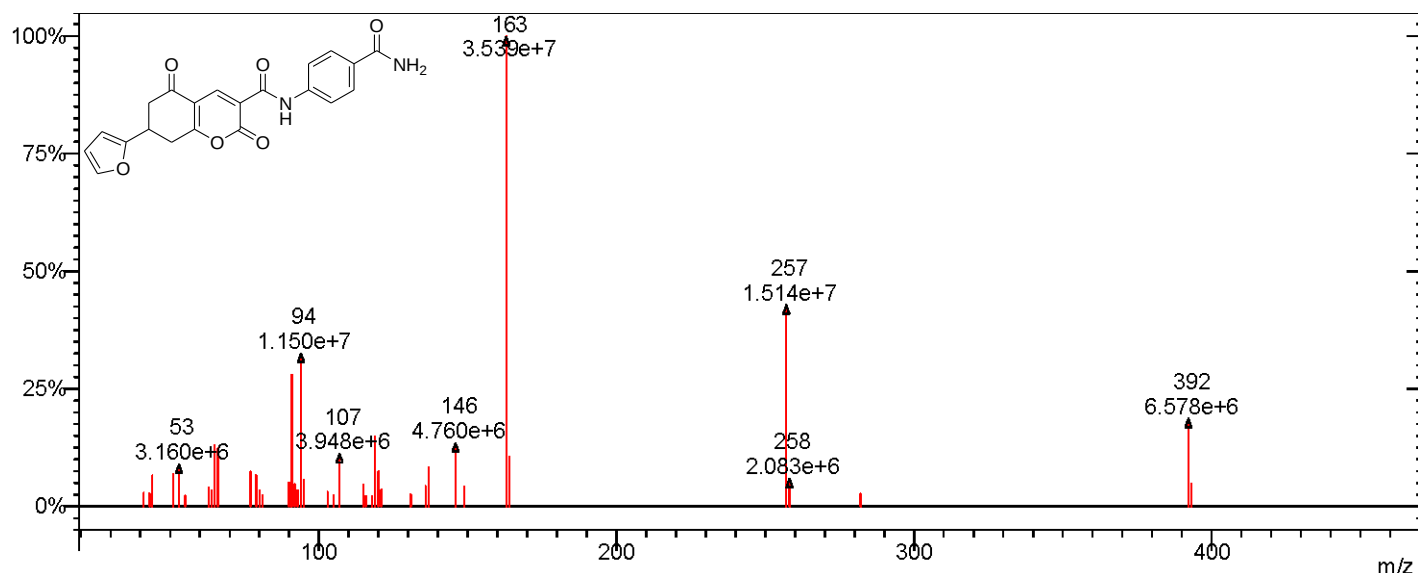


Yield 80%. Mp 300°C. ¹H NMR (200 MHz, DMSO-d₆) δ 2.72-2.98 (m, 2H), 3.14-3.29 (m, 2H), 3.70-3.91 (m, 1H), 6.26 (d, *J* = 3.5 Hz, 1H), 6.39 (dd, *J* = 3.5 Hz, *J* = 2.1 Hz, 1H), 7.27 (s, 1H), 7.60 (s, 1H), 7.74 (d, *J* = 7.9 Hz, 2H), 7.81-8.02 (m, 3H), 8.46 (s, 1H), 10.49 (s, 1H); ¹³C NMR (125 MHz, DMSO-d₆) δ 31.4, 32.8, 38.2, 106.1, 111.0, 114.7, 118.2, 119.7, 129.0, 130.5,

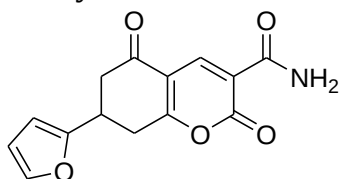
140.8, 142.7, 155.3, 160.2, 167.7, 176.6, 192.4; MS (EI, 70 eV) m/z 392 (M^+); IR (KBr), cm^{-1} :
 ν 3451, 2978, 1723, 1687, 1658, 1610, 1566, 1532.

^1H NMR
DMSO- d_6





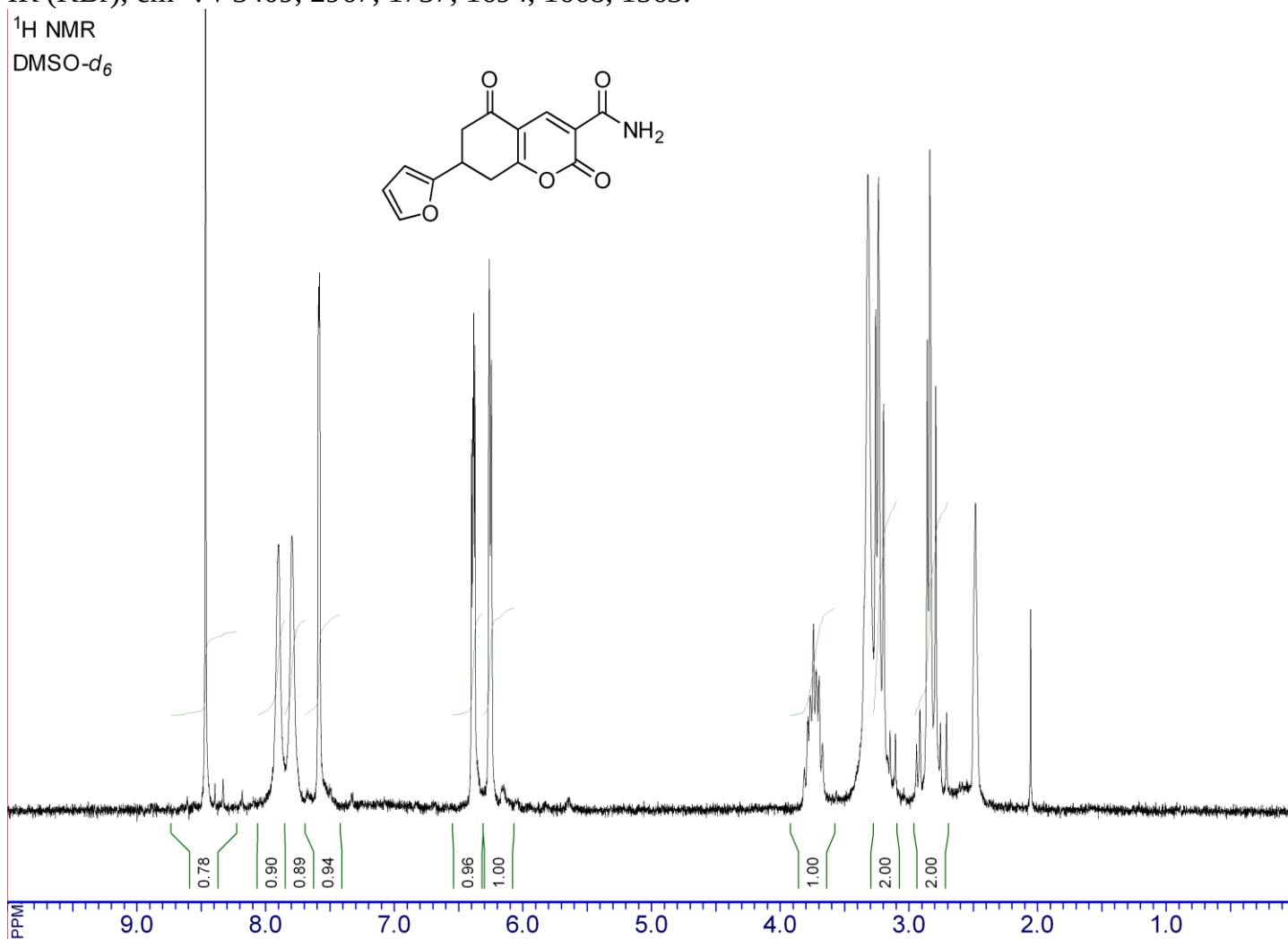
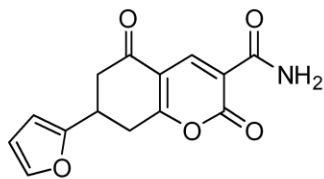
7-(Furan-2-yl)-2,5-dioxo-5,6,7,8-tetrahydro-2H-chromene-3-carboxamide (22{4,1})

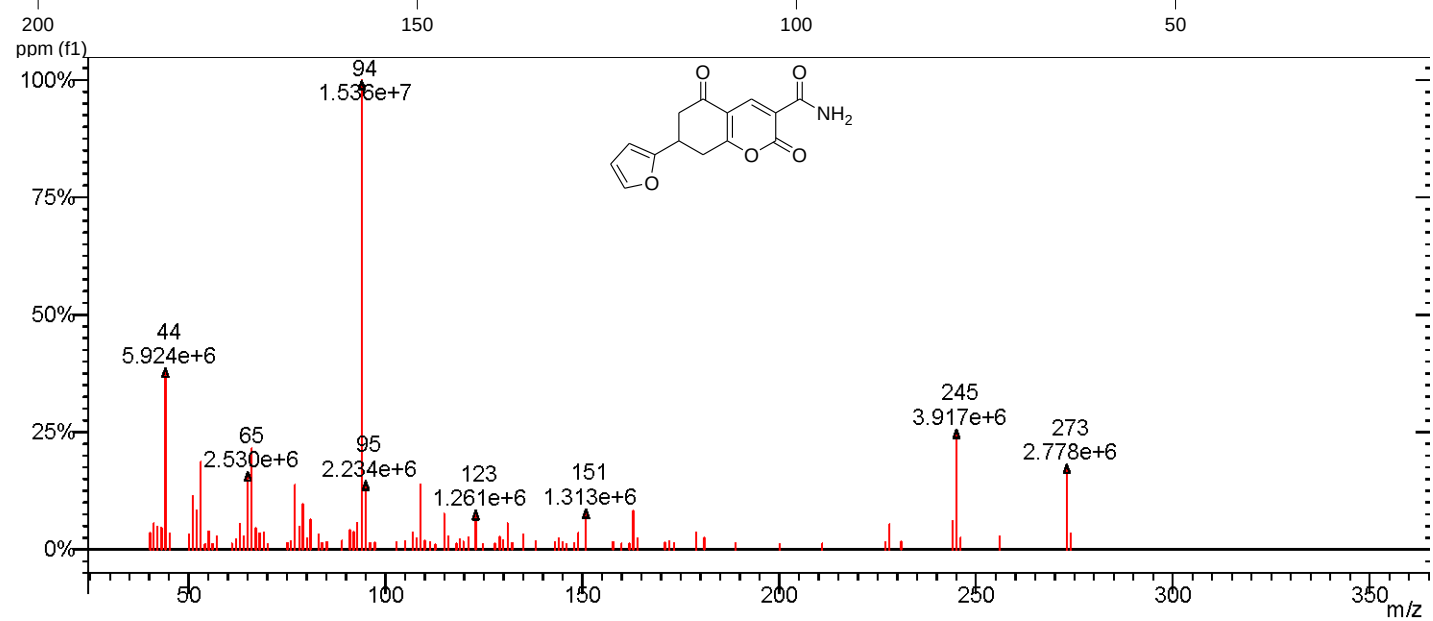
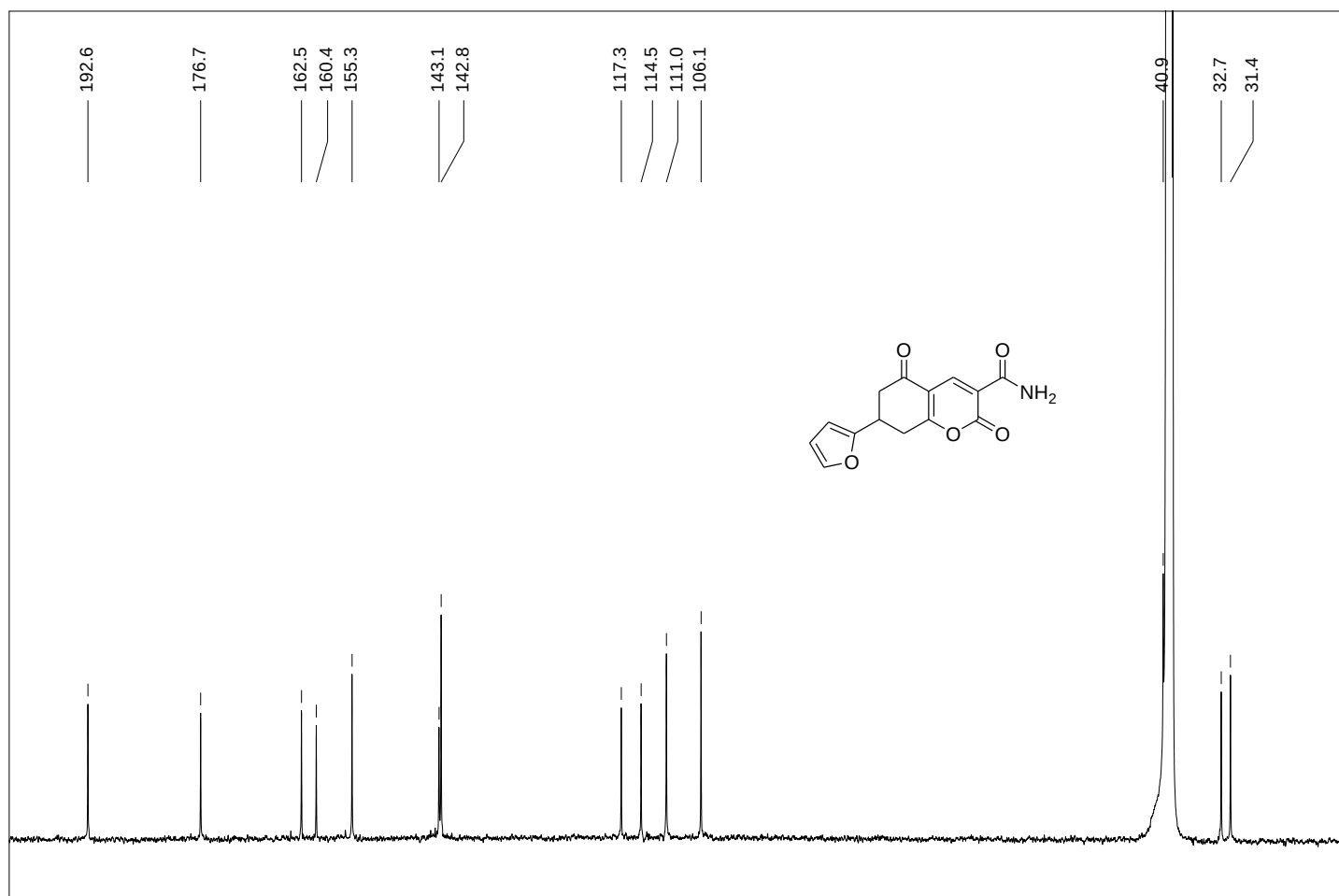


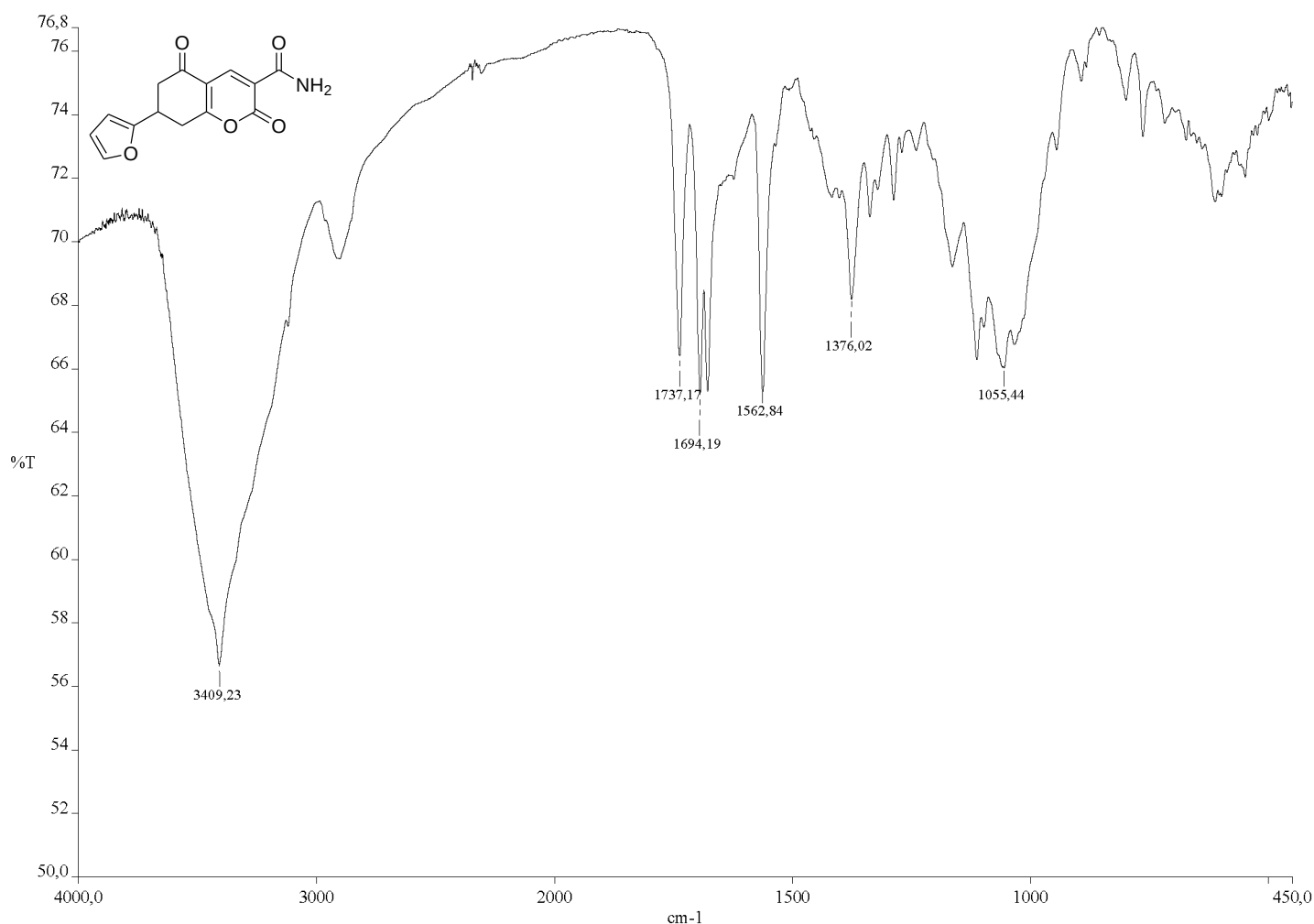
Yield 75%. Mp 230°C. Anal. Calcd (C₁₄H₁₁NO₅): C, 61.5; H, 4.1; N, 5.1. Found: C, 61.1; H, 4.4; N, 5.4; ¹H NMR (200 MHz, DMSO-d₆) δ 2.68-2.98 (m, 2H), 3.08-3.29 (m, 2H), 3.61-3.82 (m, 1H), 6.25 (d, J = 3.4 Hz, 1H), 6.38 (dd, J = 3.4 Hz, J = 2.0 Hz, 1H), 7.59 (s, 1H), 7.79 (br. s, 1H), 7.90 (br. s, 1H) 8.46 (s, 1H); ¹³C NMR (125 MHz, DMSO-d₆) δ 31.4, 32.7, 40.9, 106.1, 111.0,

114.5, 117.3, 142.8, 143.1, 155.3, 160.4, 162.5, 176.7, 192.6; MS (EI, 70 eV) m/z 273 (M^+); IR (KBr), cm^{-1} : ν 3409, 2967, 1737, 1694, 1668, 1563.

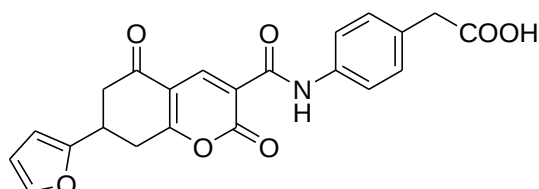
^1H NMR
DMSO- d_6



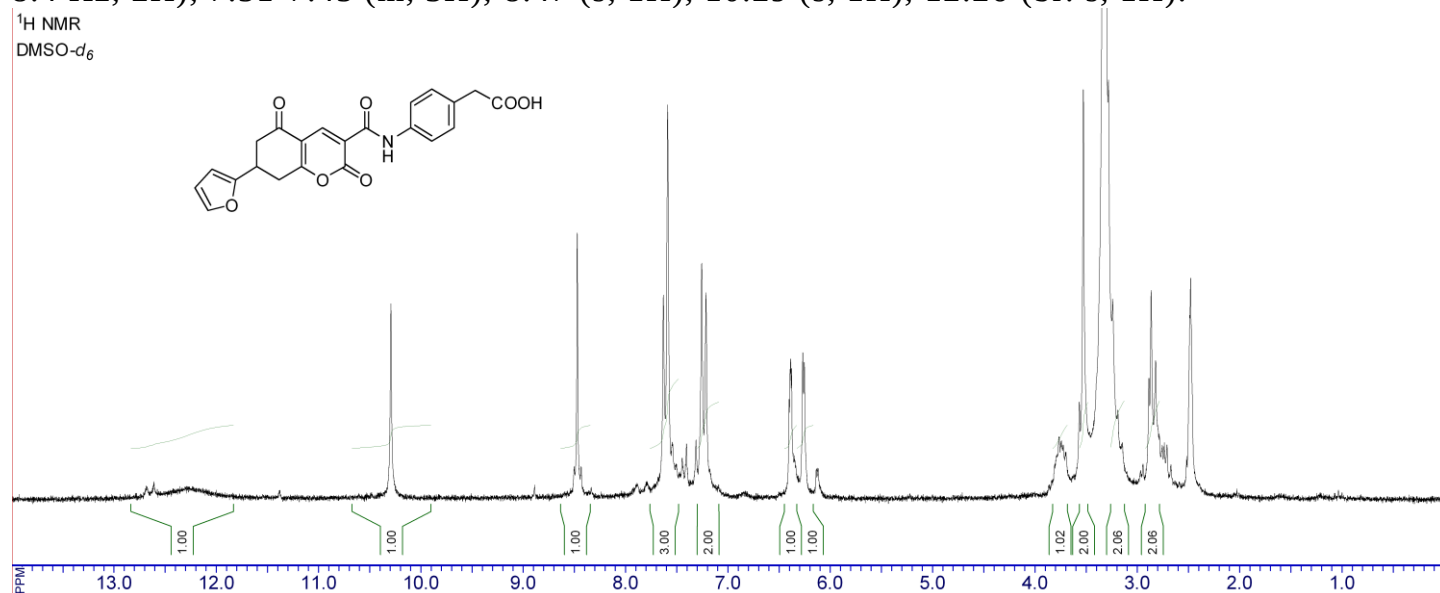




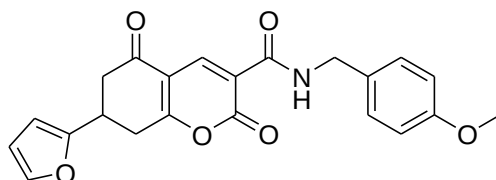
2-(4-(7-(Furan-2-yl)-2,5-dioxo-5,6,7,8-tetrahydro-2H-chromene-3-carboxamido)phenyl)acetic acid (22{4,28})



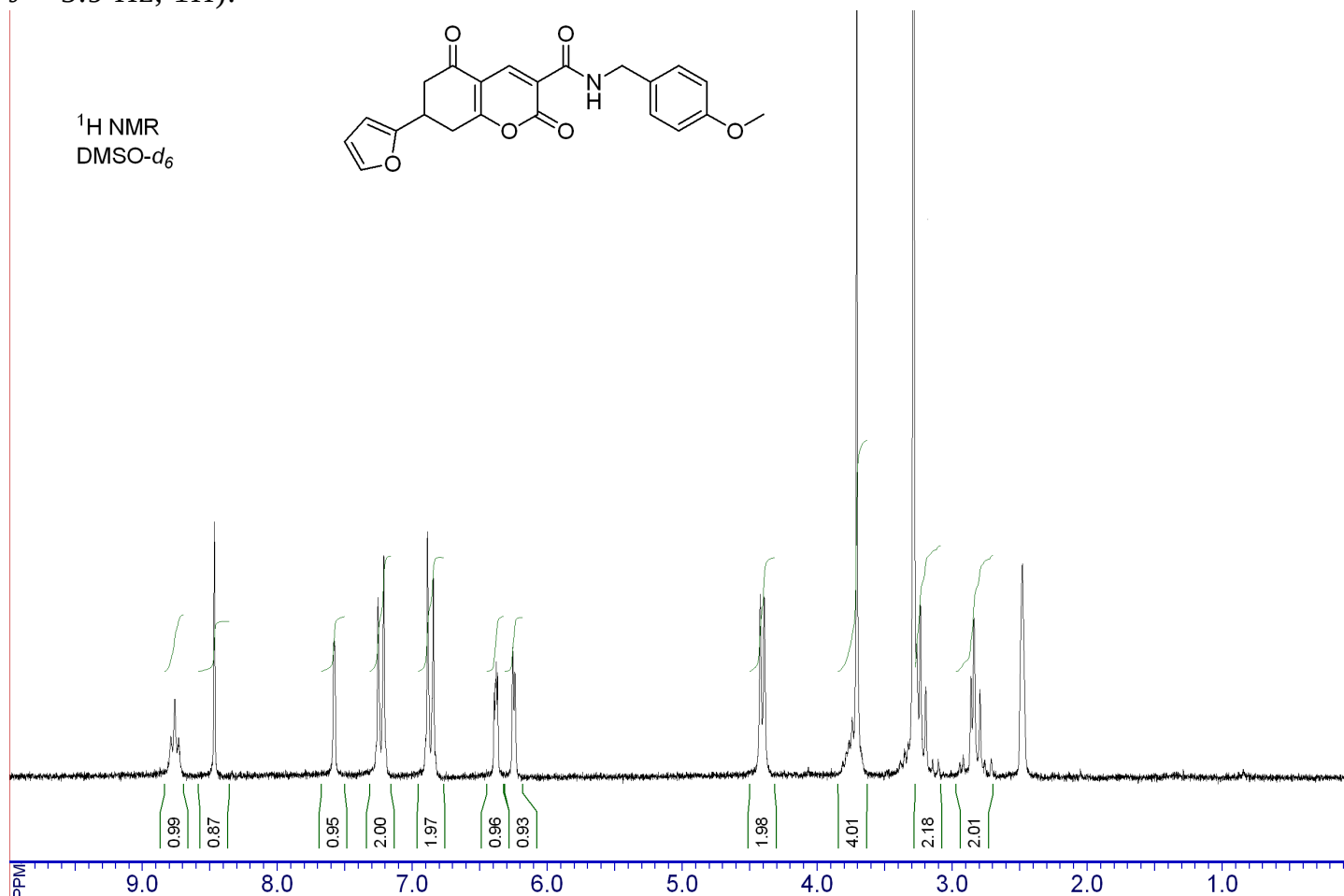
Yield 55%. ¹H NMR (200 MHz, DMSO-d₆) δ 2.78-2.92 (m, 2H), 3.13-3.26 (m, 2H), 3.53 (s, 2H), 3.65-3.90 (m, 1H), 6.27 (d, J = 3.3 Hz, 1H), 6.39 (dd, J = 3.3 Hz, J = 1.8 Hz, 1H), 7.24 (d, J = 8.4 Hz, 2H), 7.51-7.45 (m, 3H), 8.47 (s, 1H), 10.29 (s, 1H), 12.26 (br. s, 1H).



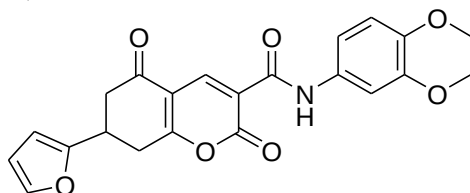
***N*-(4-Methoxybenzyl)-7-(furan-2-yl)-2,5-dioxo-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{4,23})**



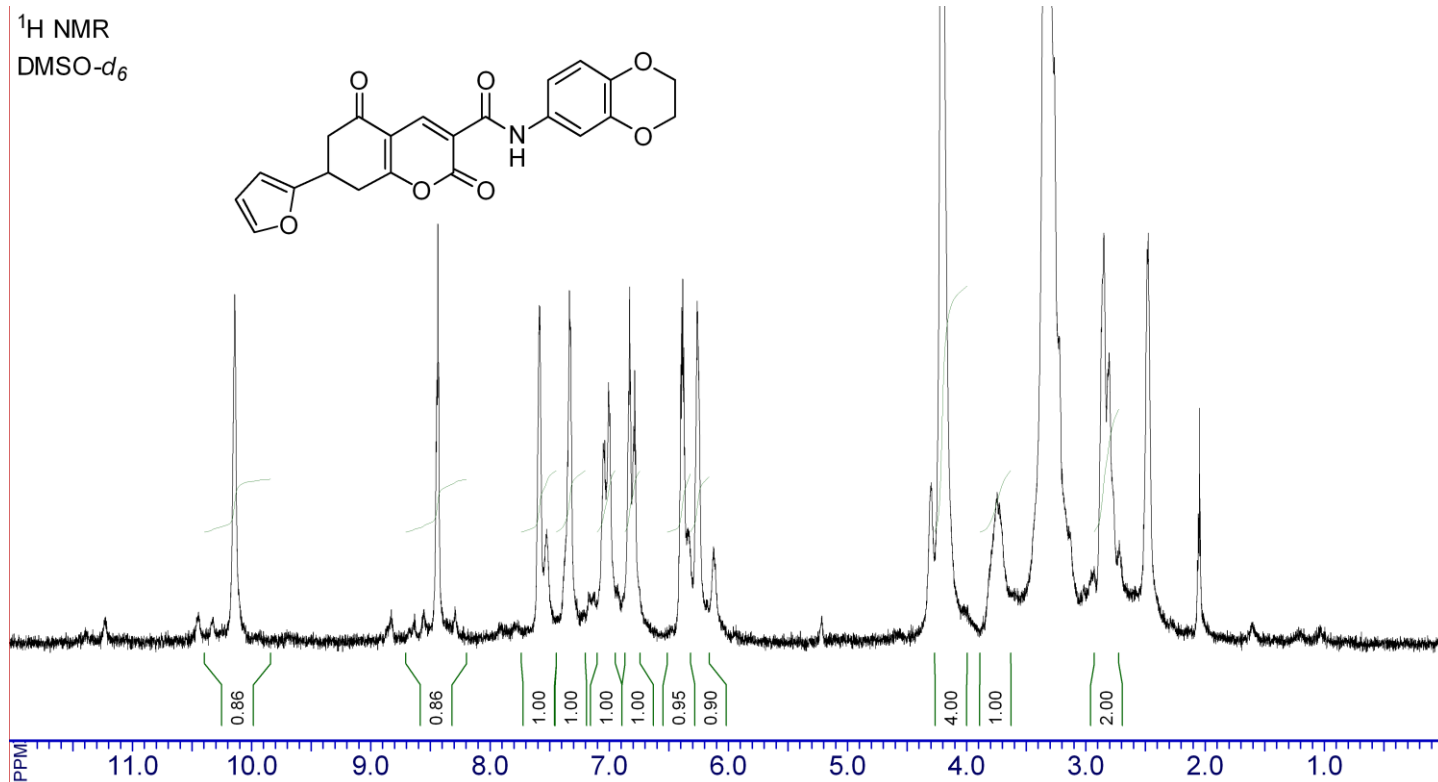
Yield 42%. ^1H NMR (200 MHz, DMSO-d_6) δ 2.70-2.97 (m, 2H), 3.09-3.29 (m, 2H), 3.71 (s, 3H), 3.65-3.85 (m, 1H), 4.41 (d, $J = 5.9$ Hz, 2H), 6.25 (d, $J = 3.4$ Hz, 1H), 6.39 (dd, $J = 3.4$ Hz, $J = 1.8$ Hz, 1H), 6.87 (d, $J = 8.5$ Hz, 2H), 7.24 (d, $J = 8.5$ Hz, 2H), 7.58 (s, 1H), 8.47 (s, 1H), 8.76 (t, $J = 5.9$ Hz, 1H).



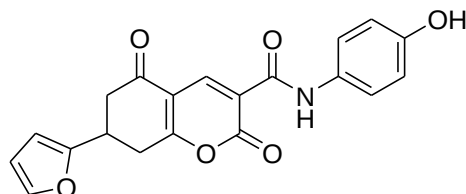
***N*-(2,3-Dihydrobenzo[*b*][1,4]dioxin-6-yl)-7-(furan-2-yl)-2,5-dioxo-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{4,4})**



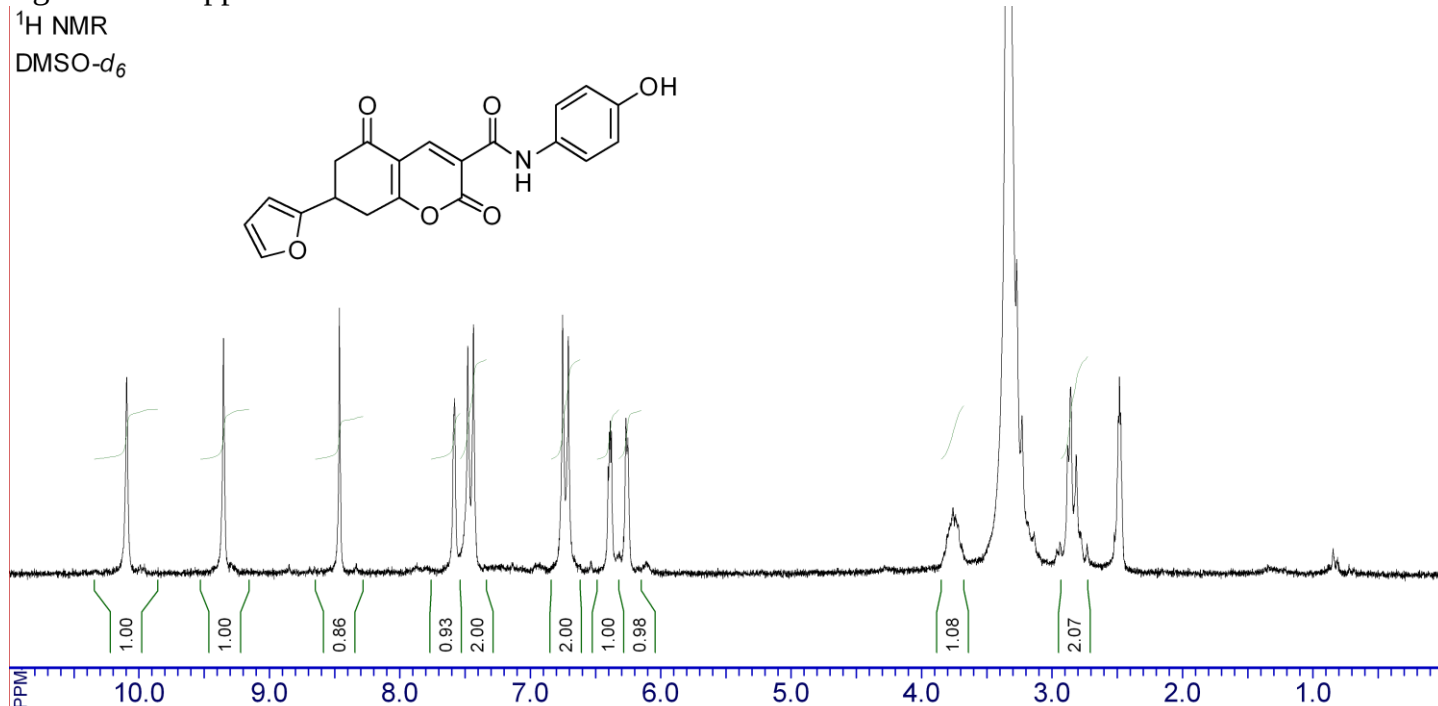
Yield 49%. ^1H NMR (200 MHz, DMSO-d_6) δ 2.72-2.93 (m, 2H), 3.65-3.88 (m, 1H), 4.21 (s, 4H), 6.19-6.30 (m, 1H), 6.35-6.45 (m, 1H), 6.81 (d, $J = 8.6$ Hz, 2H), 7.03 (d, $J = 8.6$ Hz, 2H), 7.33 (s, 1H), 7.58 (s, 1H), 8.44 (s, 1H), 10.14 (s, 1H). 2H is probably overlapped with the water proton signal at 3.33 ppm



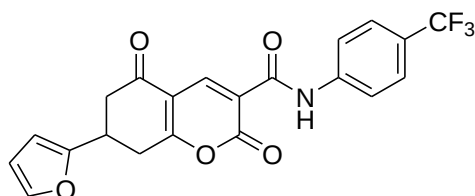
7-(Furan-2-yl)-N-(4-hydroxyphenyl)-2,5-dioxo-5,6,7,8-tetrahydro-2H-chromene-3-carboxamide (22{4,16})



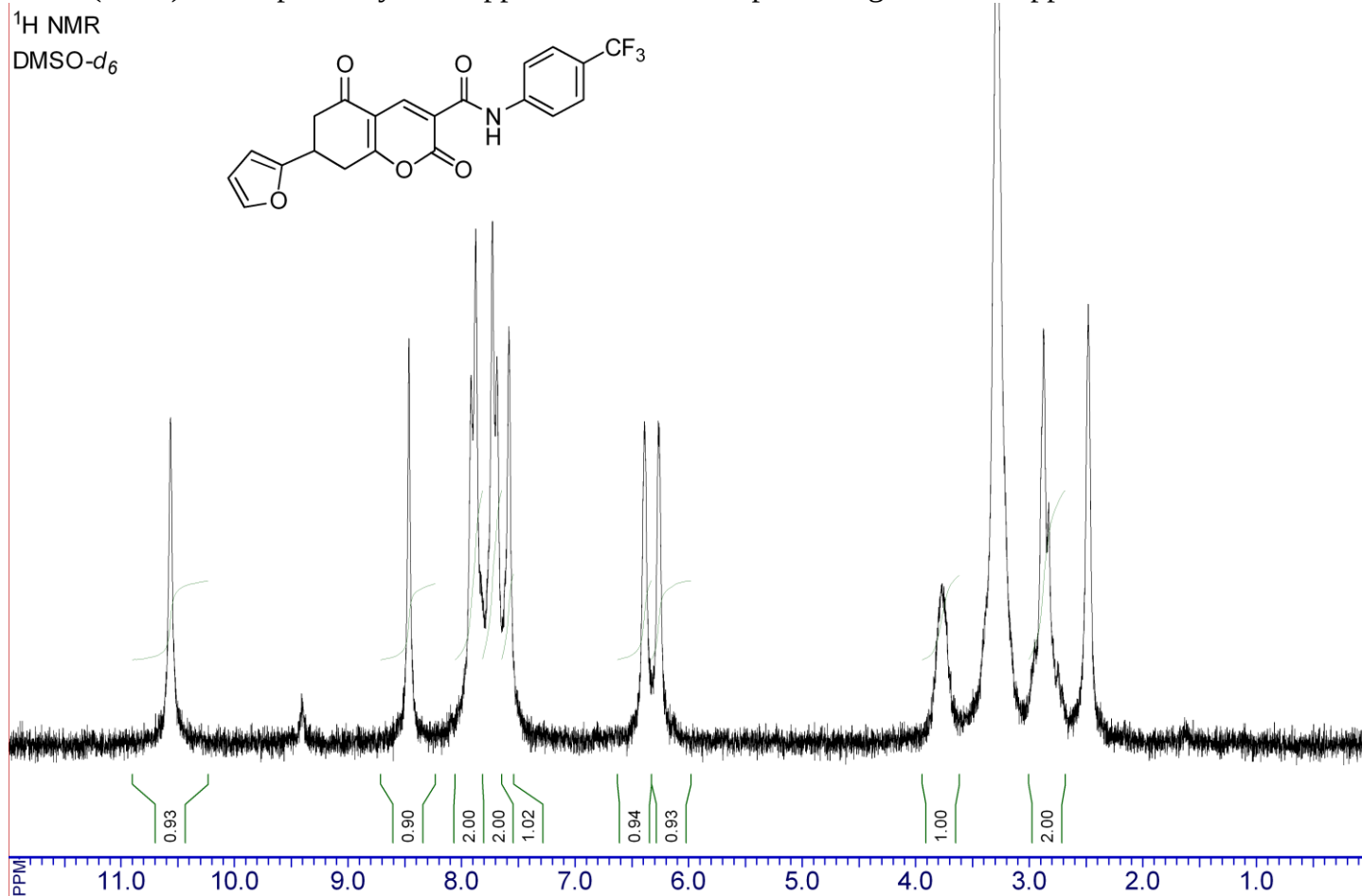
Yield 65%. ¹H NMR (200 MHz, DMSO-*d*₆) δ 2.72-2.93 (m, 2H), 3.66-3.86 (m, 1H), 6.26 (d, *J* = 3.5 Hz, 1H), 6.39 (dd, *J* = 3.5 Hz, *J* = 2.0 Hz, 1H), 6.74 (d, *J* = 8.8 Hz, 2H), 7.46 (d, *J* = 8.8 Hz, 2H), 7.59 (s, 1H), 8.46 (s, 1H), 9.35 (s, 1H), 10.10 (s, 1H). 2H is probably overlapped with the water proton signal at 3.33 ppm



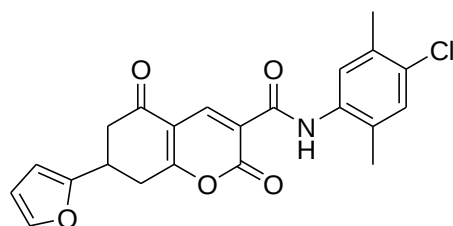
7-(Furan-2-yl)-2,5-dioxo-N-(4-(trifluoromethyl)phenyl)-5,6,7,8-tetrahydro-2H-chromene-3-carboxamide (22{4,31})



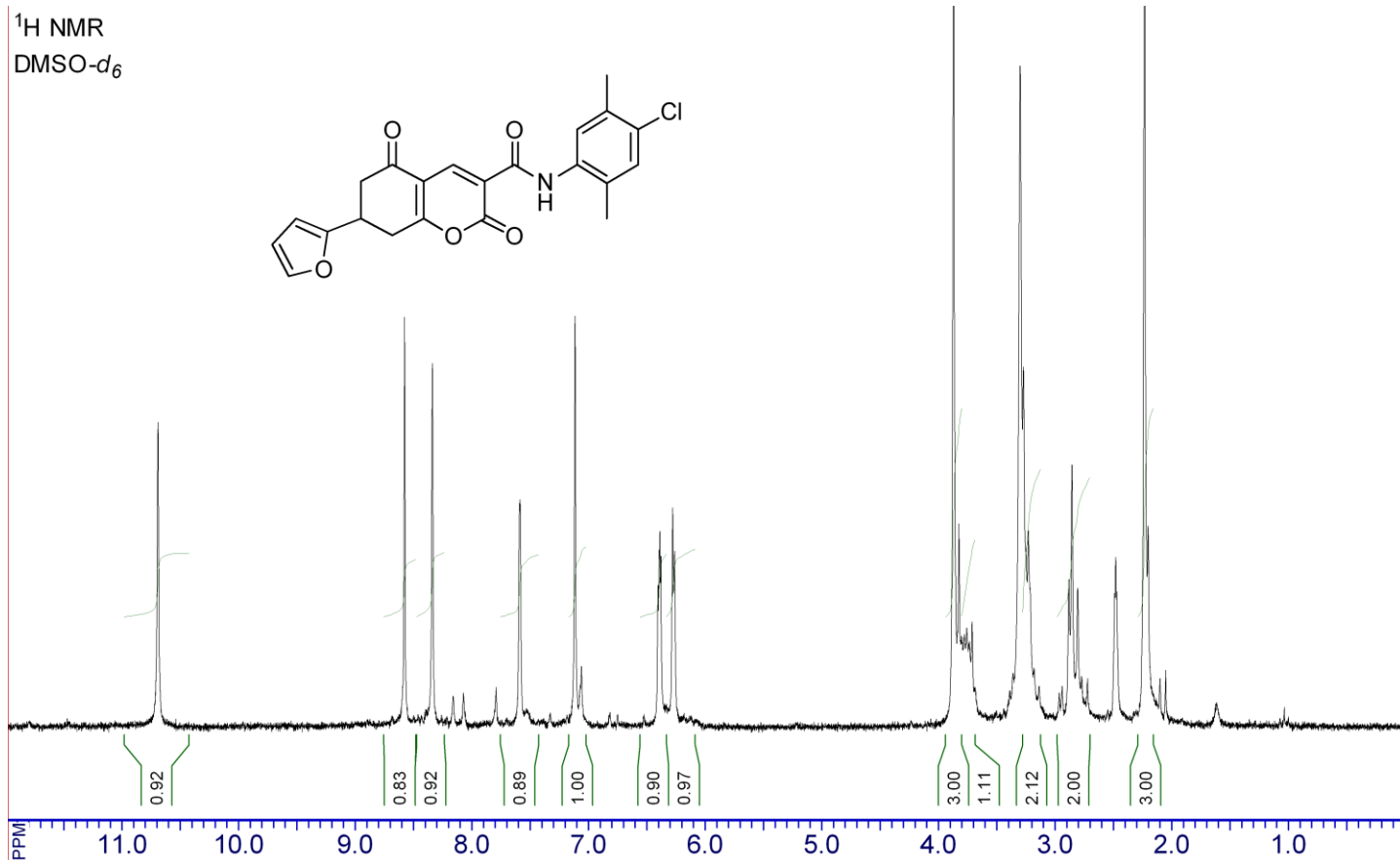
Yield 53%. ^1H NMR (200 MHz, $\text{DMSO}-d_6$) δ 2.68-3.01 (m, 2H), 3.67-3.89 (m, 1H), 6.06-6.33 (m, 1H), 6.33-6.60 (m, 1H), 7.59 (s, 1H), 7.71 (d, $J = 8.1$ Hz, 2H), 7.91 (d, $J = 8.1$ Hz, 2H), 8.47 (s, 1H), 10.57 (s, 1H). 2H is probably overlapped with the water proton signal at 3.29 ppm



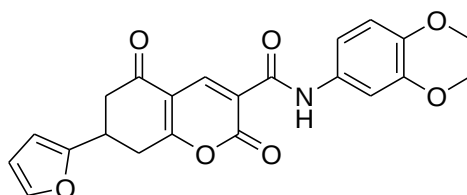
***N*-(4-Chloro-2,5-dimethylphenyl)-7-(furan-2-yl)-2,5-dioxo-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{4,33})**



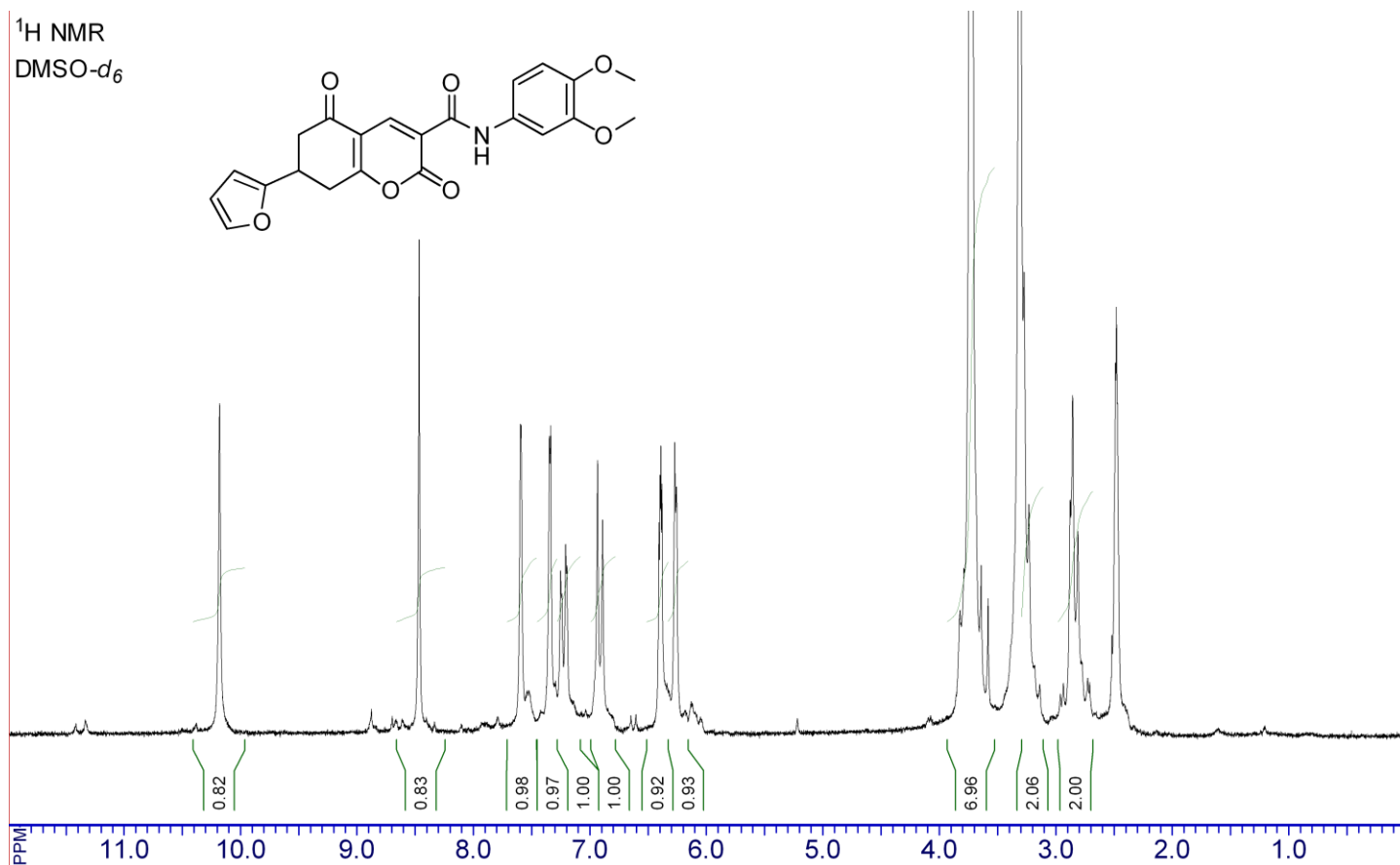
Yield 78%. ^1H NMR (200 MHz, $\text{DMSO}-d_6$) δ 2.24 (s, 3H), 2.70-2.98 (m, 2H), 3.13-3.28 (m, 2H), 3.70-3.81 (m, 1H), 3.87 (s, 3H), 6.27 (d, $J = 3.3$ Hz, 1H), 6.39 (dd, $J = 3.3$ Hz, $J = 1.8$ Hz, 1H), 7.12 (s, 1H), 7.59 (s, 1H), 8.34 (s, 1H), 8.58 (s, 1H), 10.69 (s, 1H).



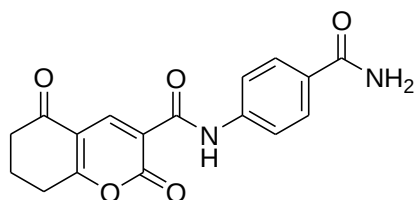
***N*-(3,4-Dimethoxyphenyl)-7-(furan-2-yl)-2,5-dioxo-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{4,34})**



Yield 65%. ¹H NMR (200 MHz, DMSO-*d*₆) δ 2.63-2.99 (m, 2H), 3.12-3.29 (m, 2H), 3.61-3.87 (m, 1H), 3.72 (s, 3H), 3.74 (s, 3H), 6.27 (d, *J* = 3.2 Hz, 1H), 6.40 (dd, *J* = 3.2 Hz, *J* = 1.8 Hz, 1H), 6.92 (d, *J* = 8.8 Hz, 1H), 7.23 (dd, *J* = 8.8 Hz, *J* = 2.2 Hz, 1H), 7.34 (d, *J* = 2.2 Hz, 1H), 7.60 (d, *J* = 1.8 Hz, 1H), 8.47 (s, 1H), 10.18 (s, 1H).

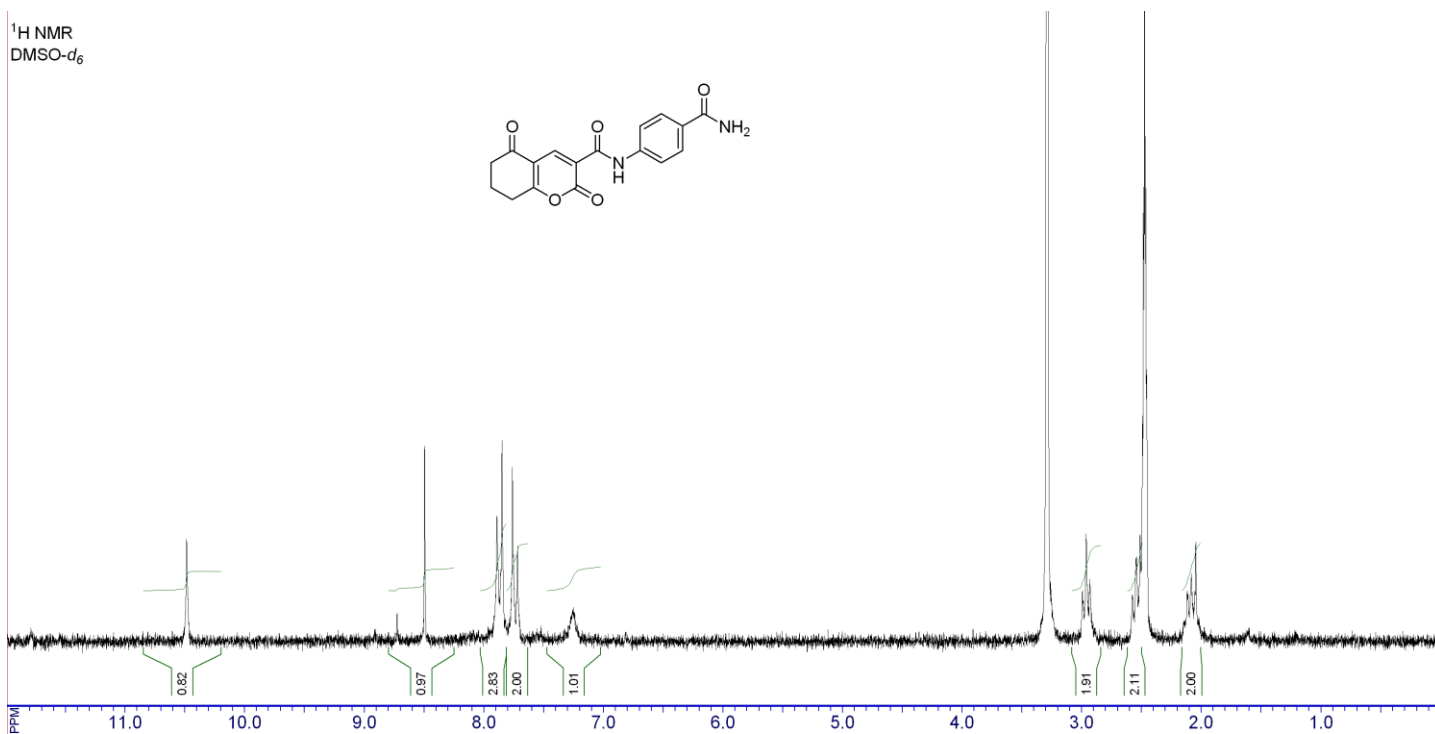
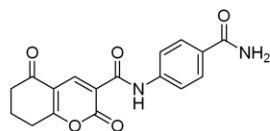


***N*-(4-Carbamoylphenyl)-2,5-dioxo-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{5,21})**

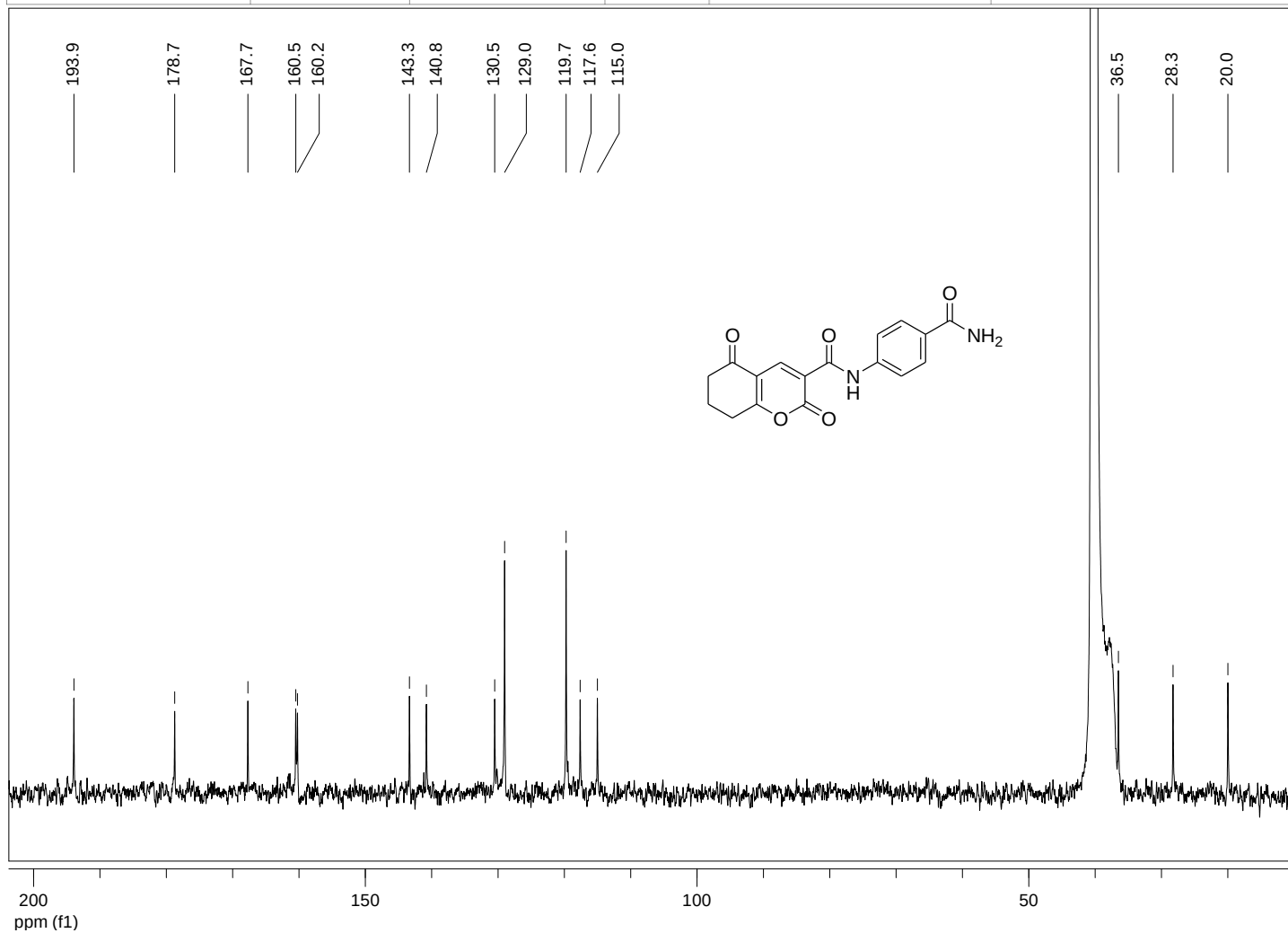


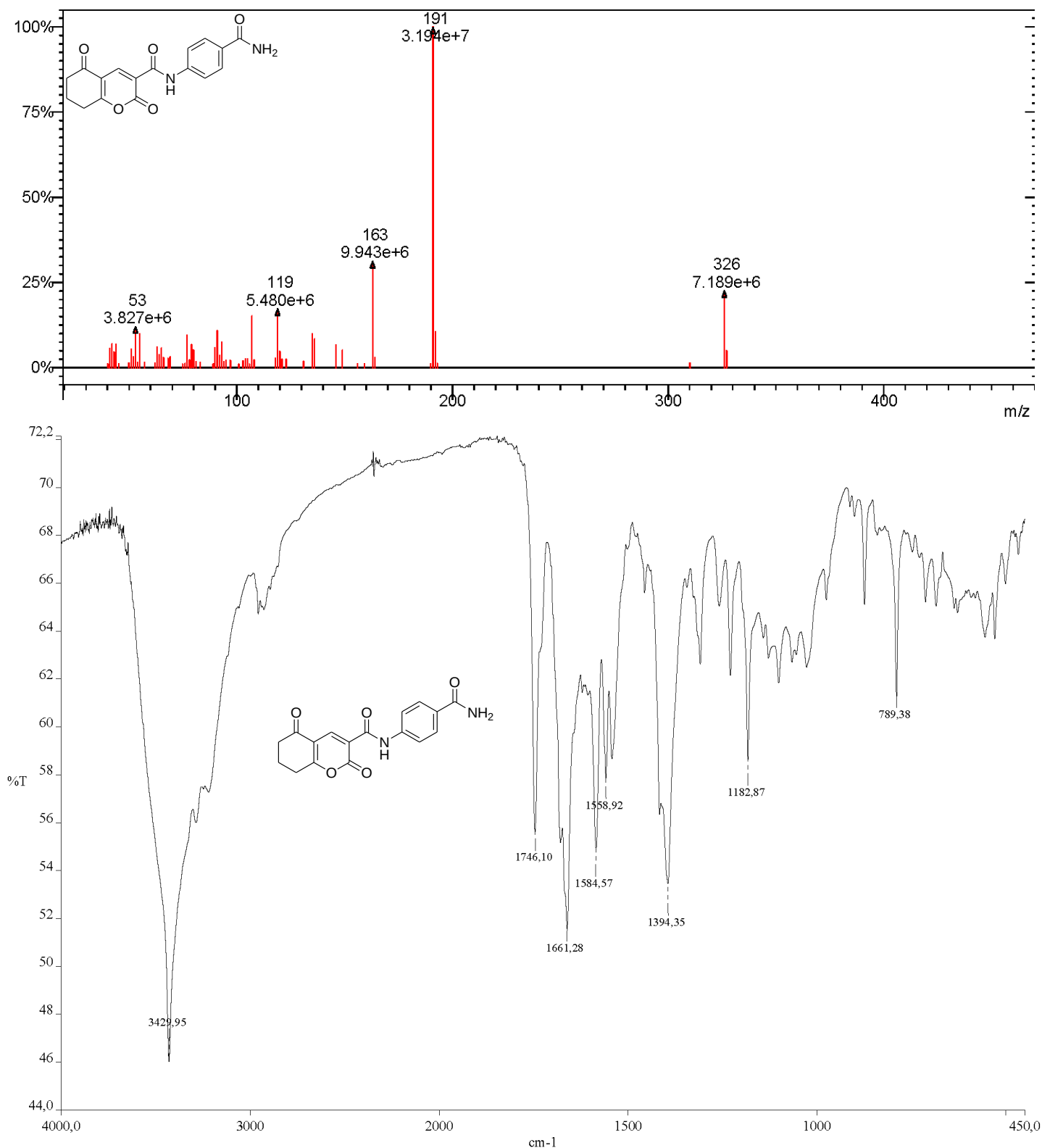
Yield 65%. Mp 263°C. ¹H NMR (200 MHz, DMSO-*d*₆) δ 2.09 (t, *J* = 6.7 Hz, 2H), 2.55 (t, *J* = 6.4 Hz, 2H), 2.97 (t, *J* = 6.1 Hz, 2H), 7.26 (br. s, 1H), 7.74 (d, *J* = 8.9 Hz, 2H), 7.87 (m, 3H), 8.50 (s, 1H), 10.49 (s, 1H); ¹³C NMR (125 MHz, DMSO-*d*₆) δ 20.0, 28.3, 36.5, 115.0, 117.6, 119.7, 129.0, 130.5, 140.8, 143.3, 160.2, 160.3, 160.5, 167.7, 178.7, 193.9; MS (EI, 70 eV) *m/z* 326 (*M*⁺); IR (KBr), cm⁻¹: ν 3430, 2963, 1746, 1661, 1584, 1559.

¹H NMR
DMSO-*d*₆

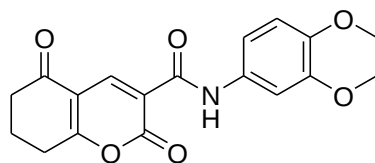


File name: MVB-094.FID	Operator:	SF: 199.9704 MHz	NSC: 0	PW: 4.00 usec, RG: 39	St: 32768
Date: 18-Jul-2008	Solvent: DMSO	SW: 5000 Hz	TE: 302 K	AQ: 1.99 sec, RD: 0.00 sec	STANDARD 1H OBSERVE

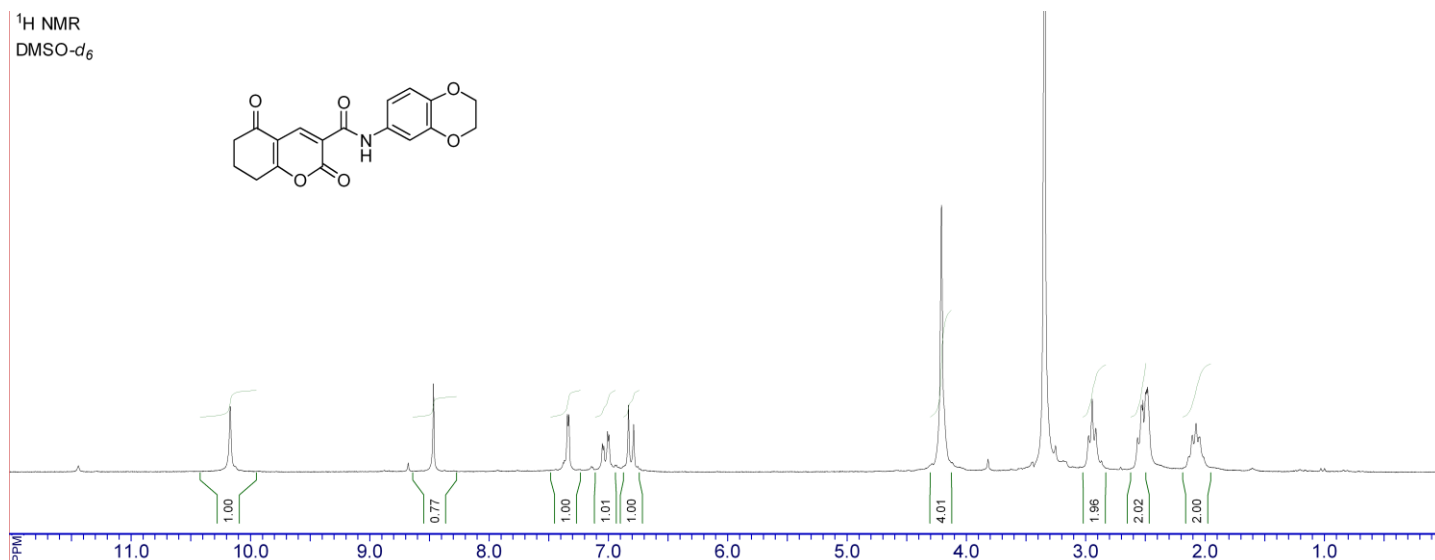




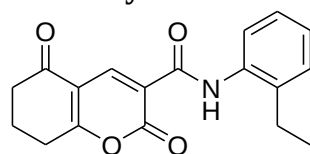
***N*-(2,3-Dihydrobenzo[*b*][1,4]dioxin-6-yl)-2,5-dioxo-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{5,4})**



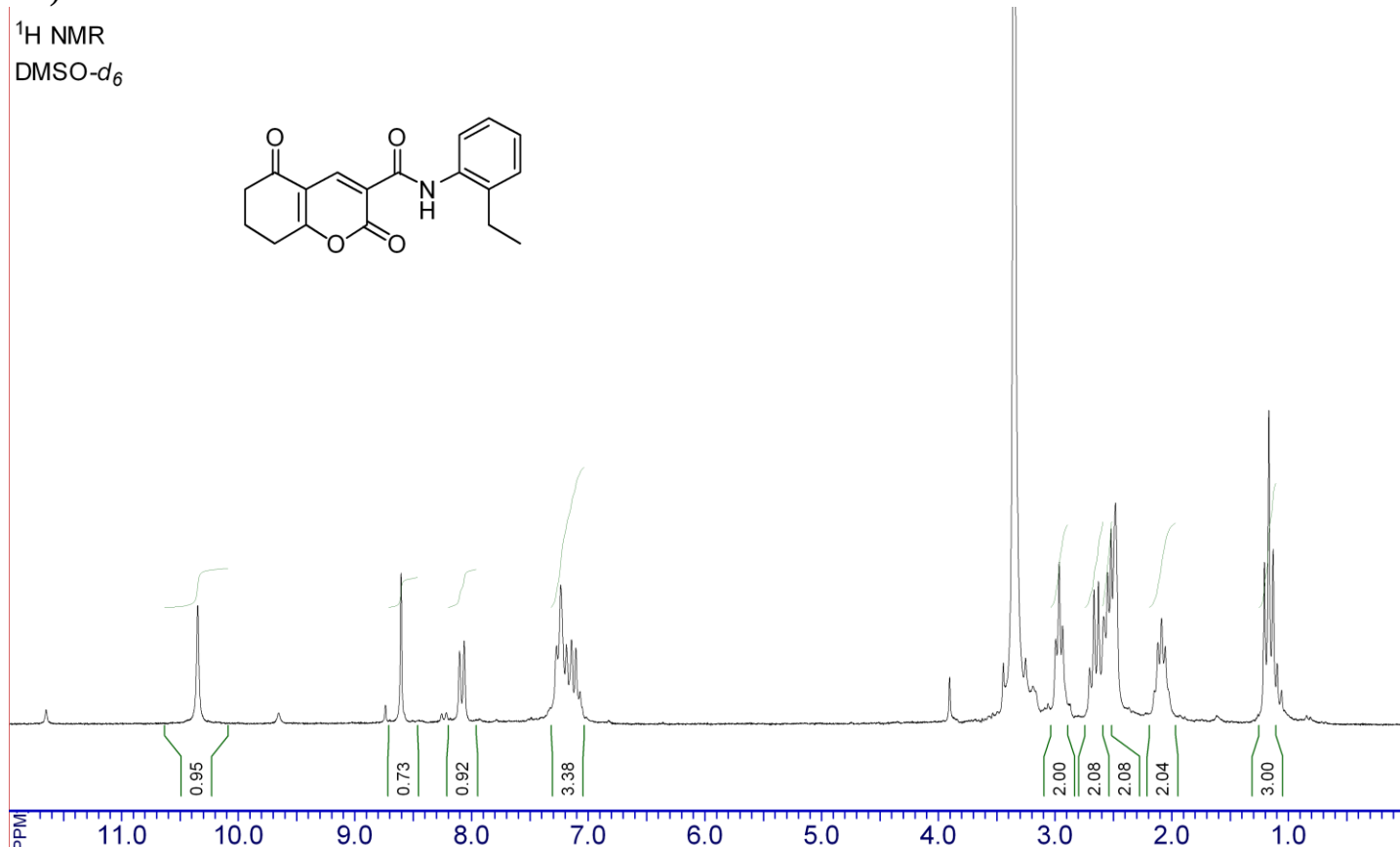
Yield 46%. ¹H NMR (200 MHz, DMSO-*d*₆) δ 1.95-2.16 (m, 2H), 2.49-2.60 (m, 2H), 2.93 (t, *J* = 6.3 Hz, 2H), 4.19 (s, 4H), 6.82 (d, *J* = 8.8 Hz, 1H), 7.03 (dd, *J* = 8.8 Hz, *J* = 2.4 Hz, 1H), 7.32 (d, *J* = 2.4 Hz, 1H), 8.45 (s, 1H), 10.15 (s, 1H).



***N*-(2-Ethylphenyl)-2,5-dioxo-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{5,5})**



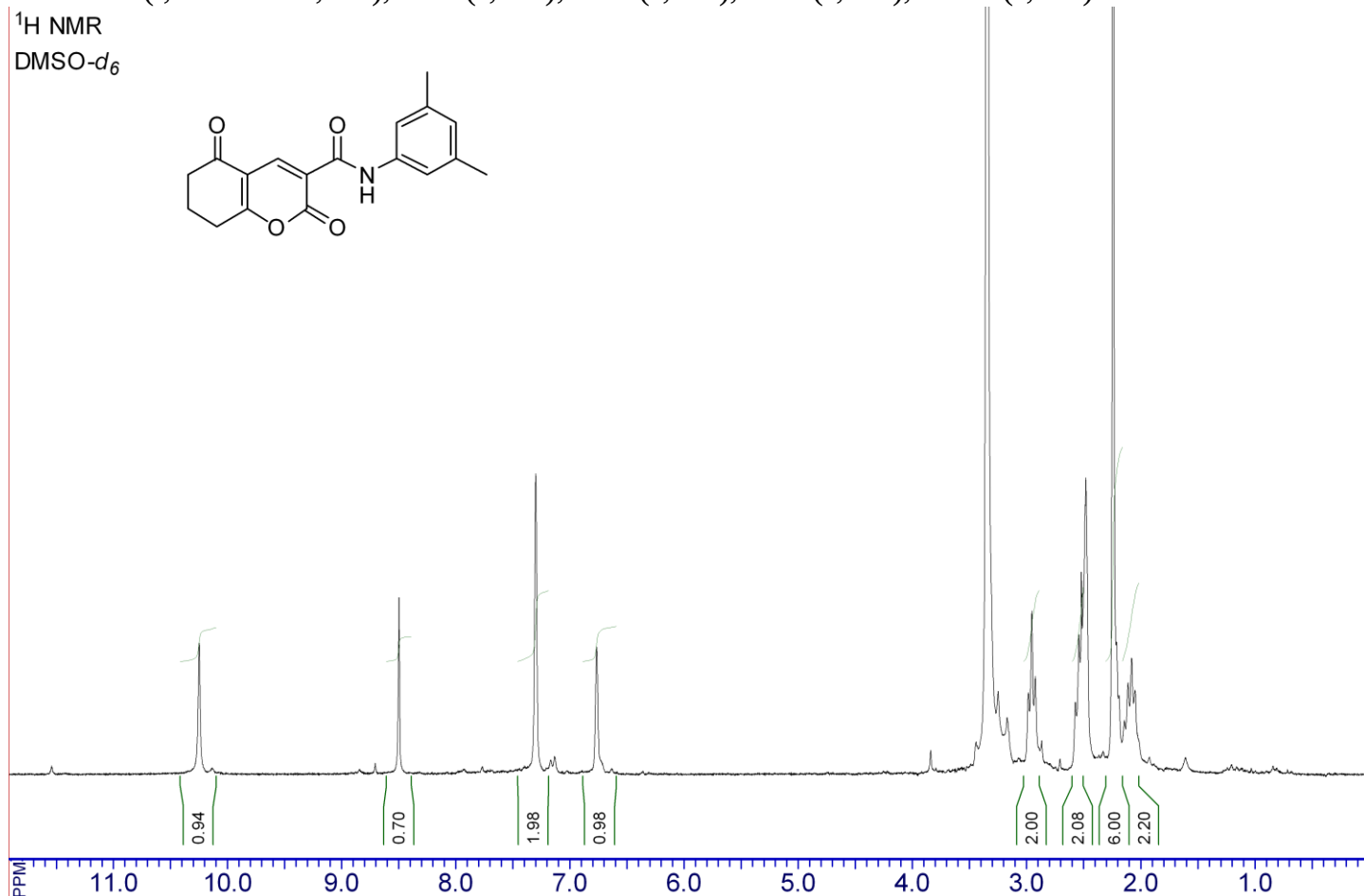
Yield 50%. ¹H NMR (200 MHz, DMSO-*d*₆) δ 1.17 (t, *J* = 7.6 Hz, 3H), 1.93-2.20 (m, 2H), 2.51-2.72 (m, 4H), 2.97 (t, *J* = 6.0 Hz, 2H), 6.95-7.38 (m, 3H), 8.07 (d, *J* = 7.9 Hz, 1H), 8.60 (s, 1H), 10.33 (s, 1H).



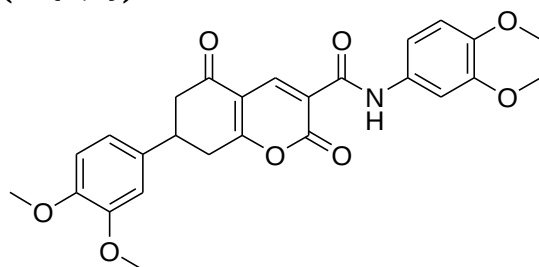
File name: MVC-085.fid	Operator:	SF: 199.9704 MHz	NSC: 0	PW: 7.00 usec, RG: 34	SI: 32768
Date: 15-Aug-2011	Solvent: DMSO	SW: 5999 Hz	TE: 302 K	AQ: 1.99 sec, RD: 0.00 sec	STANDARD 1H OBSERVE ☐

***N*-(3,5-dimethylphenyl)-2,5-dioxo-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{5,8})**

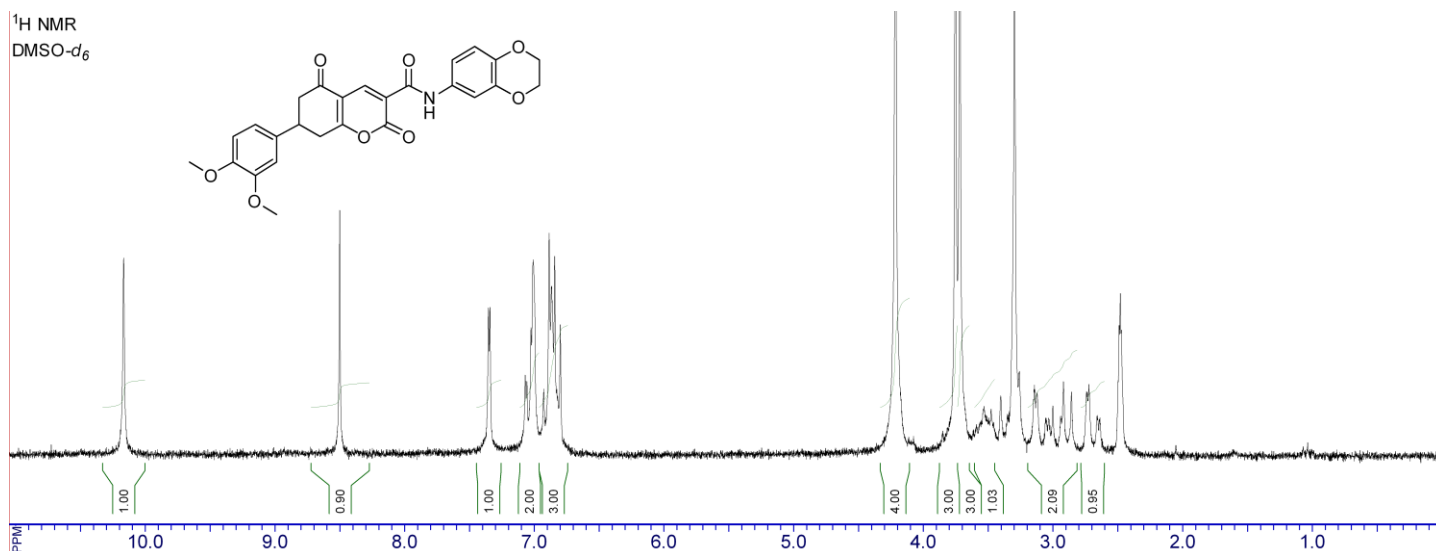
Yield 50%. ^1H NMR (200 MHz, $\text{DMSO}-d_6$) δ 2.02-2.16 (m, 2H), 2.24 (s, 6H), 2.51-2.60 (m, 2H), 2.89-3.03 (t, $J = 6.0$ Hz, 2H), 6.77 (s, 1H), 7.30 (s, 2H), 8.50 (s, 1H), 10.25 (s, 1H).



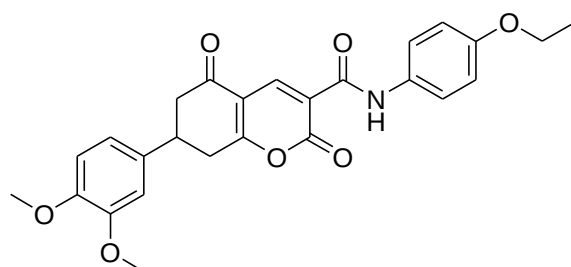
***N*-(2,3-Dihydrobenzo[*b*][1,4]dioxin-6-yl)-7-(3,4-dimethoxyphenyl)-2,5-dioxo-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{6,4})**



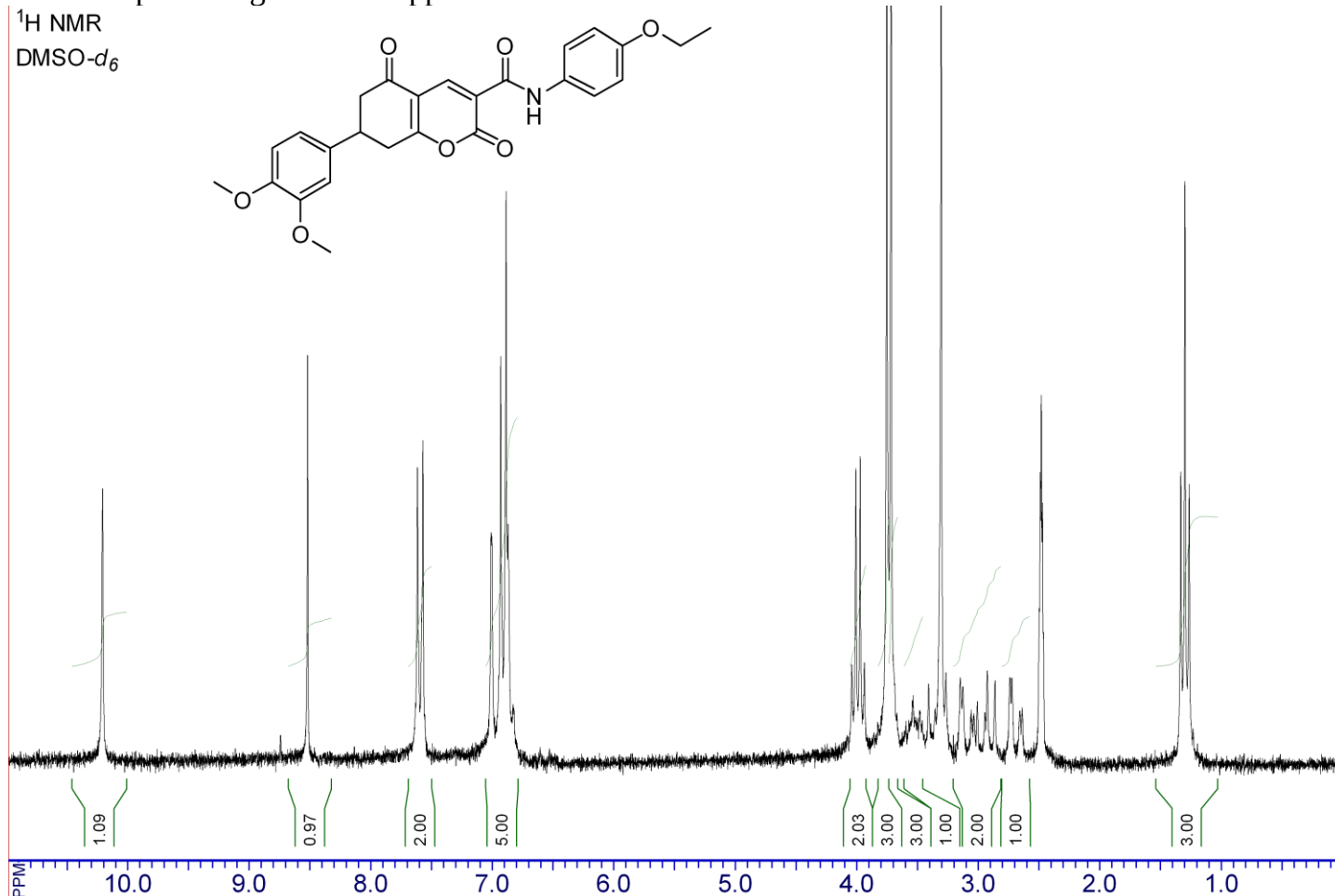
Yield 61%. ^1H NMR (200 MHz, $\text{DMSO}-d_6$) δ 2.69 (dd, $J = 16.7$ Hz, $J = 2.9$ Hz, 1H), 2.82-3.21 (m, 2H), 3.44-3.62 (m, 1H), 3.72 (s, 3H), 3.76 (s, 3H), 4.22 (s, 4H), 6.7-6.97 (m, 3H), 6.97-7.15 (m, 2H), 7.35 (d, $J=2.4$ Hz, 1H), 8.51 (s, 1H), 10.17 (s, 1H), 1H is probably overlapped with the water proton signal at 3.30 ppm.



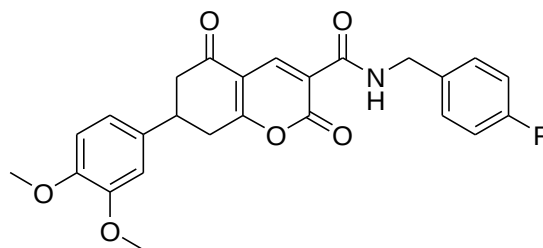
7-(3,4-Dimethoxyphenyl)-N-(4-ethoxyphenyl)-2,5-dioxo-5,6,7,8-tetrahydro-2H-chromene-3-carboxamide (22{6,22})



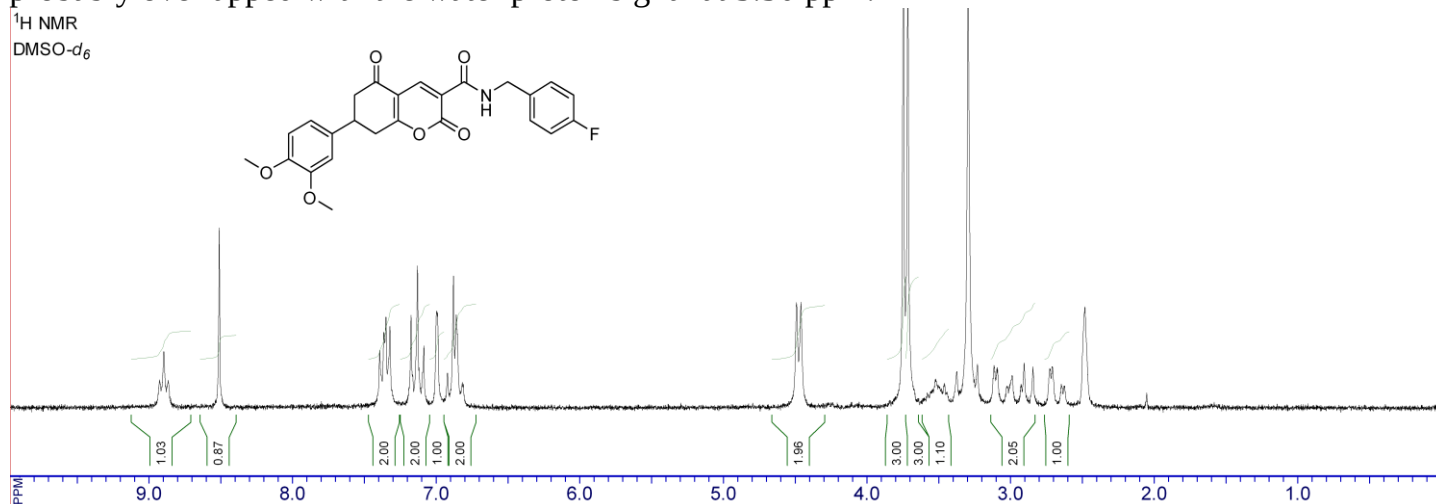
Yield 58%. ¹H NMR (200 MHz, DMSO-*d*₆) δ 1.30 (t, *J* = 7.0 Hz, 3H), 2.69 (dd, *J* = 16.5 Hz, *J* = 3.3 Hz, 1H), 2.81-3.20 (m, 2H), 3.44-3.64 (m, 1H), 3.72 (s, 3H), 3.76 (s, 3H), 4.00 (q, *J* = 7.0 Hz, 2H), 6.77-7.09 (m, 5H), 7.6 (d, *J* = 8.8 Hz, 2H), 8.52 (s, 1H), 10.21 (s, 1H), 1H is probably overlapped with the water proton signal at 3.31 ppm.



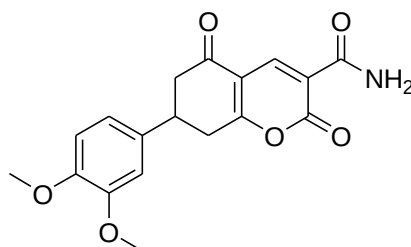
***N*-(4-Fluorobenzyl)-7-(3,4-dimethoxyphenyl)-2,5-dioxo-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{6,24})**



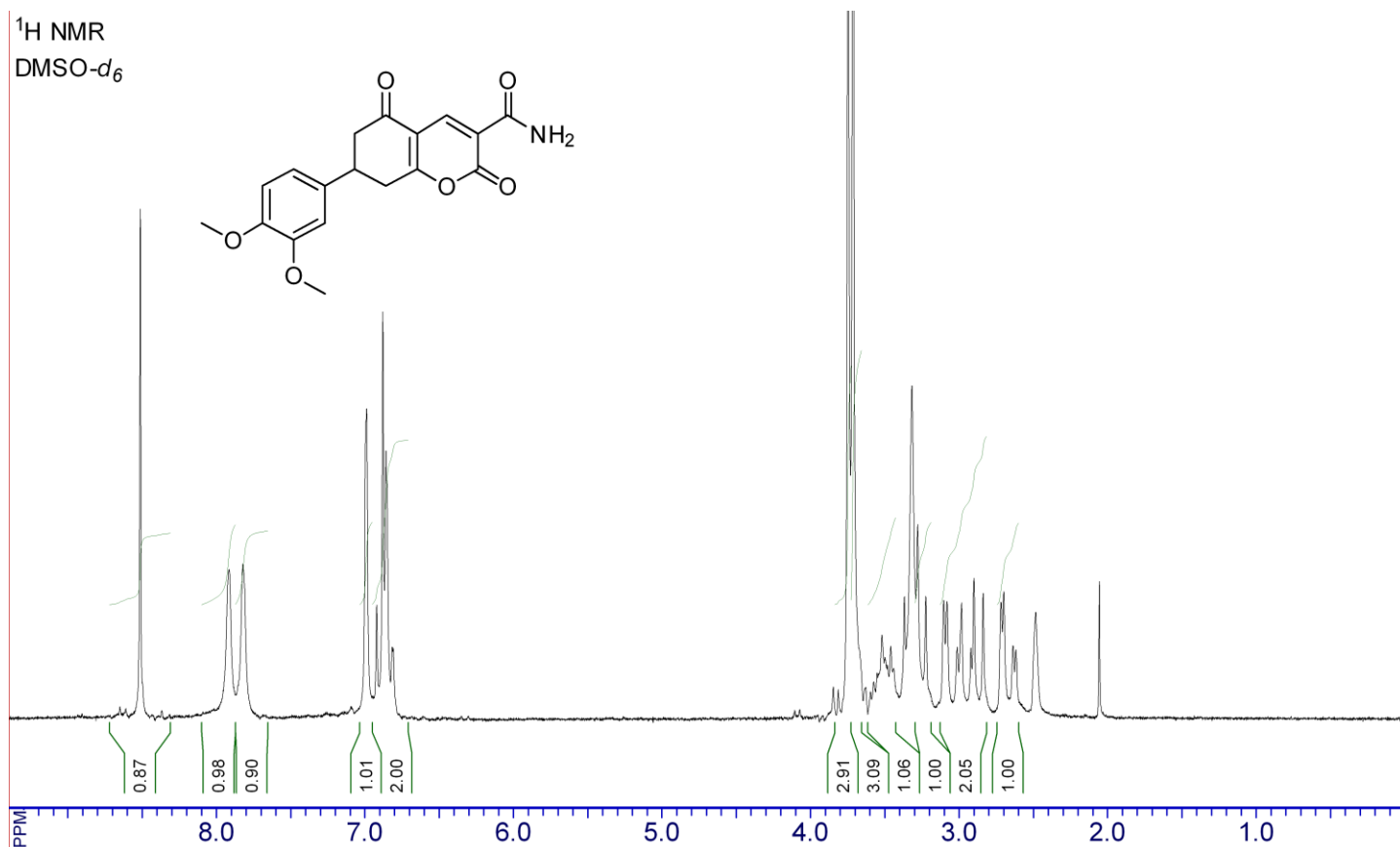
Yield 50%. ^1H NMR (200 MHz, DMSO-d_6) δ 2.68 (dd, $J = 16.6$ Hz, $J = 3.4$ Hz, 1H), 2.83-3.14 (m, 2H), 3.43-3.6 (m, 1H), 3.72 (s, 3H), 3.75 (s, 3H), 4.48 (d, $J = 5.8$ Hz, 2H), 6.73-6.95 (m, 2H), 6.95-7.05 (1H), 7.13 (t, $J = 8.9$, 2H), 7.27-7.45 (m, 2H), 8.51 (s, 1H), 8.90 (t, $J = 5.8$ Hz, 1H), 1H is probably overlapped with the water proton signal at 3.30 ppm.



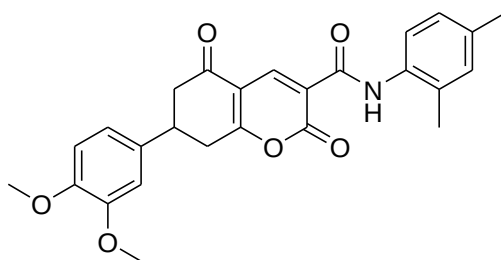
***N*-(4-Fluorobenzyl)-7-(3,4-dimethoxyphenyl)-2,5-dioxo-5,6,7,8-tetrahydro-2*H*-chromene-3-carboxamide (22{6,1})**



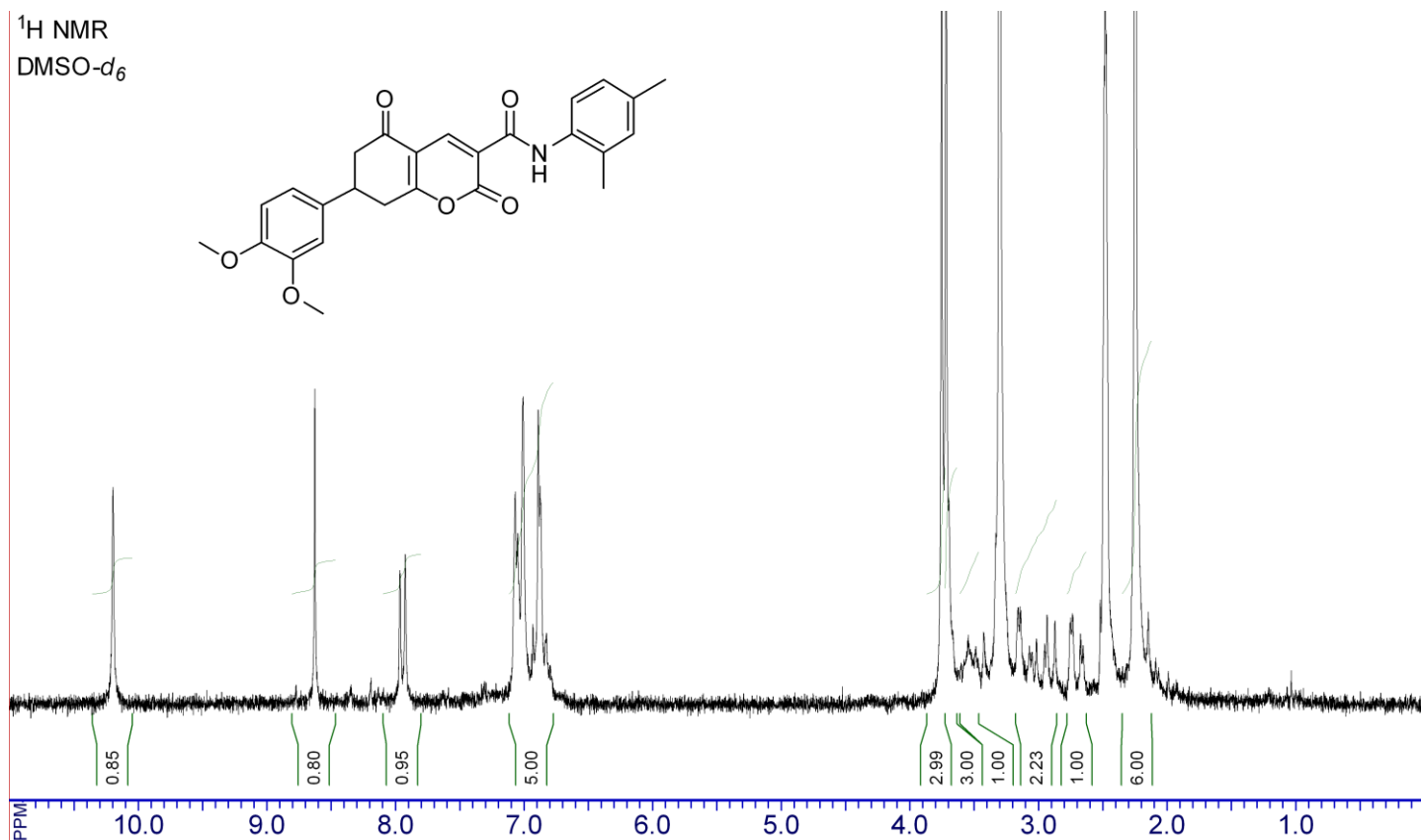
Yield 66%. ^1H NMR (200 MHz, DMSO-d_6) δ 2.67 (dd, $J = 16.5$ Hz, $J = 3.7$ Hz, 1H), 2.81-3.13 (m, 2H), 3.19-3.29 (m, 1H), 3.42-3.61 (m, 1H), 3.72 (s, 3H), 3.75 (s, 3H), 6.71-6.95 (m, 2H), 6.99 (s, 1H), 7.82 (br. s, 1H), 7.92 (br. s, 1H), 8.51 (s, 1H).



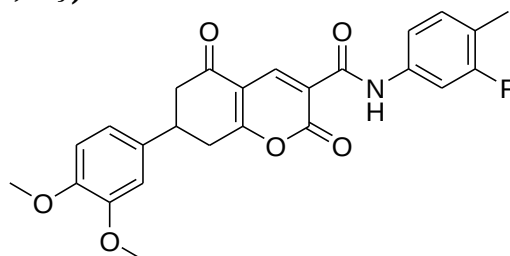
7-(3,4-Dimethoxyphenyl)-N-(2,4-dimethylphenyl)-2,5-dioxo-5,6,7,8-tetrahydro-2H-chromene-3-carboxamide (22{6,35})



Yield 56%. ¹H NMR (200 MHz, DMSO-*d*₆) δ 2.25 (s, 6H), 2.70 (dd, *J* = 16.3 Hz, *J* = 3.7 Hz, 1H), 2.86-3.18 (m, 2H), 3.47-3.61 (m, 1H), 3.73 (s, 3H), 3.76 (s, 3H), 6.78-7.14 (m, 5H), 7.95 (d, *J* = 8.2 Hz, 2H), 8.63 (s, 1H), 10.20 (s, 1H), 1H is probably overlapped with the water proton signal at 3.30 ppm.



7-(3,4-Dimethoxyphenyl)-N-(3-fluoro-4-methylphenyl)-2,5-dioxo-5,6,7,8-tetrahydro-2H-chromene-3-carboxamide (22{6,36})



Yield 55%. ¹H NMR (200 MHz, DMSO-*d*₆) δ 2.19 (s, 3H), 2.69 (dd, *J* = 16.5 Hz, *J* = 3.7 Hz, 1H), 2.85-3.17 (m, 2H), 3.45-3.60 (m, 1H), 3.72 (s, 3H), 3.76 (s, 3H), 6.77-6.96 (m, 2H), 7.00 (d, *J* = 1.5 Hz, 1H), 7.15-7.40 (m, 2H), 7.65 (dd, *J* = 11.9 Hz, *J* = 1.5 Hz, 1H), 8.51 (s, 1H), 10.38 (s, 1H), 1H is probably overlapped with the water proton signal at 3.32 ppm.

^1H NMR
DMSO- d_6

