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Supporting Information

Practical Synthesis of Chiral *β*-Aryl-*α*-Hydroxy Acids *via* Palladium-Catalyzed C(sp^3)–H Arylation of Lactic Acid

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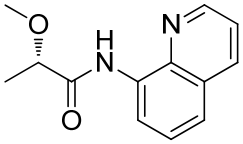
General Information: Unless otherwise noted, all commercial materials were used without further purification. Anhydrous solvents obtained from Aladdin and Adamas were used directly without further purification, and solvents obtained from other commercial suppliers were used after purification as specified in *Purification of Laboratory Chemicals, 6th Ed*. Nuclear magnetic resonance (NMR) spectra were recorded with a Bruker AVANCE 400MHz instrument. ^{1}H and ^{13}C chemical shifts are reported in ppm downfield of tetramethylsilane and referenced to residual solvent peak ($CHCl_3$ = 7.26 (^{1}H NMR), DMSO = 2.50 (^{1}H NMR), $CDCl_3$ = 77.16 (^{13}C NMR)) unless otherwise noted. Multiplicities are reported using the following abbreviations: s = singlet, d = doublet, t = triplet, q = quartet, m = multiplet, br = broad resonance. High-resolution mass spectra for new compounds were recorded at Mass Spectrometry Facilities, Zhejiang University. X-ray diffraction experiments were performed at X-Ray Facilities, Zhejiang University.

Experimental Procedures:

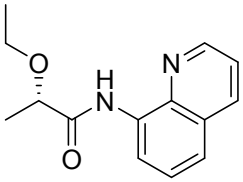
Preparation of Lactic Acid Substrates

(*S*)-2-Methoxy-*N*-(quinolin-8-yl)propanamide (1a)



To a stirred solution of (*S*)-2-methoxypropanoic acid [1] (10.41 g, 100 mmol) in dry dichloromethane (300 mL), 4-methylmorpholine (NMM, 11.5 mL, 105 mmol) was added slowly at 0 °C. After the solution was stirred for five minutes, *iso*-butyl carbonochloridate (13.3 mL, 105 mmol) was added dropwise slowly at 0 °C. The mixture was then stirred at room temperature for 1.5 h. A solution of 8-aminoquinoline (8.65 g, 60 mmol) in dry dichloromethane (50 mL) was slowly added to the reaction at 0 °C. After the reaction was stirred at room temperature overnight, the resulting mixture was then washed by aqueous HCl (100 mL, 0.1 M), saturated Na_2CO_3 (100 mL), brine (100 mL), and dried over anhydrous $MgSO_4$. Evaporation of organic solvent and purification by silica gel column chromatography in 6:3:1 petroleum ether: dichloromethane: ethyl acetate, afforded the pure 8-aminoquinoline amide **1a** (13.12 g, 95%) as a white solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.80 (s, 1H), 8.86 (dd, *J* = 4.0, 1.6 Hz, 1H), 8.80 (dd, *J* = 6.4, 2.4 Hz, 1H), 8.16 (dd, *J* = 8.4, 1.6 Hz, 1H), 7.57 – 7.52 (m, 2H), 7.46 (dd, *J* = 8.4, 4.4 Hz, 1H), 3.99 (q, *J* = 6.8 Hz, 1H), 3.58 (s, 3H), 1.55 (d, *J* = 6.8 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.89, 148.63, 138.92, 137.77, 136.20, 133.95, 129.51, 128.38, 128.03, 127.27, 126.60, 122.06, 121.69, 116.63, 84.55, 59.32, 39.58; HRMS (EI) *m/z*: 230.1058(M^+), calc. for $C_{13}H_{14}N_2O_2$: 230.1055.

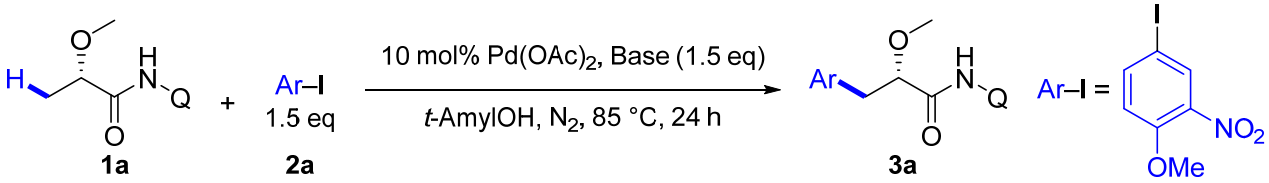
(*S*)-2-Ethyloxy-*N*-(quinolin-8-yl)propanamide (1b)



The preparation of **1b** followed the same procedure of **1a** except using (*S*)-2-ethyloxypropanoic acid instead of (*S*)-2-methoxypropanoic acid. The compound **1b** was obtained as a light yellow solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.93 (s, 1H), 8.85 (dd, *J* = 4.0, 1.1 Hz, 1H), 8.79 (dd, *J* = 6.6, 1.9 Hz, 1H), 8.16 (dd, *J* = 8.2, 1.1 Hz, 1H), 7.71 – 7.50 (m, 2H), 7.45 (dd, *J* = 8.2, 4.2 Hz, 1H), 4.06 (q, *J* = 6.8 Hz, 1H), 3.84 – 3.60 (m, 2H), 1.55 (d, *J* = 6.8 Hz, 3H), 1.41 (t, *J* = 7.0 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 172.67, 148.64, 139.09, 136.29, 134.28, 128.14, 127.40, 121.93, 121.74, 116.59, 77.61, 66.28, 19.24, 15.54; HRMS (EI) *m/z*: 244.1214(M^+), calc. for $C_{14}H_{16}N_2O_2$: 244.1212.

Optimization of Reaction Conditions Mono-arylation of 1a

(1) Optimization of Base Additives (*t*-AmylOH used as solvent)

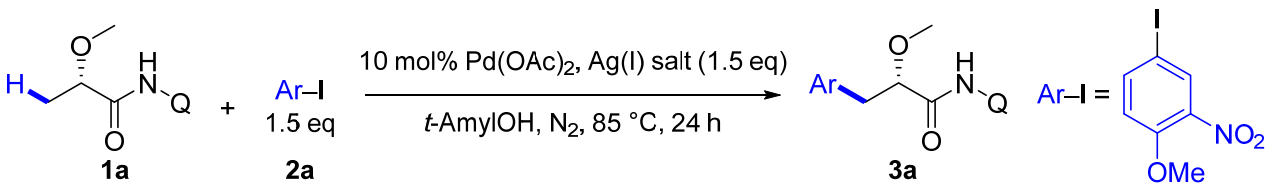


1a **2a** **3a**

Entry	Base	Yield **3a**
1	K_2CO_3	17%
2	KOAc	trace
3	K_3PO_4	26%
4	LiOAc	0
5	NaOAc	0
6	Na_2CO_3	trace
7	CsOAc	trace
8	Cs_2CO_3	18%

Reaction conditions: **1a** (0.20 mmol, 1.0 eq), **2a** (0.30 mmol, 1.5 eq), $Pd(OAc)_2$ (0.02 mmol, 10 mol%), base (0.30 mmol, 1.5 eq), *t*-AmylOH (2.0 ml), reaction for 24 hours at 85 °C and under N_2 atmosphere.

(2) Optimization of Silver(I) Salt Additives (*t*-AmylOH used as solvent)

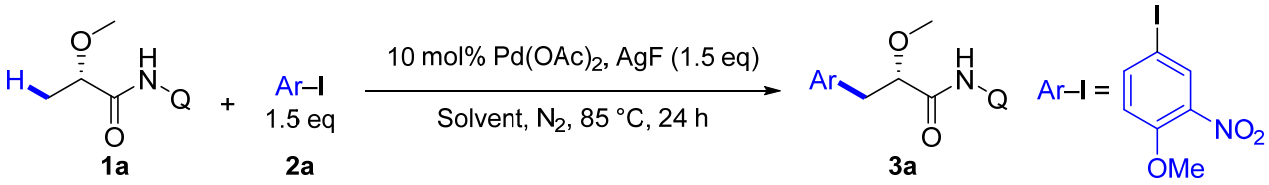


1a **2a** **3a**

Entry	Base	Yield **3a**
1	AgOAc	16%
2	AgF	65%
3	AgTFA	0
4	Ag_2CO_3	25%
5	Ag_2O	50%
6	Ag_3PO_4	trace
7	AgOCN	trace
8	$AgBF_4$	0
9	AgOPiv	trace

Reaction conditions: **1a** (0.20 mmol, 1.0 eq), **2a** (0.30 mmol, 1.5 eq), $Pd(OAc)_2$ (0.02 mmol, 10 mol%), silver salt (0.30 mmol, 1.5 eq), *t*-AmylOH (2.0 ml), reaction for 24 hours at 85 °C and under N_2 atmosphere.

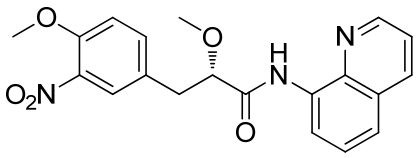
(3) Optimization of Solvent (AgF used as silver salt additive)



Entry	Solvent	Yield **3a**
1	*t*-AmylOH	65%
2	DCE	51%
3	THF	30%
4	1,4-dioxane	18%
5	PhMe	14%
6	MeCN	0
7	DMF	60%
8	DMAc	54%
9	Acetone	52%
10	MeOH	64%
11 [a]	*t*-AmylOH	75%
12 [a, b]	*t*-AmylOH	64%
13 [a, c]	*t*-AmylOH	81% [d]
14 [a, c]	DMSO	trace
15 [a, c]	NMP	45%

Reaction conditions: **1a** (0.20 mmol, 1.0 eq), **2a** (0.30 mmol, 1.5 eq), $Pd(OAc)_2$ (0.02 mmol, 10 mol%), AgF (0.30 mmol, 1.5 eq), solvent (2.0 ml), reaction for 24 hours at 85 °C and under N_2 atmosphere. [a] 3.0 equiv AgF was used; [b] 1.2 eq **2a** was used; [c] reaction for 12 hours; [d] isolated yield.

(*S*)-2-Methoxy-3-(4-methoxy-3-nitrophenyl)-*N*-(quinolin-8-yl)propanamide (3a)

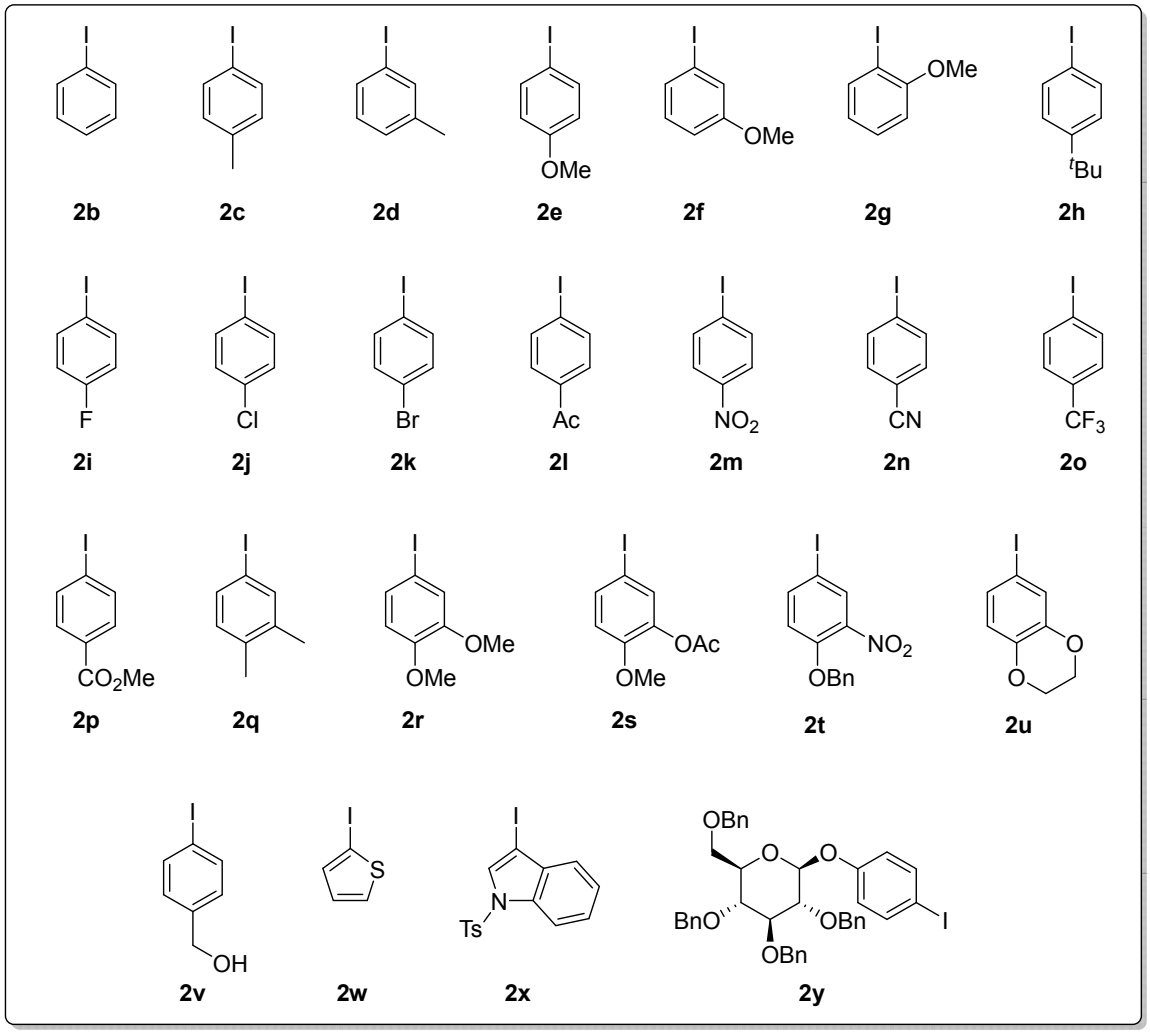


The title compound was prepared under the optimized condition. The crude product was purified by silica gel column chromatography in 4:1 petroleum ether:ethyl acetate, providing **3a** as a white solid (61.5 mg, 81%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.65 (s, 1H), 8.79 (dd, *J* = 4.4, 2.0 Hz, 1H), 8.77 – 8.72 (m, 1H), 8.12 (dd, *J* = 8.4, 1.6 Hz, 1H), 7.84 (d, *J* = 2.4 Hz, 1H), 7.54 – 7.49 (m, 2H), 7.45 – 7.41 (m, 2H), 6.90 (d, *J* = 8.4 Hz, 1H), 4.03 (dd, *J* = 7.6, 3.6 Hz, 1H), 3.82 (s, 3H), 3.53 (s, 3H), 3.24 (dd, *J* = 14.4, 3.6 Hz, 1H), 3.07 (dd, *J* = 14.4, 7.6 Hz, 1H).^{13}C NMR (101 MHz, $CDCl_3$) δ 170.06, 151.79, 148.70, 139.27, 138.81, 136.20, 135.41, 133.62, 129.78, 127.99, 127.16, 126.76, 122.24, 121.74, 116.66, 113.37, 83.69, 59.19, 56.47, 37.72. HRMS (EI) *m/z*: 381.1329 (M^+), calc. for $C_{20}H_{19}N_3O_5$: 381.1325.

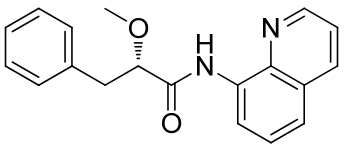
General Procedure (GP) for Mono-arylation of Lactic Acid Derivative

To a 30-mL resealable Schlenk flask was added **1a** (46.1 mg, 0.2 mmol), $Pd(OAc)_2$ (4.5 mg, 0.02 mmol), aryl iodide (0.3 mmol), AgF (76.1 mg, 0.6 mmol), and *t*-AmylOH (2.0 mL). The Schlenk flask was charged with N_2. The mixture was stirred at 85 °C for 12 hours. After cooling to room temperature, the reaction was diluted with dichloromethane (5 mL), then filtered through a pad of Celite and washed by dichloromethane (20 mL). Evaporation of organic solvent and purification by column chromatography gave the corresponding product.

Scope of alkyl iodides:



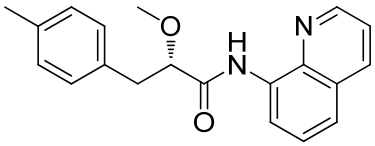
(*S*)-2-Methoxy-3-phenyl-*N*-(quinolin-8-yl)propanamide (3b)



The compound **3b** was prepared according to the **GP** and purified by column chromatography in toluene: ethyl acetate = 12:1. **3b** was obtained as a light yellow solid (45.5 mg, 74%). ^1H NMR (400

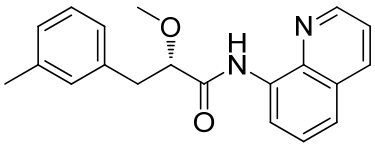
MHz, $CDCl_3$) δ 10.81 (s, 1H), 8.89 – 8.79 (m, 2H), 8.13 (dd, *J* = 8.3, 1.3 Hz, 1H), 7.59 – 7.50 (m, 2H), 7.43 (dd, *J* = 8.3, 4.2 Hz, 1H), 7.39 – 7.34 (m, 2H), 7.33 – 7.27 (m, 2H), 7.25 – 7.19 (m, 1H), 4.09 (dd, *J* = 8.7, 3.5 Hz, 1H), 3.49 (s, 2H), 3.33 (dd, *J* = 14.2, 3.4 Hz, 1H), 3.08 (dd, *J* = 14.2, 8.7 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.89, 148.63, 138.92, 137.77, 136.20, 133.95, 129.51, 128.38, 128.03, 127.27, 126.60, 122.06, 121.69, 116.63, 84.55, 59.32, 39.58; HRMS (EI) *m/z*: 306.1368 (M^+); calc. for $C_{19}H_{18}N_2O_2$: 306.1368.

(*S*)-2-Methoxy-*N*-(quinolin-8-yl)-3-(*p*-tolyl)propanamide (3c)



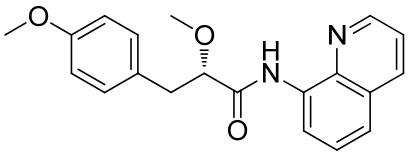
The compound **3c** was prepared according to the **GP** and purified by column chromatography in petroleum ether: ethyl acetate = 4:1. **3c** was obtained as a colorless oil (45.8 mg, 72%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.77 (s, 1H), 8.93 – 8.73 (m, 2H), 8.13 (dd, *J* = 8.2, 1.3 Hz, 1H), 7.60 – 7.48 (m, 2H), 7.42 (dd, *J* = 8.2, 4.2 Hz, 1H), 7.22 (d, *J* = 7.8 Hz, 2H), 7.08 (d, *J* = 7.7 Hz, 2H), 4.04 (dd, *J* = 8.6, 3.5 Hz, 1H), 3.48 (s, 3H), 3.26 (dd, *J* = 14.2, 3.3 Hz, 1H), 3.03 (dd, *J* = 14.2, 8.6 Hz, 1H), 2.28 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 171.02, 148.63, 139.01, 136.21, 136.07, 134.68, 134.06, 129.39, 129.11, 128.08, 127.31, 122.03, 121.68, 116.71, 84.73, 59.29, 39.20, 21.13; HRMS (EI) *m/z*: 320.1523 (M^+); calc. for $C_{20}H_{20}N_2O_2$: 320.1525.

(*S*)-2-Methoxy-*N*-(quinolin-8-yl)-3-(*m*-tolyl)propanamide (3d)



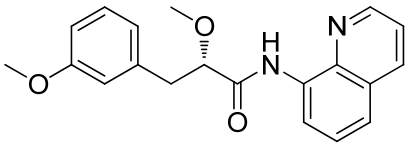
The compound **3d** was prepared according to the **GP** and purified by column chromatography in toluene: ethyl acetate = 20:1. **3d** was obtained as a colorless oil (46.3 mg, 72%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.77 (s, 1H), 8.97 – 8.67 (m, 2H), 8.14 (dd, *J* = 8.2, 1.4 Hz, 1H), 7.63 – 7.48 (m, 2H), 7.43 (dd, *J* = 8.2, 4.2 Hz, 1H), 7.22 – 7.09 (m, 3H), 7.01 (d, *J* = 6.8 Hz, 1H), 4.06 (dd, *J* = 8.8, 3.4 Hz, 1H), 3.48 (s, 3H), 3.27 (dd, *J* = 14.2, 3.2 Hz, 1H), 3.01 (dd, *J* = 14.2, 8.8 Hz, 1H), 2.29 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 171.06, 148.66, 139.07, 137.95, 137.78, 136.24, 134.10, 130.35, 128.31, 128.12, 127.39, 127.35, 126.53, 122.05, 121.71, 116.74, 84.77, 59.37, 39.71, 21.46; HRMS (EI) *m/z*: 320.1520 (M^+); calc. for $C_{20}H_{20}N_2O_2$: 320.1525.

(*S*)-2-Methoxy-3-(4-methoxyphenyl)-*N*-(quinolin-8-yl)propanamide (3e)



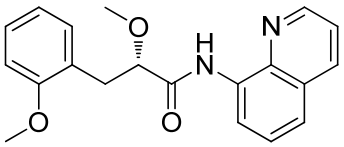
The compound **3e** was prepared according to the **GP** and purified by column chromatography in petroleum ether: ethyl acetate = 4:1. **3e** was obtained as a colorless oil (36.8 mg, 55%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.76 (s, 1H), 8.99 – 8.76 (m, 2H), 8.16 (d, *J* = 8.2 Hz, 1H), 7.61 – 7.51 (m, 2H), 7.45 (dd, *J* = 8.2, 4.2 Hz, 1H), 7.27 (d, *J* = 7.9 Hz, 2H), 6.83 (d, *J* = 8.0 Hz, 2H), 4.05 (dd, *J* = 8.1, 3.1 Hz, 1H), 3.77 (s, 3H), 3.51 (s, 3H), 3.26 (dd, *J* = 14.3, 3.1 Hz, 1H), 3.04 (dd, *J* = 14.3, 8.4 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.98, 158.36, 148.63, 138.95, 136.20, 133.99, 130.51, 129.73, 128.05, 127.28, 122.04, 121.68, 116.65, 113.78, 84.72, 59.28, 55.23, 38.65; HRMS (EI) *m/z*: 336.1479 (M^+); calc. for $C_{20}H_{20}N_2O_3$: 336.1474.

(*S*)-2-Methoxy-3-(3-methoxyphenyl)-*N*-(quinolin-8-yl)propanamide (3f)



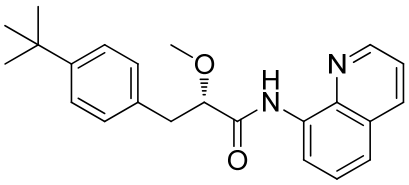
The compound **3f** was prepared according to the **GP** and purified by column chromatography in petroleum ether: ethyl acetate = 4:1. **3f** was obtained as a white solid (54.0 mg, 80%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.78 (s, 1H), 8.98 – 8.71 (m, 2H), 8.15 (dd, *J* = 8.3, 1.5 Hz, 1H), 7.60 – 7.50 (m, 2H), 7.45 (dd, *J* = 8.2, 4.2 Hz, 1H), 7.20 (t, *J* = 7.8 Hz, 1H), 6.99 – 6.84 (m, 2H), 6.75 (dd, *J* = 8.2, 1.7 Hz, 1H), 4.08 (dd, *J* = 8.6, 3.4 Hz, 1H), 3.76 (s, 3H), 3.50 (s, 3H), 3.29 (dd, *J* = 14.2, 3.2 Hz, 1H), 3.04 (dd, *J* = 14.2, 8.7 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ = 170.95, 159.70, 148.70, 139.42, 139.06, 136.27, 134.07, 129.37, 128.13, 127.35, 122.11, 121.99, 121.74, 116.74, 114.95, 112.41, 84.59, 59.40, 55.27, 39.73; HRMS (EI) *m/z*: 336.1476 (M^+); calc. for $C_{20}H_{20}N_2O_3$: 336.1474.

(*S*)-2-Methoxy-3-(2-methoxyphenyl)-*N*-(quinolin-8-yl)propanamide (3g)



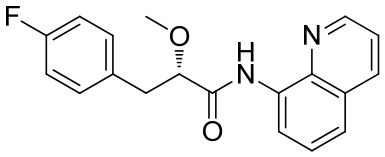
The compound **3g** was prepared according to the **GP** and purified by column chromatography in petroleum ether: ethyl acetate = 4:1. **3g** was obtained as a colorless oil (27.7 mg, 41%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.76 (s, 1H), 8.99 – 8.68 (m, 2H), 8.14 (dd, *J* = 8.2, 1.4 Hz, 1H), 7.58 – 7.49 (m, 2H), 7.44 (dd, *J* = 8.2, 4.2 Hz, 1H), 7.32 – 7.25 (m, 1H), 7.20 (td, *J* = 8.0, 1.4 Hz, 1H), 6.89 (t, *J* = 7.4 Hz, 1H), 6.83 (d, *J* = 8.1 Hz, 1H), 4.19 (dd, *J* = 8.6, 4.3 Hz, 1H), 3.81 (s, 3H), 3.45 (s, 3H), 3.41 (dd, *J* = 14.0, 4.2 Hz, 1H), 3.02 (dd, *J* = 14.0, 8.6 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ = 171.43, 157.82, 148.61, 139.05, 136.25, 134.31, 131.48, 128.12, 128.00, 127.39, 126.08, 121.86, 121.69, 120.45, 116.69, 110.35, 83.15, 59.22, 55.45, 34.67; HRMS (EI) *m/z*: 336.1474 (M^+); calc. for $C_{20}H_{20}N_2O_3$: 336.1474.

(*S*)-3-(4-(*tert*-Butyl)phenyl)-2-methoxy-*N*-(quinolin-8-yl)propanamide (3h)



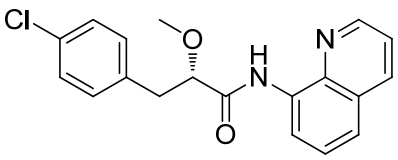
The compound **3h** was prepared according to the **GP** and purified by column chromatography in petroleum ether: ethyl acetate = 4:1. **3h** was obtained as a colorless oil (50.5 mg, 70%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.77 (s, 1H), 8.91 – 8.77 (m, 2H), 8.14 (dd, *J* = 8.3, 1.6 Hz, 1H), 7.59 – 7.50 (m, 2H), 7.43 (dd, *J* = 8.3, 4.2 Hz, 1H), 7.34 – 7.26 (m, 4H), 4.09 (dd, *J* = 8.6, 3.4 Hz, 1H), 3.51 (s, 3H), 3.29 (dd, *J* = 14.3, 3.4 Hz, 1H), 3.06 (dd, *J* = 14.3, 8.6 Hz, 1H), 1.28 (s, 9H); ^{13}C NMR (100MHz, $CDCl_3$) δ 171.10, 149.33, 148.62, 138.95, 136.21, 134.69, 134.03, 129.14, 128.05, 127.30, 125.30, 122.02, 121.68, 116.63, 84.63, 59.29, 39.13, 34.44, 31.43; HRMS (EI) *m/z*: 362.1991 (M^+); calc. for $C_{23}H_{26}N_2O_2$: 362.1994.

(*S*)-3-(4-Fluorophenyl)-2-methoxy-*N*-(quinolin-8-yl)propanamide (3i)



The compound **3i** was prepared according to the **GP** and purified by column chromatography in petroleum ether: ethyl acetate = 4:1. **3i** was obtained as a white solid (51.1 mg, 79%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.72 (s, 1H), 8.82 (dd, *J* = 4.0, 1.2 Hz, 1H), 8.79 (dd, *J* = 6.3, 2.5 Hz, 1H), 8.15 (dd, *J* = 8.2, 1.0 Hz, 1H), 7.60 – 7.49 (m, 2H), 7.44 (dd, *J* = 8.2, 4.2 Hz, 1H), 7.32 – 7.23 (m, 2H), 6.95 (t, *J* = 8.7 Hz, 2H), 4.03 (dd, *J* = 8.2, 3.5 Hz, 1H), 3.50 (s, 3H), 3.26 (dd, *J* = 14.3, 3.4 Hz, 1H), 3.05 (dd, *J* = 14.3, 8.2 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.68, 161.90(d, J_{C-F} = 242.8 Hz), 148.71, 139.01, 136.28, 133.95, 133.32(d, J_{C-F} = 3.2 Hz), 131.08(d, J_{C-F} = 7.8 Hz), 128.12, 127.32, 122.17, 121.76, 116.73, 115.19(d, J_{C-F} = 21.0 Hz), 84.47, 59.32, 38.63; HRMS (EI) *m/z*: 324.1271 (M^+); calc. for $C_{19}H_{17}FN_2O_2$: 324.1274.

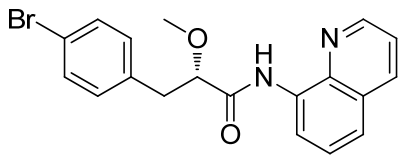
(*S*)-3-(4-Chlorophenyl)-2-methoxy-*N*-(quinolin-8-yl)propanamide (3j)



The compound **3j** was prepared according to the **GP** and purified by column chromatography in toluene: ethyl acetate = 12:1. **3j** was obtained as a yellow solid (56.1 mg, 83%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.72 (s, 1H), 8.81 (dd, *J* = 4.2, 1.6 Hz, 1H), 8.79 (dd, *J* = 6.6, 2.4 Hz, 1H), 8.13 (dd, *J* = 8.2, 1.3 Hz, 1H), 7.59 – 7.48 (m, 2H), 7.43 (dd, *J* = 8.2, 4.2 Hz, 1H), 7.24 (q, *J* = 8.4 Hz, 4H), 4.03 (dd, *J* = 8.2, 3.5 Hz, 1H), 3.49 (s, 3H), 3.25 (dd, *J* = 14.2, 3.4 Hz, 1H), 3.04 (dd, *J* = 14.2, 8.2 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.51, 148.70, 138.97, 136.25, 136.13, 133.89, 132.51, 130.98,

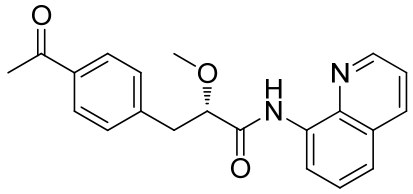
128.50, 128.09, 127.28, 122.18, 121.74, 116.72, 84.26, 59.31, 38.74; HRMS (EI) *m/z*: 340.0976 (M^+); calc. for $C_{19}H_{17}ClN_2O_2$: 340.0979.

(*S*)-3-(4-Bromophenyl)-2-methoxy-*N*-(quinolin-8-yl)propanamide (3k)



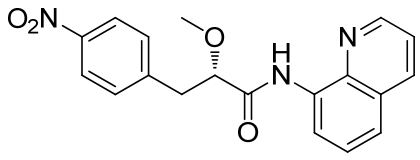
The compound **3k** was prepared according to the **GP** and purified by column chromatography in touene: ethyl acetate = 20:1. **3k** was obtained as a light yellow oil (53.5 mg, 70%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.72 (s, 1H), 8.82 (dd, *J* = 4.1, 1.6 Hz, 1H), 8.79 (dd, *J* = 6.4, 2.5 Hz, 1H), 8.14 (dd, *J* = 8.3, 1.5 Hz, 1H), 7.59 – 7.49 (m, 2H), 7.44 (dd, *J* = 8.2, 4.2 Hz, 1H), 7.38 (d, *J* = 8.3 Hz, 2H), 7.20 (d, *J* = 8.2 Hz, 2H), 4.03 (dd, *J* = 8.2, 3.6 Hz, 1H), 3.50 (s, 3H), 3.24 (dd, *J* = 14.2, 3.4 Hz, 1H), 3.03 (dd, *J* = 14.2, 8.2 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.48, 148.70, 138.98, 136.65, 136.24, 133.90, 131.45, 131.38, 128.09, 127.28, 122.18, 121.74, 120.64, 116.74, 84.19, 59.31, 38.81; HRMS (EI) *m/z*: 384.0477 (M^+); calc. for $C_{19}H_{17}BrN_2O_2$: 384.0473.

(*S*)-3-(4-Acetylphenyl)-2-methoxy-*N*-(quinolin-8-yl)propanamide (3l)



The compound **3l** was prepared according to the **GP** and purified by column chromatography in petroleum ether: ethyl acetate = 4:1. **3l** was obtained as a white solid (48.3 mg, 69%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.73 (s, 1H), 8.85 – 8.74 (m, 2H), 8.14 (dd, *J* = 8.3, 1.5 Hz, 1H), 7.86 (d, *J* = 8.2 Hz, 2H), 7.58 – 7.50 (m, 2H), 7.46 – 7.38 (m, 3H), 4.09 (dd, *J* = 8.2, 3.6 Hz, 1H), 3.50 (s, 3H), 3.34 (dd, *J* = 14.1, 3.6 Hz, 1H), 3.14 (dd, *J* = 14.1, 8.2 Hz, 1H), 2.53 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 197.96, 170.35, 148.68, 143.39, 138.92, 136.26, 135.68, 133.81, 129.83, 128.49, 128.05, 127.27, 122.22, 121.75, 116.70, 84.00, 59.34, 39.33, 26.65; HRMS (EI) *m/z*: 348.1477 (M^+); calc. for $C_{21}H_{20}N_2O_3$: 348.1474.

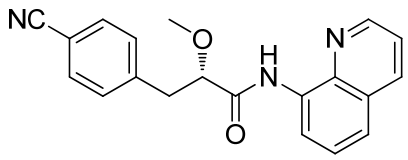
(*S*)-2-Methoxy-3-(4-nitrophenyl)-*N*-(quinolin-8-yl)propanamide (3m)



The compound **3m** was prepared according to the **GP** and purified by column chromatography in petroleum ether: ethyl acetate = 4:1. **3m** was obtained as a light yellow solid (39.5 mg, 56%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.68 (s, 1H), 8.80 (d, *J* = 2.7 Hz, 1H), 8.78 – 8.65 (m, 1H), 8.15 (d, *J* = 8.2 Hz, 1H), 8.11 (d, *J* = 8.4 Hz, 2H), 7.55 (d, *J* = 4.5 Hz, 2H), 7.51 – 7.39 (m, 3H), 4.11 (dd, *J* = 7.5,

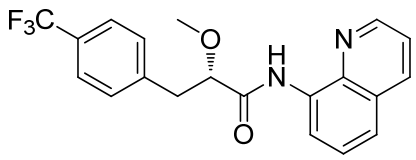
3.6 Hz, 1H), 3.54 (s, 3H), 3.38 (dd, *J* = 14.0, 3.3 Hz, 1H), 3.21 (dd, *J* = 14.0, 7.7 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 169.92, 148.75, 147.03, 145.32, 138.95, 136.35, 133.67, 130.61, 128.12, 127.29, 123.58, 122.42, 121.85, 116.81, 83.63, 59.36, 39.01; HRMS (EI) *m/z*: 351.1220 (M^+); calc. for $C_{19}H_{17}N_3O_4$: 351.1219.

(*S*)-3-(4-Cyanophenyl)-2-methoxy-*N*-(quinolin-8-yl)propanamide (3n)



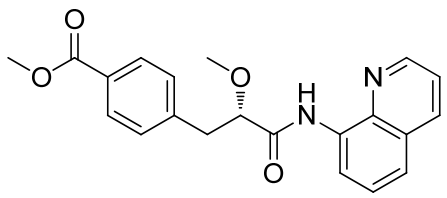
The compound **3n** was prepared according to the **GP** and purified by column chromatography in petroleum ether: ethyl acetate = 4:1. **3n** was obtained as a colorless oil (14.0 mg, 21% under standard conditions; 32.4 mg, 49% under conditions of 2.0 equiv. Ag_2O and 2.0 mL DMF). ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.67 (s, 1H), 8.82 (dd, *J* = 4.0, 1.2 Hz 1H), 8.76 (t, *J* = 4.4 Hz, 1H), 8.16 (dd, *J* = 8.0, 1.2 Hz, 1H), 7.55 – 7.53 (m, 4H), 7.48 – 7.42 (m, 3H), 4.08 (dd, *J* = 8.0, 4.0 Hz, 1H), 3.52 (s, 3H), 3.33 (dd, *J* = 14.0, 3.6 Hz, 1H), 3.16 (dd, *J* = 14.0, 8.0 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.03, 148.77, 143.22, 138.98, 136.36, 133.74, 132.18, 130.54, 128.15, 127.32, 122.39, 121.87, 119.09, 116.80, 110.69, 83.74, 59.36, 39.35; HRMS (EI) *m/z*: 331.1319 (M^+); calc. for $C_{20}H_{17}N_3O_2$: 331.1321.

(*S*)-2-Methoxy-*N*-(quinolin-8-yl)-3-(4-(trifluoromethyl)phenyl)propanamide (3o)



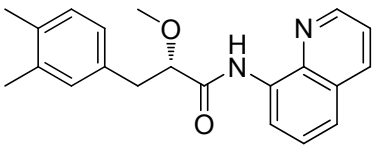
The compound **3o** was prepared according to the **GP** and purified by column chromatography in toluene: ethyl acetate = 12:1. **3o** was obtained as a white solid (48.3 mg, 65%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.72 (s, 1H), 8.86 – 8.70 (m, 2H), 8.15 (dd, *J* = 8.2, 1.0 Hz, 1H), 7.59 – 7.48 (m, 4H), 7.47 – 7.40 (m, 3H), 4.08 (dd, *J* = 8.1, 3.5 Hz, 1H), 3.51 (s, 3H), 3.34 (dd, *J* = 14.2, 3.3 Hz, 1H), 3.14 (dd, *J* = 14.1, 8.2 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.37, 148.74, 141.81, 138.98, 136.29, 133.85, 131.14, 129.99, 129.48, 129.16, 129.00 (q, $J_{C\text{-}F}$ = 32.1 Hz), 128.12，127.30，125.30 (q, $J_{C\text{-}F}$ = 3.6 Hz)，124.41 (q, $J_{C\text{-}F}$ = 270.2 Hz),122.28, 121.79，116.76, 84.06, 59.36, 39.22; HRMS (EI) *m/z*: 374.1241 (M^+); calc. for $C_{20}H_{17}F_3N_2O_2$: 374.1242.

(*S*)-Methyl 4-(2-methoxy-3-oxo-3-(quinolin-8-ylamino)propyl)benzoate (3p)



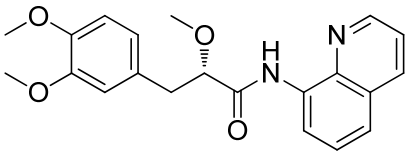
The compound **3p** was prepared according to the **GP** and purified by column chromatography in petroleum ether: ethyl acetate = 4:1. **3p** was obtained as a white solid (48.2 mg, 66%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.74 (s, 1H), 8.94 – 8.62 (m, 2H), 8.13 (dd, *J* = 8.2, 1.1 Hz, 1H), 7.94 (d, *J* = 8.1 Hz, 2H), 7.62 – 7.48 (m, 2H), 7.47 – 7.33 (m, 3H), 4.08 (dd, *J* = 8.3, 3.5 Hz, 1H), 3.87 (s, 3H), 3.49 (s, 3H), 3.34 (dd, *J* = 14.1, 3.3 Hz, 1H), 3.12 (dd, *J* = 14.1, 8.4 Hz, 1H); ^{13}CNMR (101 MHz, $CDCl_3$) δ 170.40, 167.14, 148.68, 143.18, 138.98, 136.24, 133.87, 129.70, 129.65, 128.63, 128.09, 127.27, 122.19, 121.71, 116.73, 84.11, 59.34, 52.05, 39.43; HRMS (EI) *m/z*: 364.1419 (M^+); calc. for $C_{21}H_{20}N_2O_4$: 364.1423.

(*S*)-3-(3,4-Dimethylphenyl)-2-methoxy-*N*-(quinolin-8-yl)propanamide (3q)



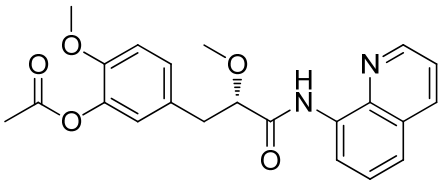
The compound **3q** was prepared according to the **GP** and purified by column chromatography in toluene: ethyl acetate = 20:1. **3q** was obtained as a colorless oil (50.5 mg, 76%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.76 (s, 1H), 9.00 – 8.67 (m, 2H), 8.15 (dd, *J* = 8.2, 1.4 Hz, 1H), 7.62 – 7.50 (m, 2H), 7.45 (dd, *J* = 8.2, 4.2 Hz, 1H), 7.17 – 6.96 (m, 3H), 4.06 (dd, *J* = 8.7, 3.4 Hz, 1H), 3.49 (s, 3H), 3.24 (dd, *J* = 14.2, 3.3 Hz, 1H), 3.00 (dd, *J* = 14.2, 8.7 Hz, 1H), 2.20 (s, 6H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 171.20, 148.65, 139.08, 136.49, 136.25, 135.20, 134.74, 134.15, 130.86, 129.71, 128.13, 127.37, 126.85, 122.03, 121.71, 116.77, 84.88, 59.35, 39.34, 19.79, 19.44; HRMS (EI) *m/z*: 334.1685 (M^+); calc. for $C_{21}H_{22}N_2O_2$: 334.1681.

(*S*)-3-(3,4-Dimethoxyphenyl)-2-methoxy-*N*-(quinolin-8-yl)propanamide (3r)



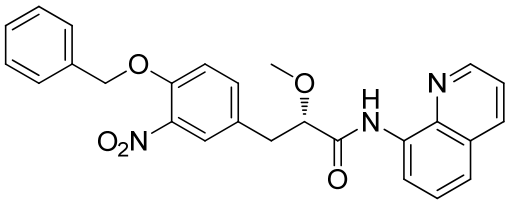
The compound **3r** was prepared according to the **GP** and purified by column chromatography in petroleum ether: ethyl acetate = 4:1. **3r** was obtained as a colorless oil (52.2 mg, 71%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.72 (s, 1H), 9.00 – 8.63 (m, 2H), 8.14 (dd, *J* = 8.2, 1.4 Hz, 1H), 7.62 – 7.48 (m, 2H), 7.44 (dd, *J* = 8.2, 4.2 Hz, 1H), 6.95 – 6.80 (m, 2H), 6.76 (d, *J* = 8.6 Hz, 1H), 4.04 (dd, *J* = 8.1, 3.5 Hz, 1H), 3.81 (s, 3H), 3.79 (s, 3H), 3.51 (s, 3H), 3.24 (dd, *J* = 14.3, 3.4 Hz, 1H), 3.03 (dd, *J* = 14.3, 8.1 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.98, 148.81, 148.66, 147.81, 138.99, 136.25, 134.03, 130.22, 128.11, 127.29, 122.11, 121.74, 121.69, 116.66, 112.69, 111.14, 84.71, 59.32, 55.91, 55.88, 39.14; HRMS (EI) *m/z*: 366.1577 (M^+); calc. for $C_{21}H_{22}N_2O_4$: 366.1580.

(*S*)-2-Methoxy-5-(2-methoxy-3-oxo-3-(quinolin-8-ylamino)propyl)phenyl acetate (3s)



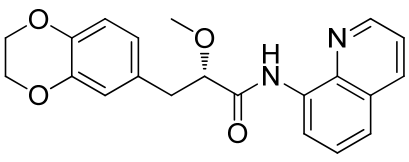
The compound **3s** was prepared according to the **GP** and purified by column chromatography in petroleum ether: ethyl acetate = 4:1. **3s** was obtained as a colorless oil (54.1 mg, 69%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.76 (s, 1H), 8.84 (dd, *J* = 4.0, 1.4 Hz, 1H), 8.80 (dd, *J* = 6.4, 2.3 Hz, 1H), 8.15 (dd, *J* = 8.2, 1.4 Hz, 1H), 7.58 – 7.51 (m, 2H), 7.45 (dd, *J* = 8.2, 4.2 Hz, 1H), 7.16 (dd, *J* = 8.3, 1.4 Hz, 1H), 7.06 (s, 1H), 6.86 (d, *J* = 8.3 Hz, 1H), 4.00 (dd, *J* = 8.6, 3.1 Hz, 1H), 3.78 (s, 3H), 3.49 (s, 3H), 3.23 (dd, *J* = 14.3, 2.8 Hz, 1H), 2.98 (dd, *J* = 14.3, 8.7 Hz, 1H), 2.29 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ = 170.84, 169.14, 149.94, 148.71, 139.60, 139.06, 136.26, 134.03, 130.50, 128.13, 127.82, 127.33, 124.09, 122.12, 121.74, 116.76, 112.37, 84.61, 59.45, 56.01, 38.69, 20.79; HRMS (EI) *m/z*: 394.1526 (M^+); calc. for $C_{22}H_{22}N_2O_5$: 394.1529.

(*S*)-3-(4-(Benzyloxy)-3-nitrophenyl)-2-methoxy-*N*-(quinolin-8-yl)propanamide (3t)



The compound **3t** was prepared according to the **GP** and purified by column chromatography in petroleum ether: ethyl acetate = 4:1. **3t** was obtained as a colorless oil (57.5 mg, 63%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.66 (s, 1H), 8.81 (dd, *J* = 4.0, 1.1 Hz, 1H), 8.76 (dd, *J* = 5.3, 3.6 Hz, 1H), 8.14 (d, *J* = 8.2 Hz, 1H), 7.87 (s, 1H), 7.58 – 7.49 (m, 2H), 7.46 – 7.28 (m, 7H), 6.95 (d, *J* = 8.5 Hz, 1H), 5.17 – 5.02 (m, 2H), 4.04 (dd, *J* = 7.3, 3.4 Hz, 1H), 3.54 (s, 3H), 3.25 (dd, *J* = 14.3, 3.3 Hz, 1H), 3.08 (dd, *J* = 14.3, 7.6 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.11, 150.82, 148.76, 140.02, 138.95, 136.24, 135.79, 135.21, 133.75, 130.34, 128.74, 128.24, 128.08, 127.26, 127.04, 126.78, 122.27, 121.78, 116.78, 115.15, 83.78, 71.31, 59.24, 37.90; HRMS (EI) *m/z*: 457.1639 (M^+); calc. for $C_{26}H_{23}N_3O_5$: 457.1638.

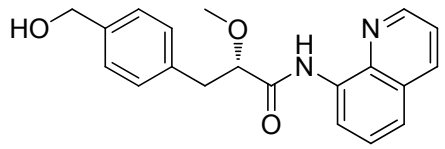
(*S*)-3-(2,3-Dihydrobenzo[*b*][1,4]dioxin-6-yl)-2-methoxy-*N*-(quinolin-8-yl)propanamide (3u)



The compound **3u** was prepared according to the **GP** and purified by column chromatography in petroleum ether: ethyl acetate = 4:1. **3u** was obtained as a colorless oil (46.8 mg, 64%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.75 (s, 1H), 8.95 – 8.70 (m, 2H), 8.14 (dd, *J* = 8.2, 1.3 Hz, 1H), 7.60 – 7.49 (m, 2H), 7.44 (dd, *J* = 8.2, 4.2 Hz, 1H), 6.86 (s, 1H), 6.83 – 6.67 (m, 2H), 4.20 (s, 4H), 4.02 (dd, *J* = 8.5, 3.4 Hz, 1H), 3.50 (s, 3H), 3.19 (dd, *J* = 14.3, 3.2 Hz, 1H), 2.96 (dd, *J* = 14.3, 8.5 Hz, 1H); ^{13}C

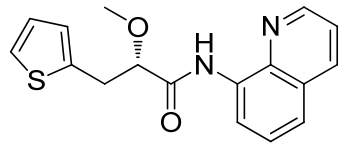
NMR (101 MHz, $CDCl_3$) δ 170.99, 148.66, 143.34, 142.35, 139.03, 136.25, 134.05, 131.02, 128.10, 127.34, 122.52, 122.05, 121.70, 118.24, 117.09, 116.75, 84.62, 64.43, 64.40, 59.32, 38.86; HRMS (EI) *m/z*: 364.1427 (M^+); calc. for $C_{21}H_{20}N_2O_4$: 364.1423.

(*S*)-3-(4-(Hydroxymethyl)phenyl)-2-methoxy-*N*-(quinolin-8-yl)propanamide (3v)



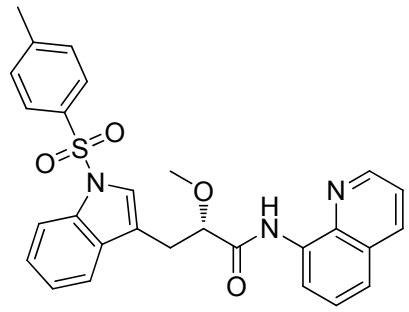
The compound **3v** was prepared according to the **GP** and purified by column chromatography in petroleum ether: ethyl acetate = 2:1. **3v** was obtained as a light yellow solid (39.6 mg, 59%). ^1H NMR (400 MHz, $CDCl_3$) δ 10.75 (s, 1H), 8.96 – 8.63 (m, 2H), 8.15 (dd, *J* = 8.2, 1.0 Hz, 1H), 7.59 – 7.49 (m, 2H), 7.44 (dd, *J* = 8.2, 4.2 Hz, 1H), 7.32 (d, *J* = 7.9 Hz, 2H), 7.27 (d, *J* = 8.6 Hz, 2H), 4.63 (s, 2H), 4.05 (dd, *J* = 8.4, 3.5 Hz, 1H), 3.49 (s, 3H), 3.29 (dd, *J* = 14.2, 3.3 Hz, 1H), 3.07 (dd, *J* = 14.2, 8.5 Hz, 1H), 1.78 (brs, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.90, 148.69, 139.29, 139.04, 137.23, 136.29, 134.01, 129.79, 128.12, 127.36, 127.19, 122.14, 121.74, 116.78, 84.55, 65.29, 59.32, 39.24; HRMS (EI) *m/z*: 336.1475 (M^+); calc. for $C_{20}H_{20}N_2O_3$: 336.1474.

(*S*)-2-Methoxy-*N*-(quinolin-8-yl)-3-(thiophen-2-yl)propanamide (3w)



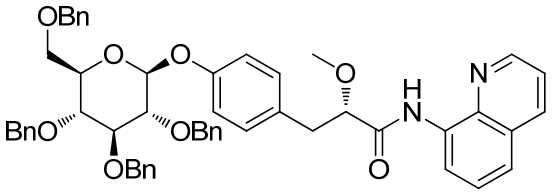
The compound **3w** was prepared according to the **GP** and purified by column chromatography in toluene: ethyl acetate = 20:1. **3w** was obtained as a light yellow oil (37.4 mg, 60%). ^1H NMR (400 MHz, $CDCl_3$) δ 10.82 (s, 1H), 8.84 (d, *J* = 3.9 Hz, 1H), 8.81 (dd, *J* = 6.2, 2.4 Hz, 1H), 8.15 (d, *J* = 8.2 Hz, 1H), 7.61 – 7.50 (m, 2H), 7.45 (dd, *J* = 8.2, 4.2 Hz, 1H), 7.15 (d, *J* = 5.0 Hz, 1H), 7.03 – 6.93 (m, 1H), 6.94 – 6.82 (m, 1H), 4.06 (dd, *J* = 8.2, 3.2 Hz, 1H), 3.60 (s, 3H), 3.53 (dd, *J* = 15.3, 3.0 Hz, 1H), 3.32 (dd, *J* = 15.2, 8.3 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.29, 148.73, 139.48, 139.05, 136.27, 133.98, 128.12, 127.34, 126.74, 126.41, 124.54, 122.19, 121.76, 116.79, 84.03, 59.34, 33.65; HRMS (EI) *m/z*: 312.0929 (M^+); calc. for $C_{17}H_{16}N_2O_2S$: 312.0932.

(*S*)-2-Methoxy-*N*-(quinolin-8-yl)-3-(1-tosyl-1*H*-indol-3-yl)propanamide (3x)



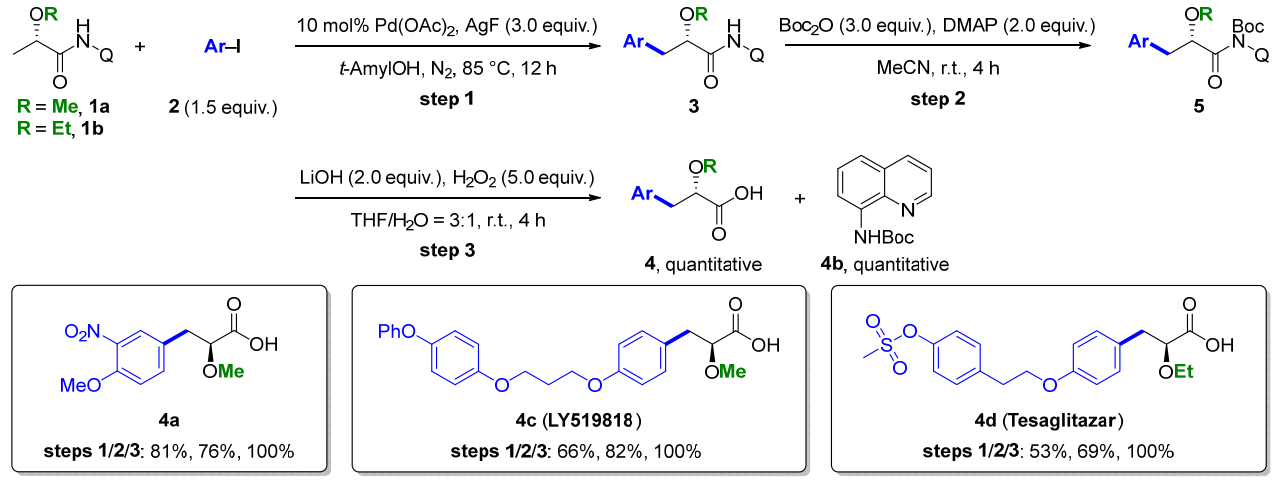
The compound **3x** was prepared according to the **GP** and purified by column chromatography in petroleum ether: ethyl acetate = 4:1. **3x** was obtained as a colorless oil (58.6 mg, 59%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.79 (s, 1H), 8.83 (dd, *J* = 4.1, 1.6 Hz, 1H), 8.77 (dd, *J* = 4.9, 4.0 Hz, 1H), 8.14 (dd, *J* = 8.3, 1.5 Hz, 1H), 7.91 (d, *J* = 7.9 Hz, 1H), 7.67 – 7.56 (m, 4H), 7.56 – 7.49 (m, 2H), 7.44 (dd, *J* = 8.2, 4.2 Hz, 1H), 7.28 – 7.16 (m, 2H), 6.90 (d, *J* = 8.1 Hz, 2H), 4.13 (dd, *J* = 7.3, 3.7 Hz, 1H), 3.52 (s, 3H), 3.35 (dd, *J* = 15.2, 3.5 Hz, 1H), 3.20 (dd, *J* = 15.2, 7.3 Hz, 1H), 2.17 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ = 170.50, 148.80, 144.61, 138.99, 136.22, 135.36, 135.12, 133.94, 131.27, 129.69, 128.09, 127.31, 126.71, 124.79, 124.65, 123.19, 122.15, 121.79, 119.81, 118.46, 116.77, 113.67, 82.89, 59.15, 28.33, 21.49; HRMS (EI) *m/z*: 499.1570 (M^+); calc. for $C_{28}H_{25}N_3O_4S$: 499.1566.

(*S*)-2-Methoxy-*N*-(quinolin-8-yl)-3-(4-(((2*S*,3*R*,4*S*,5*R*,6*R*)-3,4,5-tris(benzyloxy)-6-((benzyloxy)methyl)tetrahydro-2*H*-pyran-2-yl)oxy)phenyl)propanamide (3y)

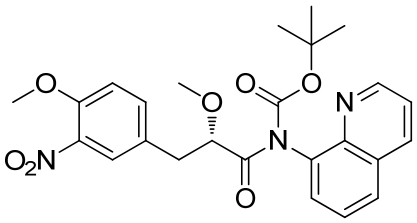


The compound **3y** was prepared according to the **GP** and purified by column chromatography in petroleum ether: ethyl acetate = 4:1. **3y** was obtained as a white solid (117.0 mg, 67%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.78 (s, 1H), 8.84 – 8.81 (m, 2H), 8.14 (dd, *J* = 8.4, 1.2 Hz, 1H), 7.58 – 7.52 (m, 2H), 7.43 (dd, *J* = 8.0, 4.0 Hz, 1H), 7.31 – 7.25 (m, 21H), 7.20 – 7.18 (m, 2H), 7.01 (d, *J* = 8.4 Hz, 2 H), 5.02 (d, *J* = 10.8 Hz, 1H), 4.96 – 4.93 (m, 2H), 4.86 – 4.79 (m, 3H), 4.60 – 4.50 (m, 3H), 4.03 (dd, *J* = 8.8, 3.6 Hz, 1H), 3.78 (d, *J* = 10.4 Hz, 1H), 3.73 – 3.64 (m, 4H), 3.59 (dd, *J* = 8.0, 4.0 Hz, 1H), 3.49 (s, 3H), 3.27 (dd, *J* = 14.0, 2.8 Hz, 1H), 3.03 (dd, *J* = 14.3, 8.4 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.94, 156.32, 148.69, 139.04, 138.65, 138.37, 138.26, 138.17, 136.26, 134.05, 132.05, 130.63, 128.53, 128.51, 128.49, 128.47, 128.33, 128.12, 128.07, 127.99, 127.92, 127.86, 127.76, 127.72, 127.34, 122.09, 121.74, 116.99, 116.91, 116.72, 102.01, 84.79, 84.71, 82.14, 77.85, 75.86, 75.23, 75.16, 75.11, 73.61, 68.98, 59.38, 38.84; HRMS (ESI) *m/z*: 867.3567 (MNa^+); calc. for $C_{53}H_{52}N_2O_8$: 867.3616.

Synthetic Applications

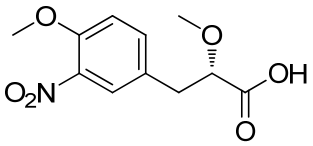


(*S*)-*tert*-Butyl(2-methoxy-3-(4-methoxy-3-nitrophenyl)propanoyl)(quinolin-8-yl)carbamate (5a)



To a solution of **3a** (152.6 mg, 0.4 mmol) in dry MeCN (4 mL) were added di-*tert*-butyl dicarbonate (Boc_2O, 261.9 mg, 1.2 mmol) and *N*,*N*-dimethylpyridin-4-amine (DMAP, 97.7 mg, 0.8 mmol). The mixture was stirred at room temperature for 4 hours. Then the reaction was diluted with dichloromethane (15 mL), washed by water (15 mL), brine (20 mL), and dried over anhydrous $MgSO_4$. Evaporation of organic solvent and purification by column chromatography in petroleum ether: ethyl acetate = 2:1 gave the product **5a** as a white solid (146.3 mg, 76%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.86 (dd, *J* = 4.0, 1.5 Hz, 1H), 8.17 (dd, *J* = 8.3, 1.4 Hz, 1H), 7.92 (d, *J* = 1.7 Hz, 1H), 7.83 (dd, *J* = 8.1, 1.1 Hz, 1H), 7.61 (dd, *J* = 8.6, 1.9 Hz, 1H), 7.56 (t, *J* = 7.7 Hz, 1H), 7.50 (dd, *J* = 7.2, 1.0 Hz, 1H), 7.42 (dd, *J* = 8.3, 4.2 Hz, 1H), 7.02 (d, *J* = 8.6 Hz, 1H), 5.21 (dd, *J* = 8.5, 2.6 Hz, 1H), 3.94 (s, 3H), 3.46 (dd, *J* = 13.4, 2.2 Hz, 1H), 3.38 (s, 3H), 3.01 (dd, *J* = 14.2, 8.6 Hz, 1H), 1.22 (s, 9H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 175.11, 152.98, 151.73, 150.54, 144.15, 139.53, 136.41, 136.07, 135.84, 131.32, 129.05, 128.39, 126.74, 126.17, 121.72, 113.39, 83.26, 82.51, 58.27, 56.66, 38.21, 27.72.

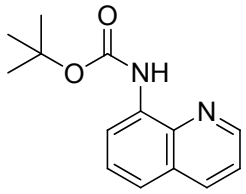
(*S*)-2-Methoxy-3-(4-methoxy-3-nitrophenyl)propanoic acid (4a)



To a solution of **5a** (48.1 mg, 0.1 mmol) in THF/H_2O (3:1, 0.5 mL) were added LiOH (4.8 mg, 0.2 mmol) and H_2O_2 (30%, 50 μL, 0.5 mmol). The mixture was stirred at room temperature for 4 hours. Then the reaction was acidified by HCl (0.5 M, 12 mL), diluted with ethyl acetate (15 mL), washed by water (15 mL), brine (20 mL), and dried over anhydrous $MgSO_4$. Evaporation of organic solvent and

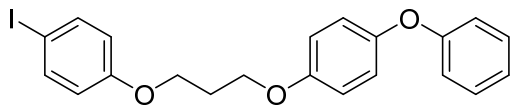
purification by column chromatography in petroleum ether: ethyl acetate = 1:1 gave the product **4a** as a light yellow oil (25.5 mg, 100%) with **4b** (24.1 mg, 100%) isolated. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.74 (d, *J* = 1.7 Hz, 1H), 7.44 (dd, *J* = 8.5, 1.8 Hz, 1H), 7.02 (d, *J* = 8.6 Hz, 1H), 3.99 (dd, *J* = 7.4, 4.2 Hz, 1H), 3.94 (s, 3H), 3.42 (s, 3H), 3.12 (dd, *J* = 14.3, 4.0 Hz, 1H), 3.01 (dd, *J* = 14.4, 7.5 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 175.99, 152.13, 139.48, 135.54, 129.03, 126.57, 113.72, 80.63, 58.85, 56.68, 37.28; HRMS (EI) *m/z*: 255.0745 (M^+); calc. for $C_{11}H_{13}NO_6$: 255.0743.

***tert*-Butyl quinolin-8-ylcarbamate (4b)**



^{1}H NMR (400 MHz, $CDCl_3$) δ 9.02 (s, 1H), 8.79 (dd, *J* = 4.1, 1.5 Hz, 1H), 8.42 (d, *J* = 7.4 Hz, 1H), 8.13 (dd, *J* = 8.2, 1.4 Hz, 1H), 7.51 (t, *J* = 8.0 Hz, 1H), 7.46 – 7.35 (m, 2H), 1.58 (s, 9H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 153.05, 148.09, 138.41, 136.37, 135.35, 128.21, 127.49, 121.63, 120.28, 114.59, 80.54, 28.55; HRMS (EI) *m/z*: 244.1210 (M^+); calc. for $C_{14}H_{16}N_2O_2$: 244.1212.

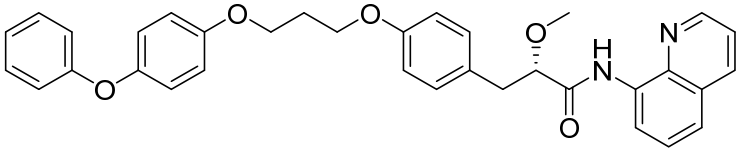
1-Iodo-4-(3-(4-phenoxyphenoxy)propoxy)benzene (2z)



To a solution of 4-phenoxyphenol (1.86 g, 10 mmol) and 1,3-dibromopropane (10.09 g, 50 mmol) in anhydrous DMF (50 mL) was slowly added cesium carbonate (4.24 g, 13 mmol). The resulting suspension was heated at 65 °C overnight. After being allowed to cool to the room temperature, the reaction mixture was diluted with water (50 mL). Then the aqueous layer was extracted with Et_2O (3 × 50 mL). The organic layer was washed by brine (2 × 40 mL), and dried over anhydrous $MgSO_4$. Evaporation of organic solvent and purification by column chromatography in petroleum ether: ethyl acetate = 50:1 gave the product 1-(3-bromopropoxy)-4-phenoxybenzene as a yellow liquid.

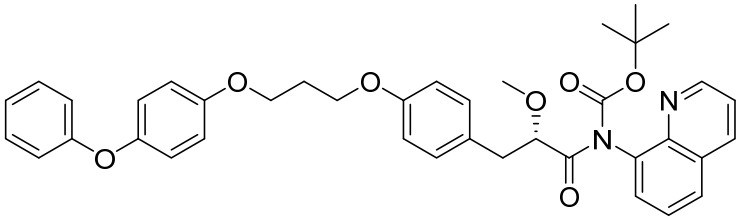
To a solution of 4-iodophenol (1.32 g, 6 mmol) and 1-(3-bromopropoxy)-4-phenoxybenzene (2.03 g, 6.6 mmol) in anhydrous DMF (30 mL) was slowly added cesium carbonate (2.35 g, 7.2 mmol). The resulting suspension was heated at 65 °C overnight. After being allowed to cool to the room temperature, the reaction mixture was diluted with water (30 mL). Then the aqueous layer was extracted with Et_2O (3 × 40 mL). The organic layer was washed by brine (2 × 20 mL), and dried over anhydrous $MgSO_4$. Evaporation of organic solvent and purification by column chromatography in petroleum ether: ethyl acetate = 50:1 gave the product **2z** as a white solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.56 (d, *J* = 8.5 Hz, 2H), 7.31 (t, *J* = 7.7 Hz, 2H), 7.05 (t, *J* = 7.0 Hz, 2H), 7.00 – 6.93 (m, 4H), 6.90 (d, *J* = 8.9 Hz, 2H), 6.71 (d, *J* = 8.5 Hz, 2H), 4.14 (t, *J* = 6.0 Hz, 4H), 2.31 – 2.21 (m, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 158.88, 158.58, 155.22, 150.39, 138.35, 129.74, 122.59, 120.94, 117.75, 117.06, 115.65, 82.90, 77.48, 77.16, 76.84, 64.87, 64.67, 29.38; HRMS (EI) *m/z*: 446.0381 (M^+); calc. for $C_{21}H_{19}IO_3$: 446.0379.

(*S*)-2-Methoxy-3-(4-(3-(4-phenoxyphenoxy)propoxy)phenyl)-*N*-(quinolin-8-yl)propanamide (3z)



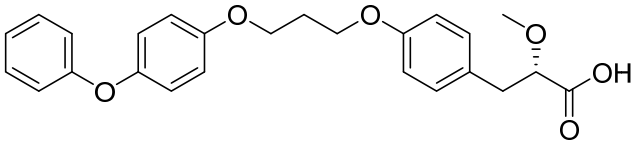
The compound **3z** was prepared according to the **GP** (using **1a** and **2z** as substrates) and purified by column chromatography in petroleum ether: ethyl acetate = 2:1. **3z** was obtained as a light yellow oil (72.5 mg, 66%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.74 (s, 1H), 8.91 – 8.71 (m, 2H), 8.15 (d, *J* = 7.6 Hz, 1H), 7.63 – 7.49 (m, 2H), 7.44 (dd, *J* = 8.2, 4.2 Hz, 1H), 7.29 (t, *J* = 7.9 Hz, 2H), 7.25 (d, *J* = 9.8 Hz, 2H), 7.04 (t, *J* = 7.4 Hz, 1H), 7.01 – 6.91 (m, 4H), 6.88 (d, *J* = 8.9 Hz, 2H), 6.83 (d, *J* = 8.4 Hz, 2H), 4.12 (dd, *J* = 11.0, 5.6 Hz, 4H), 4.02 (dd, *J* = 8.3, 3.5 Hz, 1H), 3.49 (s, 3H), 3.24 (dd, *J* = 14.3, 3.3 Hz, 1H), 3.02 (dd, *J* = 14.3, 8.4 Hz, 1H), 2.23 (dt, *J* = 11.8, 5.8 Hz, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.97, 158.59, 157.68, 155.28, 150.26, 148.62, 138.98, 136.21, 134.03, 130.55, 129.87, 129.69, 128.07, 127.30, 122.51, 122.03, 121.67, 120.90, 117.68, 116.68, 115.62, 114.44, 84.73, 65.03, 64.40, 59.26, 38.65, 29.45; HRMS (EI) *m/z*: 548.2310 (M^+); calc. for $C_{34}H_{32}N_2O_5$: 548.2311.

(*S*)-*tert*-Butyl-(2-methoxy-3-(4-(3-(4-phenoxyphenoxy)propoxy)phenyl)propanoyl)(quinolin-8-yl)carbamate (5b)



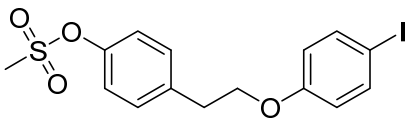
To a solution of **3z** (53.5 mg, 0.1 mmol) in dry MeCN (1 mL) were added di-*tert*-butyl dicarbonate (Boc_2O, 65.5 mg, 0.3 mmol) and *N*,*N*-dimethylpyridin-4-amine (DMAP, 24.4 mg, 0.2 mmol). The mixture was stirred at room temperature for 8 hours. Then the reaction was diluted with dichloromethane (10 mL), washed by water (10 mL), brine (10 mL), and dried over anhydrous $MgSO_4$. Evaporation of organic solvent and purification by column chromatography in petroleum ether: ethyl acetate = 2:1 gave the product **5b** as light yellow oil (53.2 mg, 82%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.86 (s, 1H), 8.14 (d, *J* = 8.1 Hz, 1H), 7.80 (d, *J* = 8.1 Hz, 1H), 7.53 (t, *J* = 7.7 Hz, 1H), 7.43 (d, *J* = 7.2 Hz, 1H), 7.39 (dd, *J* = 7.9, 4.0 Hz, 1H), 7.36 – 7.22 (m, 4H), 7.14 – 6.72 (m, 9H), 5.25 (d, *J* = 7.2 Hz, 1H), 4.15 (dd, *J* = 11.7, 5.7 Hz, 4H), 3.57 – 3.16 (m, 4H), 2.96 (dd, *J* = 13.9, 9.0 Hz, 1H), 2.40 – 2.12 (m, 2H), 1.22 (s, 9H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 175.86, 158.63, 157.60, 155.33, 152.90, 150.44, 150.23, 144.22, 136.63, 136.00, 130.85, 130.73, 129.70, 128.98, 128.21, 126.14, 122.51, 121.63, 120.94, 117.68, 115.64, 114.35, 82.90, 65.08, 64.44, 58.30, 38.80, 29.51, 27.70.

(*S*)-2-Methoxy-3-(4-(3-(4-phenoxyphenoxy)propoxy)phenyl)propanoic acid (4c)



To a solution of **5b** (45.1 mg, 0.07 mmol) in THF/H_2O (3:1, 0.5 mL) were added LiOH (3.4 mg, 0.14 mmol) and H_2O_2 (30%, 35 μL, 0.35 mmol). The mixture was stirred at room temperature for 4 hours. Then the reaction was acidified by HCl (0.5 M, 10 mL), diluted with ethyl acetate (10 mL), washed by water (10 mL), brine (10 mL), and dried over anhydrous $MgSO_4$. Evaporation of organic solvent and purification by column chromatography in petroleum ether: ethyl acetate = 1:1 gave the product **4c** as a light yellow oil (30.5 mg, 100%) with **4b** (17.0 mg, 100%) isolated. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.30 (t, *J* = 7.9 Hz, 2H), 7.17 (d, *J* = 8.3 Hz, 2H), 7.04 (t, *J* = 7.3 Hz, 1H), 7.00 – 6.91 (m, 4H), 6.91 – 6.81 (m, 4H), 4.14 (t, *J* = 5.1 Hz, 4H), 3.98 (dd, *J* = 6.9, 4.1 Hz, 1H), 3.40 (s, 3H), 3.09 (dd, *J* = 14.2, 3.8 Hz, 1H), 2.97 (dd, *J* = 14.2, 7.6 Hz, 1H), 2.30 – 2.20 (m, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 176.02, 158.62, 157.96, 155.30, 150.30, 130.57, 129.73, 128.75, 122.56, 120.95, 117.72, 115.65, 114.56, 81.56, 65.03, 64.47, 58.76, 37.83, 29.50; HRMS (ESI) *m/z*: 421.4 ([M-H]$^-$); calc. for $C_{25}H_{25}O_6^-$: 421.2.

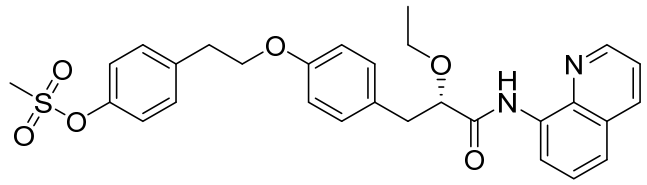
4-(2-(4-Iodophenoxy)ethyl)phenyl methanesulfonate (2aa)



A mixture of 4-hydroxyphenethyl alcohol (2.76 g, 20 mmol) and triethylamine (8.8 mL, 63 mmol) in anhydrous dichloromethane (40 mL) was stirred at 0 °C. Then methane sulfonic chloride (4.0 ml, 50 mmol) was slowly added to the solution. After stirring for 30 minutes, the reaction was diluted with ethyl acetate (20 mL), washed by aqueous NH_4Cl (40 mL), brine (20 mL), and dried over anhydrous $MgSO_4$. After evaporation of organic solvent, the crude product was directly used for the next step without any purification.

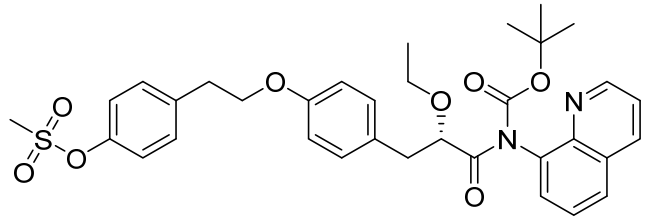
The crude product 4-(2-((methylsulfonyl)oxy)ethyl)phenyl methanesulfonate (20 mmol) was dissolved in acetonitrile (30 mL). The resulting solution was then slowly added to a mixture of 4-iodophenol (11.0 g, 50 mmol) and potassium carbonate (8.29g, 60.0 mmol) in acetonitrile (50 mL). The reaction was heated at a refluxing temperature for 3.0 h. After being allowed to cool to room temperature, the reaction mixture was filtered through a pad of Celite. After the evaporation of the solvent, the mixture was diluted with dichloromethane (50 mL), washed by water (40 mL), brine (20 mL), and dried over anhydrous $MgSO_4$. Evaporation of the solvent and purification by column chromatography in petroleum ether: ethyl acetate = 3:1 gave the product **2aa** as a white solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.54 (d, *J* = 8.8 Hz, 2H), 7.32 (d, *J* = 8.4 Hz, 2H), 7.23 (d, *J* = 8.8 Hz, 2H), 6.66 (d, *J* = 8.8 Hz, 2H), 4.13 (t, *J* = 6.8 Hz, 1H), 3.13 (s, 2H), 3.09 (t, *J* = 6.8 Hz, 1H);^{13}C NMR (101 MHz, $CDCl_3$) δ 158.65, 148.05, 138.40, 137.80, 130.67, 122.18, 117.08, 83.09, 68.45, 37.48, 35.15; HRMS (EI) *m/z*: 417.9738 (M^+); calc. for $C_{15}H_{15}IO_4S$: 417.9736.

(*S*)-4-(2-(4-(2-Ethoxy-3-oxo-3-(quinolin-8-ylamino)propyl)phenoxy)ethyl)phenyl methanesulfonate (3aa)



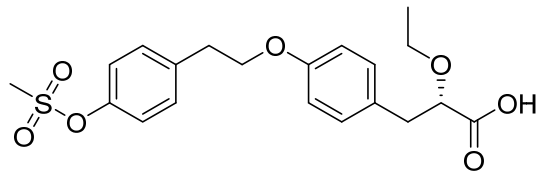
The compound **3aa** was prepared according to the **GP** (using **1b** and **2aa** as substrates) and purified by column chromatography in petroleum ether: ethyl acetate = 2:1. **3aa** was obtained as a light yellow oil (56.5 mg, 53%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.92 (s, 1H), 8.91 – 8.70 (m, 2H), 8.13 (dd, *J* = 8.2, 1.0 Hz, 1H), 7.59 – 7.48 (m, 2H), 7.42 (dd, *J* = 8.2, 4.2 Hz, 1H), 7.31 (d, *J* = 8.4 Hz, 2H), 7.27 – 7.24 (m, 2H), 7.21 (d, *J* = 8.5 Hz, 2H), 6.80 (d, *J* = 8.4 Hz, 2H), 4.12 (t, *J* = 6.7 Hz, 2H), 4.05 (dd, *J* = 8.9, 3.1 Hz, 1H), 3.64 (tt, *J* = 14.0, 7.0 Hz, 1H), 3.49 (dq, *J* = 14.1, 7.0 Hz, 1H), 3.23 (dd, *J* = 14.2, 3.0 Hz, 1H), 3.12 (s, 3H), 3.06 (t, *J* = 6.7 Hz, 2H), 2.97 (dd, *J* = 14.2, 9.0 Hz, 1H), 1.29 (t, *J* = 7.0 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 171.47, 157.40, 148.61, 147.96, 139.02, 138.13, 136.24, 134.15, 130.66, 130.64, 130.49, 128.10, 127.34, 122.04, 121.99, 121.72, 116.56, 114.42, 82.93, 68.25, 67.38, 39.04, 37.38, 35.24, 15.37; HRMS (EI) *m/z*: 534.1829 (M^+); calc. for $C_{29}H_{30}N_2O_6S$: 534.1825.

(*S*)-4-(2-(4-(3-((*tert*-Butoxycarbonyl)(quinolin-8-yl)amino)-2-ethoxy-3-oxopropyl)phenoxy)ethyl)phenyl methanesulfonate (5c)



To a solution of **3aa** (53.5 mg, 0.1 mmol) in dry MeCN (1 mL) were added di-*tert*-butyl dicarbonate (Boc_2O, 65.5 mg, 0.3 mmol) and *N*,*N*-dimethylpyridin-4-amine (DMAP, 24.4 mg, 0.2 mmol). The mixture was stirred at room temperature for 8 hours. Then the reaction was diluted with dichloromethane (10 mL), washed by water (10 mL), brine (10 mL), and dried over anhydrous $MgSO_4$. Evaporation of organic solvent and purification by column chromatography in petroleum ether: ethyl acetate = 2:1 gave the product **5c** as light yellow oil (44.0 mg, 69%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.86 (dd, *J* = 4.1, 1.5 Hz, 1H), 8.16 (dd, *J* = 8.2, 1.4 Hz, 1H), 7.81 (d, *J* = 8.2 Hz, 1H), 7.53 (t, *J* = 7.8 Hz, 1H), 7.46 – 7.37 (m, 2H), 7.36 – 7.31 (m, 3H), 7.23 (d, *J* = 8.6 Hz, 2H), 6.84 (d, *J* = 8.5 Hz, 2H), 5.34 – 5.21 (m, 1H), 4.18 (t, *J* = 6.7 Hz, 2H), 3.66 (dq, *J* = 14.0, 7.0 Hz, 1H), 3.44 – 3.30 (m, 2H), 3.24 – 2.99 (m, 5H), 2.96 (dd, *J* = 14.0, 9.1 Hz, 1H), 1.22 (s, 9H), 1.11 (t, *J* = 7.0 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 176.34, 157.33, 152.99, 150.45, 148.02, 144.30, 138.26, 136.78, 136.01, 130.85, 130.73, 129.00, 128.19, 126.17, 122.08, 121.64, 114.33, 100.13, 82.86, 81.35, 68.34, 66.13, 38.90, 37.40, 35.34, 27.75, 15.34.

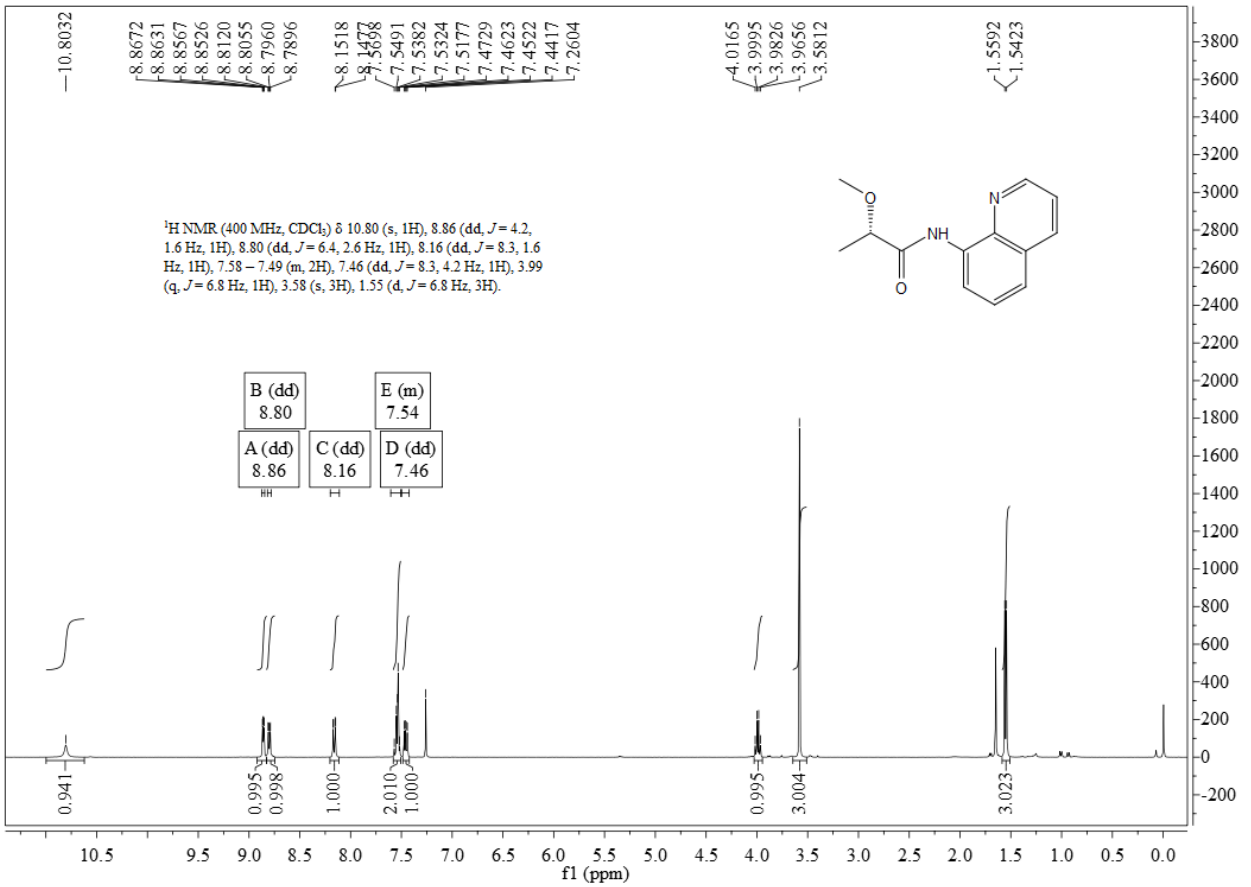
(*S*)-2-Ethoxy-3-(4-(4-((methylsulfonyl)oxy)phenethoxy)phenyl)propanoic acid (4d)



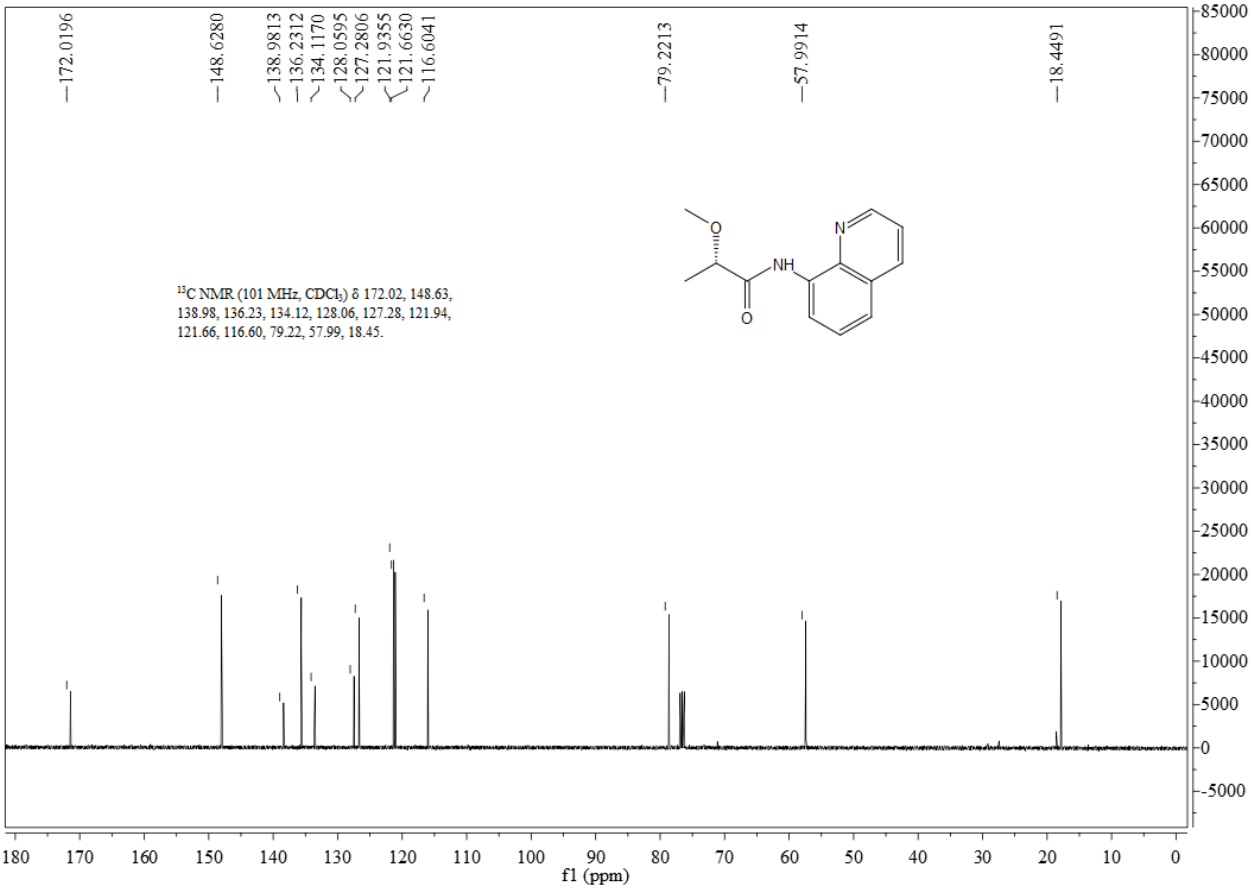
To a solution of **5c** (38.1 mg, 0.06 mmol) in THF/H_2O (3:1, 0.5 mL) were added LiOH (2.9 mg, 0.12 mmol) and H_2O_2 (30%, 30 μL, 0.3 mmol). The mixture was stirred at room temperature for 4 hours. Then the reaction was acidified by HCl (0.5 M, 8 mL), diluted with ethyl acetate (10 mL), washed by water (10 mL), brine (10 mL), and dried over anhydrous $MgSO_4$. Evaporation of organic solvent and purification by column chromatography in petroleum ether: ethyl acetate = 1:1 gave the product **4d** as a light yellow oil (25.7 mg, 100%) with **4b** (14.8 mg, 100%) isolated. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.33 (d, *J* = 8.4 Hz, 2H), 7.22 (d, *J* = 8.5 Hz, 2H), 7.15 (d, *J* = 8.4 Hz, 2H), 6.81 (d, *J* = 8.4 Hz, 2H), 4.14 (t, *J* = 6.7 Hz, 2H), 4.04 (dd, *J* = 7.3, 4.2 Hz, 1H), 3.60 (dt, *J* = 14.0, 7.0 Hz, 1H), 3.49 – 3.37 (m, 1H), 3.13 (s, 3H), 3.11 – 3.02 (m, 3H), 2.94 (dd, *J* = 14.1, 7.7 Hz, 1H), 1.17 (t, *J* = 6.9 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 175.13, 157.71, 147.98, 138.10, 130.70, 130.68, 128.98, 122.10, 114.54, 79.89, 68.30, 66.97, 37.87, 37.42, 35.28, 15.18; HRMS (ESI) *m/z*: 407.5 ($[M-H]^-$); calc. for $C_{20}H_{23}O_7S^-$: 407.2.

References

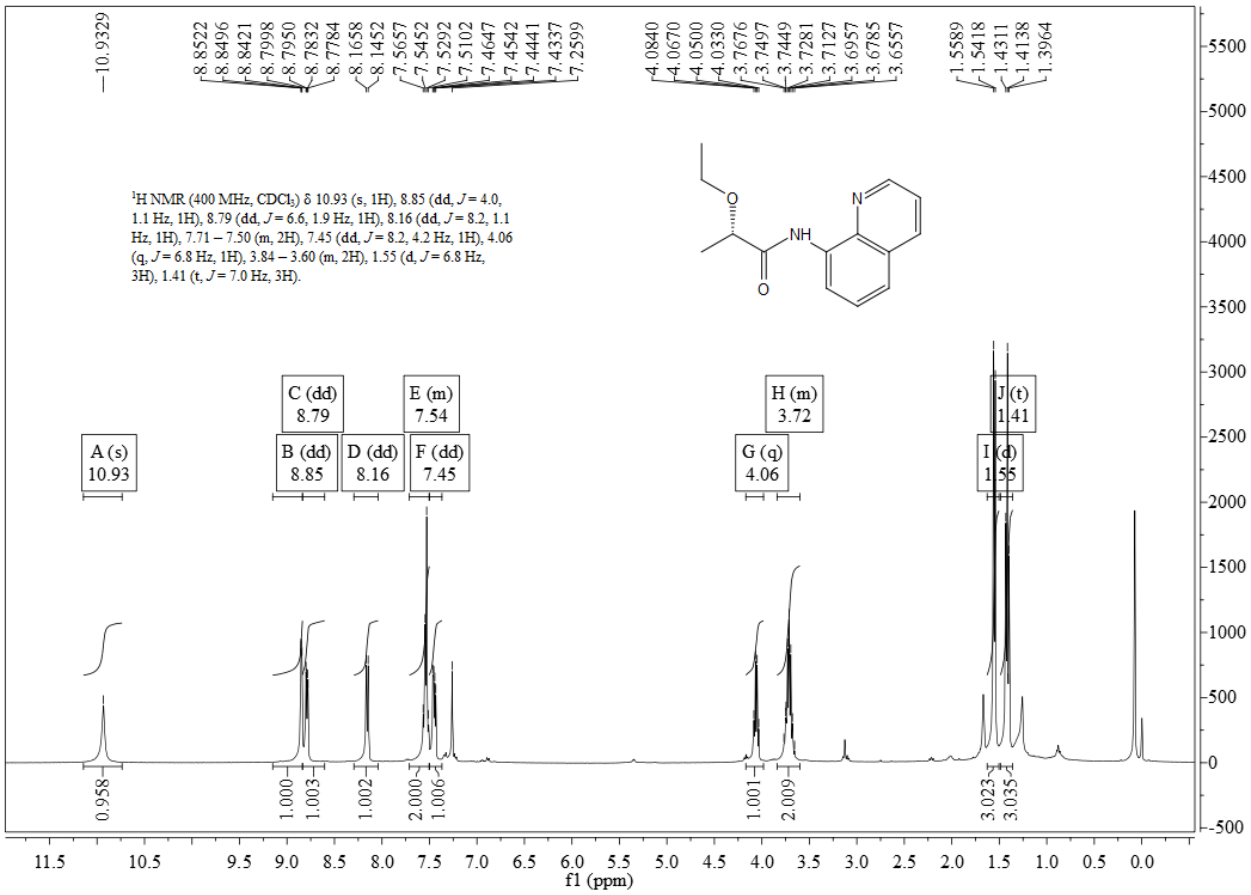
1. Barrett, A. G. M.; Braddock, D. C.; Christian, P. W. N.; Pilipauskas, D.; White, A. J. P.; Williams, D. J. *Journal of Organic Chemistry*, **1998**, *63*, 5818 – 5823.



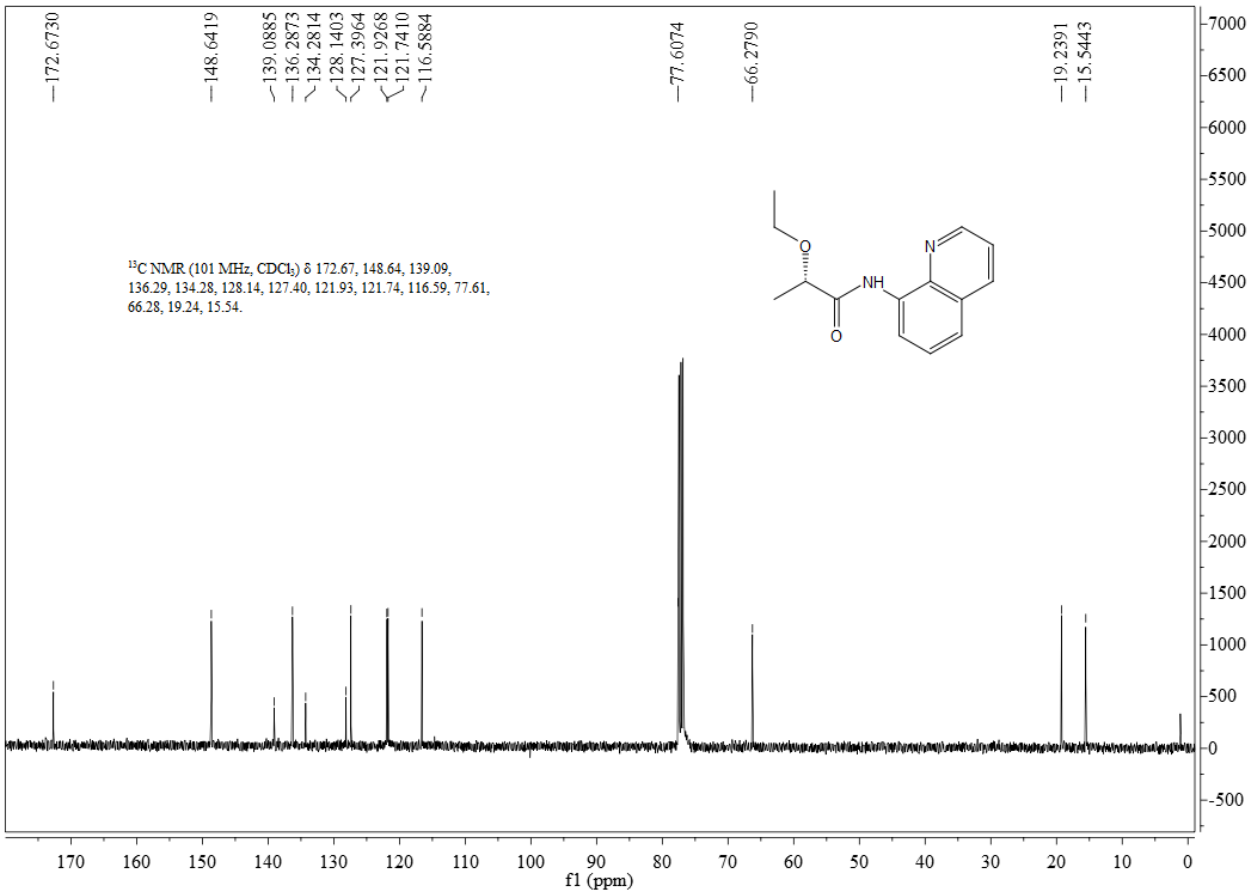
^{1}H NMR (400 MHz, $CDCl_3$) δ 10.80 (s, 1H), 8.86 (dd, *J* = 4.2, 1.6 Hz, 1H), 8.80 (dd, *J* = 6.4, 2.6 Hz, 1H), 8.16 (dd, *J* = 8.3, 1.6 Hz, 1H), 7.58 – 7.49 (m, 2H), 7.46 (dd, *J* = 8.3, 4.2 Hz, 1H), 3.99 (q, *J* = 6.8 Hz, 1H), 3.58 (s, 3H), 1.55 (d, *J* = 6.8 Hz, 3H).



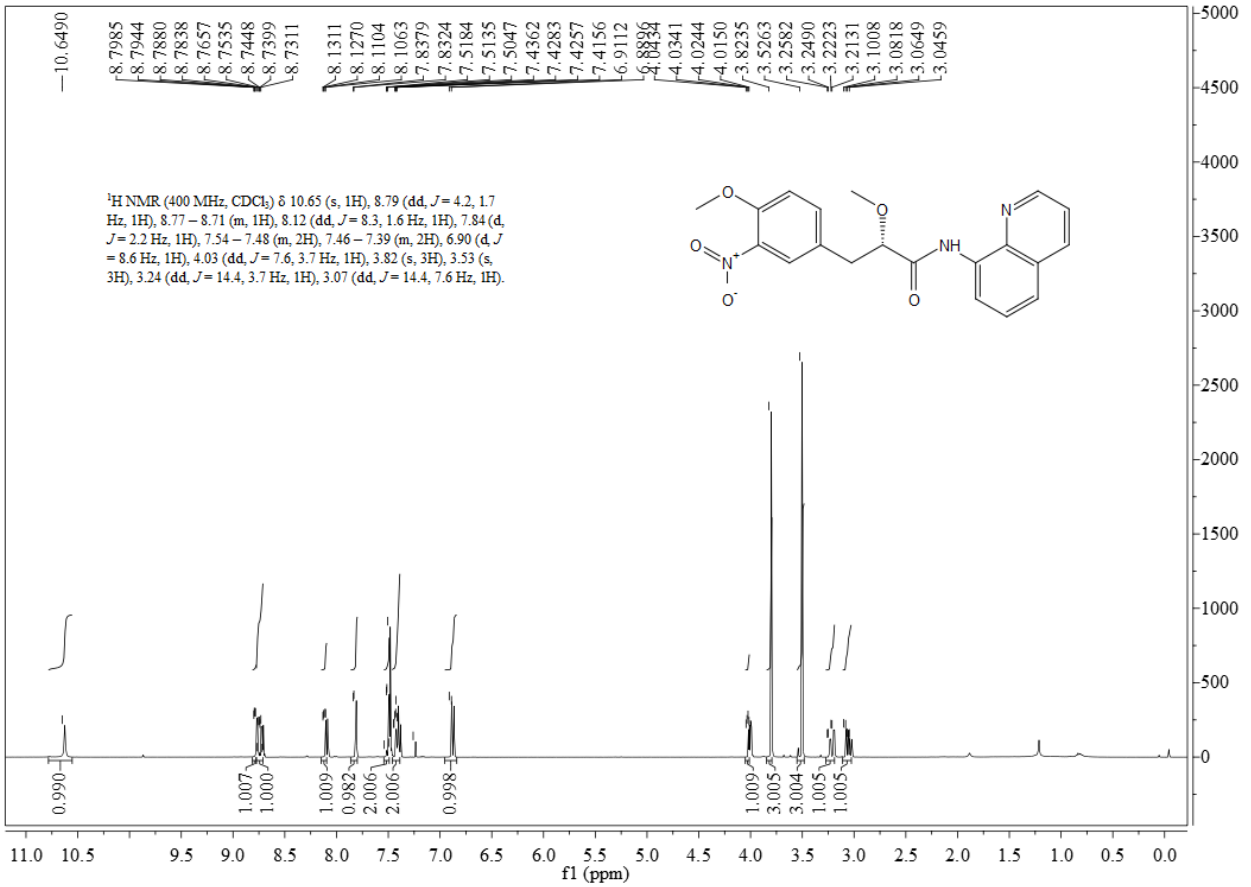
^{13}C NMR (101 MHz, $CDCl_3$) δ 172.02, 148.63, 138.98, 136.23, 134.12, 128.06, 127.28, 121.94, 121.66, 116.60, 79.22, 57.99, 18.45.



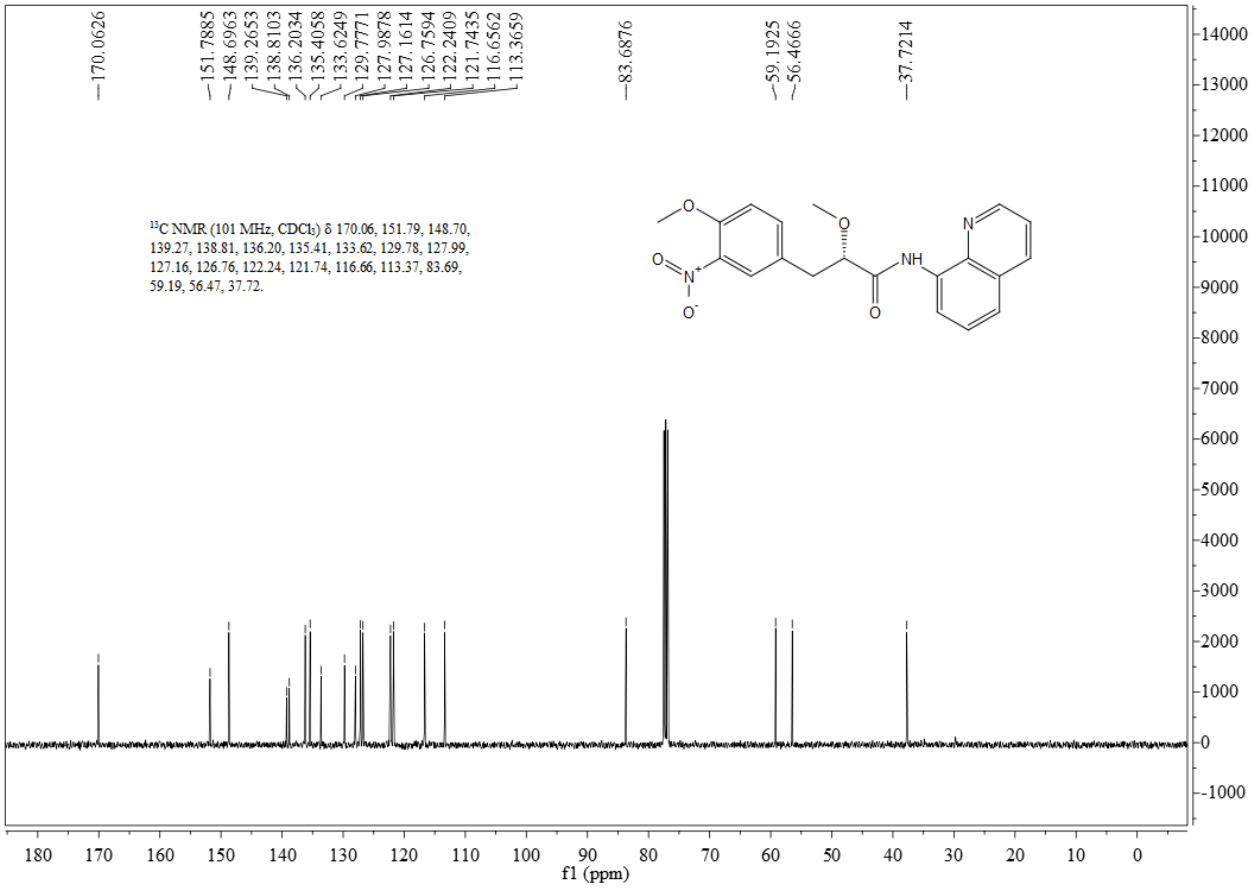
^{1}H NMR (400 MHz, $CDCl_3$) δ 10.93 (s, 1H), 8.85 (dd, *J* = 4.0, 1.1 Hz, 1H), 8.79 (dd, *J* = 6.6, 1.9 Hz, 1H), 8.16 (dd, *J* = 8.2, 1.1 Hz, 1H), 7.71 – 7.50 (m, 2H), 7.45 (dd, *J* = 8.2, 4.2 Hz, 1H), 4.06 (q, *J* = 6.8 Hz, 1H), 3.84 – 3.60 (m, 2H), 1.55 (d, *J* = 6.8 Hz, 3H), 1.41 (t, *J* = 7.0 Hz, 3H).



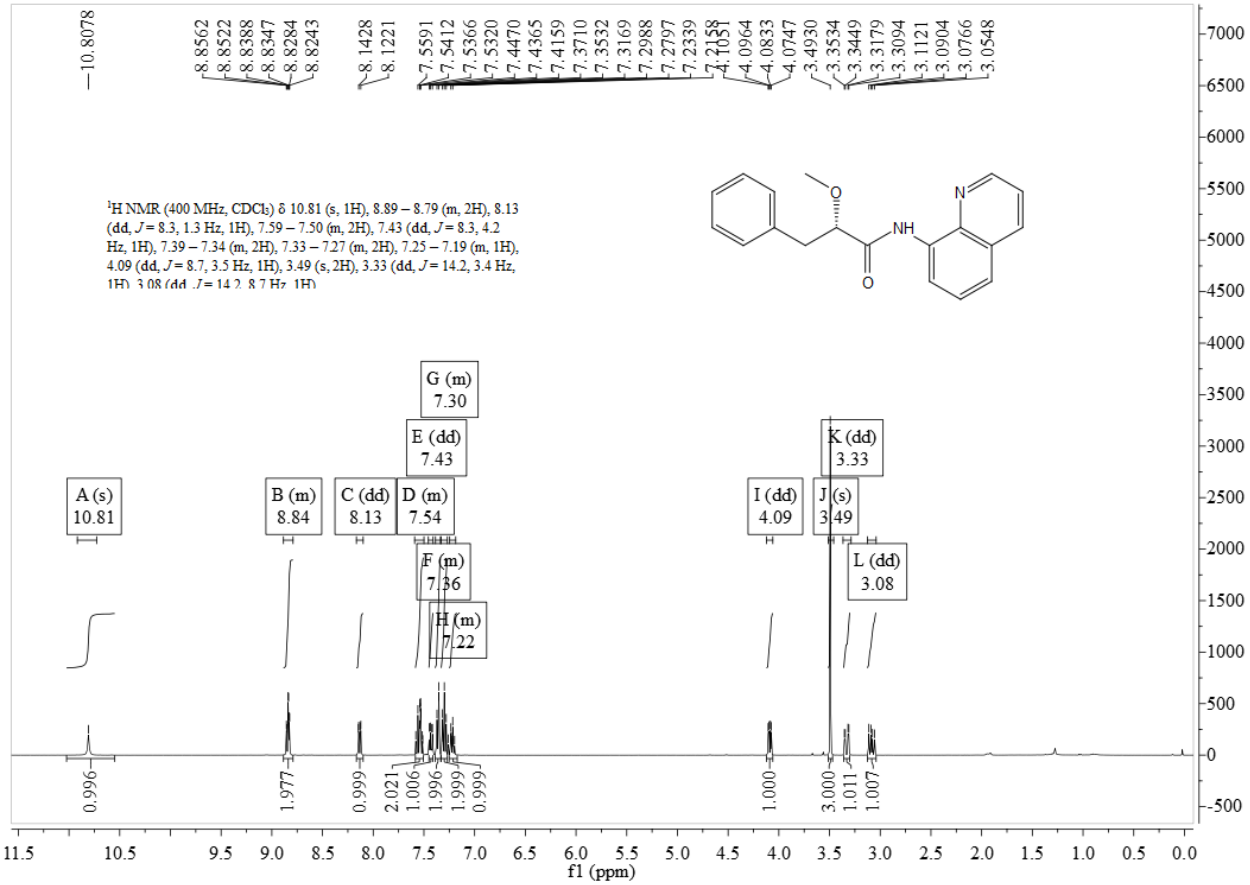
^{13}C NMR (101 MHz, $CDCl_3$) δ 172.67, 148.64, 139.09, 136.29, 134.28, 128.14, 127.40, 121.93, 121.74, 116.59, 77.61, 66.28, 19.24, 15.54.



^{1}H NMR (400 MHz, $CDCl_3$) δ 10.65 (s, 1H), 8.79 (dd, *J* = 4.2, 1.7 Hz, 1H), 8.77 – 8.71 (m, 1H), 8.12 (dd, *J* = 8.3, 1.6 Hz, 1H), 7.84 (d, *J* = 2.2 Hz, 1H), 7.54 – 7.48 (m, 2H), 7.46 – 7.39 (m, 2H), 6.90 (d, *J* = 8.6 Hz, 1H), 4.03 (dd, *J* = 7.6, 3.7 Hz, 1H), 3.82 (s, 3H), 3.53 (s, 3H), 3.24 (dd, *J* = 14.4, 3.7 Hz, 1H), 3.07 (dd, *J* = 14.4, 7.6 Hz, 1H).



^{13}C NMR (101 MHz, $CDCl_3$) δ 170.06, 151.79, 148.70, 139.27, 138.81, 136.20, 135.41, 133.62, 129.78, 127.99, 127.16, 126.76, 122.24, 121.74, 116.66, 113.37, 83.69, 59.19, 56.47, 37.72.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7.3532
7.3169
7.2988
7.2797
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3.3534
3.3449
3.3179
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3.1121
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3.0548
¹H NMR (400 MHz, CDCl₃) δ 10.81 (s, 1H), 8.89 – 8.79 (m, 2H), 8.13 (dd, J = 8.3, 1.3 Hz, 1H), 7.59 – 7.50 (m, 2H), 7.43 (dd, J = 8.3, 4.2 Hz, 1H), 7.39 – 7.34 (m, 2H), 7.33 – 7.27 (m, 2H), 7.25 – 7.19 (m, 1H), 4.09 (dd, J = 8.7, 3.5 Hz, 1H), 3.49 (s, 2H), 3.33 (dd, J = 14.2, 3.4 Hz, 1H), 3.08 (dd, J = 14.2, 8.7 Hz, 1H)
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B (m) 8.84
C (dd) 8.13
D (m) 7.54
E (dd) 7.43
F (m) 7.36
G (m) 7.30
H (m) 7.22
I (dd) 4.09
J (s) 3.49
K (dd) 3.33
L (dd) 3.08
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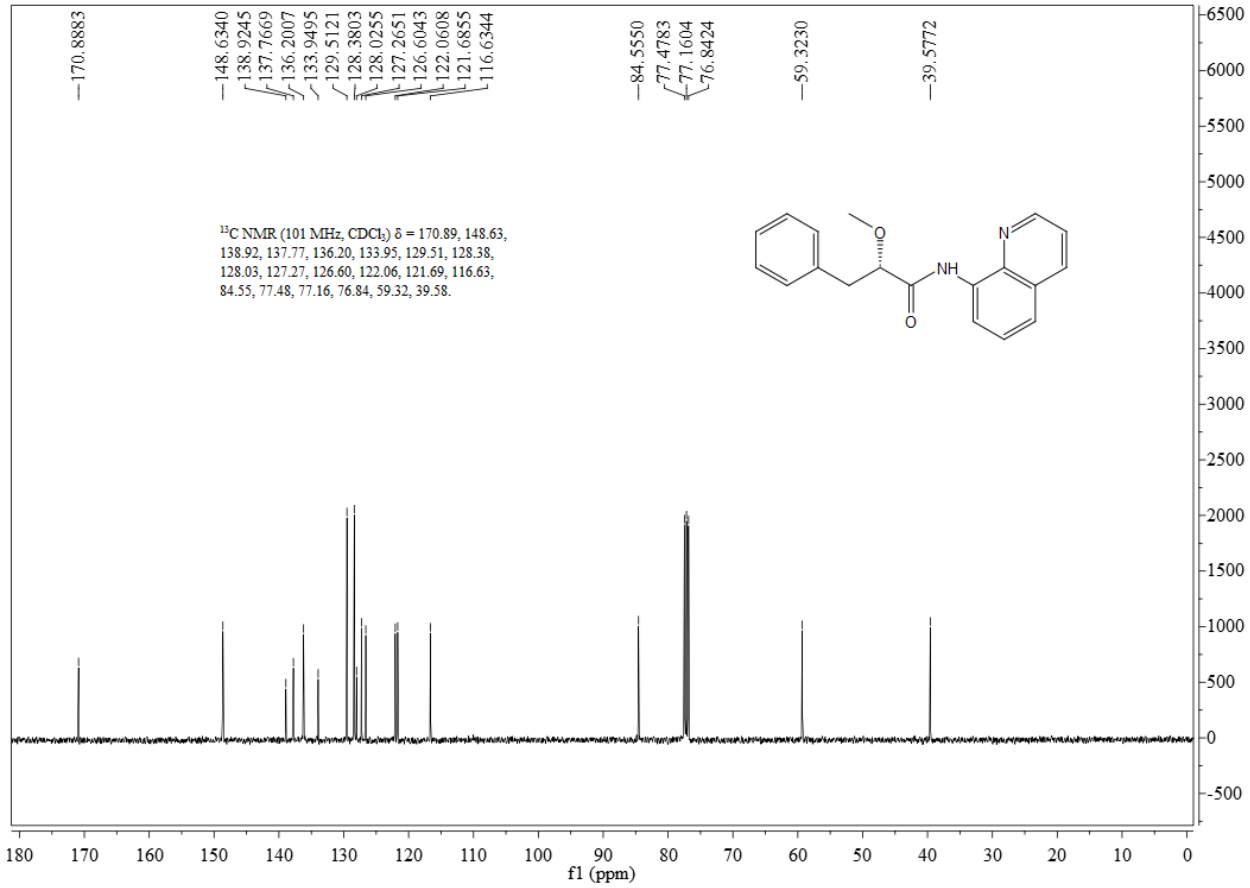
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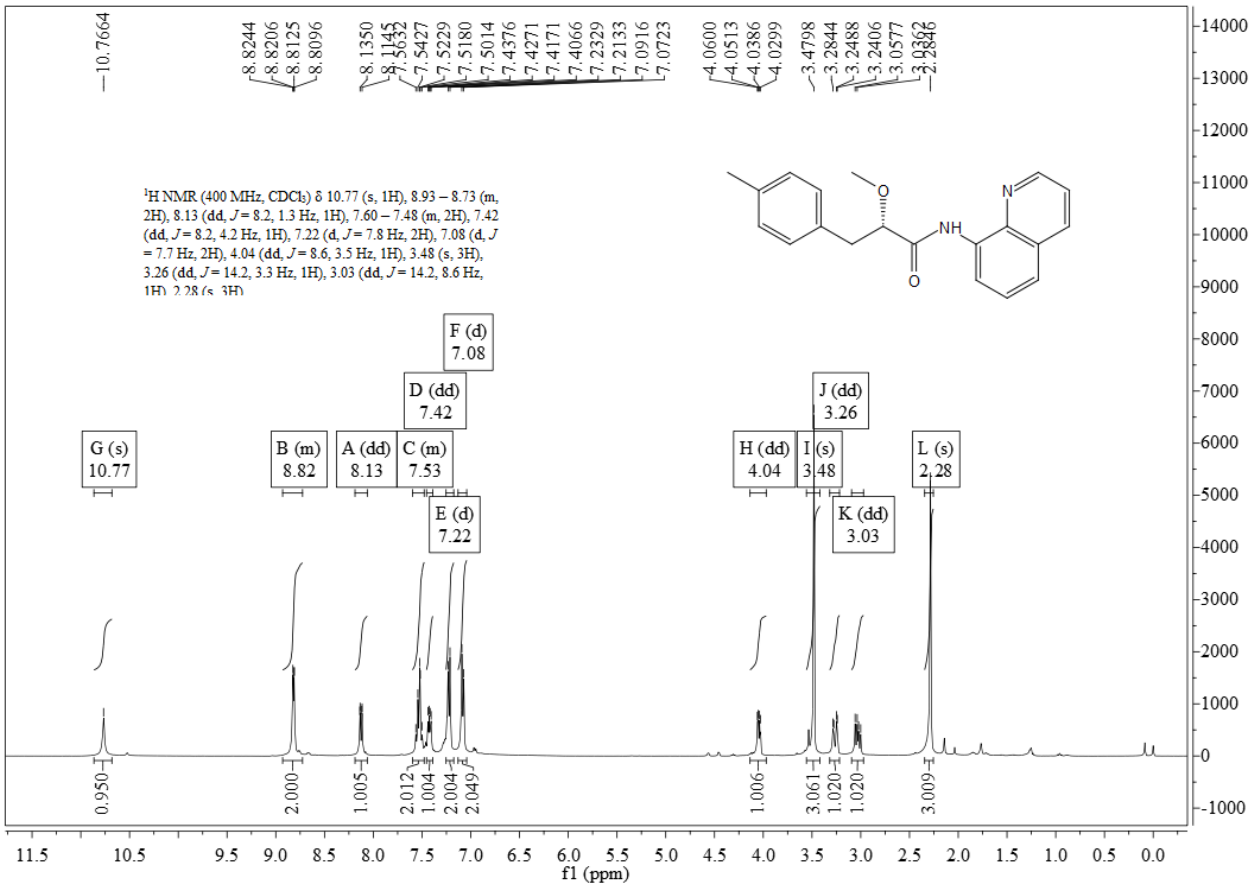
f1 (ppm)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1H NMR (400 MHz, CDCl3) δ 10.77 (s, 1H), 8.93 – 8.73 (m, 2H), 8.13 (dd, J = 8.2, 1.3 Hz, 1H), 7.60 – 7.48 (m, 2H), 7.42 (dd, J = 8.2, 4.2 Hz, 1H), 7.22 (d, J = 7.8 Hz, 2H), 7.08 (d, J = 7.7 Hz, 2H), 4.04 (dd, J = 8.6, 3.5 Hz, 1H), 3.48 (s, 3H), 3.26 (dd, J = 14.2, 3.3 Hz, 1H), 3.03 (dd, J = 14.2, 8.6 Hz, 1H), 2.28 (s, 3H)
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D (dd) 7.42
J (dd) 3.26
G (s) 10.77
B (m) 8.82
A (dd) 8.13
C (m) 7.53
H (dd) 4.04
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L (s) 2.28
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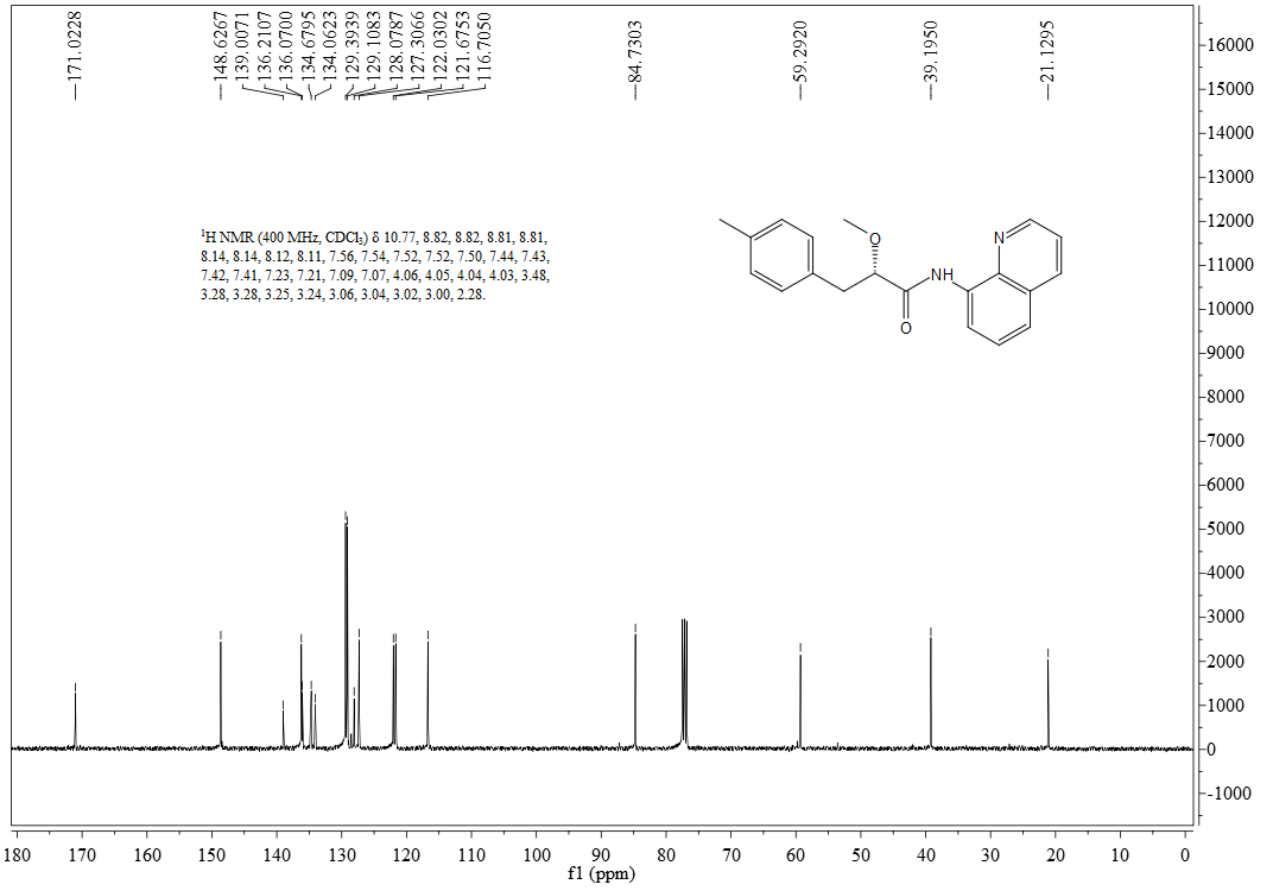
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121.6753
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59.2920
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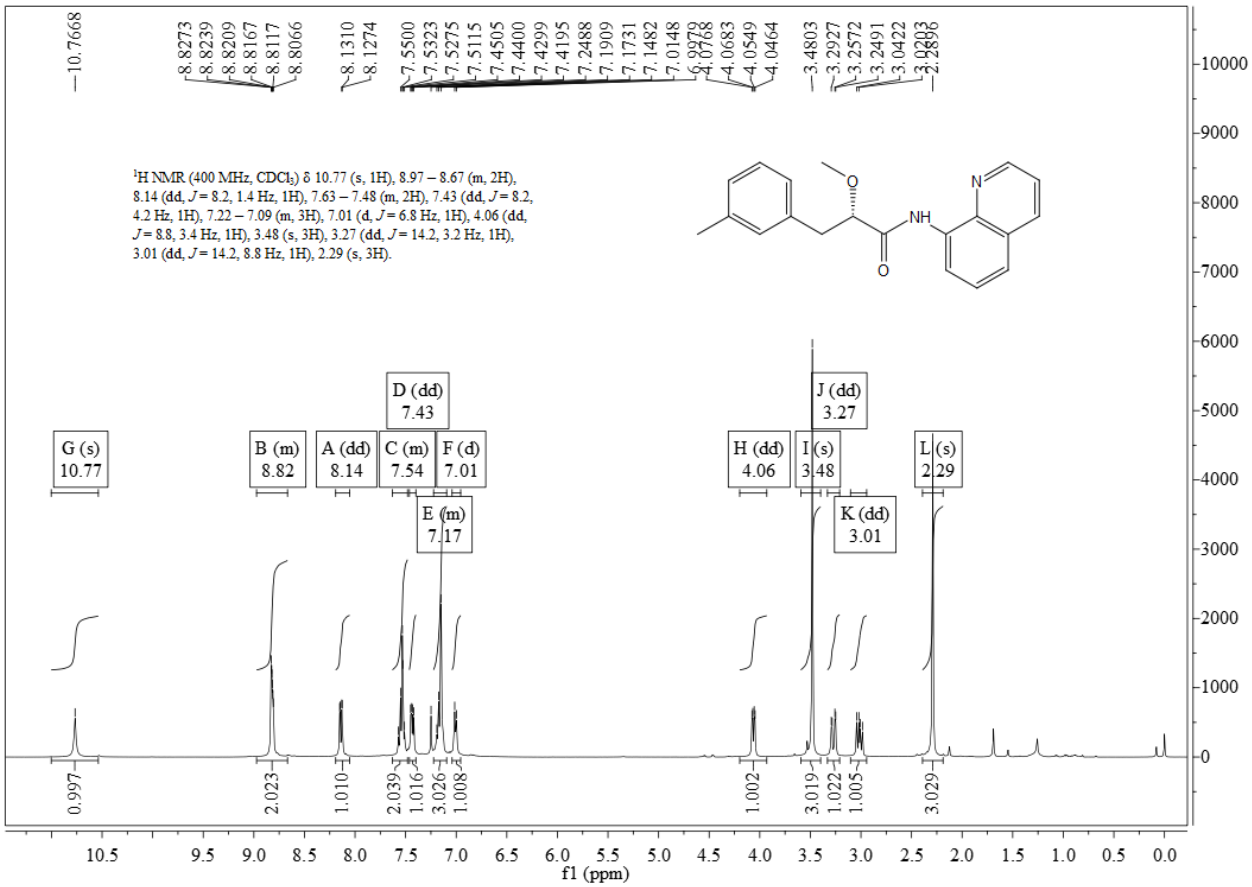
f1 (ppm)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1H NMR (400 MHz, CDCl3) δ 10.77 (s, 1H), 8.97 – 8.67 (m, 2H), 8.14 (dd, J = 8.2, 1.4 Hz, 1H), 7.63 – 7.48 (m, 2H), 7.43 (dd, J = 8.2, 4.2 Hz, 1H), 7.22 – 7.09 (m, 3H), 7.01 (d, J = 6.8 Hz, 1H), 4.06 (dd, J = 8.8, 3.4 Hz, 1H), 3.48 (s, 3H), 3.27 (dd, J = 14.2, 3.2 Hz, 1H), 3.01 (dd, J = 14.2, 8.8 Hz, 1H), 2.29 (s, 3H).
G (s) 10.77
B (m) 8.82
A (dd) 8.14
C (m) 7.54
D (dd) 7.43
F (d) 7.01
E (m) 7.17
H (dd) 4.06
I (s) 3.48
J (dd) 3.27
K (dd) 3.01
L (s) 2.29
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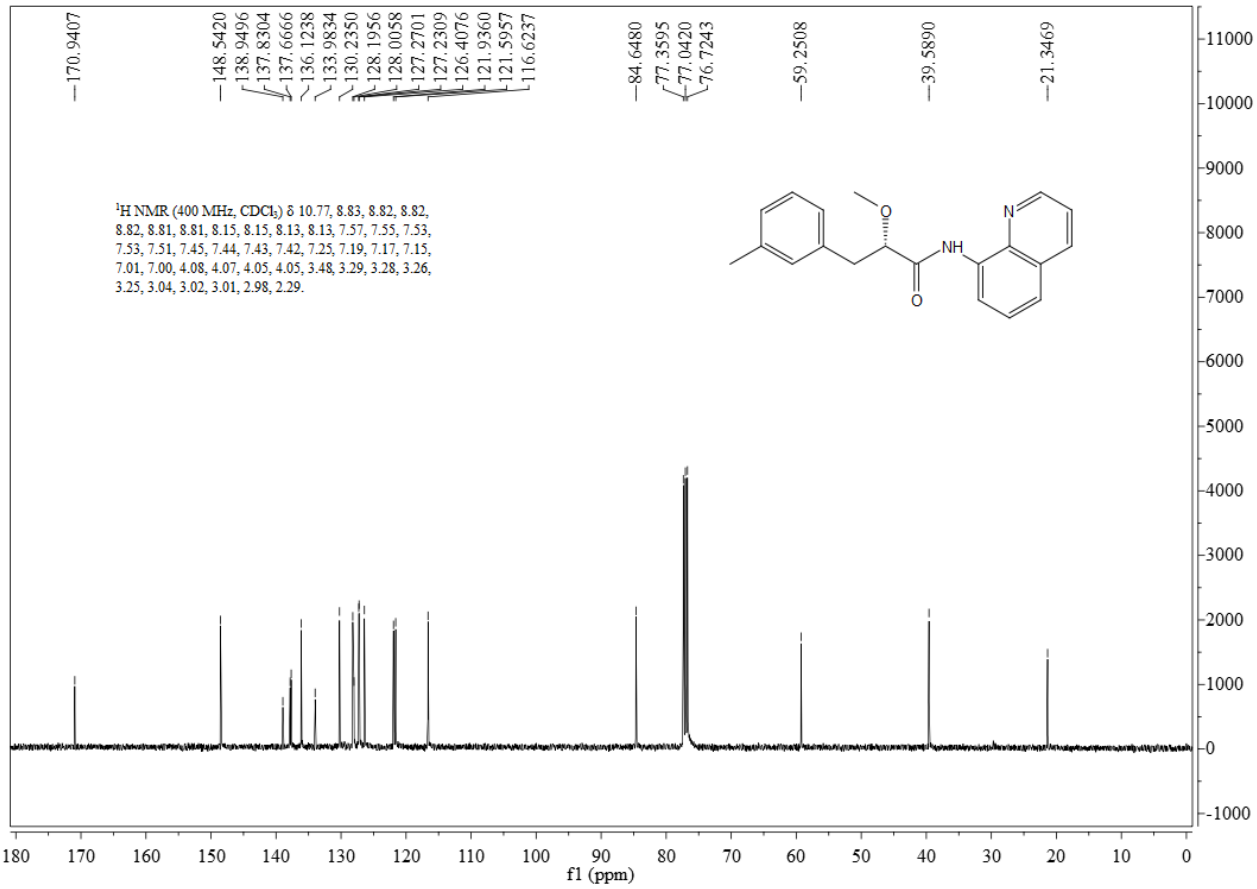
f1 (ppm)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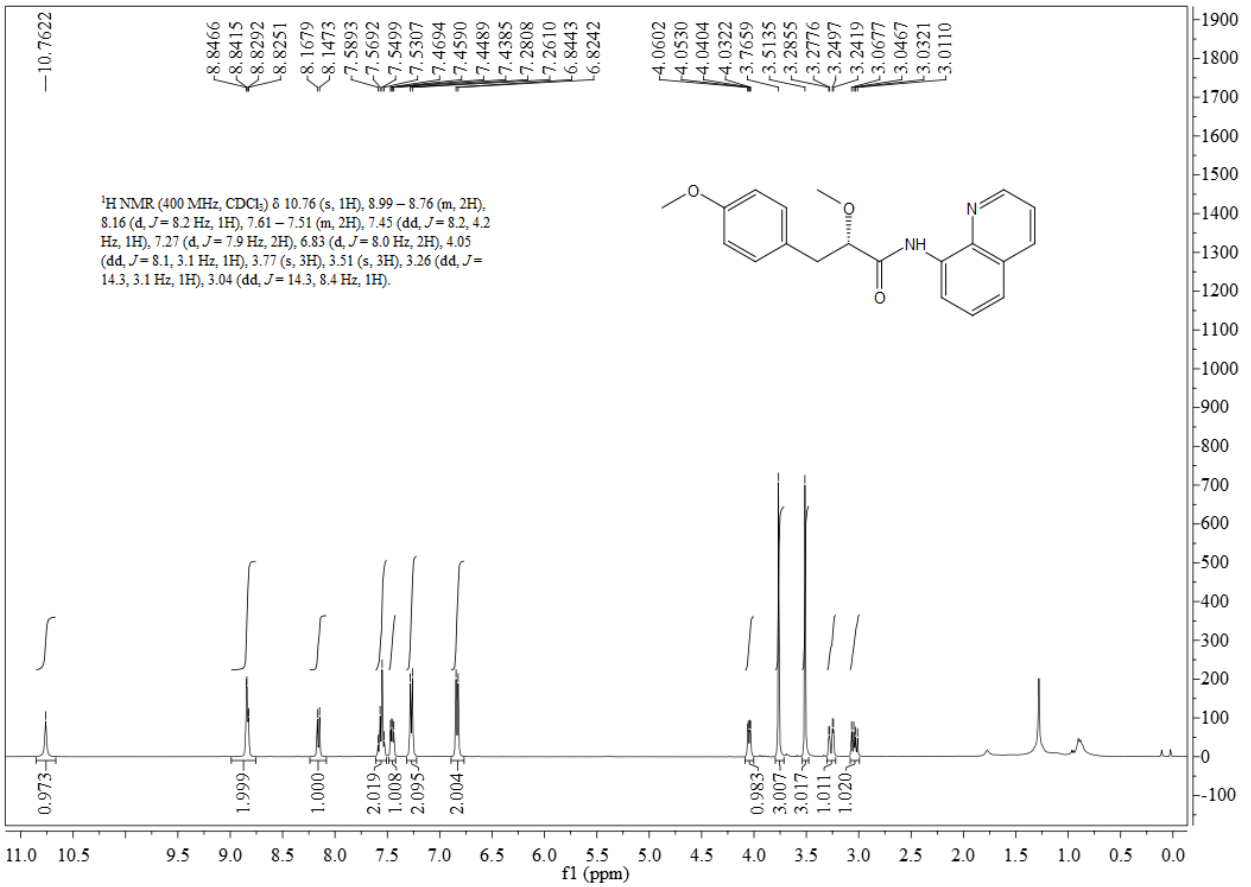
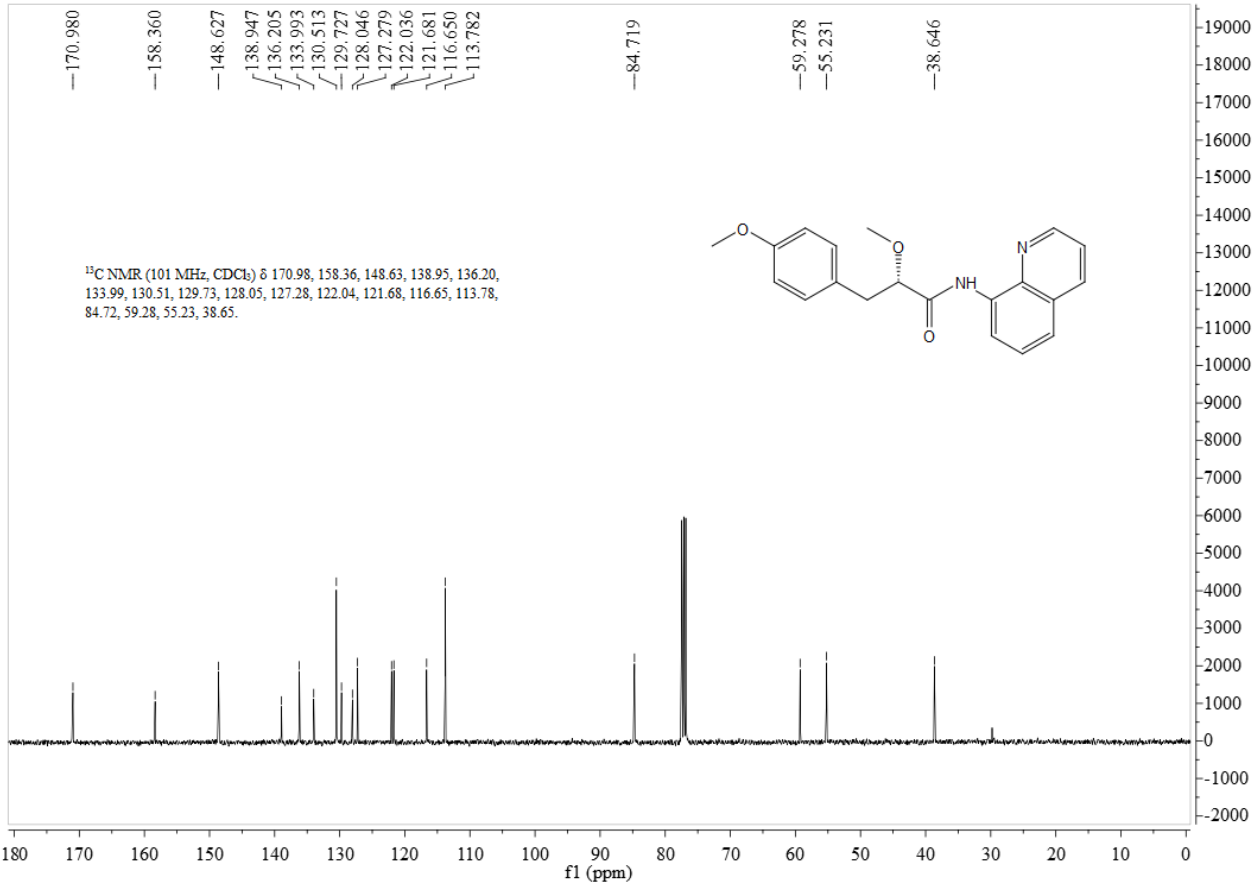
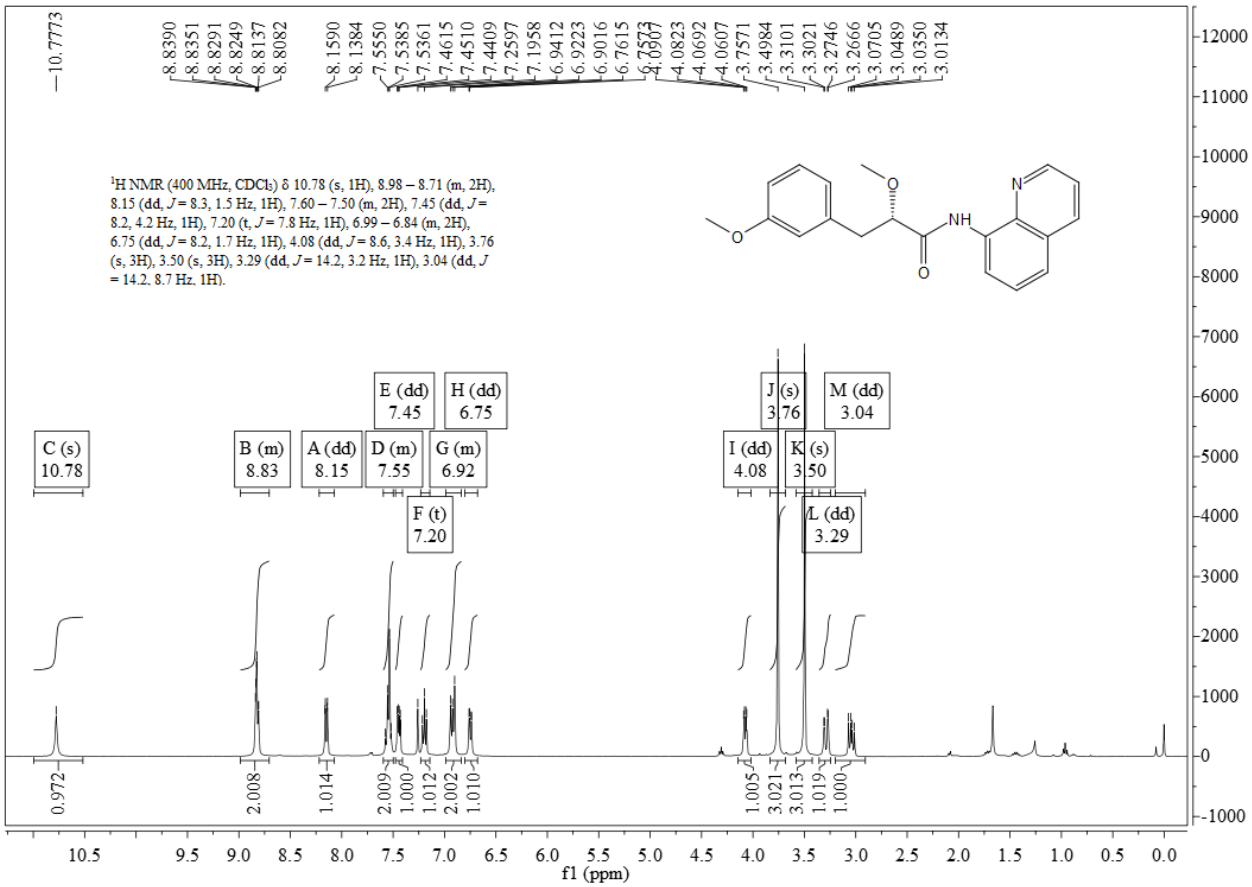
1H NMR (400 MHz, CDCl3) δ 10.77, 8.83, 8.82, 8.82, 8.82, 8.81, 8.81, 8.15, 8.15, 8.13, 8.13, 7.57, 7.55, 7.53, 7.53, 7.51, 7.45, 7.44, 7.43, 7.42, 7.25, 7.19, 7.17, 7.15, 7.01, 7.00, 4.08, 4.07, 4.05, 4.05, 3.48, 3.29, 3.28, 3.26, 3.25, 3.04, 3.02, 3.01, 2.98, 2.29.
f1 (ppm)

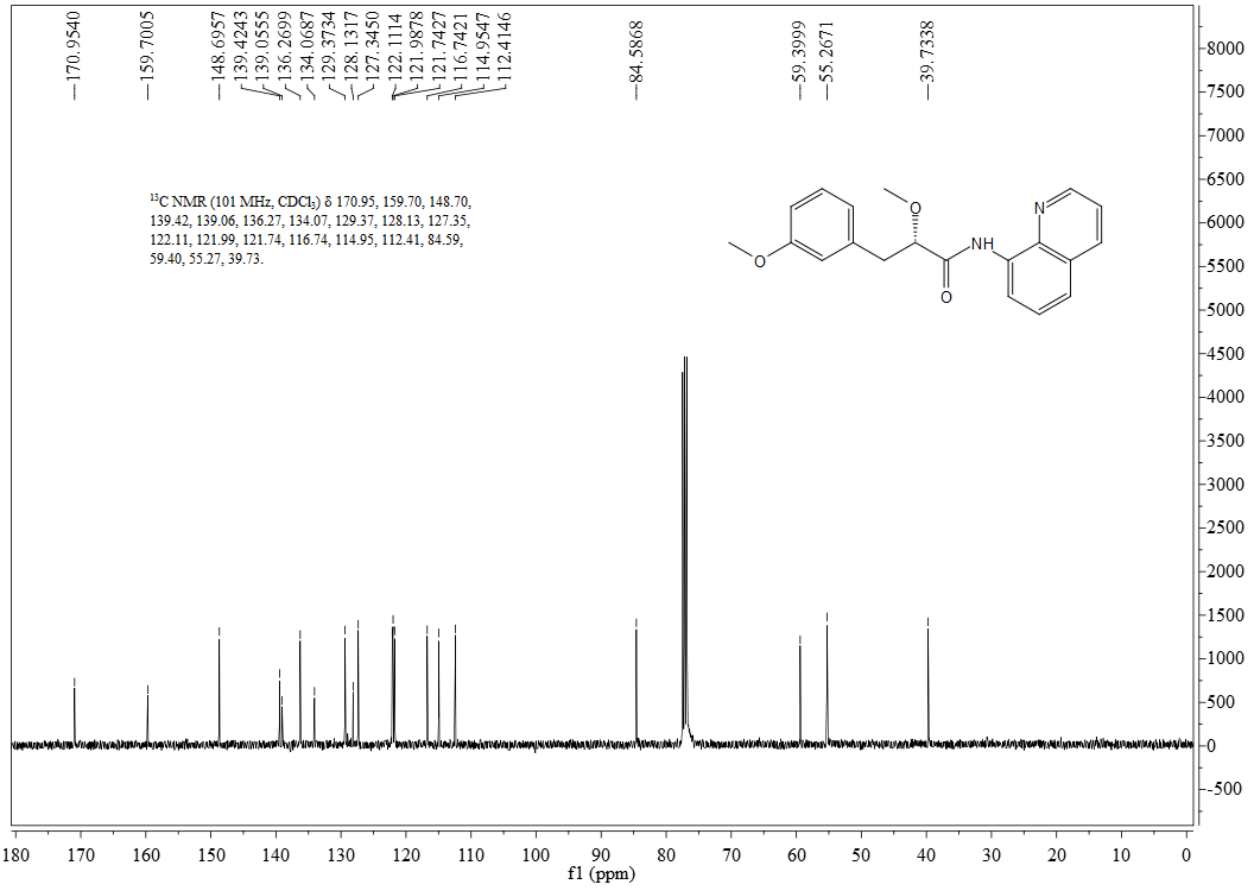


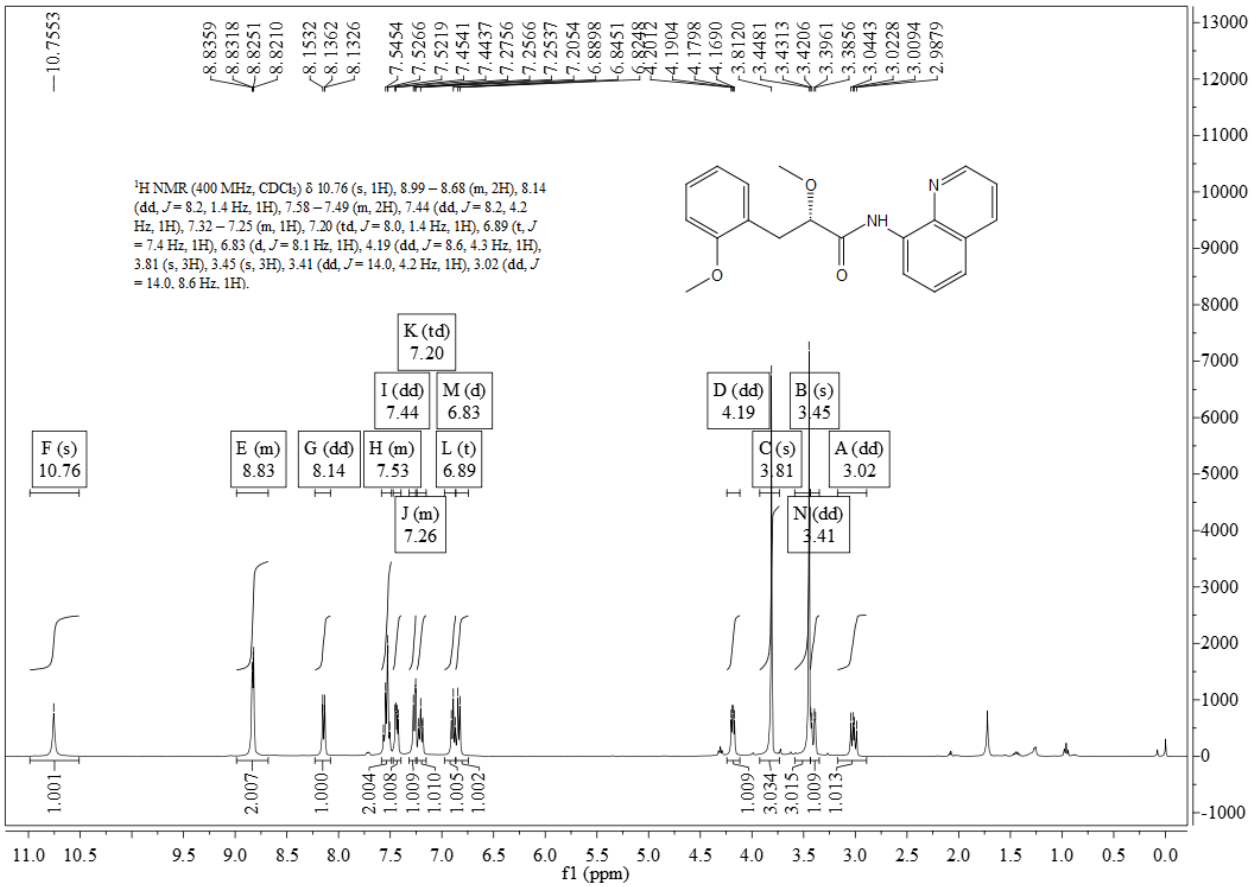
^{1}H NMR (400 MHz, $CDCl_3$) δ 10.76 (s, 1H), 8.99 – 8.76 (m, 2H), 8.16 (d, *J* = 8.2 Hz, 1H), 7.61 – 7.51 (m, 2H), 7.45 (dd, *J* = 8.2, 4.2 Hz, 1H), 7.27 (d, *J* = 7.9 Hz, 2H), 6.83 (d, *J* = 8.0 Hz, 2H), 4.05 (dd, *J* = 8.1, 3.1 Hz, 1H), 3.77 (s, 3H), 3.51 (s, 3H), 3.26 (dd, *J* = 14.3, 3.1 Hz, 1H), 3.04 (dd, *J* = 14.3, 8.4 Hz, 1H).



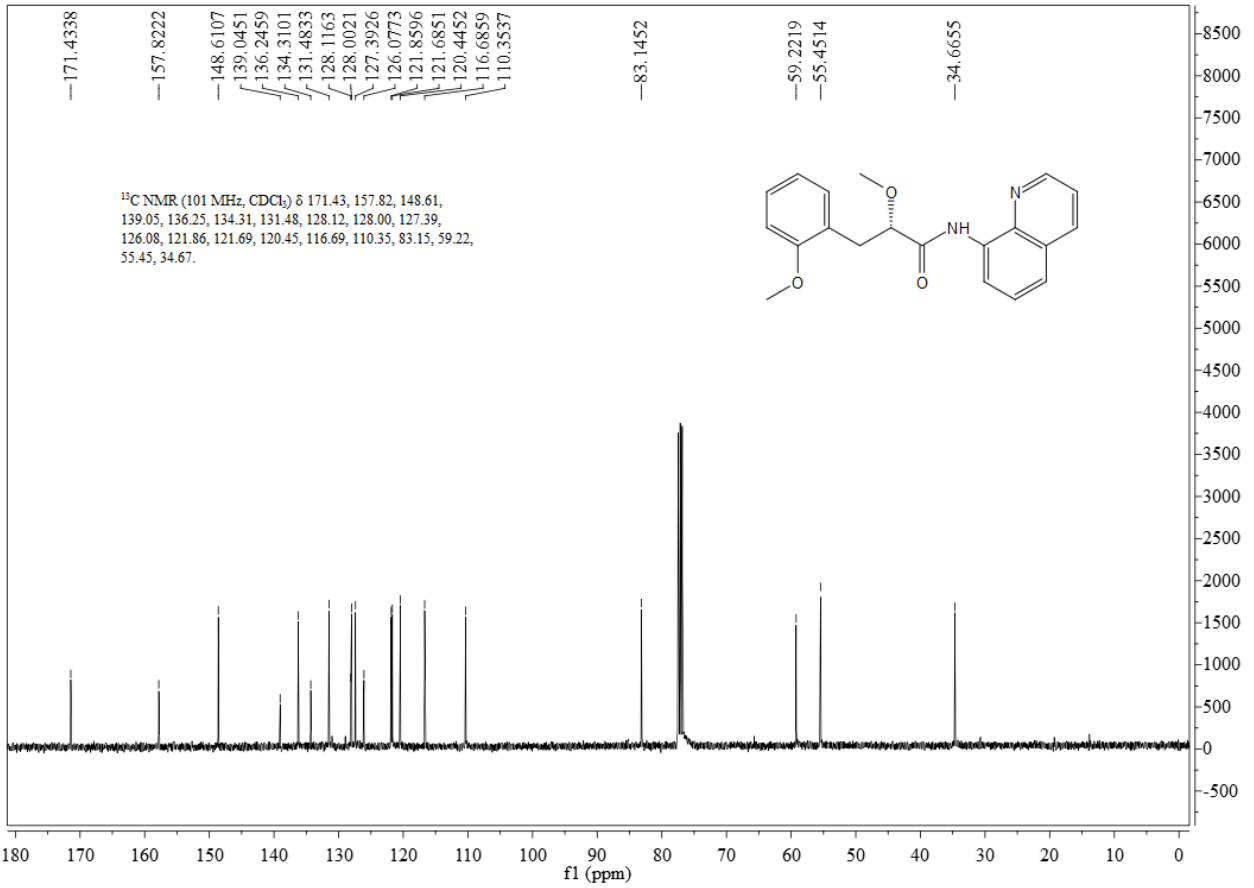
^{13}C NMR (101 MHz, $CDCl_3$) δ 170.98, 158.36, 148.63, 138.95, 136.20, 133.99, 130.51, 129.73, 128.05, 127.28, 122.04, 121.68, 116.65, 113.78, 84.72, 59.28, 55.23, 38.65.


10.7773
8.8390
8.8351
8.8291
8.8249
8.8137
8.8082
8.1590
8.1384
7.5550
7.5385
7.5361
7.4615
7.4510
7.4409
7.2597
7.1958
6.9412
6.9223
6.9016
6.7615
6.7573
4.0907
4.0823
4.0692
4.0607
3.7571
3.4984
3.3101
3.3021
3.2746
3.2666
3.0705
3.0489
3.0350
3.0134
1H NMR (400 MHz, CDCl3) δ 10.78 (s, 1H), 8.98 – 8.71 (m, 2H), 8.15 (dd, J = 8.3, 1.5 Hz, 1H), 7.60 – 7.50 (m, 2H), 7.45 (dd, J = 8.2, 4.2 Hz, 1H), 7.20 (t, J = 7.8 Hz, 1H), 6.99 – 6.84 (m, 2H), 6.75 (dd, J = 8.2, 1.7 Hz, 1H), 4.08 (dd, J = 8.6, 3.4 Hz, 1H), 3.76 (s, 3H), 3.50 (s, 3H), 3.29 (dd, J = 14.2, 3.2 Hz, 1H), 3.04 (dd, J = 14.2, 8.7 Hz, 1H).
C (s) 10.78
B (m) 8.83
A (dd) 8.15
E (dd) 7.45
D (m) 7.55
F (t) 7.20
H (dd) 6.75
G (m) 6.92
I (dd) 4.08
J (s) 3.76
K (s) 3.50
L (dd) 3.29
M (dd) 3.04
0.972
2.008
1.014
2.009
1.000
1.012
2.002
1.010
1.005
3.021
3.013
1.019
1.000
f1 (ppm)

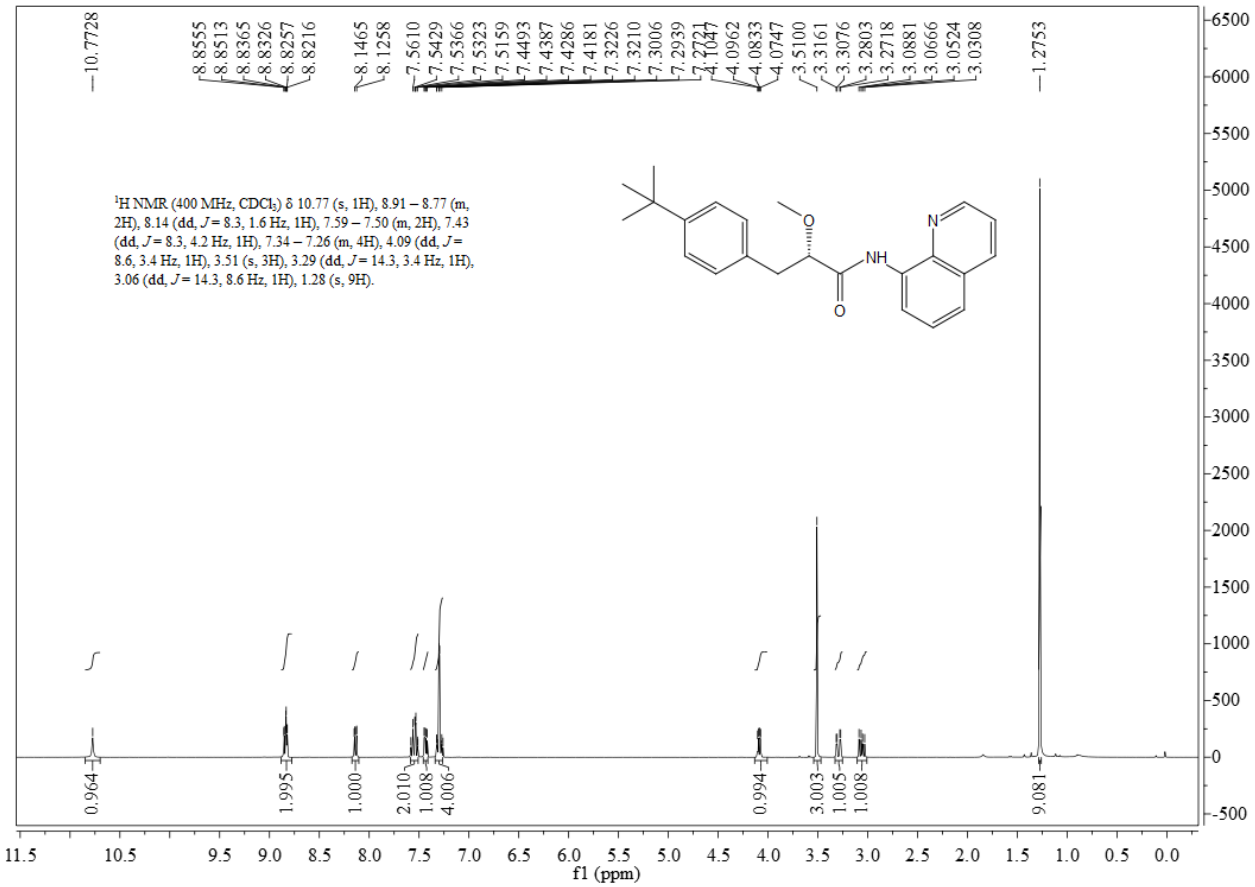

170.9540
159.7005
148.6957
139.4243
139.0555
136.2699
134.0687
129.3734
128.1317
127.3450
122.1114
121.9878
121.7427
116.7421
114.9547
112.4146
84.5868
59.3999
55.2671
39.7338
13C NMR (101 MHz, CDCl3) δ 170.95, 159.70, 148.70, 139.42, 139.06, 136.27, 134.07, 129.37, 128.13, 127.35, 122.11, 121.99, 121.74, 116.74, 114.95, 112.41, 84.59, 59.40, 55.27, 39.73.
f1 (ppm)



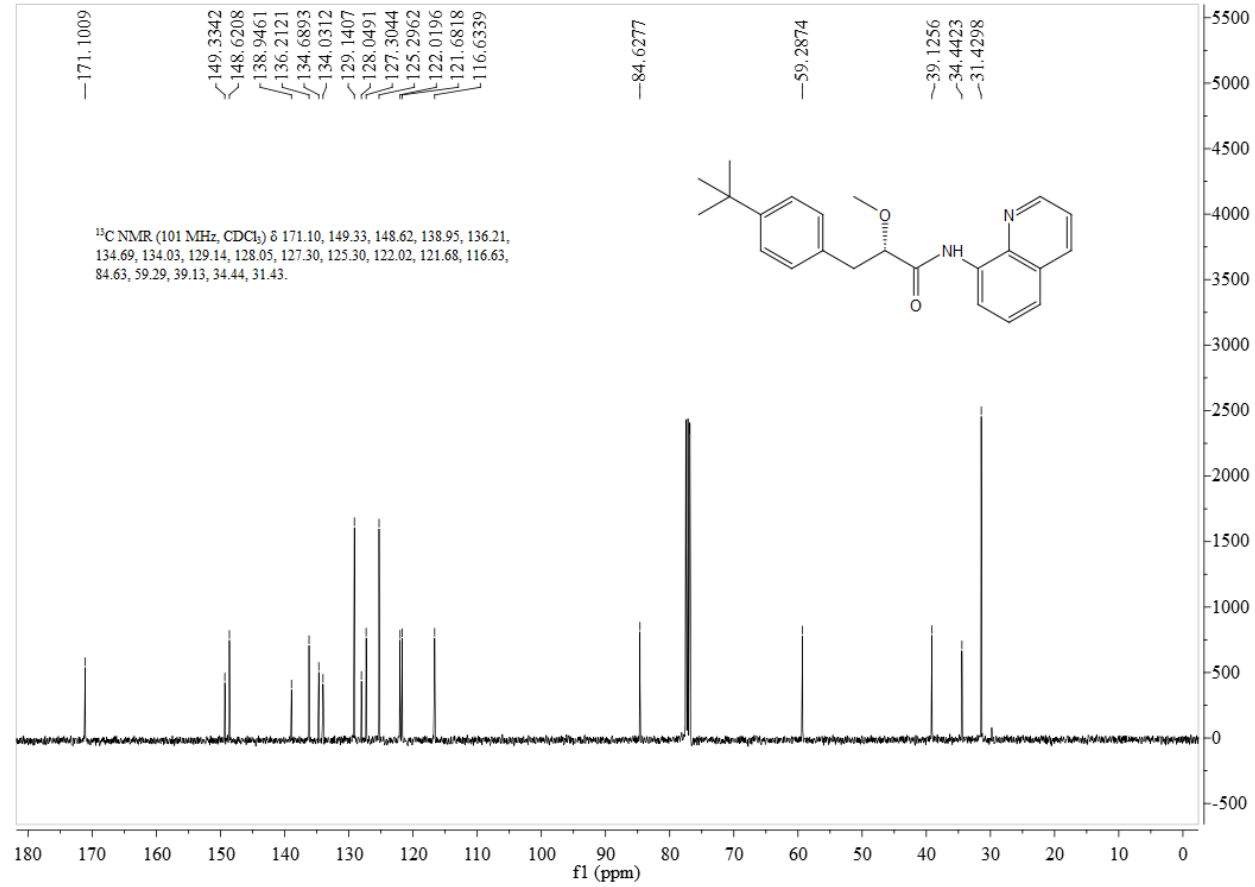
^{1}H NMR (400 MHz, $CDCl_3$) δ 10.76 (s, 1H), 8.99 – 8.68 (m, 2H), 8.14 (dd, *J* = 8.2, 1.4 Hz, 1H), 7.58 – 7.49 (m, 2H), 7.44 (dd, *J* = 8.2, 4.2 Hz, 1H), 7.32 – 7.25 (m, 1H), 7.20 (td, *J* = 8.0, 1.4 Hz, 1H), 6.89 (t, *J* = 7.4 Hz, 1H), 6.83 (d, *J* = 8.1 Hz, 1H), 4.19 (dd, *J* = 8.6, 4.3 Hz, 1H), 3.81 (s, 3H), 3.45 (s, 3H), 3.41 (dd, *J* = 14.0, 4.2 Hz, 1H), 3.02 (dd, *J* = 14.0, 8.6 Hz, 1H).



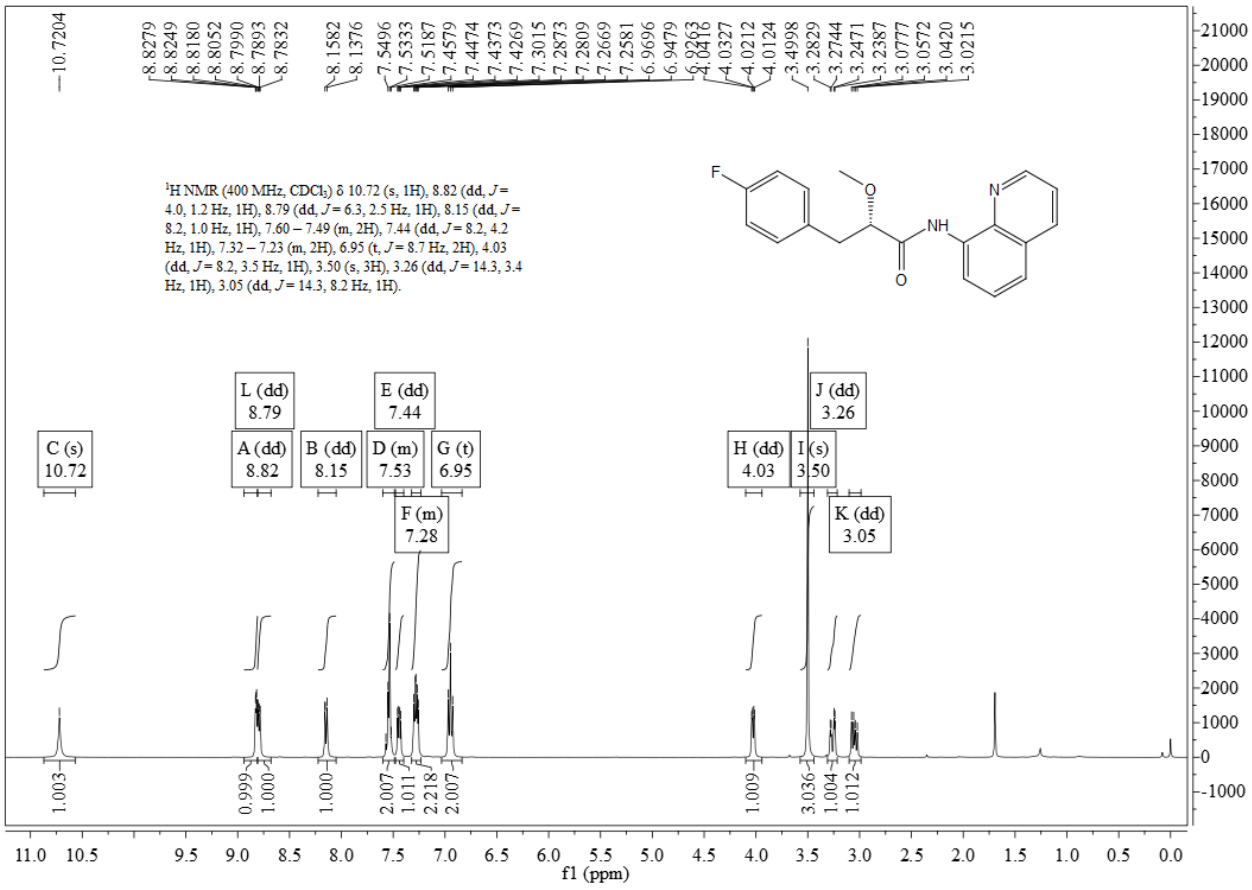
^{13}C NMR (101 MHz, $CDCl_3$) δ 171.43, 157.82, 148.61, 139.05, 136.25, 134.31, 131.48, 128.12, 128.00, 127.39, 126.08, 121.86, 121.69, 120.45, 116.69, 110.35, 83.15, 59.22, 55.45, 34.67.

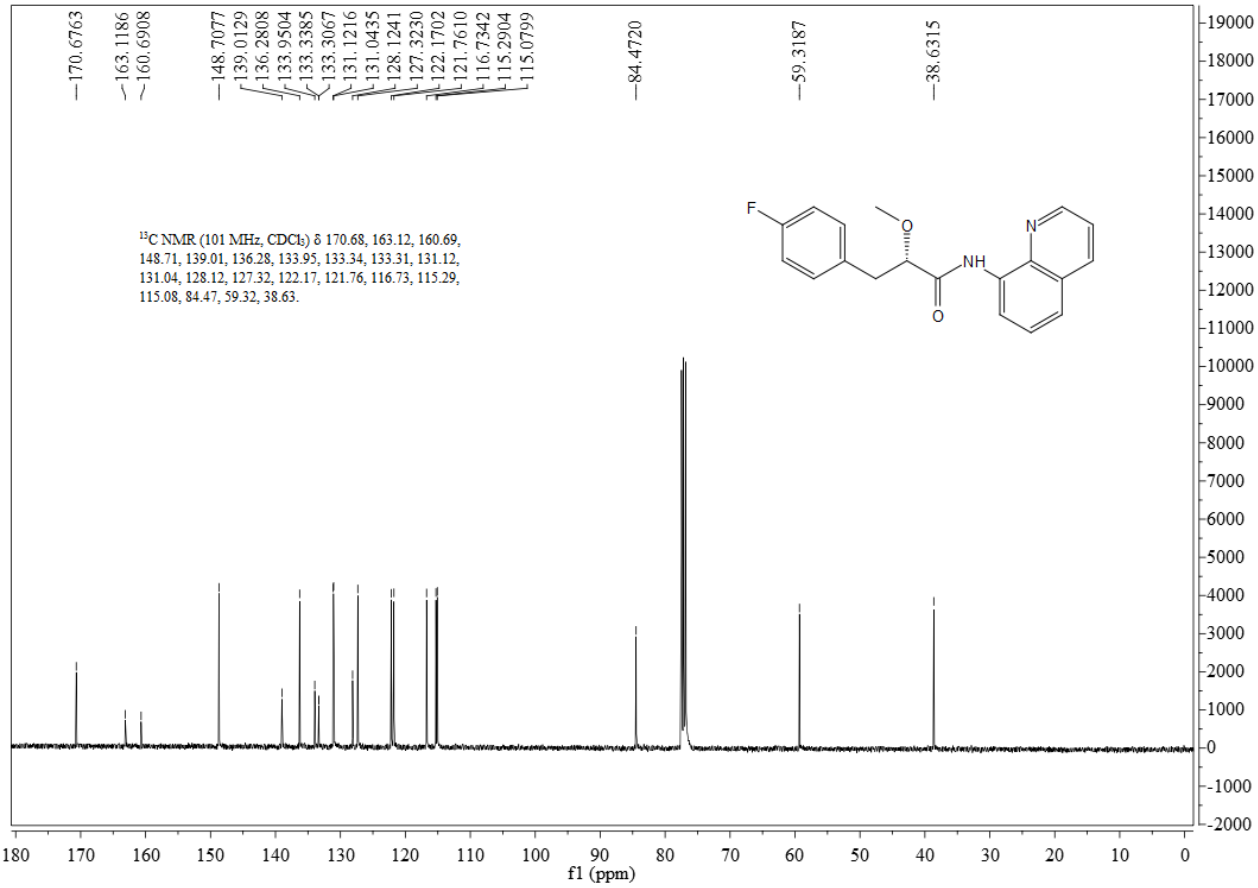


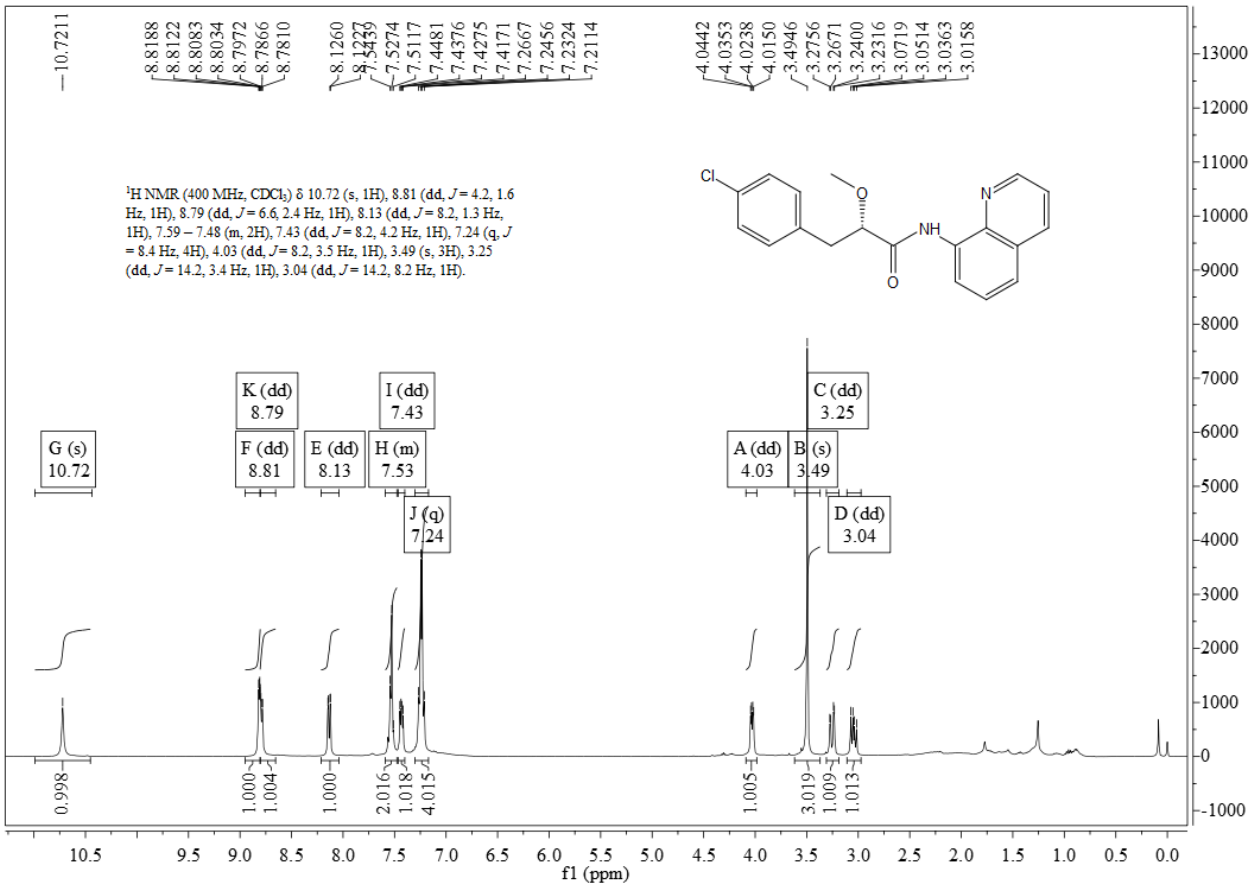
^{1}H NMR (400 MHz, $CDCl_3$) δ 10.77 (s, 1H), 8.91 – 8.77 (m, 2H), 8.14 (dd, *J* = 8.3, 1.6 Hz, 1H), 7.59 – 7.50 (m, 2H), 7.43 (dd, *J* = 8.3, 4.2 Hz, 1H), 7.34 – 7.26 (m, 4H), 4.09 (dd, *J* = 8.6, 3.4 Hz, 1H), 3.51 (s, 3H), 3.29 (dd, *J* = 14.3, 3.4 Hz, 1H), 3.06 (dd, *J* = 14.3, 8.6 Hz, 1H), 1.28 (s, 9H).

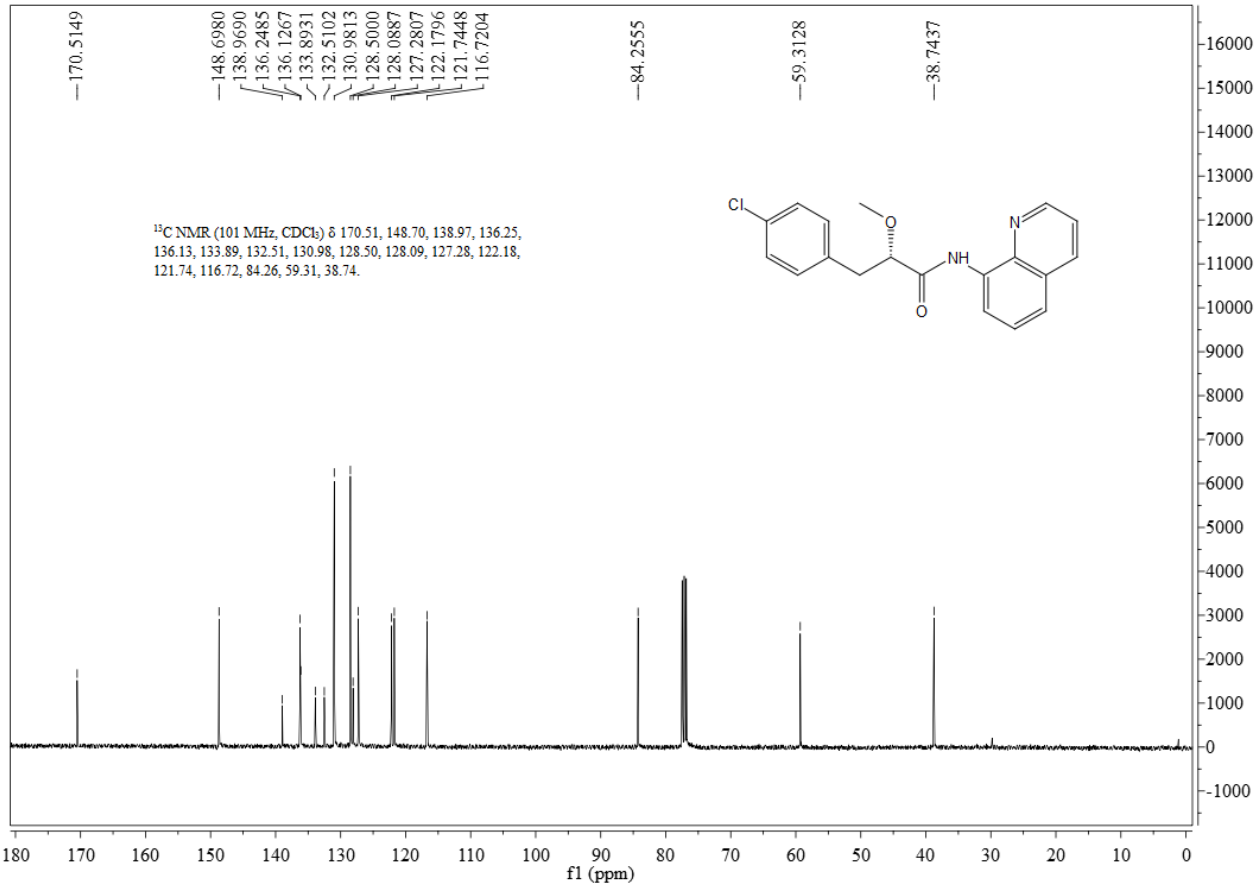


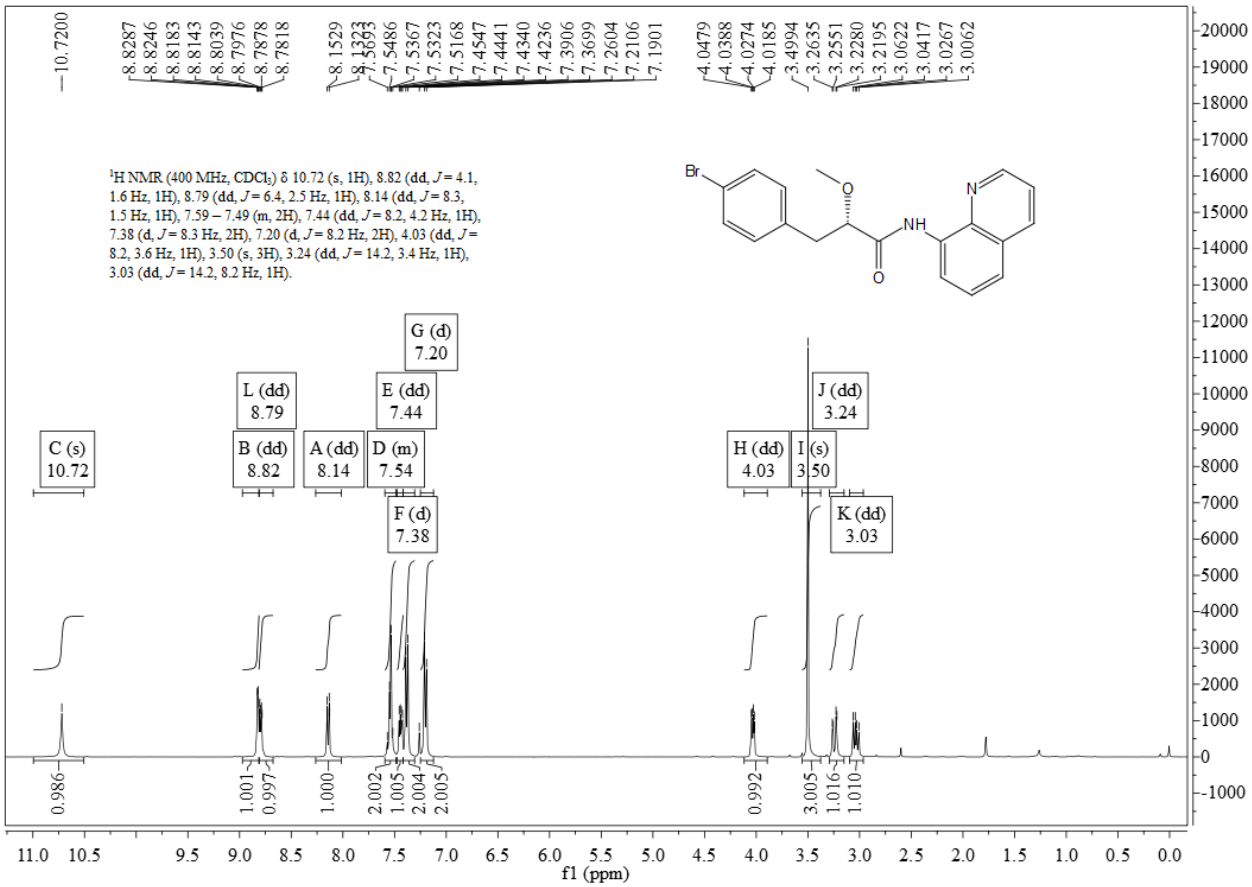
^{13}C NMR (101 MHz, $CDCl_3$) δ 171.10, 149.33, 148.62, 138.95, 136.21, 134.69, 134.03, 129.14, 128.05, 127.30, 125.30, 122.02, 121.68, 116.63, 84.63, 59.29, 39.13, 34.44, 31.43.

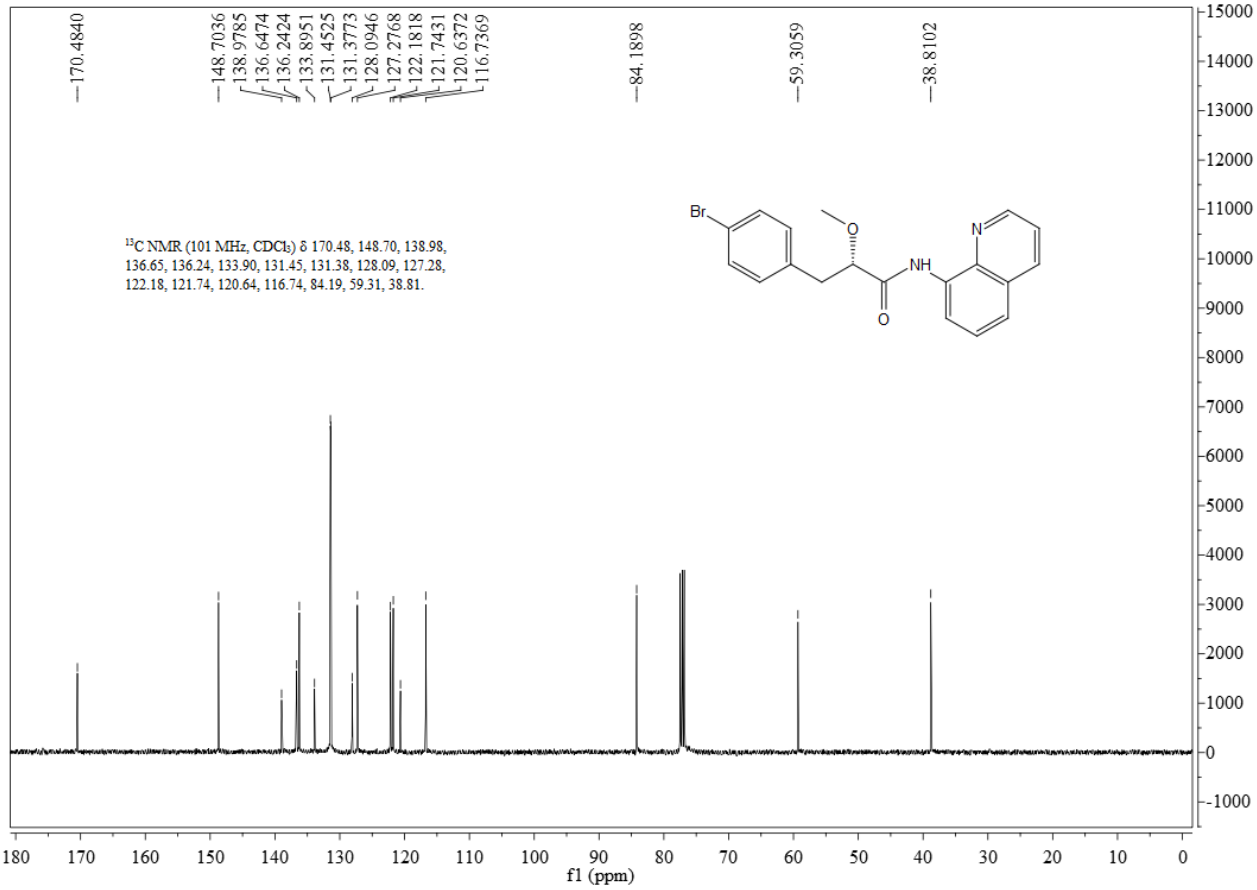

10.7204
8.8279
8.8249
8.8180
8.8052
8.7990
8.7893
8.7832
8.1582
8.1376
7.5496
7.5333
7.5187
7.4579
7.4474
7.4373
7.4269
7.3015
7.2873
7.2809
7.2669
7.2581
6.9696
6.9479
6.9263
4.0416
4.0327
4.0212
4.0124
3.4998
3.2829
3.2744
3.2471
3.2387
3.0777
3.0572
3.0420
3.0215
1H NMR (400 MHz, CDCl3) δ 10.72 (s, 1H), 8.82 (dd, J = 4.0, 1.2 Hz, 1H), 8.79 (dd, J = 6.3, 2.5 Hz, 1H), 8.15 (dd, J = 8.2, 1.0 Hz, 1H), 7.60 – 7.49 (m, 2H), 7.44 (dd, J = 8.2, 4.2 Hz, 1H), 7.32 – 7.23 (m, 2H), 6.95 (t, J = 8.7 Hz, 2H), 4.03 (dd, J = 8.2, 3.5 Hz, 1H), 3.50 (s, 3H), 3.26 (dd, J = 14.3, 3.4 Hz, 1H), 3.05 (dd, J = 14.3, 8.2 Hz, 1H).
F
O
NH
N
O
C (s) 10.72
L (dd) 8.79
A (dd) 8.82
B (dd) 8.15
E (dd) 7.44
D (m) 7.53
G (t) 6.95
F (m) 7.28
H (dd) 4.03
I (s) 3.50
J (dd) 3.26
K (dd) 3.05
1.003
0.999
1.000
1.000
2.007
1.011
2.218
2.007
1.009
3.036
1.004
1.012
f1 (ppm)

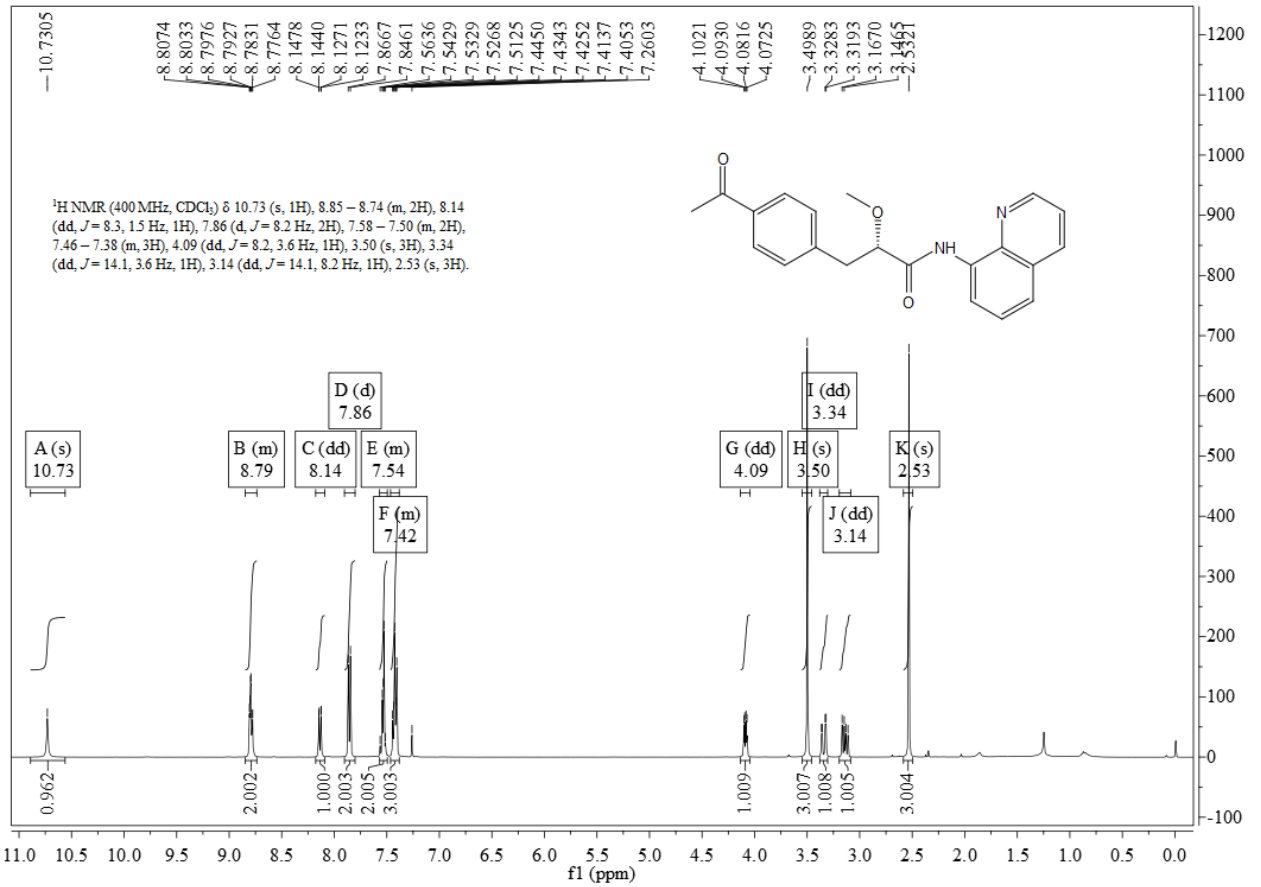

170.6763
163.1186
160.6908
148.7077
139.0129
136.2808
133.9504
133.3385
133.3067
131.1216
131.0435
128.1241
127.3230
122.1702
121.7610
116.7342
115.2904
115.0799
84.4720
59.3187
38.6315
13C NMR (101 MHz, CDCl3) δ 170.68, 163.12, 160.69, 148.71, 139.01, 136.28, 133.95, 133.34, 133.31, 131.12, 131.04, 128.12, 127.32, 122.17, 121.76, 116.73, 115.29, 115.08, 84.47, 59.32, 38.63.
F
O
NH
N
O
f1 (ppm)

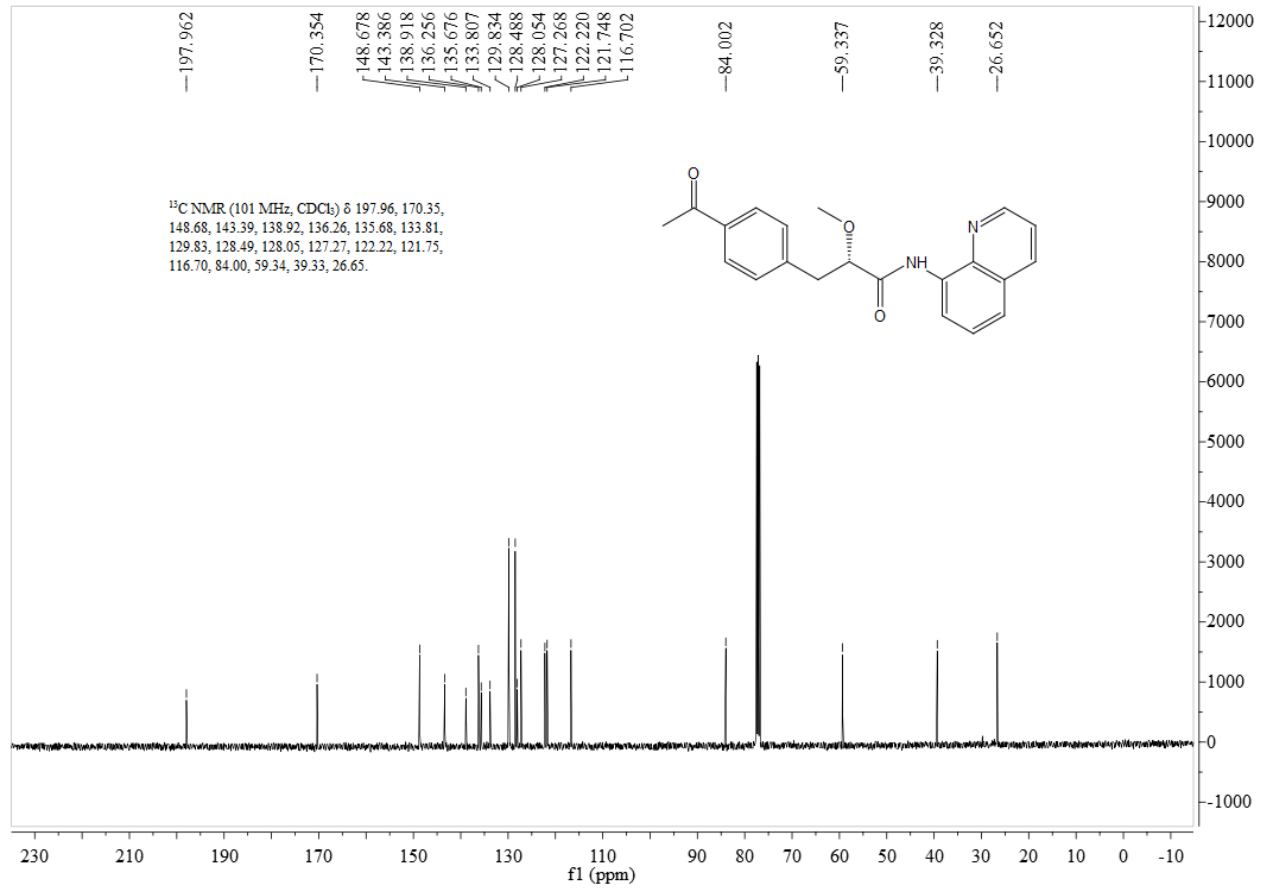

10.7211
8.8188
8.8122
8.8083
8.8034
8.7972
8.7866
8.7810
8.1260
8.1237
7.5439
7.5274
7.5117
7.4481
7.4376
7.4275
7.4171
7.2667
7.2456
7.2324
7.2114
4.0442
4.0353
4.0238
4.0150
3.4946
3.2756
3.2671
3.2400
3.2316
3.0719
3.0514
3.0363
3.0158
¹H NMR (400 MHz, CDCl₃) δ 10.72 (s, 1H), 8.81 (dd, J = 4.2, 1.6 Hz, 1H), 8.79 (dd, J = 6.6, 2.4 Hz, 1H), 8.13 (dd, J = 8.2, 1.3 Hz, 1H), 7.59 – 7.48 (m, 2H), 7.43 (dd, J = 8.2, 4.2 Hz, 1H), 7.24 (q, J = 8.4 Hz, 4H), 4.03 (dd, J = 8.2, 3.5 Hz, 1H), 3.49 (s, 3H), 3.25 (dd, J = 14.2, 3.4 Hz, 1H), 3.04 (dd, J = 14.2, 8.2 Hz, 1H).
Cl
O
NH
N
O
G (s) 10.72
K (dd) 8.79
F (dd) 8.81
E (dd) 8.13
I (dd) 7.43
H (m) 7.53
J (q) 7.24
A (dd) 4.03
B (s) 3.49
C (dd) 3.25
D (dd) 3.04
0.998
1.000
1.004
1.000
2.016
1.018
4.015
1.005
3.019
1.009
1.013
f1 (ppm)

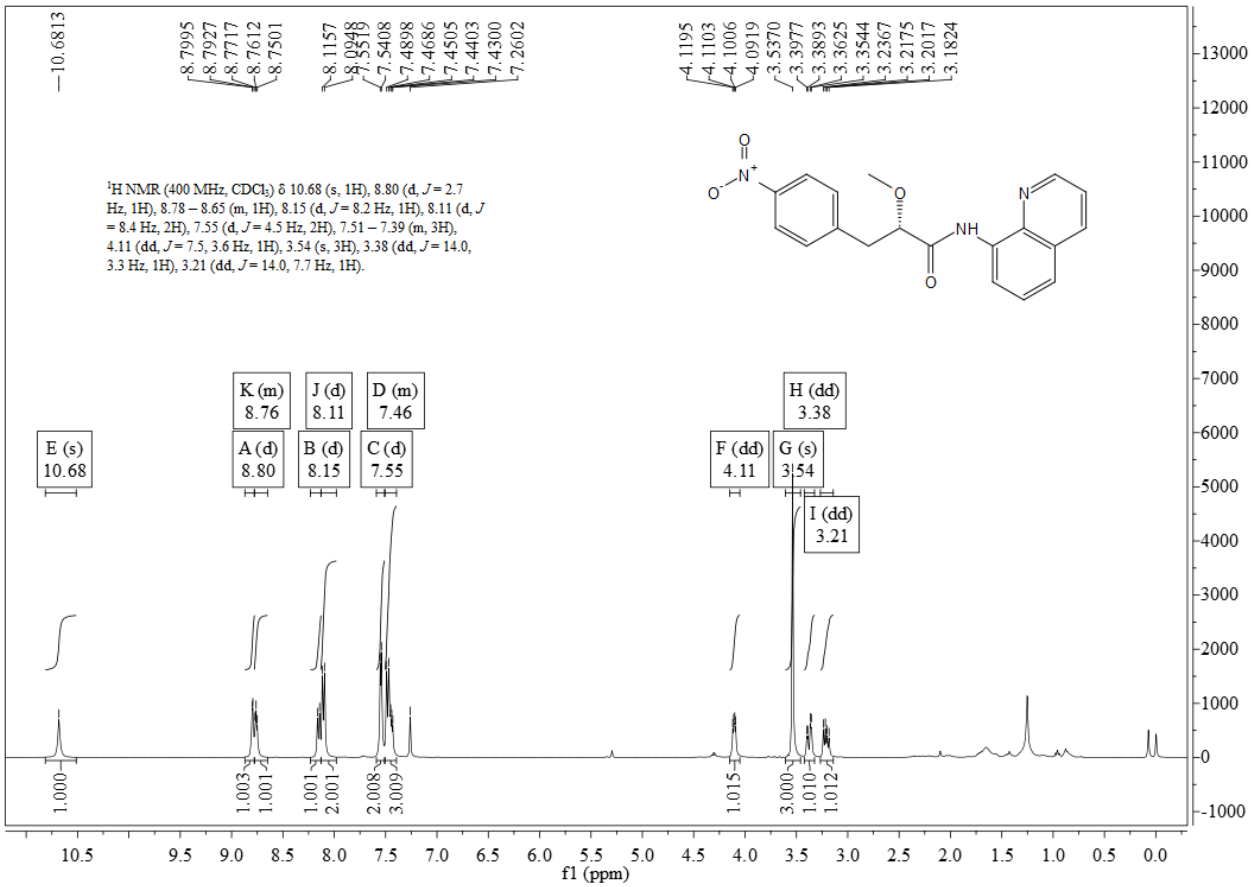

170.5149
148.6980
138.9690
136.2485
136.1267
133.8931
132.5102
130.9813
128.5000
128.0887
127.2807
122.1796
121.7448
116.7204
84.2555
59.3128
38.7437
¹³C NMR (101 MHz, CDCl₃) δ 170.51, 148.70, 138.97, 136.25, 136.13, 133.89, 132.51, 130.98, 128.50, 128.09, 127.28, 122.18, 121.74, 116.72, 84.26, 59.31, 38.74.
Cl
O
NH
N
O
f1 (ppm)

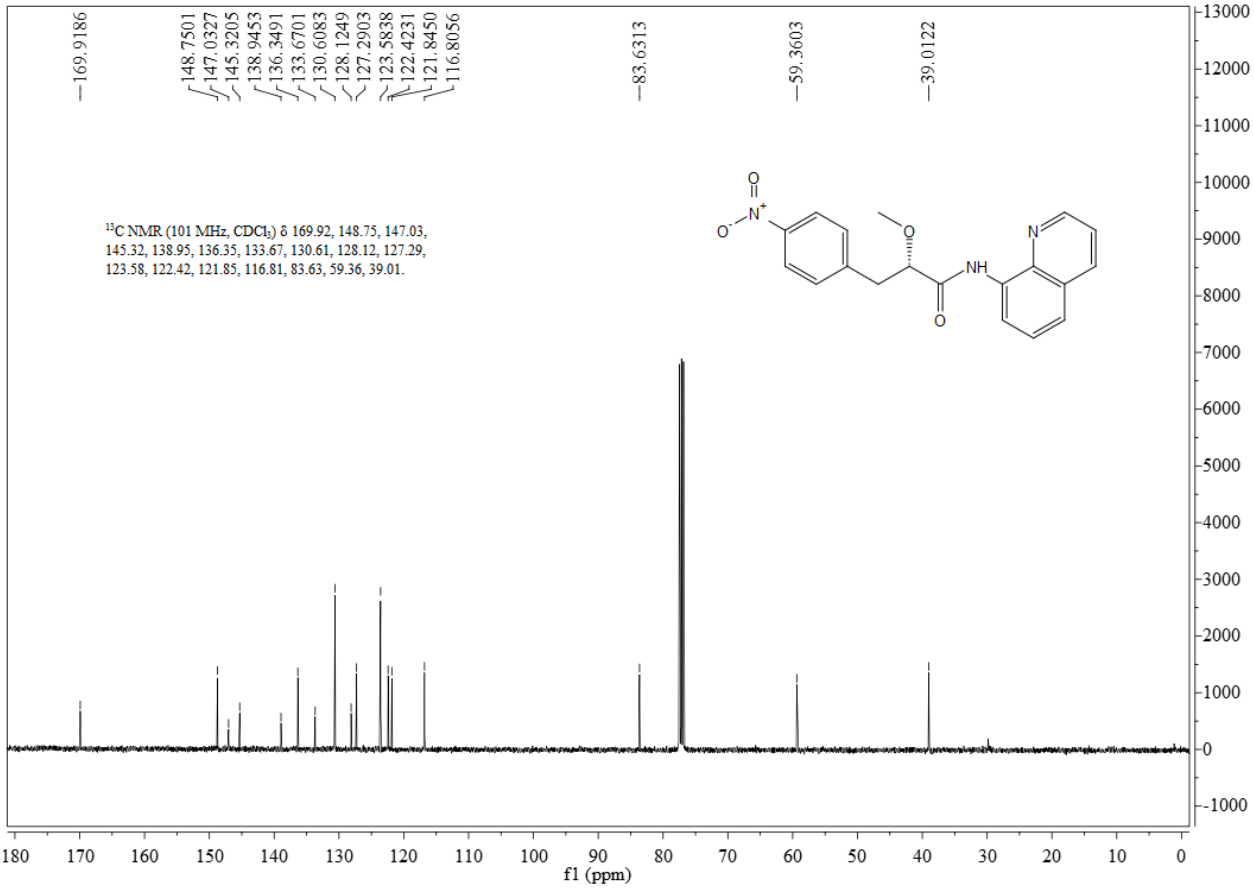

10.7200
8.8287
8.8246
8.8183
8.8143
8.8039
8.7976
8.7878
8.7818
8.1529
8.1323
7.5693
7.5486
7.5367
7.5323
7.5168
7.4547
7.4441
7.4340
7.4236
7.3906
7.3699
7.2604
7.2106
7.1901
4.0479
4.0388
4.0274
4.0185
3.4994
3.2635
3.2551
3.2280
3.2195
3.0622
3.0417
3.0267
3.0062
¹H NMR (400 MHz, CDCl₃) δ 10.72 (s, 1H), 8.82 (dd, J = 4.1, 1.6 Hz, 1H), 8.79 (dd, J = 6.4, 2.5 Hz, 1H), 8.14 (dd, J = 8.3, 1.5 Hz, 1H), 7.59 – 7.49 (m, 2H), 7.44 (dd, J = 8.2, 4.2 Hz, 1H), 7.38 (d, J = 8.3 Hz, 2H), 7.20 (d, J = 8.2 Hz, 2H), 4.03 (dd, J = 8.2, 3.6 Hz, 1H), 3.50 (s, 3H), 3.24 (dd, J = 14.2, 3.4 Hz, 1H), 3.03 (dd, J = 14.2, 8.2 Hz, 1H).
Br
O
N
NH
O
G (d) 7.20
L (dd) 8.79
E (dd) 7.44
J (dd) 3.24
C (s) 10.72
B (dd) 8.82
A (dd) 8.14
D (m) 7.54
H (dd) 4.03
I (s) 3.50
F (d) 7.38
K (dd) 3.03
0.986
1.001
0.997
1.000
2.002
1.005
2.004
2.005
0.992
3.005
1.016
1.010
f1 (ppm)

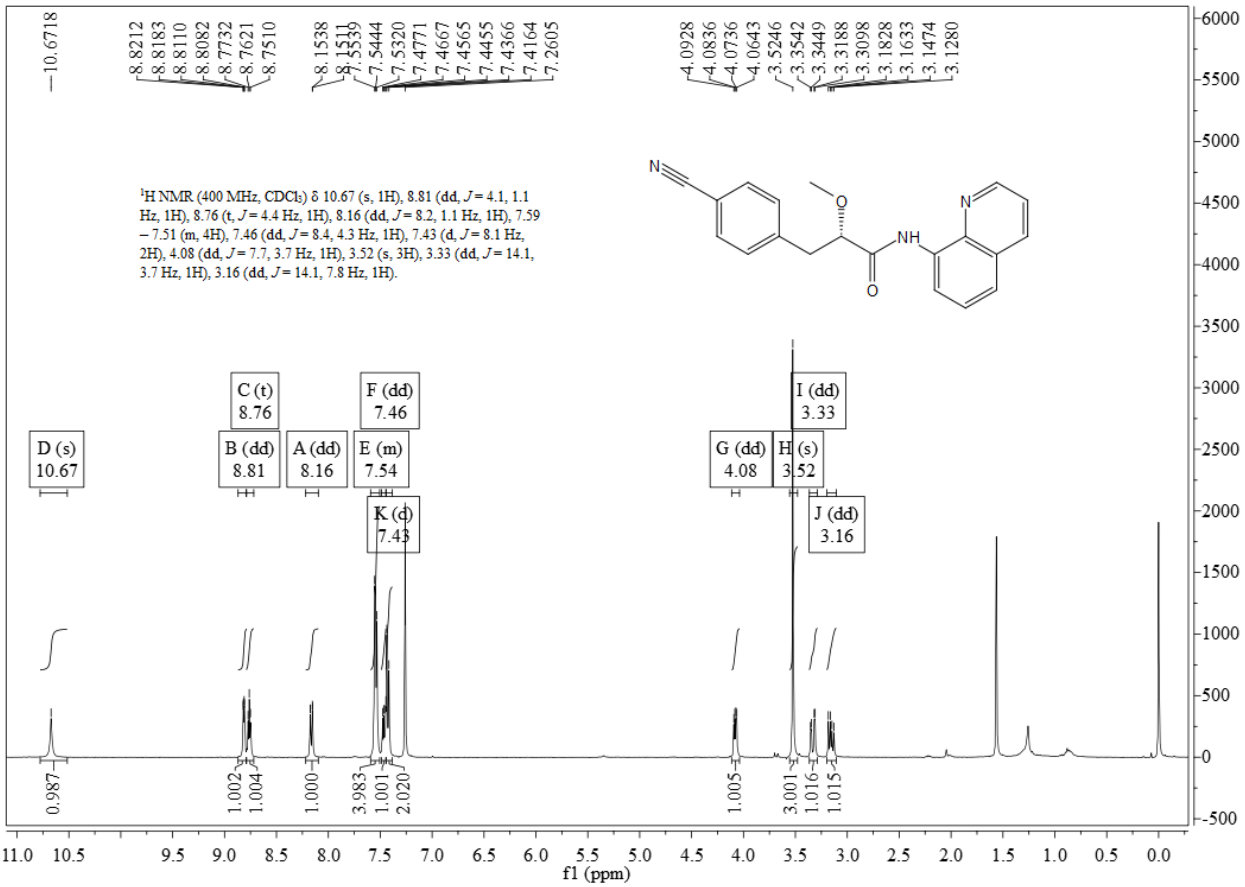

170.4840
148.7036
138.9785
136.6474
136.2424
133.8951
131.4525
131.3773
128.0946
127.2768
122.1818
121.7431
120.6372
116.7369
84.1898
59.3059
38.8102
¹³C NMR (101 MHz, CDCl₃) δ 170.48, 148.70, 138.98, 136.65, 136.24, 133.90, 131.45, 131.38, 128.09, 127.28, 122.18, 121.74, 120.64, 116.74, 84.19, 59.31, 38.81.
Br
O
N
NH
O
f1 (ppm)

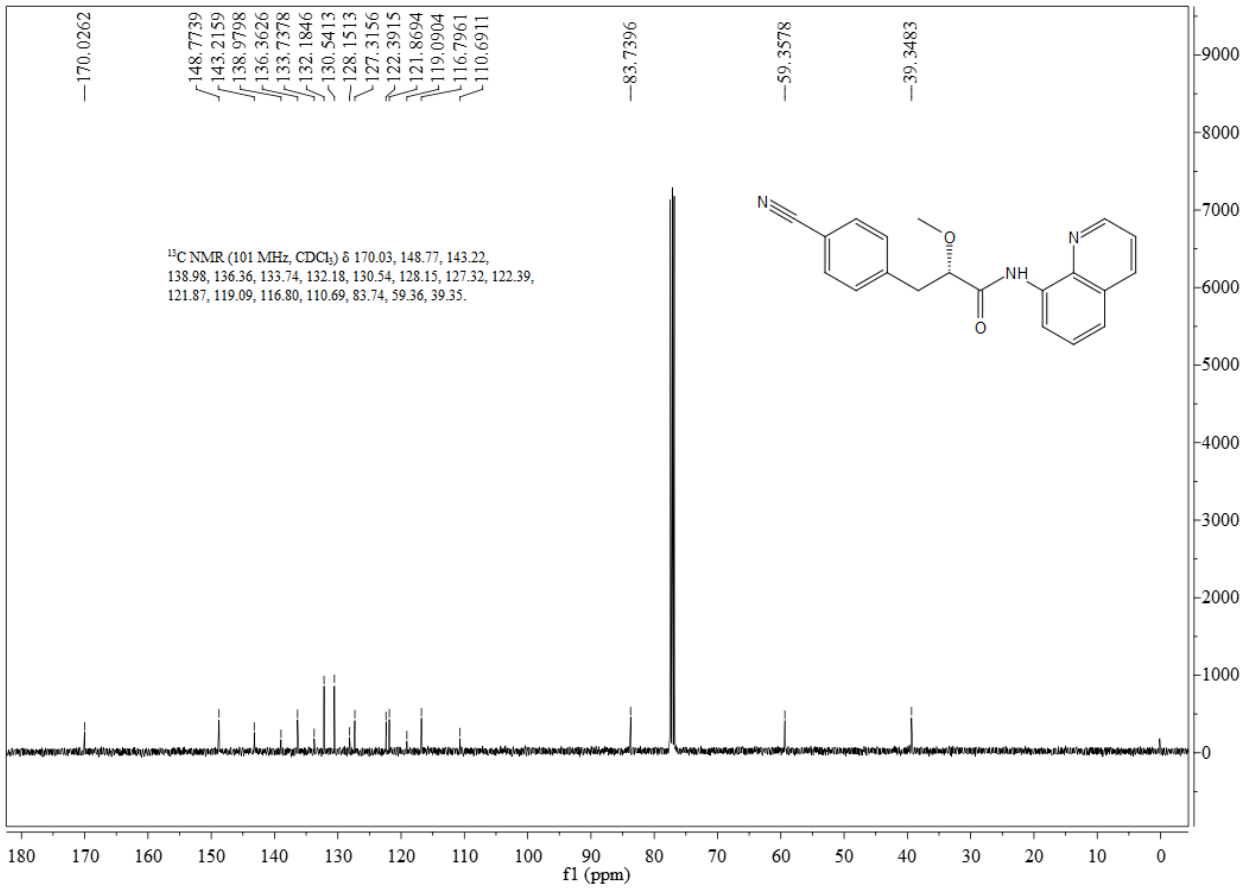

10.7305
8.8074
8.8033
8.7976
8.7927
8.7831
8.7764
8.1478
8.1440
8.1271
8.1233
7.8667
7.8461
7.5636
7.5429
7.5329
7.5268
7.5125
7.4450
7.4343
7.4252
7.4137
7.4053
7.2603
4.1021
4.0930
4.0816
4.0725
3.4989
3.3283
3.3193
3.1670
3.1465
2.5321
1H NMR (400 MHz, CDCl3) δ 10.73 (s, 1H), 8.85 – 8.74 (m, 2H), 8.14 (dd, J = 8.3, 1.5 Hz, 1H), 7.86 (d, J = 8.2 Hz, 2H), 7.58 – 7.50 (m, 2H), 7.46 – 7.38 (m, 3H), 4.09 (dd, J = 8.2, 3.6 Hz, 1H), 3.50 (s, 3H), 3.34 (dd, J = 14.1, 3.6 Hz, 1H), 3.14 (dd, J = 14.1, 8.2 Hz, 1H), 2.53 (s, 3H).
A (s) 10.73
B (m) 8.79
C (dd) 8.14
D (d) 7.86
E (m) 7.54
F (m) 7.42
G (dd) 4.09
H (s) 3.50
I (dd) 3.34
J (dd) 3.14
K (s) 2.53
0.962
2.002
1.000
2.003
2.005
3.003
1.009
3.007
1.008
1.005
3.004
f1 (ppm)

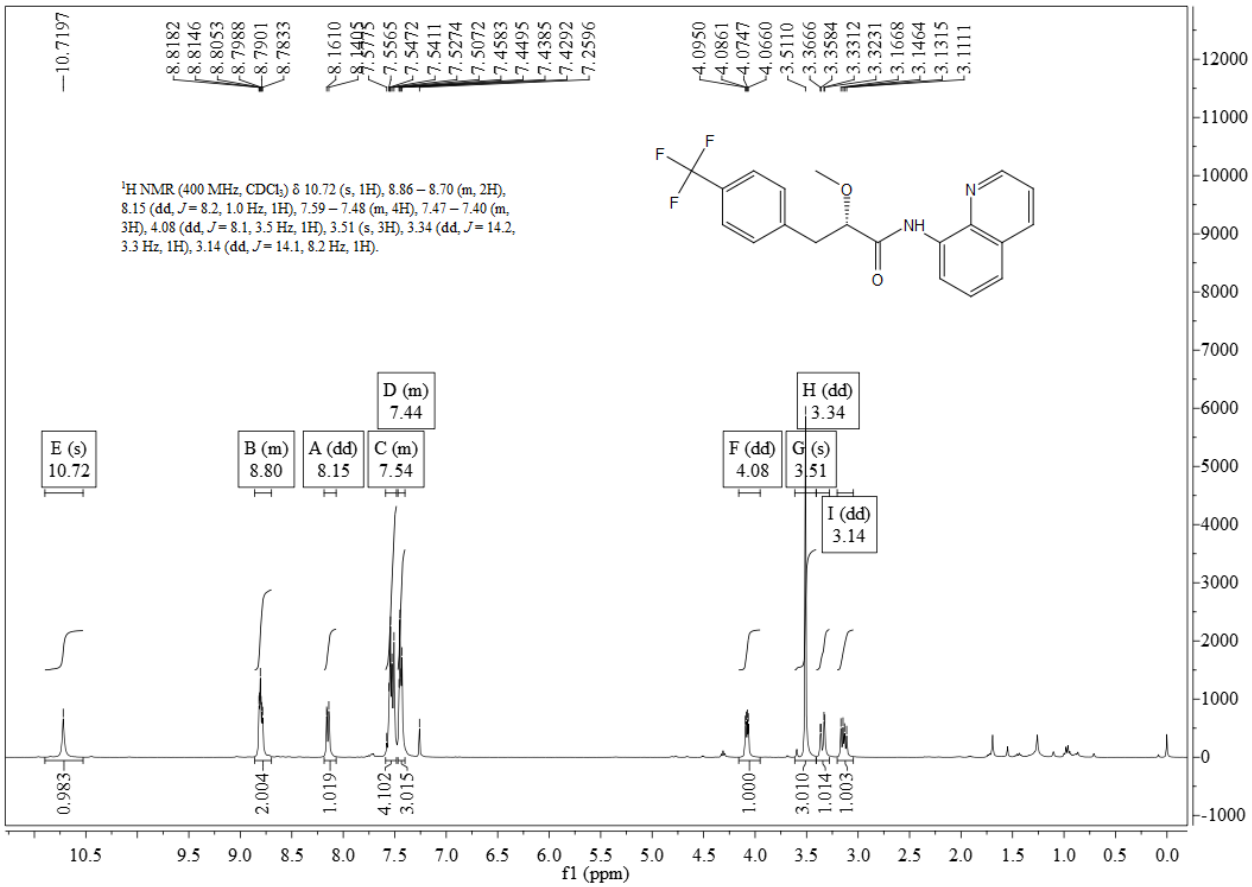

197.962
170.354
148.678
143.386
138.918
136.256
135.676
133.807
129.834
128.488
128.054
127.268
122.220
121.748
116.702
84.002
59.337
39.328
26.652
13C NMR (101 MHz, CDCl3) δ 197.96, 170.35, 148.68, 143.39, 138.92, 136.26, 135.68, 133.81, 129.83, 128.49, 128.05, 127.27, 122.22, 121.75, 116.70, 84.00, 59.34, 39.33, 26.65.
f1 (ppm)

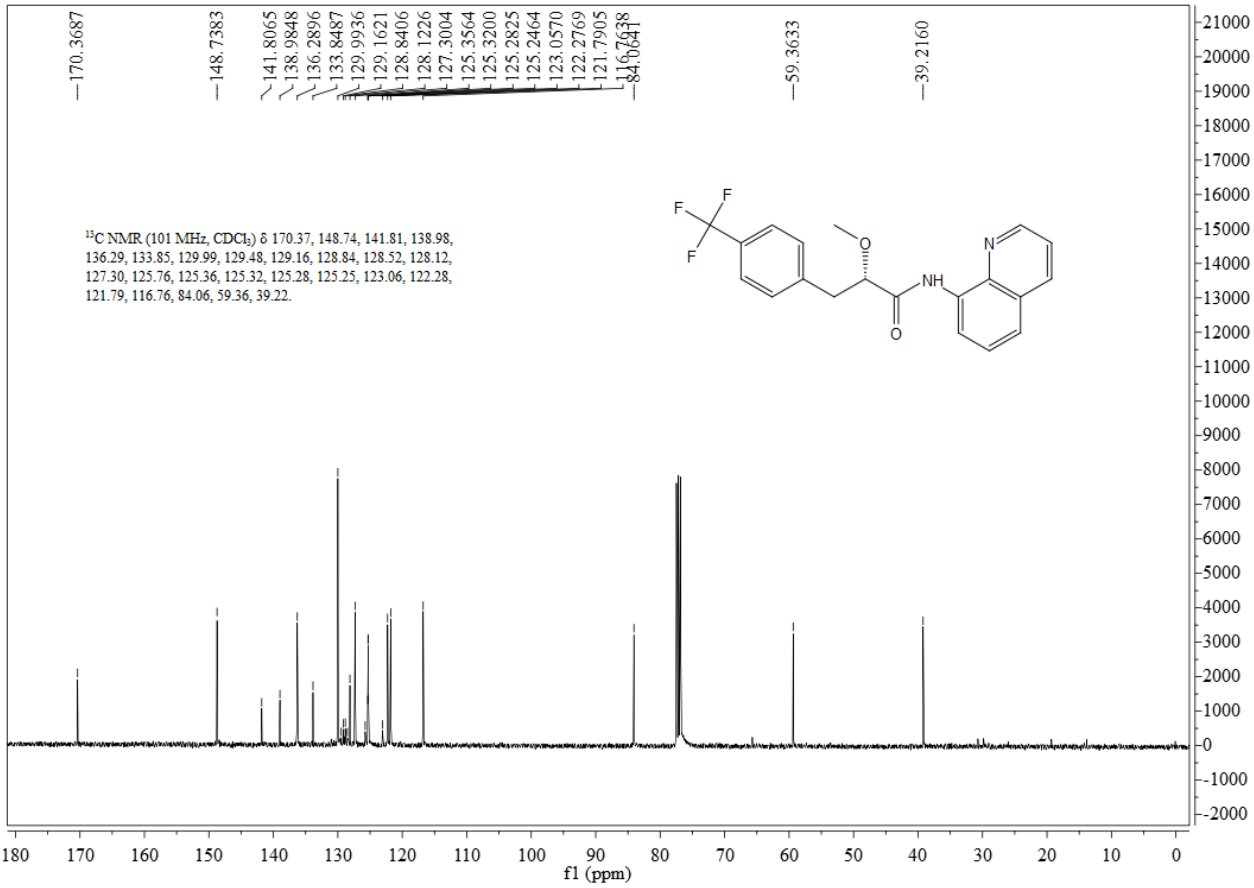

10.6813
8.7995
8.7927
8.7717
8.7612
8.7501
8.1157
8.0948
8.0919
7.5518
7.5408
7.4898
7.4686
7.4505
7.4403
7.4300
7.2602
4.1195
4.1103
4.1006
4.0919
3.5370
3.3977
3.3893
3.3625
3.3544
3.2367
3.2175
3.2017
3.1824
1H NMR (400 MHz, CDCl3) δ 10.68 (s, 1H), 8.80 (d, J = 2.7 Hz, 1H), 8.78 – 8.65 (m, 1H), 8.15 (d, J = 8.2 Hz, 1H), 8.11 (d, J = 8.4 Hz, 2H), 7.55 (d, J = 4.5 Hz, 2H), 7.51 – 7.39 (m, 3H), 4.11 (dd, J = 7.5, 3.6 Hz, 1H), 3.54 (s, 3H), 3.38 (dd, J = 14.0, 3.3 Hz, 1H), 3.21 (dd, J = 14.0, 7.7 Hz, 1H).
E (s) 10.68
K (m) 8.76
A (d) 8.80
J (d) 8.11
B (d) 8.15
D (m) 7.46
C (d) 7.55
F (dd) 4.11
H (dd) 3.38
G (s) 3.54
I (dd) 3.21
1.000
1.003
1.001
1.001
2.001
2.008
3.009
1.015
3.000
1.010
1.012
f1 (ppm)

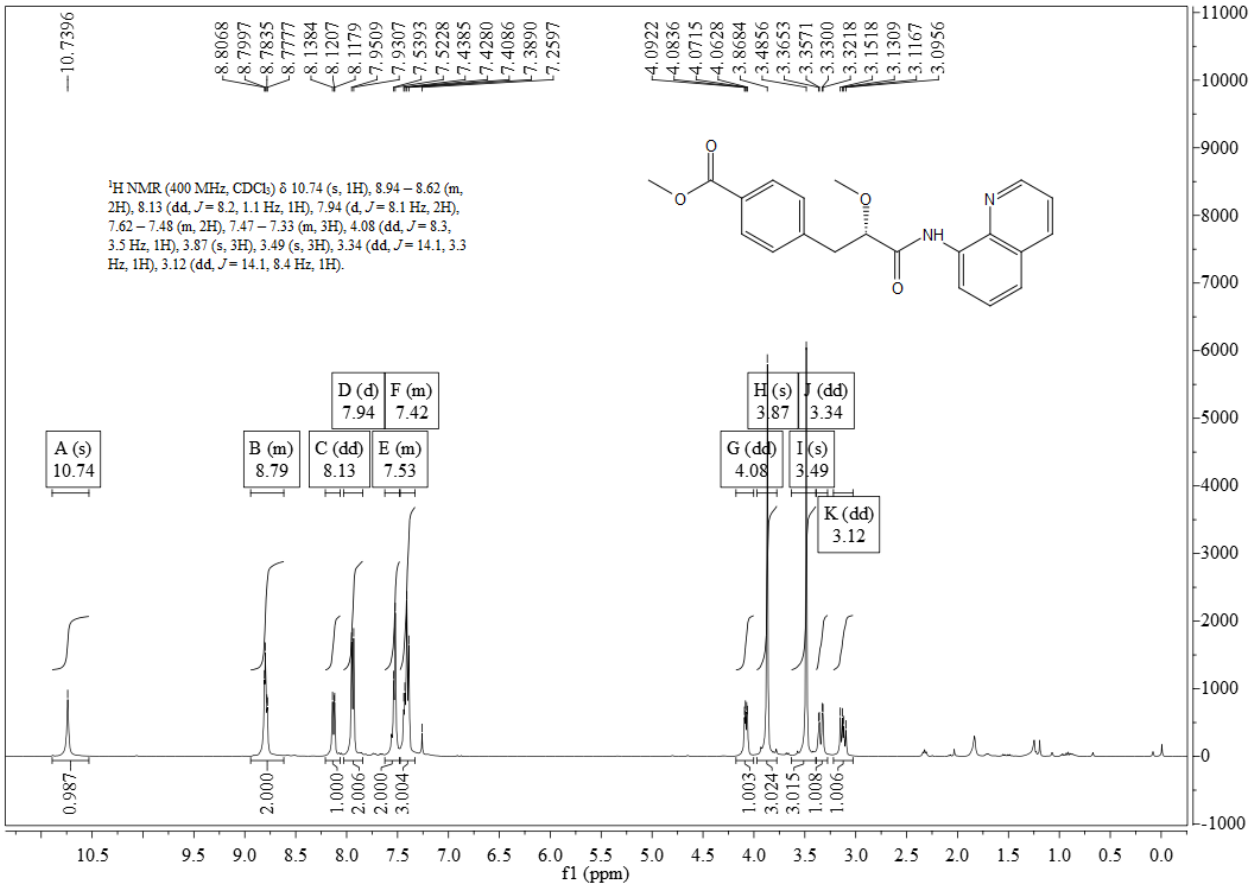

169.9186
148.7501
147.0327
145.3205
138.9453
136.3491
133.6701
130.6083
128.1249
127.2903
123.5838
122.4231
121.8450
116.8056
83.6313
59.3603
39.0122
13C NMR (101 MHz, CDCl3) δ 169.92, 148.75, 147.03, 145.32, 138.95, 136.35, 133.67, 130.61, 128.12, 127.29, 123.58, 122.42, 121.85, 116.81, 83.63, 59.36, 39.01.
f1 (ppm)


10.6718
8.8212
8.8183
8.8110
8.8082
8.7732
8.7621
8.7510
8.1538
8.1511
8.1539
7.5444
7.5320
7.4771
7.4667
7.4565
7.4455
7.4366
7.4164
7.2605
4.0928
4.0836
4.0736
4.0643
3.5246
3.3542
3.3449
3.3188
3.3098
3.1828
3.1633
3.1474
3.1280
1H NMR (400 MHz, CDCl3) δ 10.67 (s, 1H), 8.81 (dd, J = 4.1, 1.1 Hz, 1H), 8.76 (t, J = 4.4 Hz, 1H), 8.16 (dd, J = 8.2, 1.1 Hz, 1H), 7.59 – 7.51 (m, 4H), 7.46 (dd, J = 8.4, 4.3 Hz, 1H), 7.43 (d, J = 8.1 Hz, 2H), 4.08 (dd, J = 7.7, 3.7 Hz, 1H), 3.52 (s, 3H), 3.33 (dd, J = 14.1, 3.7 Hz, 1H), 3.16 (dd, J = 14.1, 7.8 Hz, 1H).
D (s) 10.67
C (t) 8.76
B (dd) 8.81
A (dd) 8.16
F (dd) 7.46
E (m) 7.54
K (d) 7.43
G (dd) 4.08
H (s) 3.52
I (dd) 3.33
J (dd) 3.16
0.987
1.002
1.004
1.000
3.983
1.001
2.020
1.005
3.001
1.016
1.015
f1 (ppm)

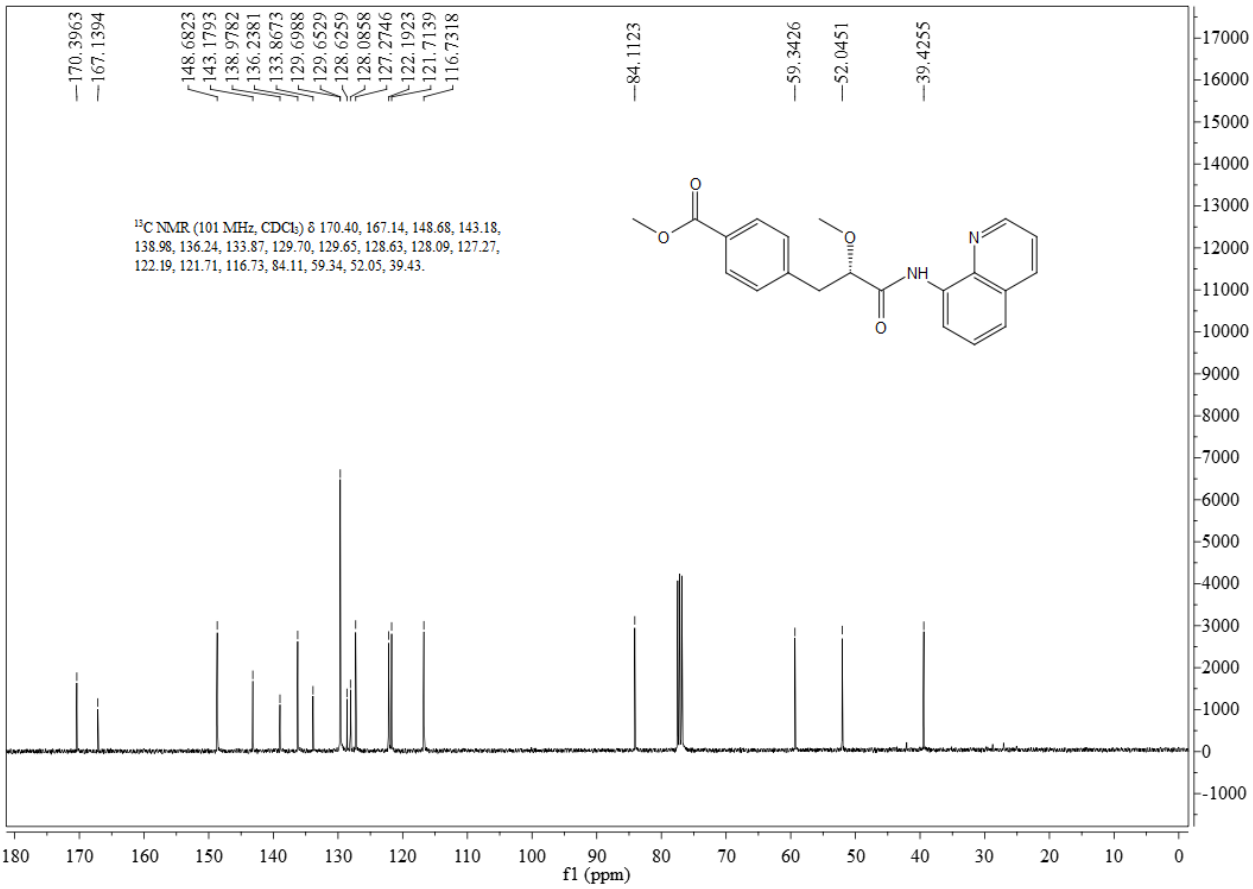

170.0262
148.7739
143.2159
138.9798
136.3626
133.7378
132.1846
130.5413
128.1513
127.3156
122.3915
121.8694
119.0904
116.7961
110.6911
83.7396
59.3578
39.3483
13C NMR (101 MHz, CDCl3) δ 170.03, 148.77, 143.22, 138.98, 136.36, 133.74, 132.18, 130.54, 128.15, 127.32, 122.39, 121.87, 119.09, 116.80, 110.69, 83.74, 59.36, 39.35.
f1 (ppm)


10.7197
8.8182
8.8146
8.8053
8.7988
8.7901
8.7833
8.1610
8.1495
7.5775
7.5565
7.5472
7.5411
7.5274
7.5072
7.4583
7.4495
7.4385
7.4292
7.2596
4.0950
4.0861
4.0747
4.0660
3.5110
3.3666
3.3584
3.3312
3.3231
3.1668
3.1464
3.1315
3.1111
1H NMR (400 MHz, CDCl3) δ 10.72 (s, 1H), 8.86 – 8.70 (m, 2H), 8.15 (dd, J = 8.2, 1.0 Hz, 1H), 7.59 – 7.48 (m, 4H), 7.47 – 7.40 (m, 3H), 4.08 (dd, J = 8.1, 3.5 Hz, 1H), 3.51 (s, 3H), 3.34 (dd, J = 14.2, 3.3 Hz, 1H), 3.14 (dd, J = 14.1, 8.2 Hz, 1H).
E (s) 10.72
B (m) 8.80
A (dd) 8.15
D (m) 7.44
C (m) 7.54
F (dd) 4.08
G (s) 3.51
H (dd) 3.34
I (dd) 3.14
0.983
2.004
1.019
4.102
3.015
1.000
3.010
1.014
1.003
f1 (ppm)

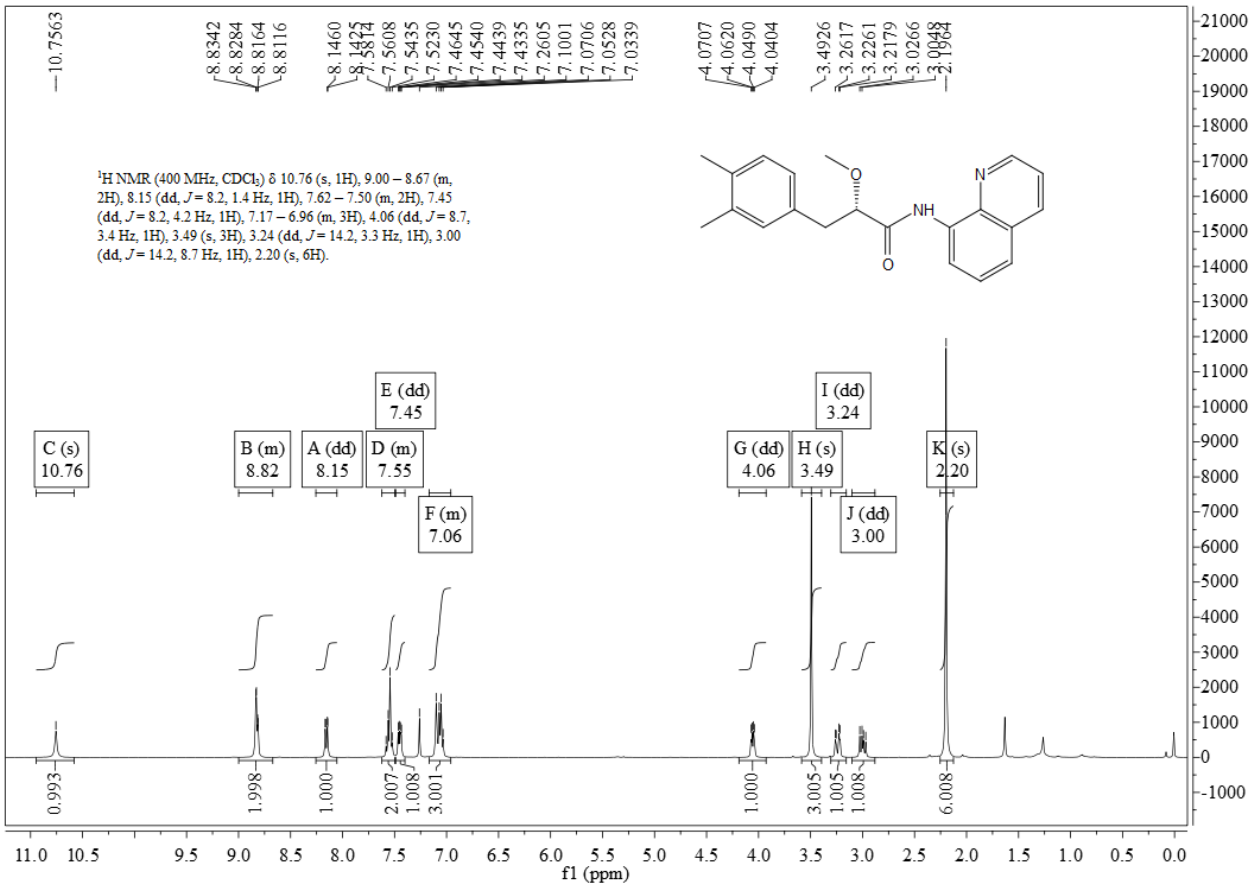

170.3687
148.7383
141.8065
138.9848
136.2896
133.8487
129.9936
129.1621
128.8406
128.1226
127.3004
125.3564
125.3200
125.2825
125.2464
123.0570
122.2769
121.7905
116.7638
84.0641
59.3633
39.2160
13C NMR (101 MHz, CDCl3) δ 170.37, 148.74, 141.81, 138.98, 136.29, 133.85, 129.99, 129.48, 129.16, 128.84, 128.52, 128.12, 127.30, 125.76, 125.36, 125.32, 125.28, 125.25, 123.06, 122.28, 121.79, 116.76, 84.06, 59.36, 39.22.
f1 (ppm)

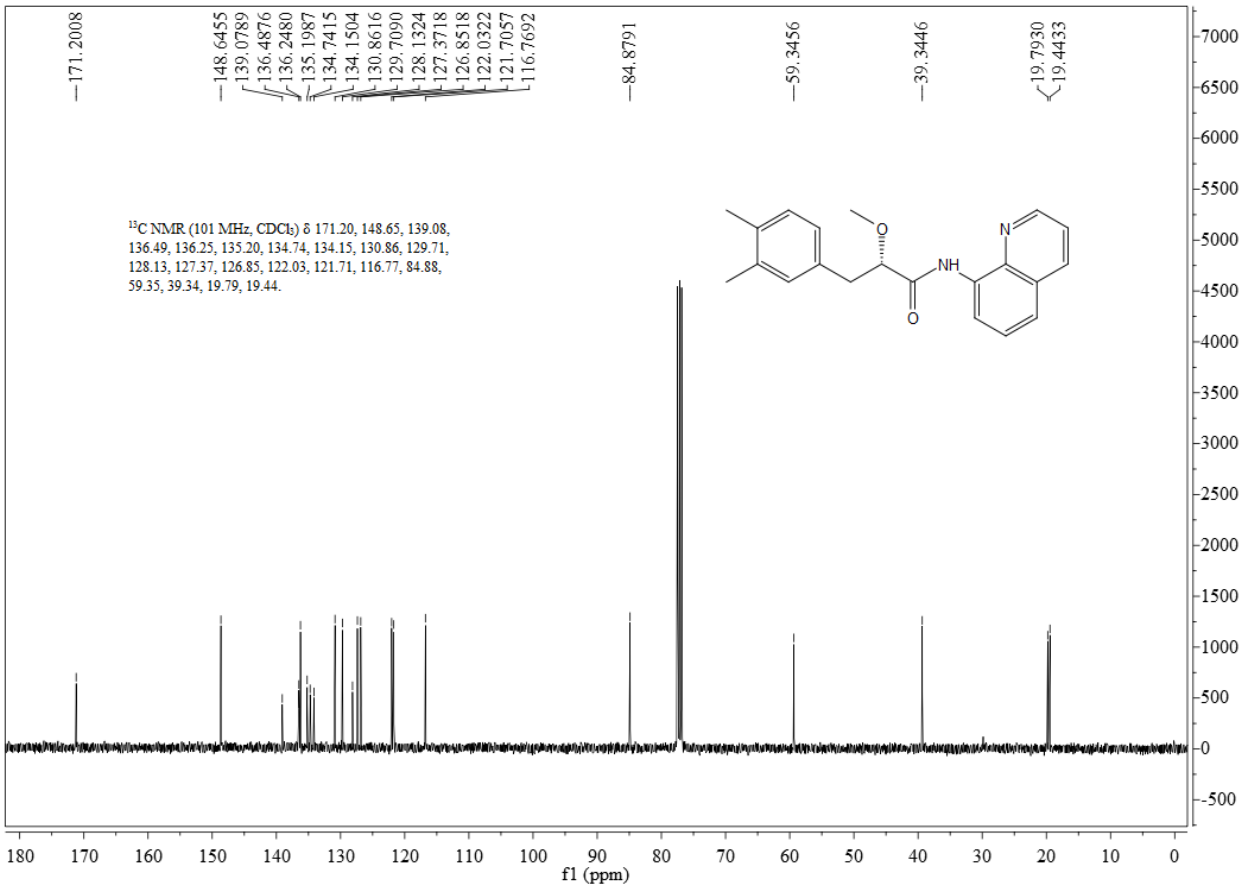


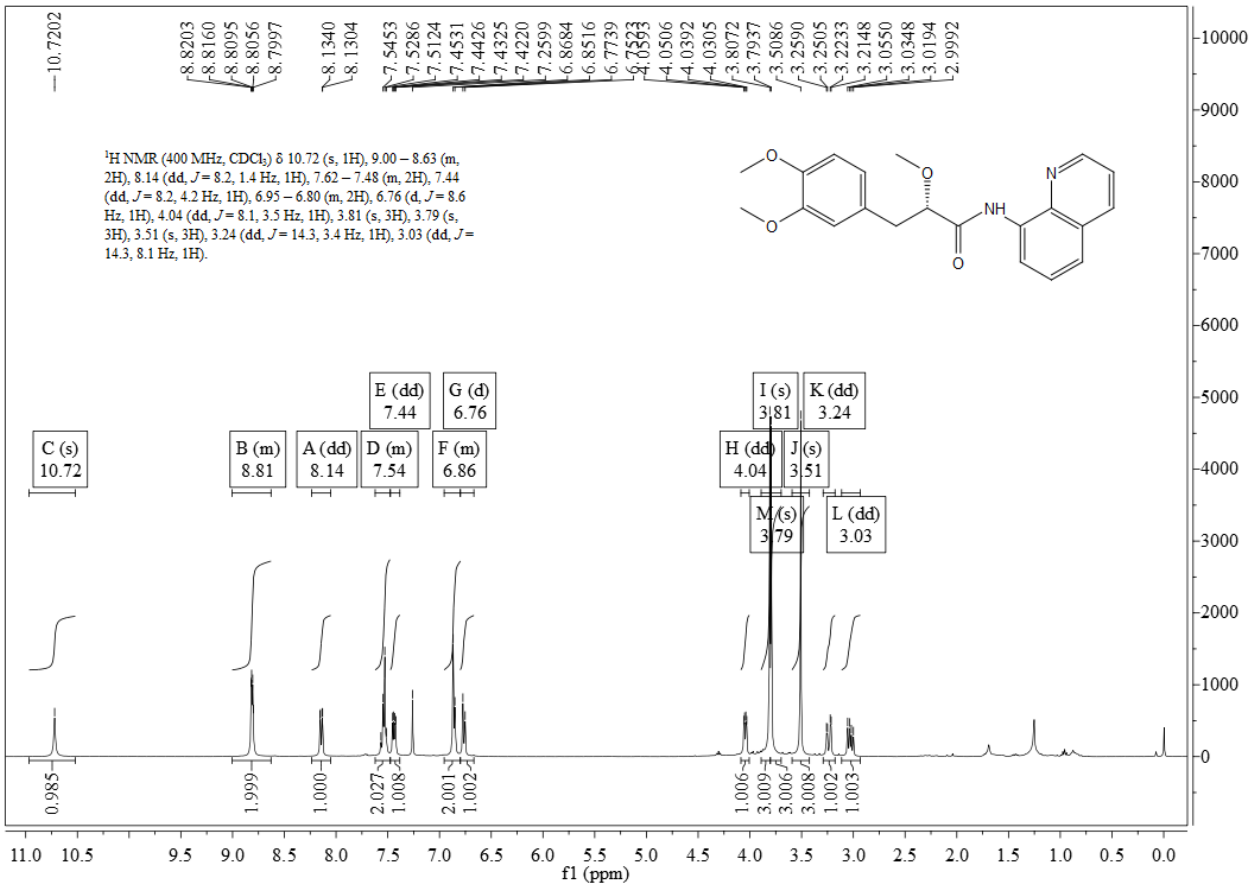
^{1}H NMR (400 MHz, $CDCl_3$) δ 10.74 (s, 1H), 8.94 – 8.62 (m, 2H), 8.13 (dd, *J* = 8.2, 1.1 Hz, 1H), 7.94 (d, *J* = 8.1 Hz, 2H), 7.62 – 7.48 (m, 2H), 7.47 – 7.33 (m, 3H), 4.08 (dd, *J* = 8.3, 3.5 Hz, 1H), 3.87 (s, 3H), 3.49 (s, 3H), 3.34 (dd, *J* = 14.1, 3.3 Hz, 1H), 3.12 (dd, *J* = 14.1, 8.4 Hz, 1H).

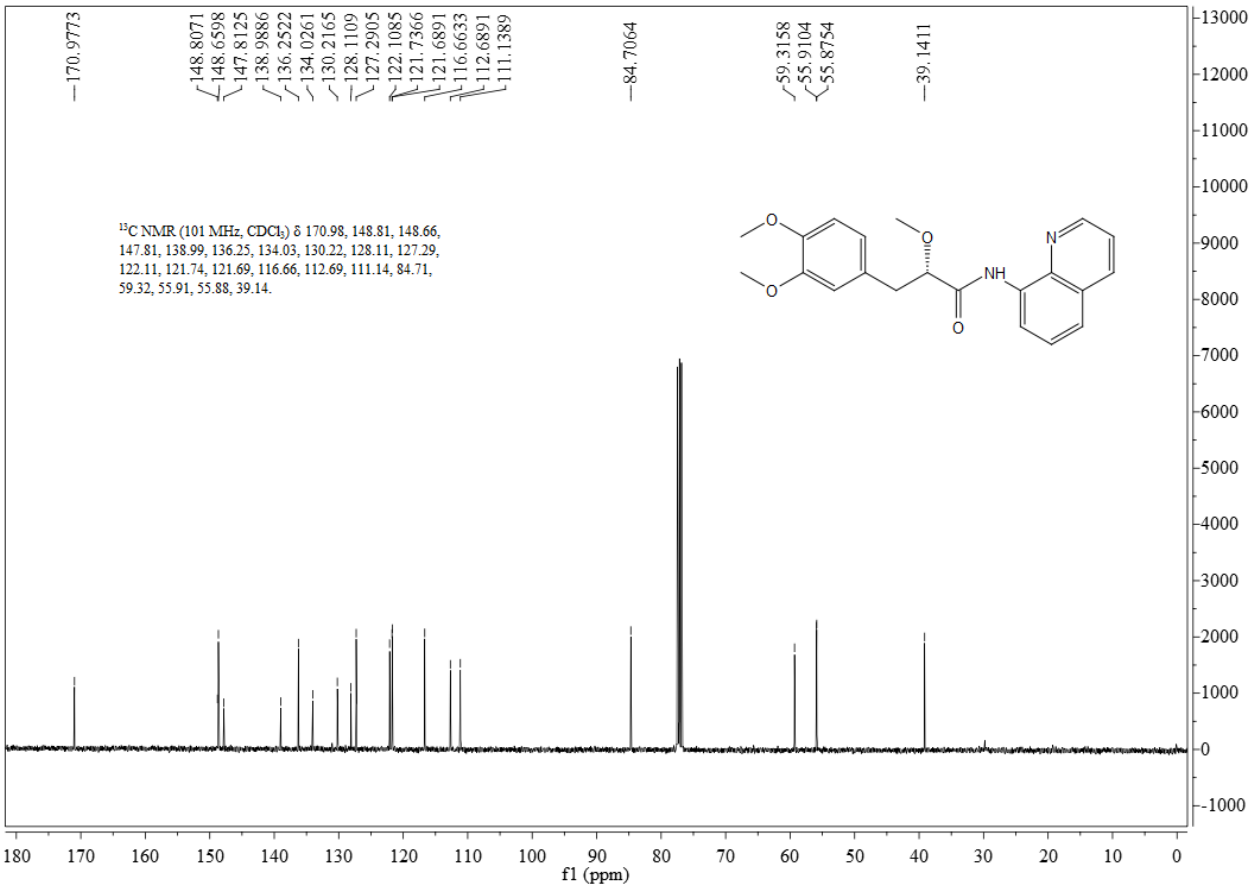


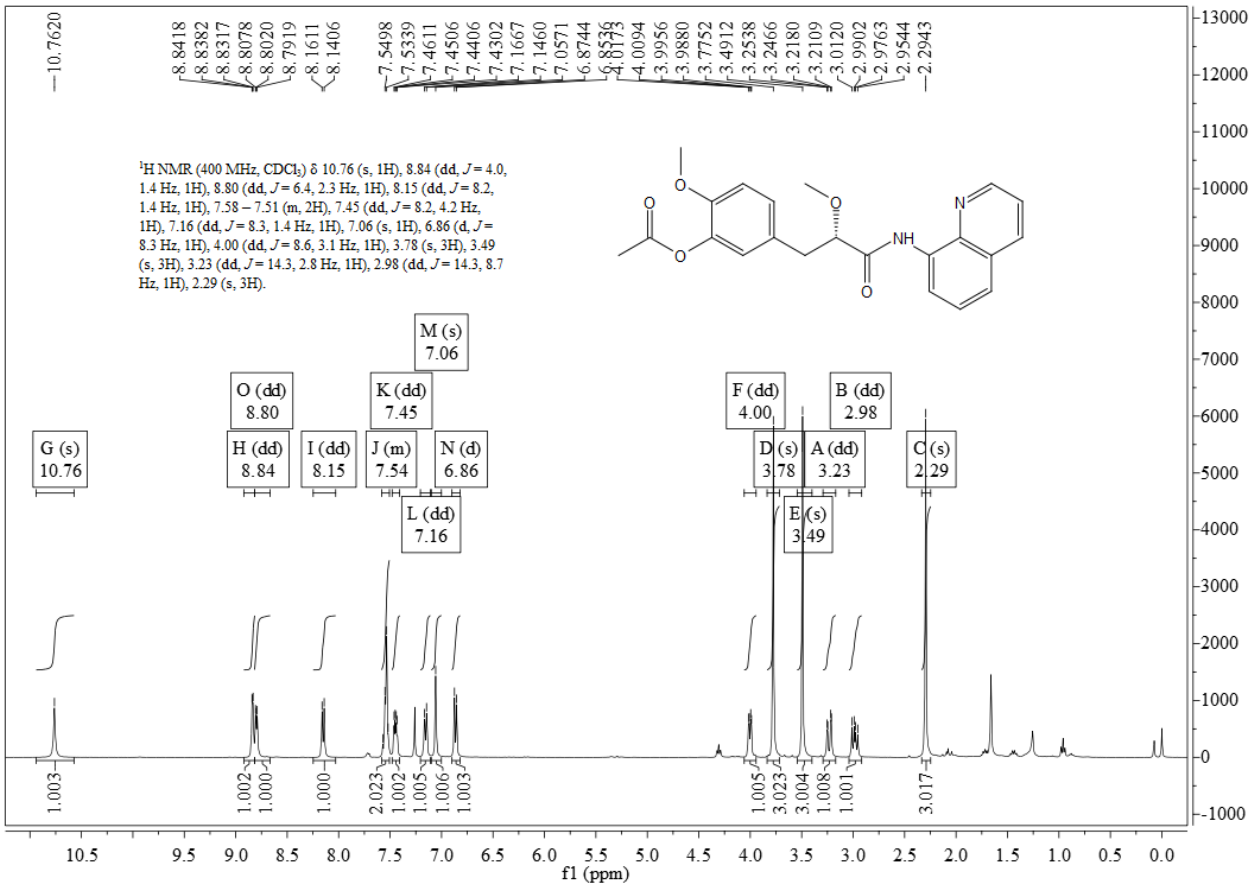
^{13}C NMR (101 MHz, $CDCl_3$) δ 170.40, 167.14, 148.68, 143.18, 138.98, 136.24, 133.87, 129.70, 129.65, 128.63, 128.09, 127.27, 122.19, 121.71, 116.73, 84.11, 59.34, 52.05, 39.43.

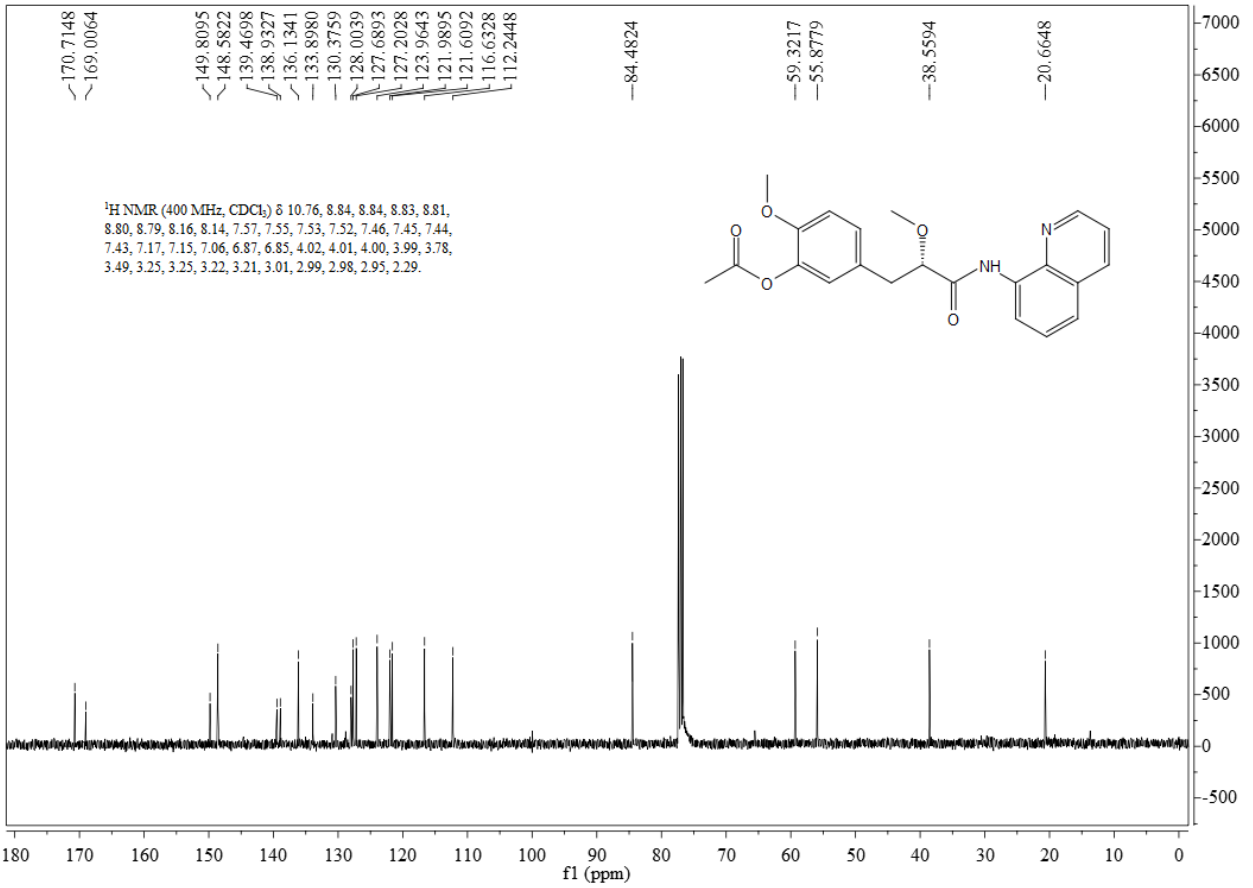

10.7563
8.8342
8.8284
8.8164
8.8116
8.1460
8.1425
8.1414
7.5814
7.5608
7.5435
7.5230
7.4645
7.4540
7.4439
7.4335
7.2605
7.1001
7.0706
7.0528
7.0339
4.0707
4.0620
4.0490
4.0404
3.4926
3.2617
3.2261
3.2179
3.0266
3.0048
2.1964
^{1}H NMR (400 MHz, $CDCl_3$) δ 10.76 (s, 1H), 9.00 – 8.67 (m, 2H), 8.15 (dd, J = 8.2, 1.4 Hz, 1H), 7.62 – 7.50 (m, 2H), 7.45 (dd, J = 8.2, 4.2 Hz, 1H), 7.17 – 6.96 (m, 3H), 4.06 (dd, J = 8.7, 3.4 Hz, 1H), 3.49 (s, 3H), 3.24 (dd, J = 14.2, 3.3 Hz, 1H), 3.00 (dd, J = 14.2, 8.7 Hz, 1H), 2.20 (s, 6H).
O
N
NH
O
C (s) 10.76
B (m) 8.82
A (dd) 8.15
D (m) 7.55
E (dd) 7.45
F (m) 7.06
G (dd) 4.06
H (s) 3.49
I (dd) 3.24
J (dd) 3.00
K (s) 2.20
0.993
1.998
1.000
2.007
1.008
3.001
1.000
3.005
1.005
1.008
6.008
f1 (ppm)

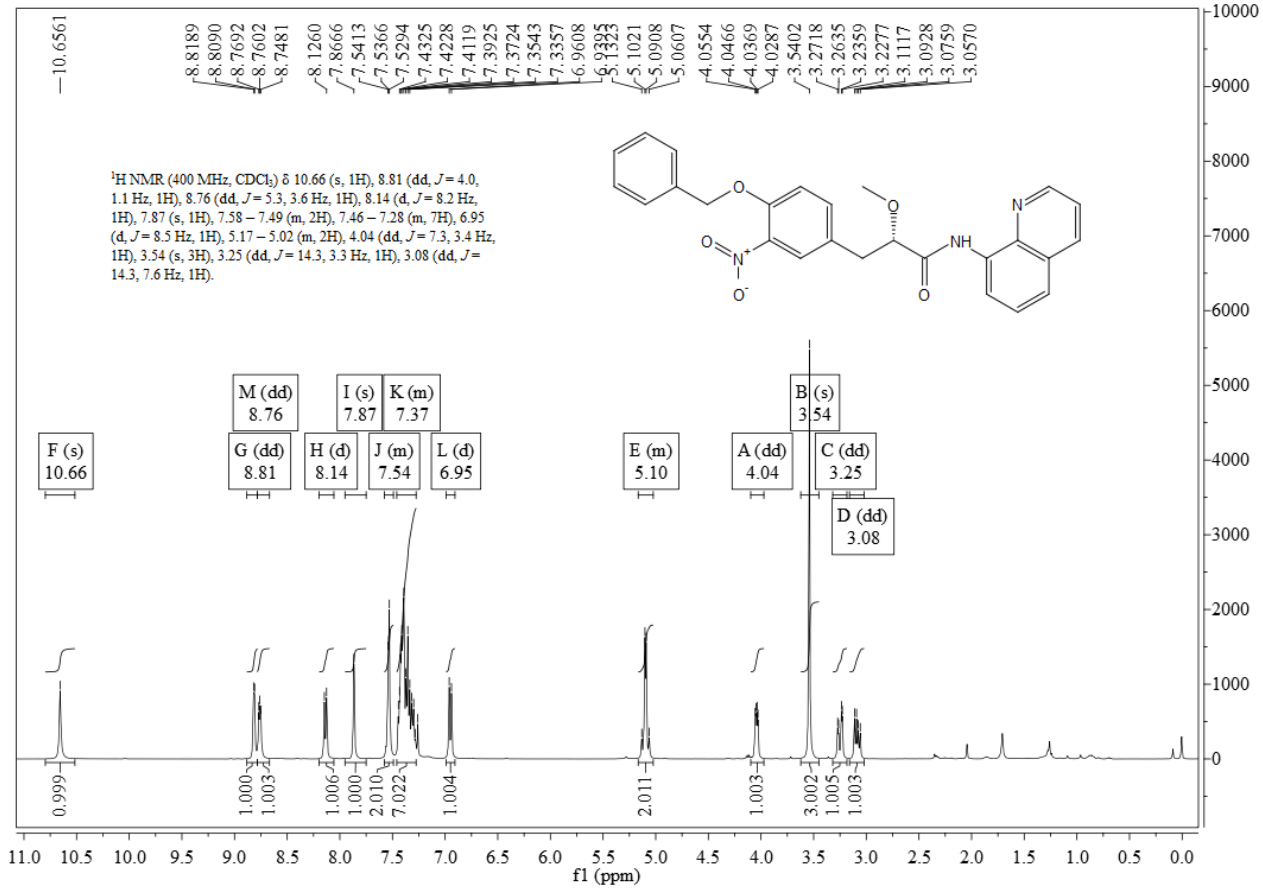

171.2008
148.6455
139.0789
136.4876
136.2480
135.1987
134.7415
134.1504
130.8616
129.7090
128.1324
127.3718
126.8518
122.0322
121.7057
116.7692
84.8791
59.3456
39.3446
19.7930
19.4433
^{13}C NMR (101 MHz, $CDCl_3$) δ 171.20, 148.65, 139.08, 136.49, 136.25, 135.20, 134.74, 134.15, 130.86, 129.71, 128.13, 127.37, 126.85, 122.03, 121.71, 116.77, 84.88, 59.35, 39.34, 19.79, 19.44.
O
N
NH
O
f1 (ppm)

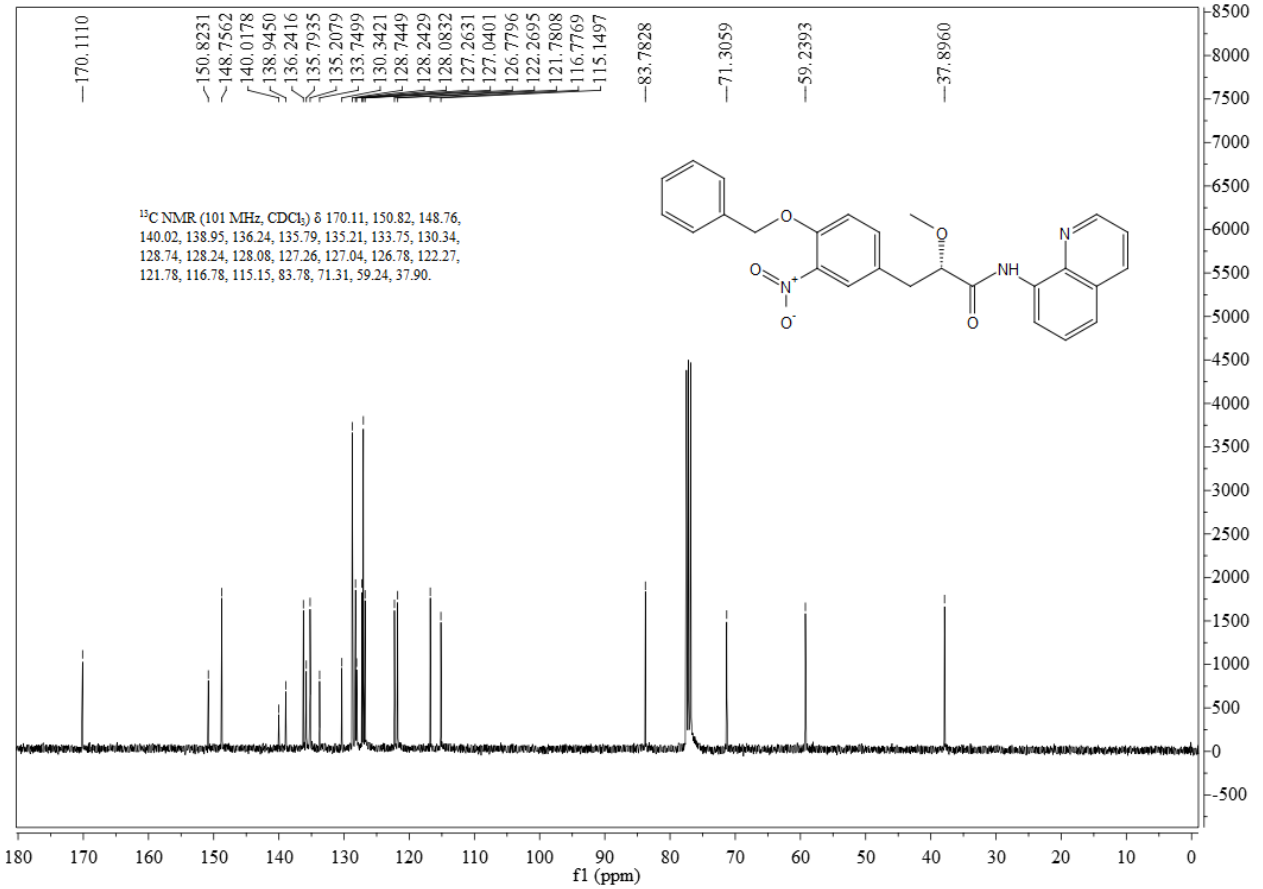

10.7202
8.8203
8.8160
8.8095
8.8056
8.7997
8.1340
8.1304
7.5453
7.5286
7.5124
7.4531
7.4426
7.4325
7.4220
7.2599
6.8684
6.8516
6.7739
4.0506
4.0392
4.0305
3.8072
3.7937
3.5086
3.2590
3.2505
3.2233
3.2148
3.0550
3.0348
3.0194
2.9992
1H NMR (400 MHz, CDCl3) δ 10.72 (s, 1H), 9.00 – 8.63 (m, 2H), 8.14 (dd, J = 8.2, 1.4 Hz, 1H), 7.62 – 7.48 (m, 2H), 7.44 (dd, J = 8.2, 4.2 Hz, 1H), 6.95 – 6.80 (m, 2H), 6.76 (d, J = 8.6 Hz, 1H), 4.04 (dd, J = 8.1, 3.5 Hz, 1H), 3.81 (s, 3H), 3.79 (s, 3H), 3.51 (s, 3H), 3.24 (dd, J = 14.3, 3.4 Hz, 1H), 3.03 (dd, J = 14.3, 8.1 Hz, 1H).
C (s) 10.72
B (m) 8.81
A (dd) 8.14
D (m) 7.54
E (dd) 7.44
F (m) 6.86
G (d) 6.76
H (dd) 4.04
J (s) 3.51
I (s) 3.81
M (s) 3.79
K (dd) 3.24
L (dd) 3.03
0.985
1.999
1.000
2.027
1.008
2.001
1.002
1.006
3.009
3.006
3.008
1.002
1.003
f1 (ppm)

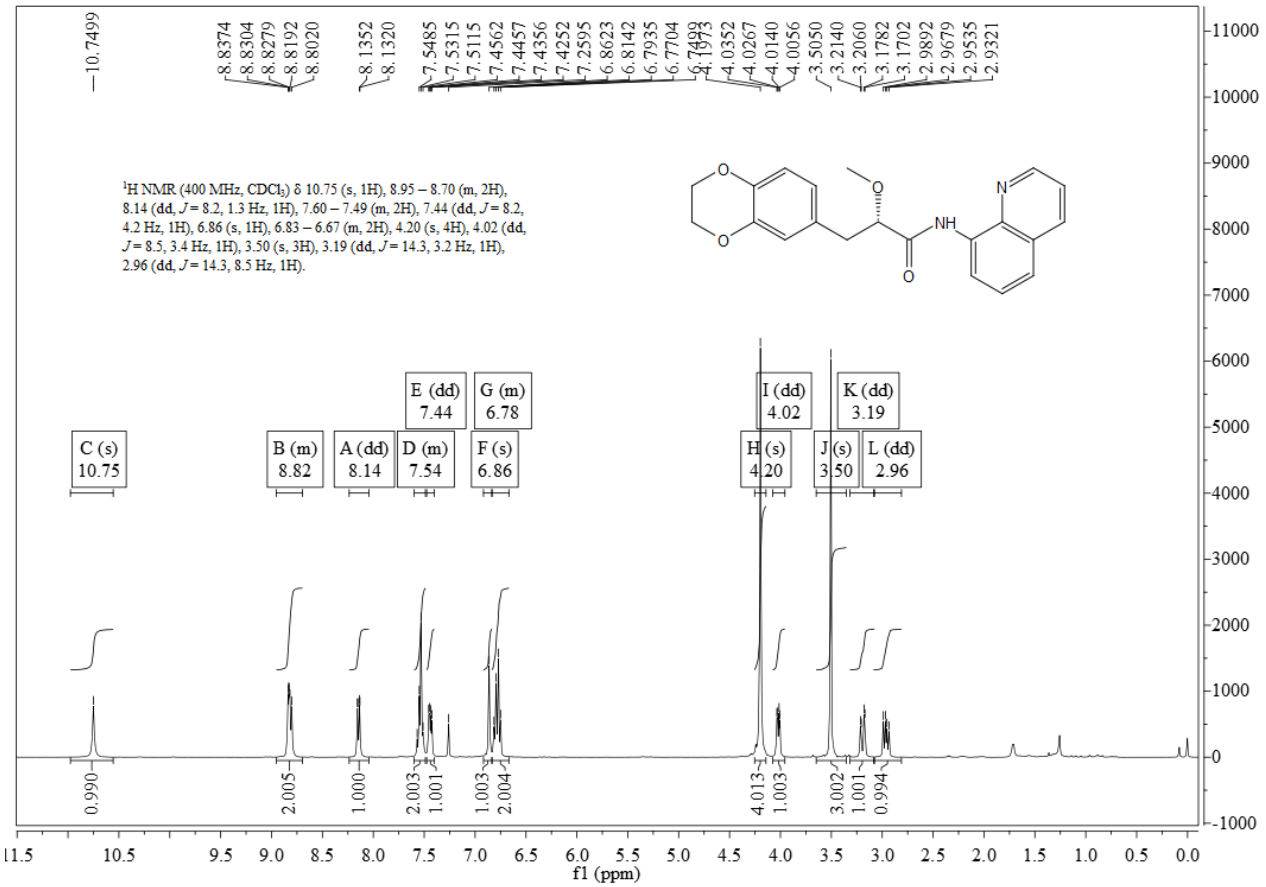

170.9773
148.8071
148.6598
147.8125
138.9886
136.2522
134.0261
130.2165
128.1109
127.2905
122.1085
121.7366
121.6891
116.6633
112.6891
111.1389
84.7064
59.3158
55.9104
55.8754
39.1411
13C NMR (101 MHz, CDCl3) δ 170.98, 148.81, 148.66, 147.81, 138.99, 136.25, 134.03, 130.22, 128.11, 127.29, 122.11, 121.74, 121.69, 116.66, 112.69, 111.14, 84.71, 59.32, 55.91, 55.88, 39.14.
f1 (ppm)

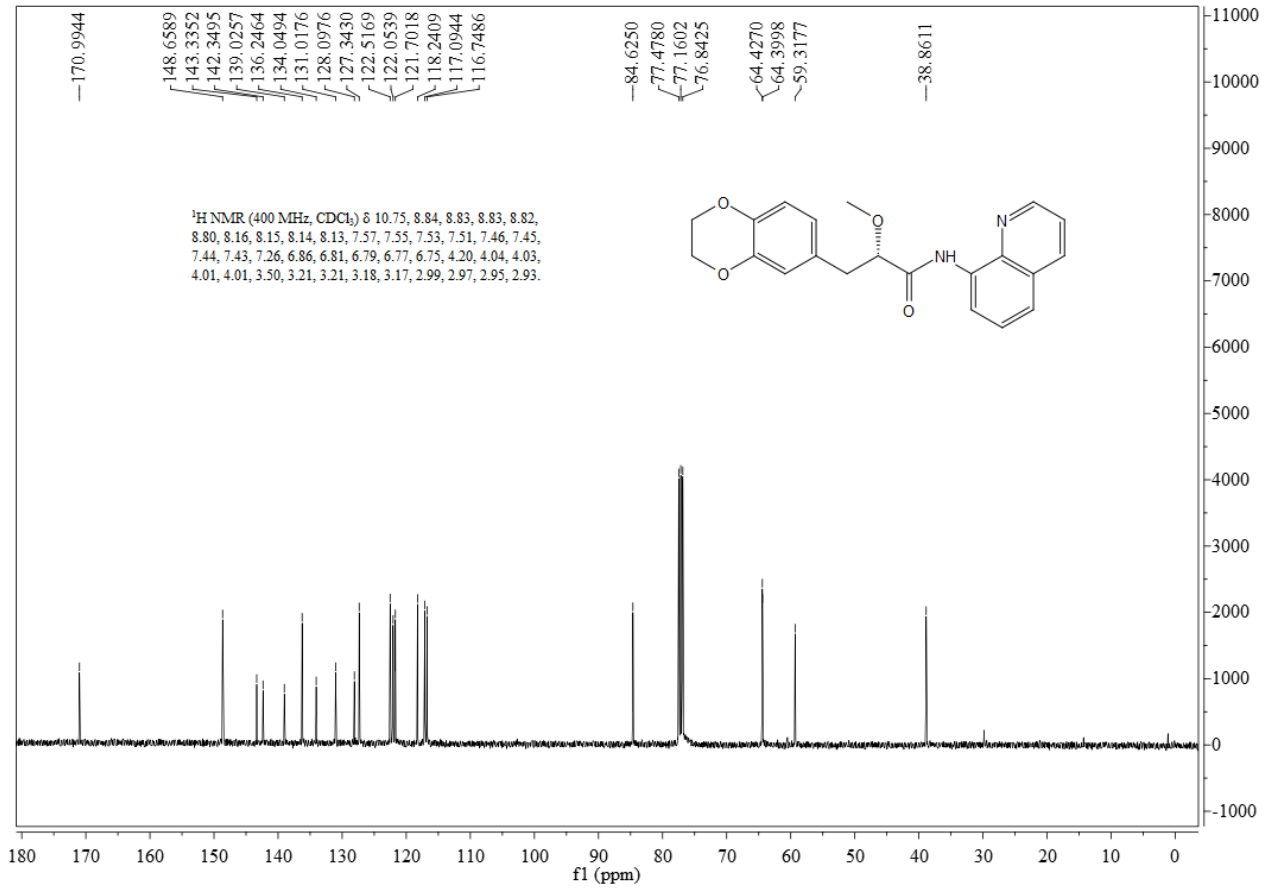

10.7620
8.8418
8.8382
8.8317
8.8078
8.8020
8.7919
8.1611
8.1406
7.5498
7.5339
7.4611
7.4506
7.4406
7.4302
7.1667
7.1460
7.0571
6.8744
4.0094
3.9956
3.9880
3.7752
3.4912
3.2538
3.2466
3.2180
3.2109
3.0120
2.9902
2.9763
2.9544
2.2943
1H NMR (400 MHz, CDCl3) δ 10.76 (s, 1H), 8.84 (dd, J = 4.0, 1.4 Hz, 1H), 8.80 (dd, J = 6.4, 2.3 Hz, 1H), 8.15 (dd, J = 8.2, 1.4 Hz, 1H), 7.58 – 7.51 (m, 2H), 7.45 (dd, J = 8.2, 4.2 Hz, 1H), 7.16 (dd, J = 8.3, 1.4 Hz, 1H), 7.06 (s, 1H), 6.86 (d, J = 8.3 Hz, 1H), 4.00 (dd, J = 8.6, 3.1 Hz, 1H), 3.78 (s, 3H), 3.49 (s, 3H), 3.23 (dd, J = 14.3, 2.8 Hz, 1H), 2.98 (dd, J = 14.3, 8.7 Hz, 1H), 2.29 (s, 3H).
M (s) 7.06
O (dd) 8.80
K (dd) 7.45
F (dd) 4.00
B (dd) 2.98
G (s) 10.76
H (dd) 8.84
I (dd) 8.15
J (m) 7.54
N (d) 6.86
D (s) 3.78
A (dd) 3.23
C (s) 2.29
L (dd) 7.16
E (s) 3.49
1.003
1.002
1.000
1.000
2.023
1.002
1.005
1.006
1.003
1.005
3.023
3.004
1.008
1.001
3.017
f1 (ppm)

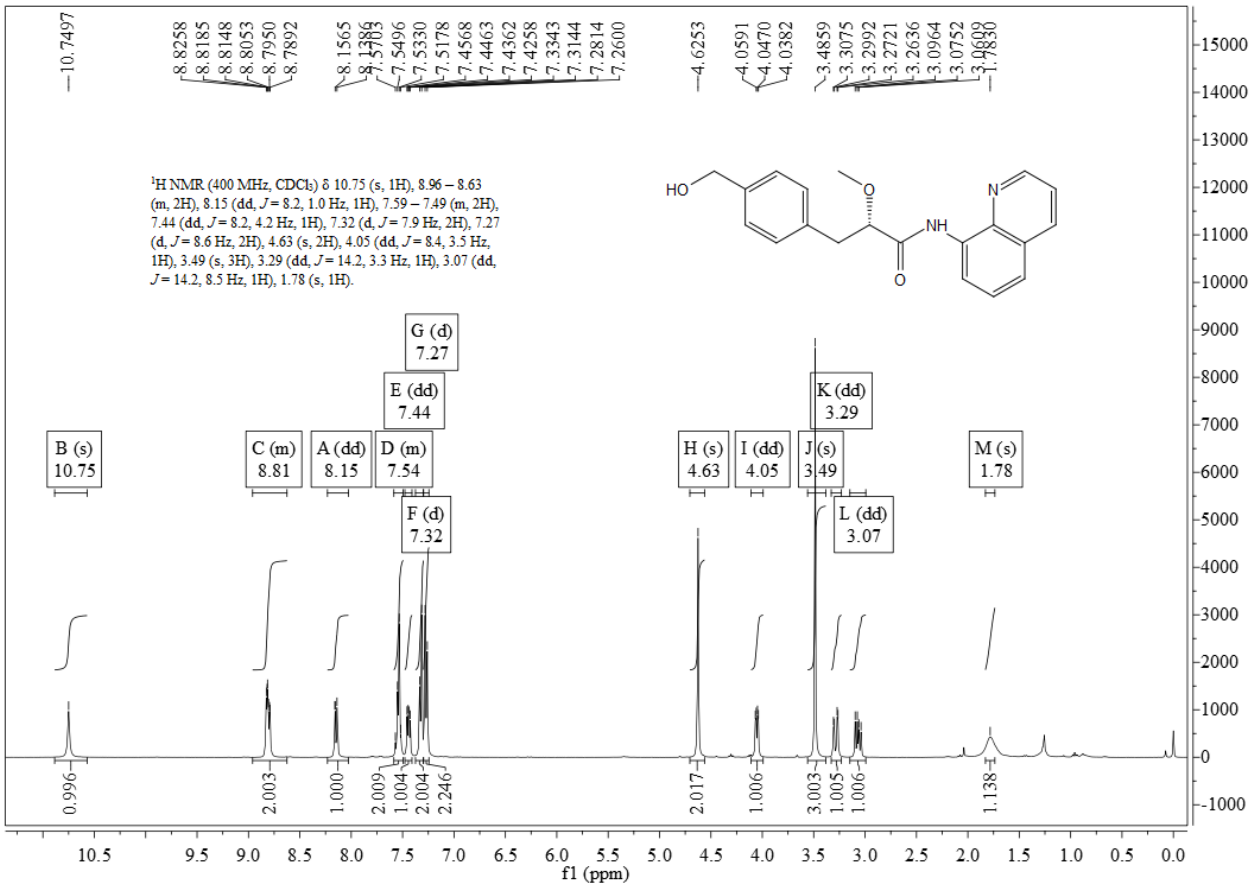

170.7148
169.0064
149.8095
148.5822
139.4698
138.9327
136.1341
133.8980
130.3759
128.0039
127.6893
127.2028
123.9643
121.9895
121.6092
116.6328
112.2448
84.4824
59.3217
55.8779
38.5594
20.6648
1H NMR (400 MHz, CDCl3) δ 10.76, 8.84, 8.84, 8.83, 8.81, 8.80, 8.79, 8.16, 8.14, 7.57, 7.55, 7.53, 7.52, 7.46, 7.45, 7.44, 7.43, 7.17, 7.15, 7.06, 6.87, 6.85, 4.02, 4.01, 4.00, 3.99, 3.78, 3.49, 3.25, 3.25, 3.22, 3.21, 3.01, 2.99, 2.98, 2.95, 2.29.
f1 (ppm)

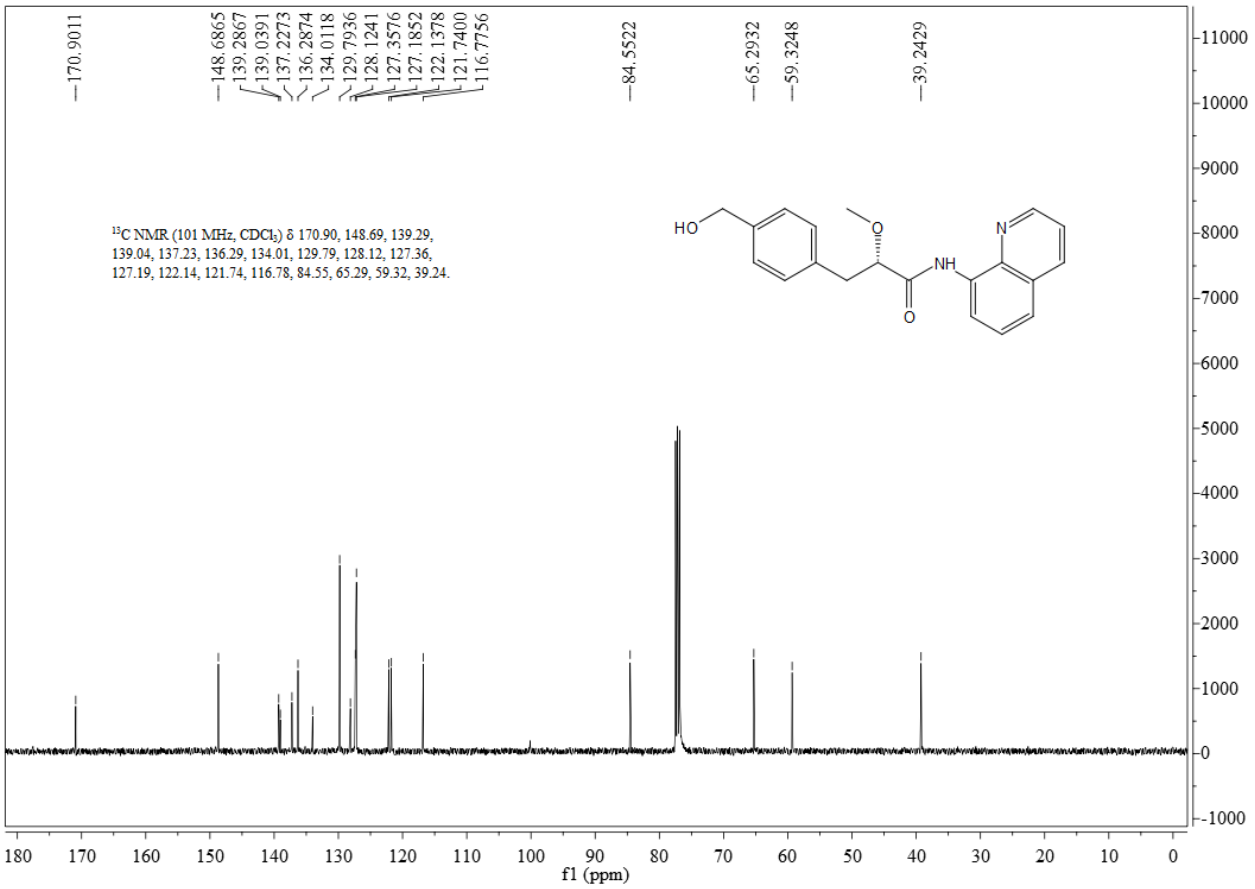

10.6561
8.8189
8.8090
8.7692
8.7602
8.7481
8.1260
7.8666
7.5413
7.5366
7.5294
7.4325
7.4228
7.4119
7.3925
7.3724
7.3543
7.3357
6.9608
6.9395
6.9323
5.1021
5.0908
5.0607
4.0554
4.0466
4.0369
4.0287
3.5402
3.2718
3.2635
3.2359
3.2277
3.1117
3.0928
3.0759
3.0570
^{1}H NMR (400 MHz, CDCl$_3$) δ 10.66 (s, 1H), 8.81 (dd, J = 4.0, 1.1 Hz, 1H), 8.76 (dd, J = 5.3, 3.6 Hz, 1H), 8.14 (d, J = 8.2 Hz, 1H), 7.87 (s, 1H), 7.58 – 7.49 (m, 2H), 7.46 – 7.28 (m, 7H), 6.95 (d, J = 8.5 Hz, 1H), 5.17 – 5.02 (m, 2H), 4.04 (dd, J = 7.3, 3.4 Hz, 1H), 3.54 (s, 3H), 3.25 (dd, J = 14.3, 3.3 Hz, 1H), 3.08 (dd, J = 14.3, 7.6 Hz, 1H).
F (s) 10.66
G (dd) 8.81
M (dd) 8.76
H (d) 8.14
I (s) 7.87
J (m) 7.54
K (m) 7.37
L (d) 6.95
E (m) 5.10
A (dd) 4.04
B (s) 3.54
C (dd) 3.25
D (dd) 3.08
0.999
1.000
1.003
1.006
1.000
2.010
7.022
1.004
2.011
1.003
3.002
1.005
1.003
f1 (ppm)

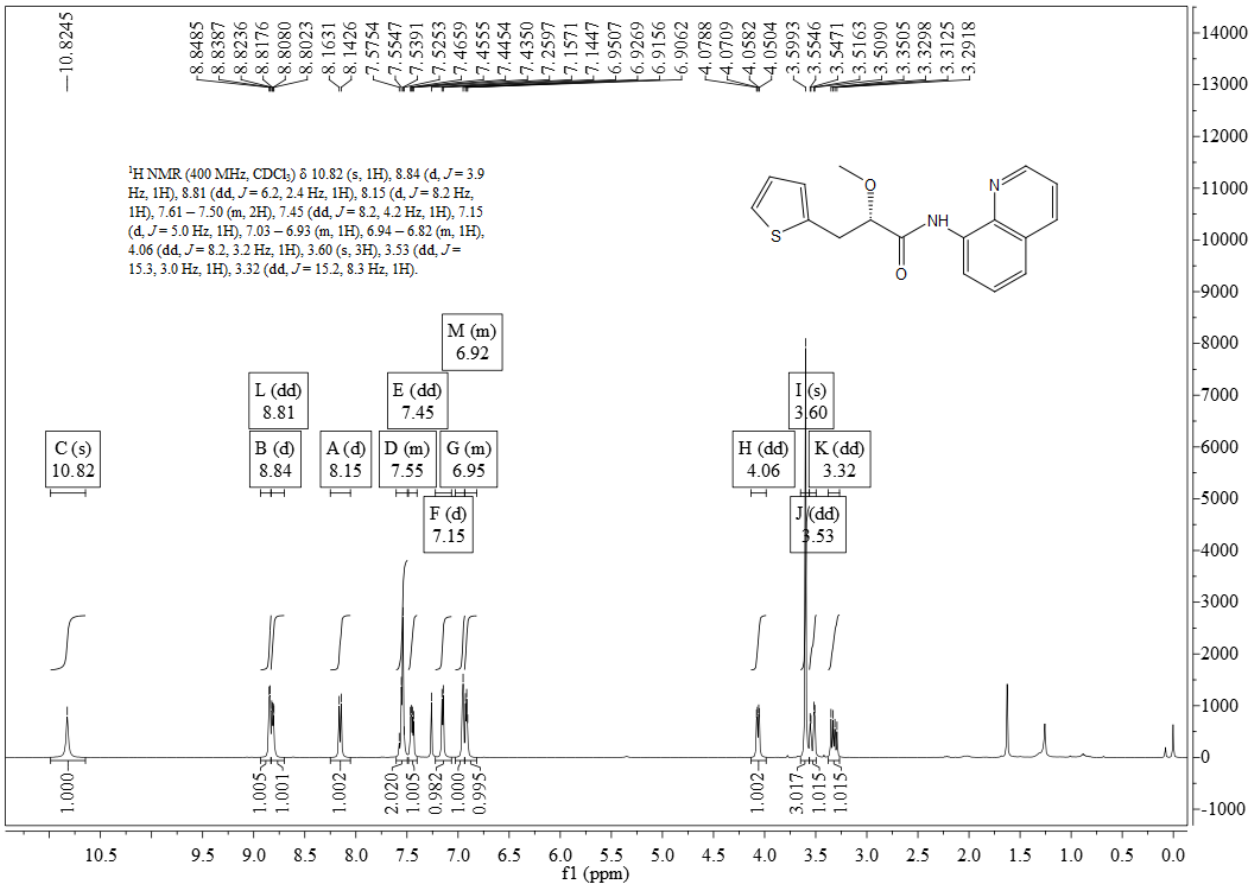

170.1110
150.8231
148.7562
140.0178
138.9450
136.2416
135.7935
135.2079
133.7499
130.3421
128.7449
128.2429
128.0832
127.2631
127.0401
126.7796
122.2695
121.7808
116.7769
115.1497
83.7828
71.3059
59.2393
37.8960
^{13}C NMR (101 MHz, CDCl$_3$) δ 170.11, 150.82, 148.76, 140.02, 138.95, 136.24, 135.79, 135.21, 133.75, 130.34, 128.74, 128.24, 128.08, 127.26, 127.04, 126.78, 122.27, 121.78, 116.78, 115.15, 83.78, 71.31, 59.24, 37.90.
f1 (ppm)

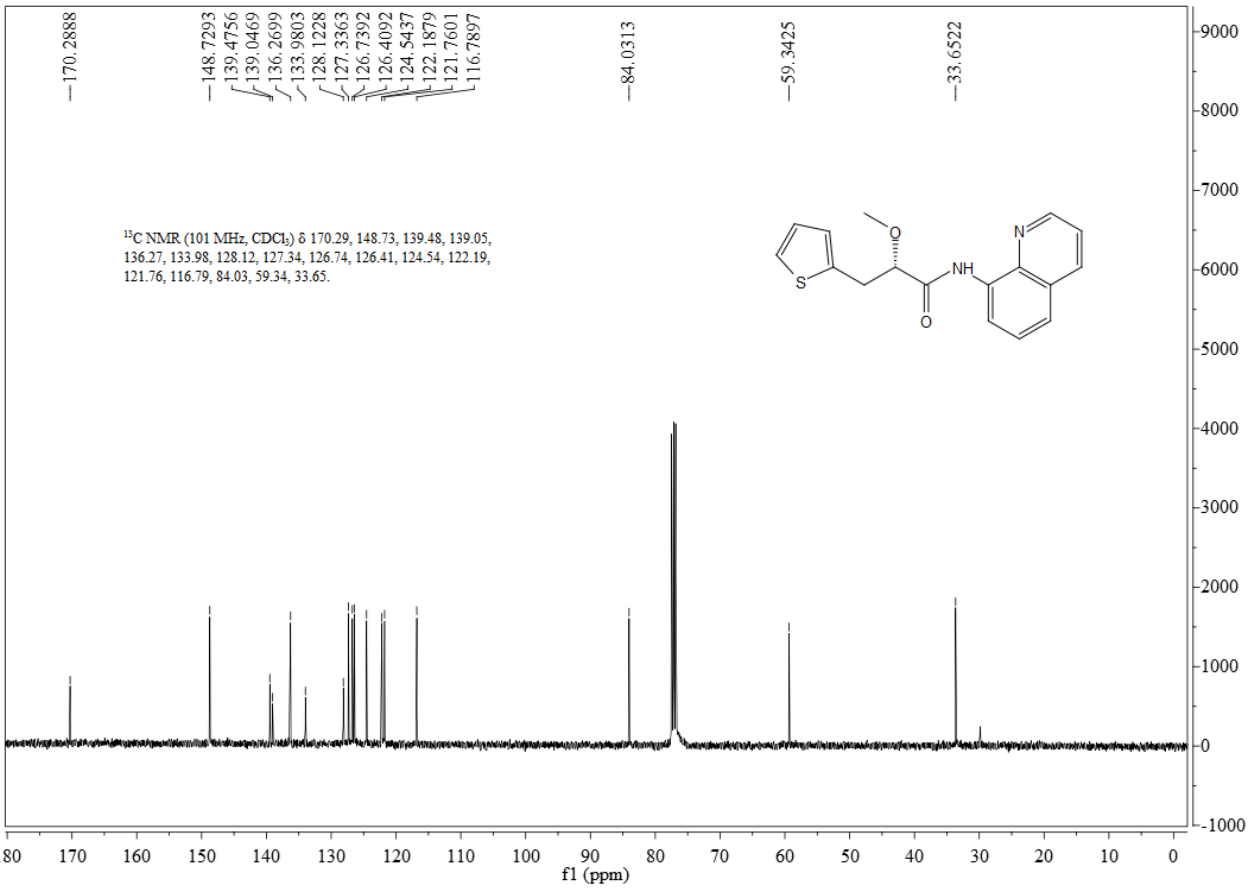

10.7499
8.8374
8.8304
8.8279
8.8192
8.8020
8.1352
8.1320
7.5485
7.5315
7.5115
7.4562
7.4457
7.4356
7.4252
7.2595
6.8623
6.8142
6.7935
6.7704
6.7499
4.1973
4.0352
4.0267
4.0140
4.0056
3.5050
3.2140
3.2060
3.1782
3.1702
2.9892
2.9679
2.9535
2.9321
1H NMR (400 MHz, CDCl3) δ 10.75 (s, 1H), 8.95 – 8.70 (m, 2H), 8.14 (dd, J = 8.2, 1.3 Hz, 1H), 7.60 – 7.49 (m, 2H), 7.44 (dd, J = 8.2, 4.2 Hz, 1H), 6.86 (s, 1H), 6.83 – 6.67 (m, 2H), 4.20 (s, 4H), 4.02 (dd, J = 8.5, 3.4 Hz, 1H), 3.50 (s, 3H), 3.19 (dd, J = 14.3, 3.2 Hz, 1H), 2.96 (dd, J = 14.3, 8.5 Hz, 1H).
C (s) 10.75
B (m) 8.82
A (dd) 8.14
D (m) 7.54
E (dd) 7.44
F (s) 6.86
G (m) 6.78
H (s) 4.20
I (dd) 4.02
J (s) 3.50
K (dd) 3.19
L (dd) 2.96
0.990
2.005
1.000
2.003
1.001
1.003
2.004
4.013
1.003
3.002
1.001
0.994
f1 (ppm)

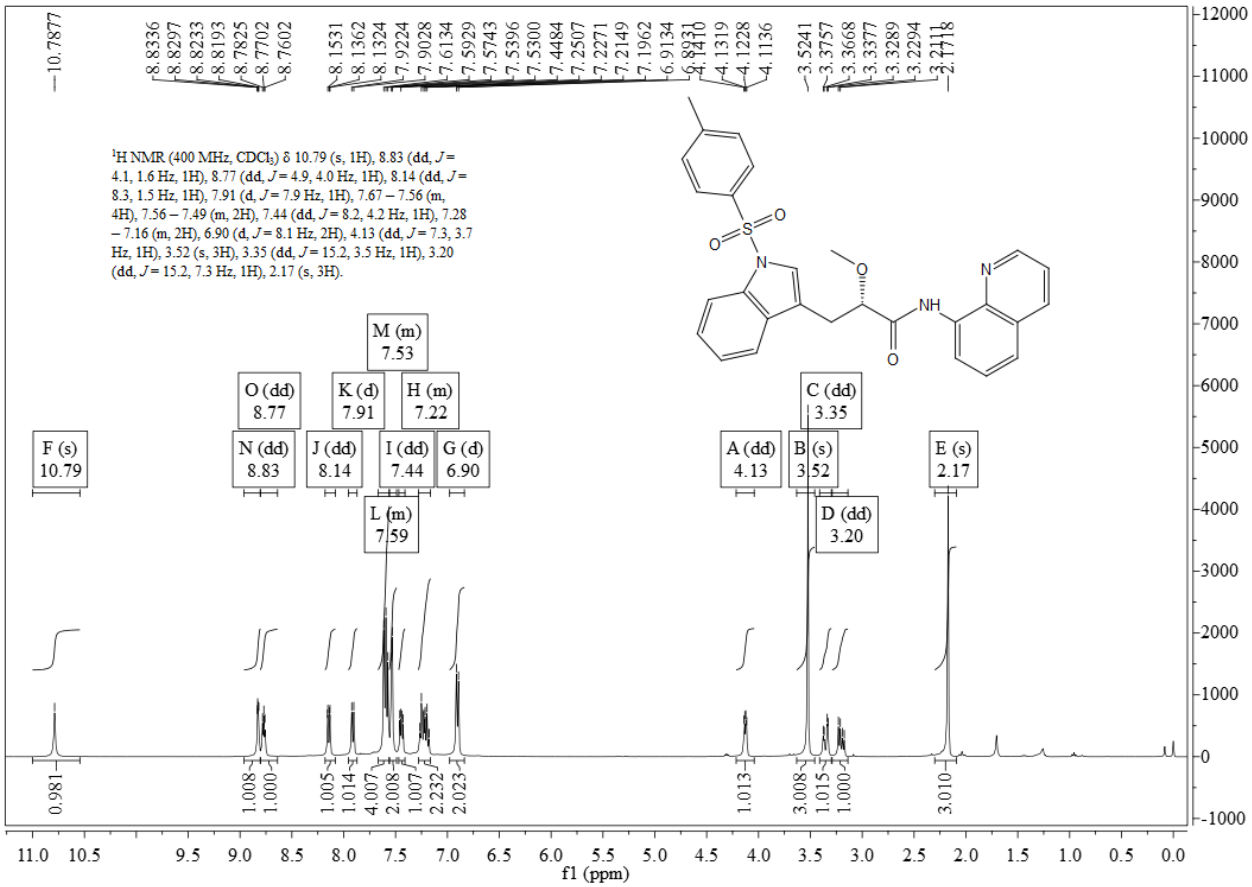

170.9944
148.6589
143.3352
142.3495
139.0257
136.2464
134.0494
131.0176
128.0976
127.3430
122.5169
122.0539
121.7018
118.2409
117.0944
116.7486
84.6250
77.4780
77.1602
76.8425
64.4270
64.3998
59.3177
38.8611
1H NMR (400 MHz, CDCl3) δ 10.75, 8.84, 8.83, 8.83, 8.82, 8.80, 8.16, 8.15, 8.14, 8.13, 7.57, 7.55, 7.53, 7.51, 7.46, 7.45, 7.44, 7.43, 7.26, 6.86, 6.81, 6.79, 6.77, 6.75, 4.20, 4.04, 4.03, 4.01, 4.01, 3.50, 3.21, 3.21, 3.18, 3.17, 2.99, 2.97, 2.95, 2.93.
f1 (ppm)

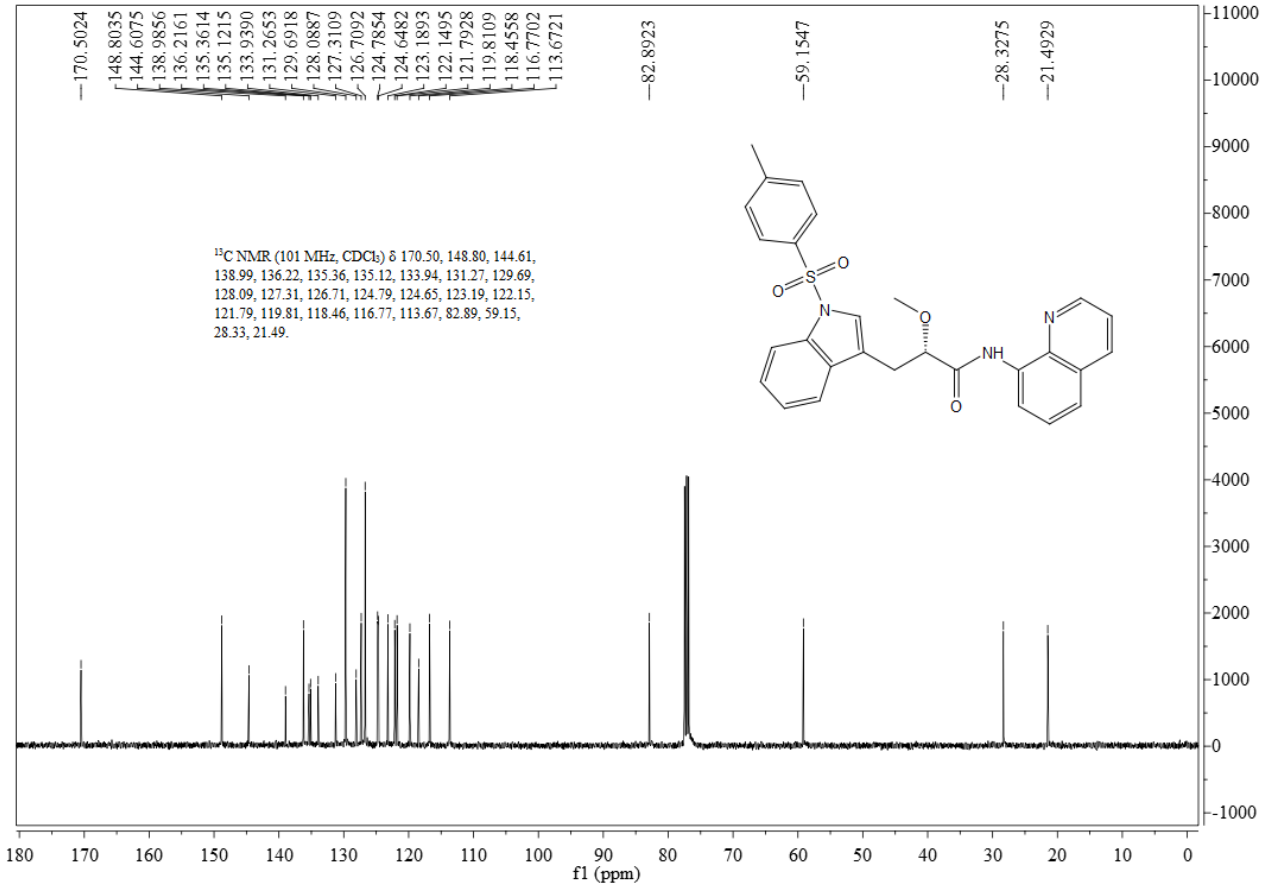

10.7497
8.8258
8.8185
8.8148
8.8053
8.7950
8.7892
8.1565
8.1386
8.1303
7.5496
7.5330
7.5178
7.4568
7.4463
7.4362
7.4258
7.3343
7.3144
7.2814
7.2600
4.6253
4.0591
4.0470
4.0382
3.4859
3.3075
3.2992
3.2721
3.2636
3.0964
3.0752
3.0609
1.7830
1H NMR (400 MHz, CDCl3) δ 10.75 (s, 1H), 8.96 – 8.63 (m, 2H), 8.15 (dd, J = 8.2, 1.0 Hz, 1H), 7.59 – 7.49 (m, 2H), 7.44 (dd, J = 8.2, 4.2 Hz, 1H), 7.32 (d, J = 7.9 Hz, 2H), 7.27 (d, J = 8.6 Hz, 2H), 4.63 (s, 2H), 4.05 (dd, J = 8.4, 3.5 Hz, 1H), 3.49 (s, 3H), 3.29 (dd, J = 14.2, 3.3 Hz, 1H), 3.07 (dd, J = 14.2, 8.5 Hz, 1H), 1.78 (s, 1H).
HO
O
NH
N
O
B (s) 10.75
C (m) 8.81
A (dd) 8.15
D (m) 7.54
E (dd) 7.44
G (d) 7.27
F (d) 7.32
H (s) 4.63
I (dd) 4.05
J (s) 3.49
K (dd) 3.29
L (dd) 3.07
M (s) 1.78
0.996
2.003
1.000
2.009
1.004
2.004
2.246
2.017
1.006
3.003
1.005
1.006
1.138
f1 (ppm)

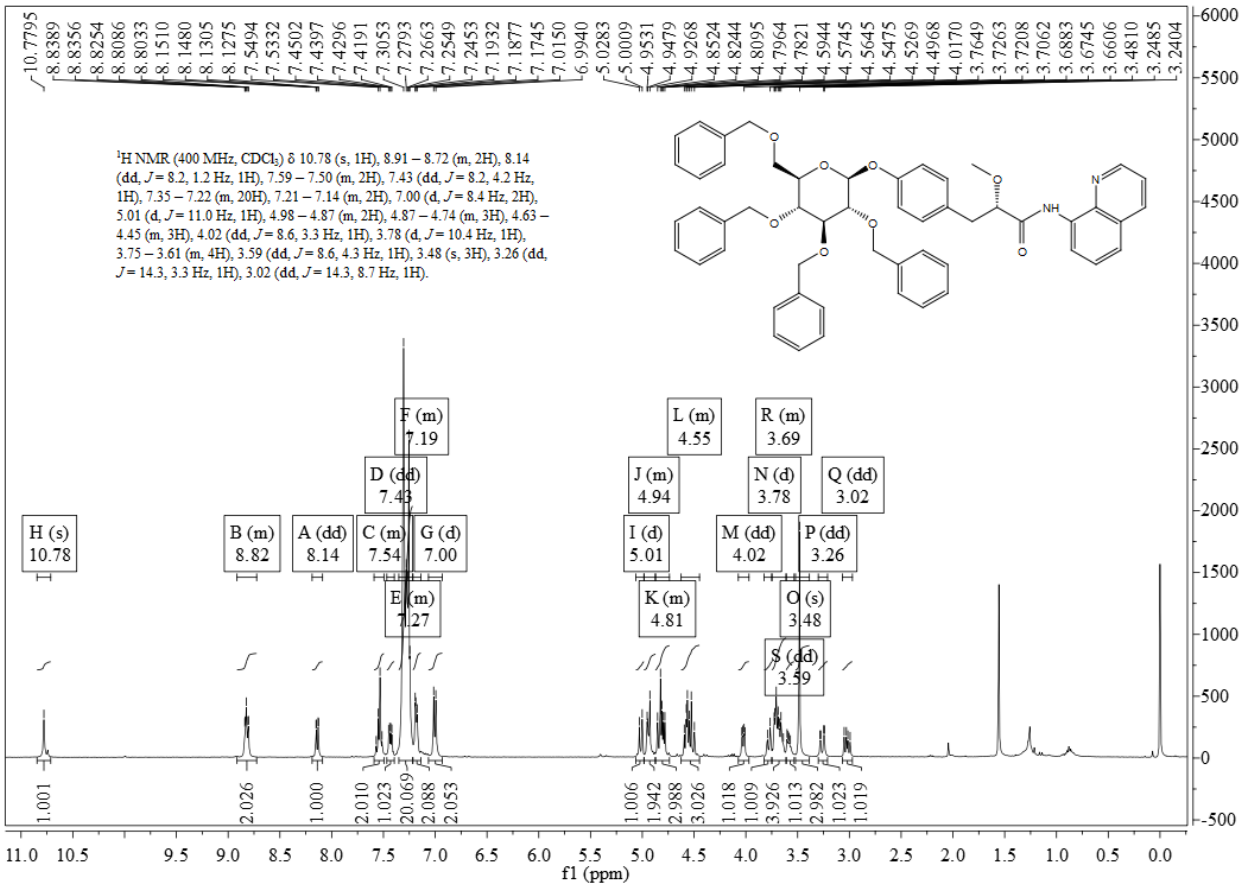

170.9011
148.6865
139.2867
139.0391
137.2273
136.2874
134.0118
129.7936
128.1241
127.3576
127.1852
122.1378
121.7400
116.7756
84.5522
65.2932
59.3248
39.2429
13C NMR (101 MHz, CDCl3) δ 170.90, 148.69, 139.29, 139.04, 137.23, 136.29, 134.01, 129.79, 128.12, 127.36, 127.19, 122.14, 121.74, 116.78, 84.55, 65.29, 59.32, 39.24.
HO
O
NH
N
O
f1 (ppm)

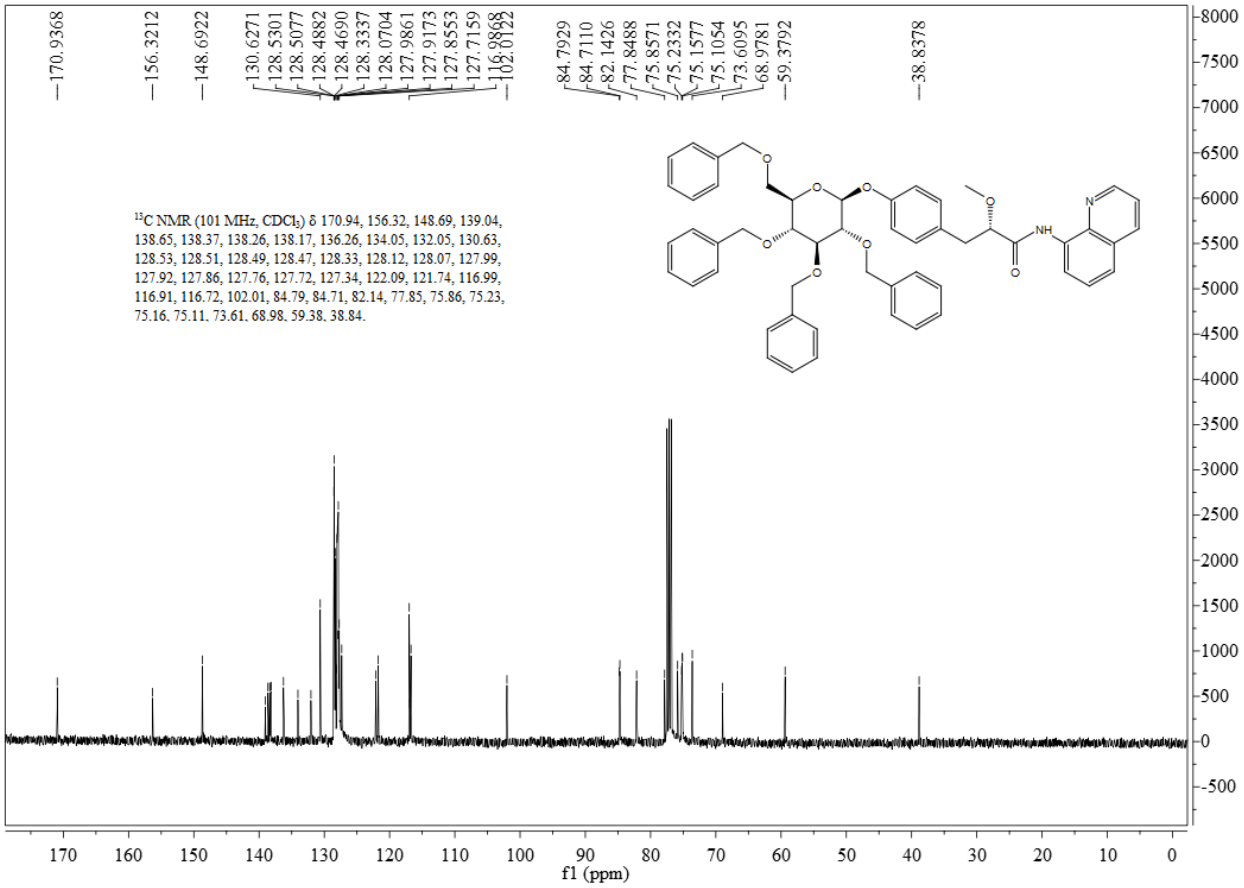

10.8245
8.8485
8.8387
8.8236
8.8176
8.8080
8.8023
8.1631
8.1426
7.5754
7.5547
7.5391
7.5253
7.4659
7.4555
7.4454
7.4350
7.2597
7.1571
7.1447
6.9507
6.9269
6.9156
6.9062
4.0788
4.0709
4.0582
4.0504
3.5993
3.5546
3.5471
3.5163
3.5090
3.3505
3.3298
3.3125
3.2918
1H NMR (400 MHz, CDCl3) δ 10.82 (s, 1H), 8.84 (d, J = 3.9 Hz, 1H), 8.81 (dd, J = 6.2, 2.4 Hz, 1H), 8.15 (d, J = 8.2 Hz, 1H), 7.61 – 7.50 (m, 2H), 7.45 (dd, J = 8.2, 4.2 Hz, 1H), 7.15 (d, J = 5.0 Hz, 1H), 7.03 – 6.93 (m, 1H), 6.94 – 6.82 (m, 1H), 4.06 (dd, J = 8.2, 3.2 Hz, 1H), 3.60 (s, 3H), 3.53 (dd, J = 15.3, 3.0 Hz, 1H), 3.32 (dd, J = 15.2, 8.3 Hz, 1H).
C (s) 10.82
B (d) 8.84
L (dd) 8.81
A (d) 8.15
D (m) 7.55
E (dd) 7.45
F (d) 7.15
G (m) 6.95
M (m) 6.92
H (dd) 4.06
I (s) 3.60
J (dd) 3.53
K (dd) 3.32
1.000
1.005
1.001
1.002
2.020
1.005
0.982
1.000
0.995
1.002
3.017
1.015
1.015
f1 (ppm)

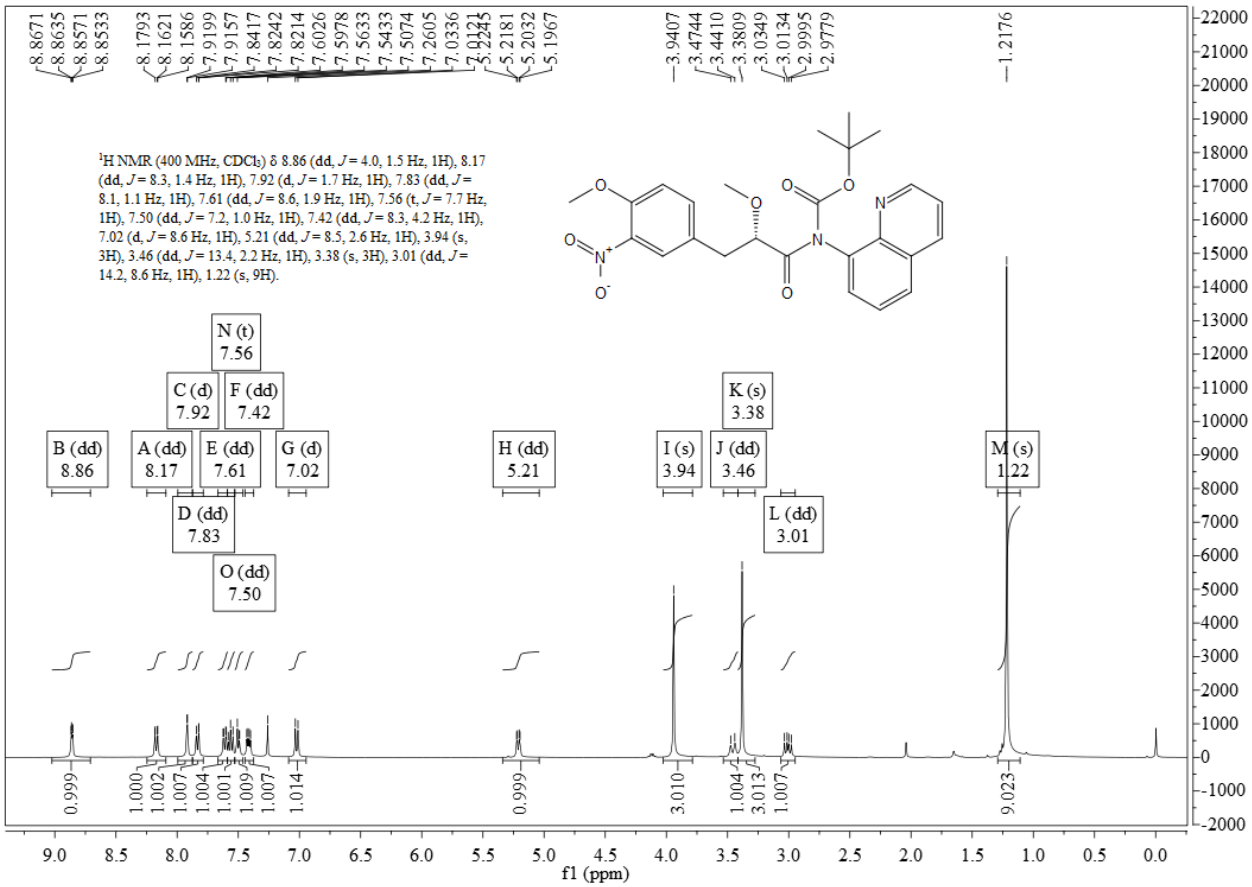

170.2888
148.7293
139.4756
139.0469
136.2699
133.9803
128.1228
127.3363
126.7392
126.4092
124.5437
122.1879
121.7601
116.7897
84.0313
59.3425
33.6522
13C NMR (101 MHz, CDCl3) δ 170.29, 148.73, 139.48, 139.05, 136.27, 133.98, 128.12, 127.34, 126.74, 126.41, 124.54, 122.19, 121.76, 116.79, 84.03, 59.34, 33.65.
f1 (ppm)

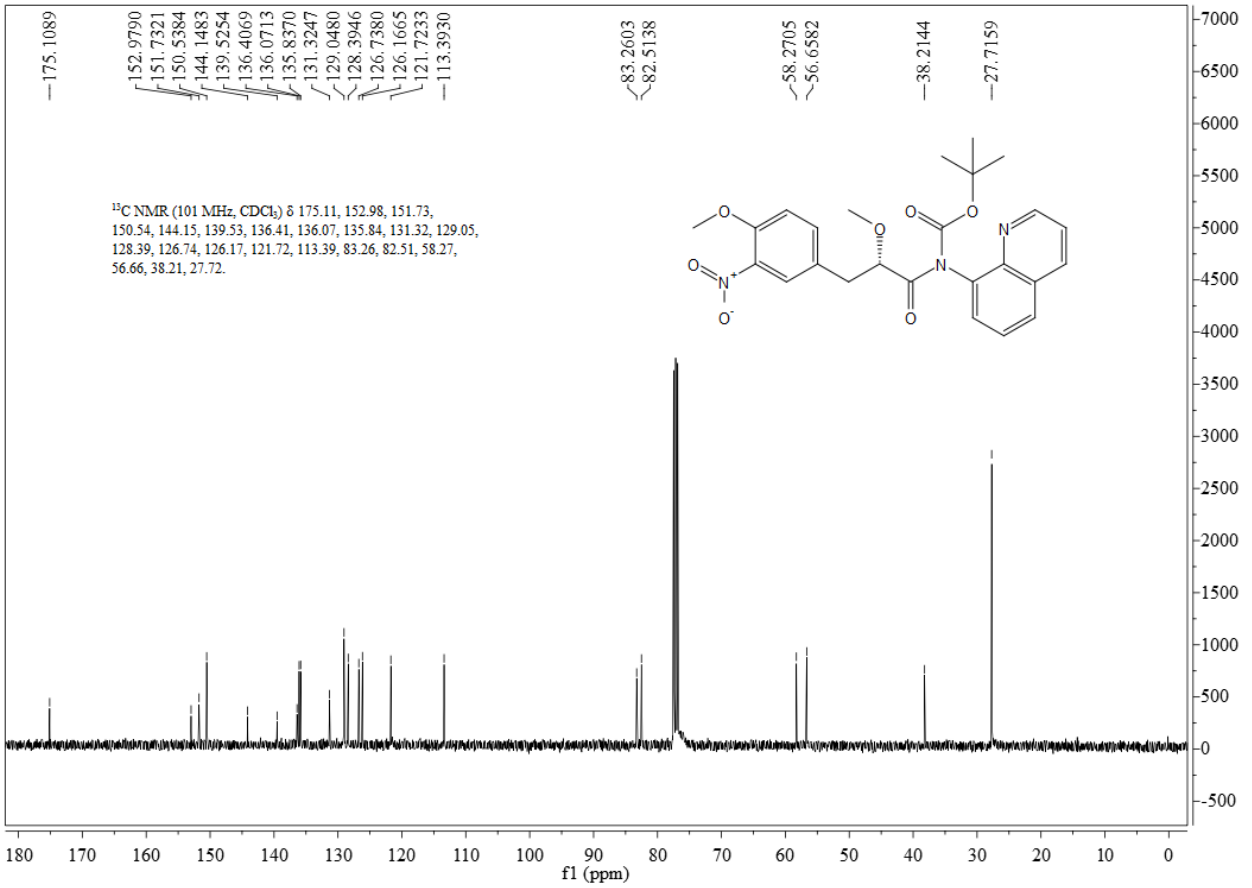

^{1}H NMR (400 MHz, CDCl$_3$) δ 10.79 (s, 1H), 8.83 (dd, J = 4.1, 1.6 Hz, 1H), 8.77 (dd, J = 4.9, 4.0 Hz, 1H), 8.14 (dd, J = 8.3, 1.5 Hz, 1H), 7.91 (d, J = 7.9 Hz, 1H), 7.67 – 7.56 (m, 4H), 7.56 – 7.49 (m, 2H), 7.44 (dd, J = 8.2, 4.2 Hz, 1H), 7.28 – 7.16 (m, 2H), 6.90 (d, J = 8.1 Hz, 2H), 4.13 (dd, J = 7.3, 3.7 Hz, 1H), 3.52 (s, 3H), 3.35 (dd, J = 15.2, 3.5 Hz, 1H), 3.20 (dd, J = 15.2, 7.3 Hz, 1H), 2.17 (s, 3H).
F (s) 10.79
N (dd) 8.83
O (dd) 8.77
J (dd) 8.14
K (d) 7.91
I (dd) 7.44
H (m) 7.22
G (d) 6.90
M (m) 7.53
L (m) 7.59
A (dd) 4.13
B (s) 3.52
C (dd) 3.35
D (dd) 3.20
E (s) 2.17
f1 (ppm)

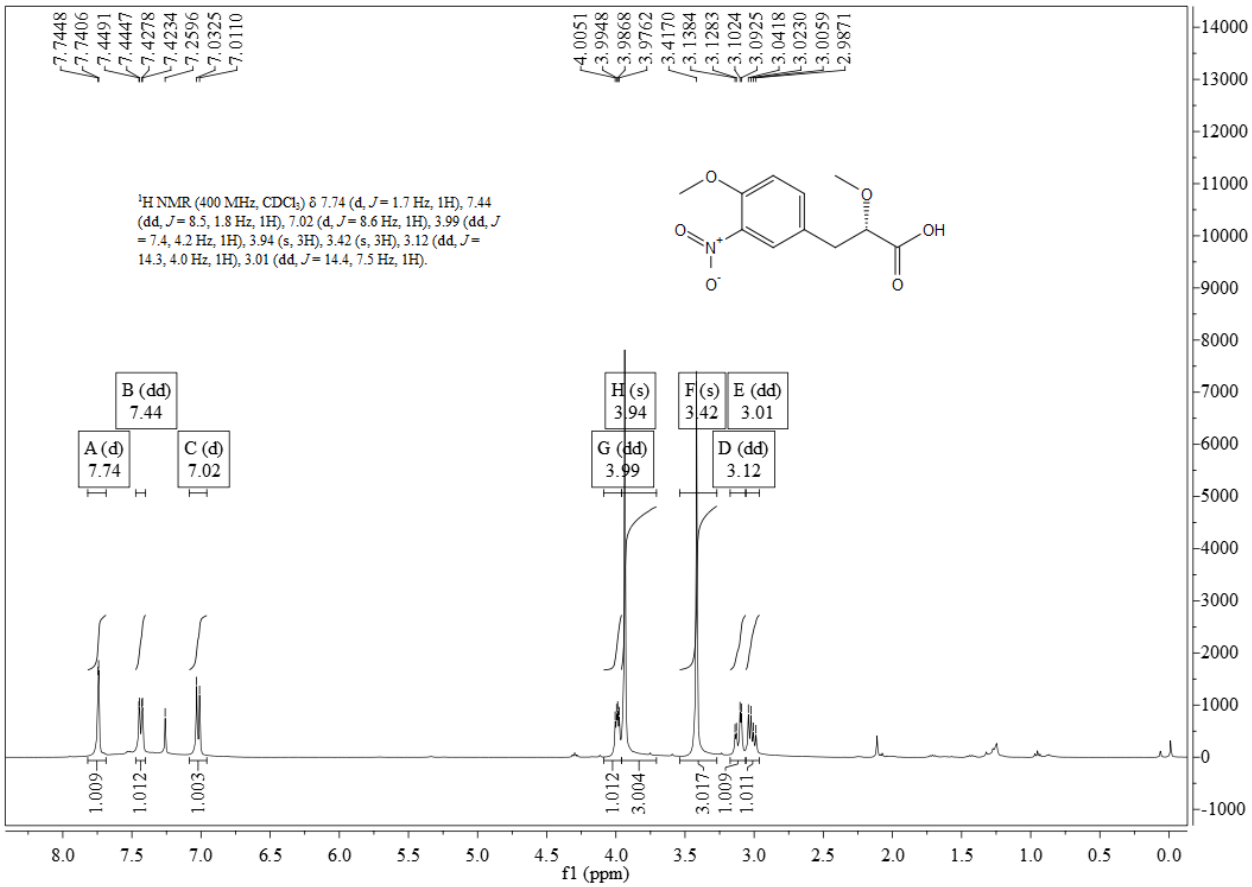

^{13}C NMR (101 MHz, CDCl$_3$) δ 170.50, 148.80, 144.61, 138.99, 136.22, 135.36, 135.12, 133.94, 131.27, 129.69, 128.09, 127.31, 126.71, 124.79, 124.65, 123.19, 122.15, 121.79, 119.81, 118.46, 116.77, 113.67, 82.89, 59.15, 28.33, 21.49.
f1 (ppm)

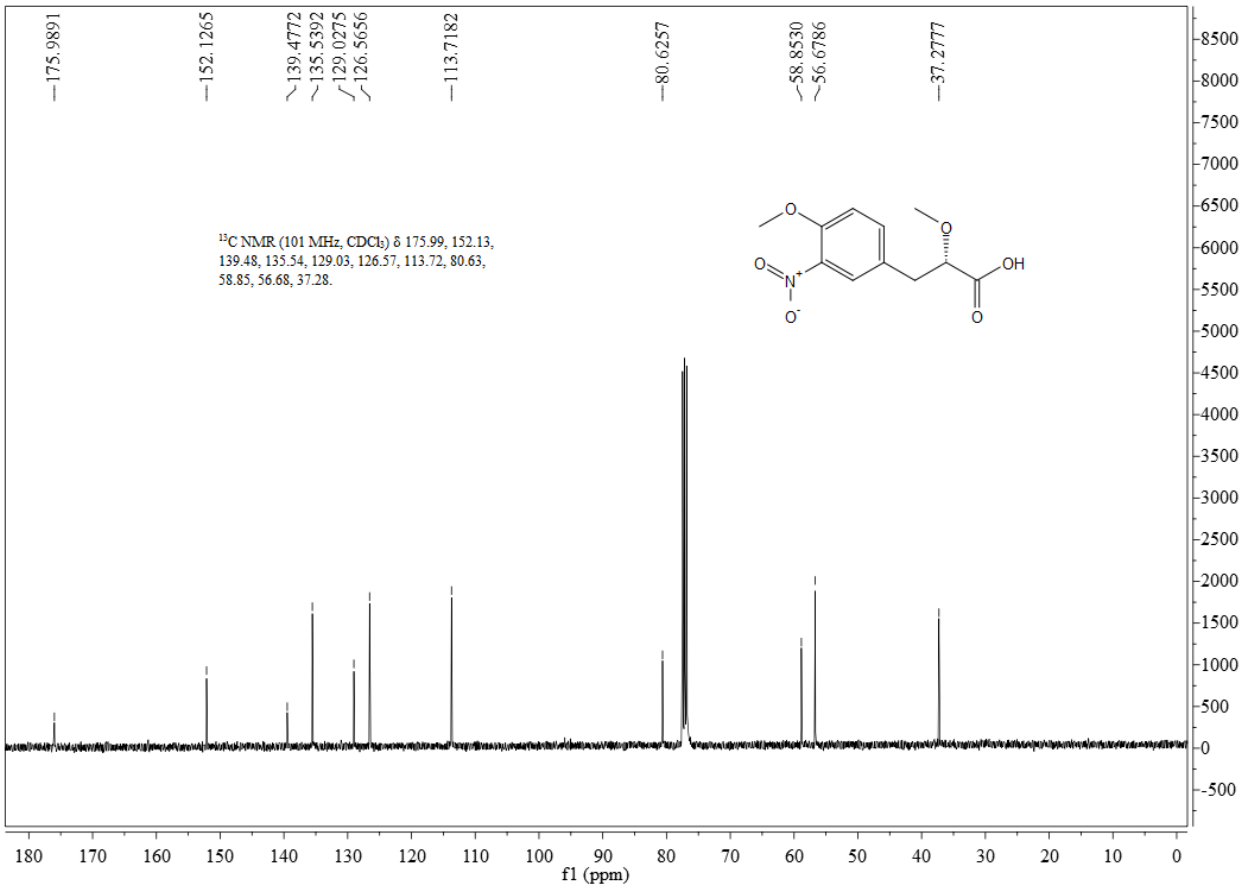

10.7795
8.8389
8.8356
8.8254
8.8086
8.8033
8.1510
8.1480
8.1305
8.1275
7.5494
7.5332
7.4502
7.4397
7.4296
7.4191
7.3053
7.2793
7.2663
7.2549
7.2453
7.1932
7.1877
7.1745
7.0150
6.9940
5.0283
5.0009
4.9531
4.9479
4.9268
4.8524
4.8244
4.8095
4.7964
4.7821
4.5944
4.5745
4.5645
4.5475
4.5269
4.4968
4.0170
3.7649
3.7263
3.7208
3.7062
3.6883
3.6745
3.6606
3.4810
3.2485
3.2404
¹H NMR (400 MHz, CDCl₃) δ 10.78 (s, 1H), 8.91 – 8.72 (m, 2H), 8.14 (dd, J = 8.2, 1.2 Hz, 1H), 7.59 – 7.50 (m, 2H), 7.43 (dd, J = 8.2, 4.2 Hz, 1H), 7.35 – 7.22 (m, 20H), 7.21 – 7.14 (m, 2H), 7.00 (d, J = 8.4 Hz, 2H), 5.01 (d, J = 11.0 Hz, 1H), 4.98 – 4.87 (m, 2H), 4.87 – 4.74 (m, 3H), 4.63 – 4.45 (m, 3H), 4.02 (dd, J = 8.6, 3.3 Hz, 1H), 3.78 (d, J = 10.4 Hz, 1H), 3.75 – 3.61 (m, 4H), 3.59 (dd, J = 8.6, 4.3 Hz, 1H), 3.48 (s, 3H), 3.26 (dd, J = 14.3, 3.3 Hz, 1H), 3.02 (dd, J = 14.3, 8.7 Hz, 1H).
H (s) 10.78
B (m) 8.82
A (dd) 8.14
C (m) 7.54
G (d) 7.00
D (dd) 7.43
F (m) 7.19
E (m) 7.27
I (d) 5.01
K (m) 4.81
J (m) 4.94
L (m) 4.55
M (dd) 4.02
P (dd) 3.26
N (d) 3.78
R (m) 3.69
Q (dd) 3.02
O (s) 3.48
S (dd) 3.59
1.001
2.026
1.000
2.010
1.023
20.069
2.088
2.053
1.006
1.942
2.988
3.026
1.018
1.009
3.926
1.013
2.982
1.023
1.019
f1 (ppm)

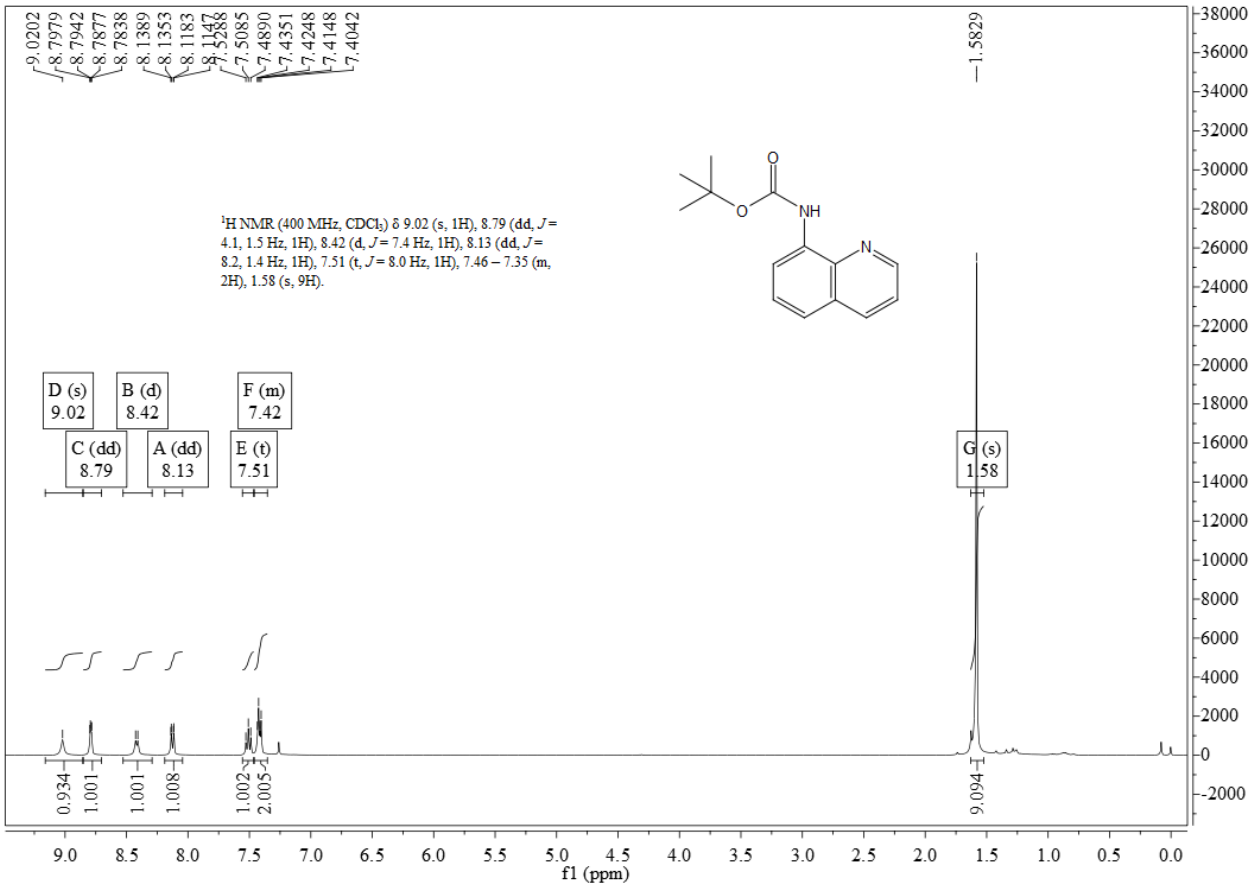

170.9368
156.3212
148.6922
130.6271
128.5301
128.5077
128.4882
128.4690
128.3337
128.0704
127.9861
127.9173
127.8553
127.7159
116.8868
102.0122
84.7929
84.7110
82.1426
77.8488
75.8571
75.2332
75.1577
75.1054
73.6095
68.9781
59.3792
38.8378
¹³C NMR (101 MHz, CDCl₃) δ 170.94, 156.32, 148.69, 139.04, 138.65, 138.37, 138.26, 138.17, 136.26, 134.05, 132.05, 130.63, 128.53, 128.51, 128.49, 128.47, 128.33, 128.12, 128.07, 127.99, 127.92, 127.86, 127.76, 127.72, 127.34, 122.09, 121.74, 116.99, 116.91, 116.72, 102.01, 84.79, 84.71, 82.14, 77.85, 75.86, 75.23, 75.16. 75.11. 73.61. 68.98. 59.38. 38.84.
f1 (ppm)

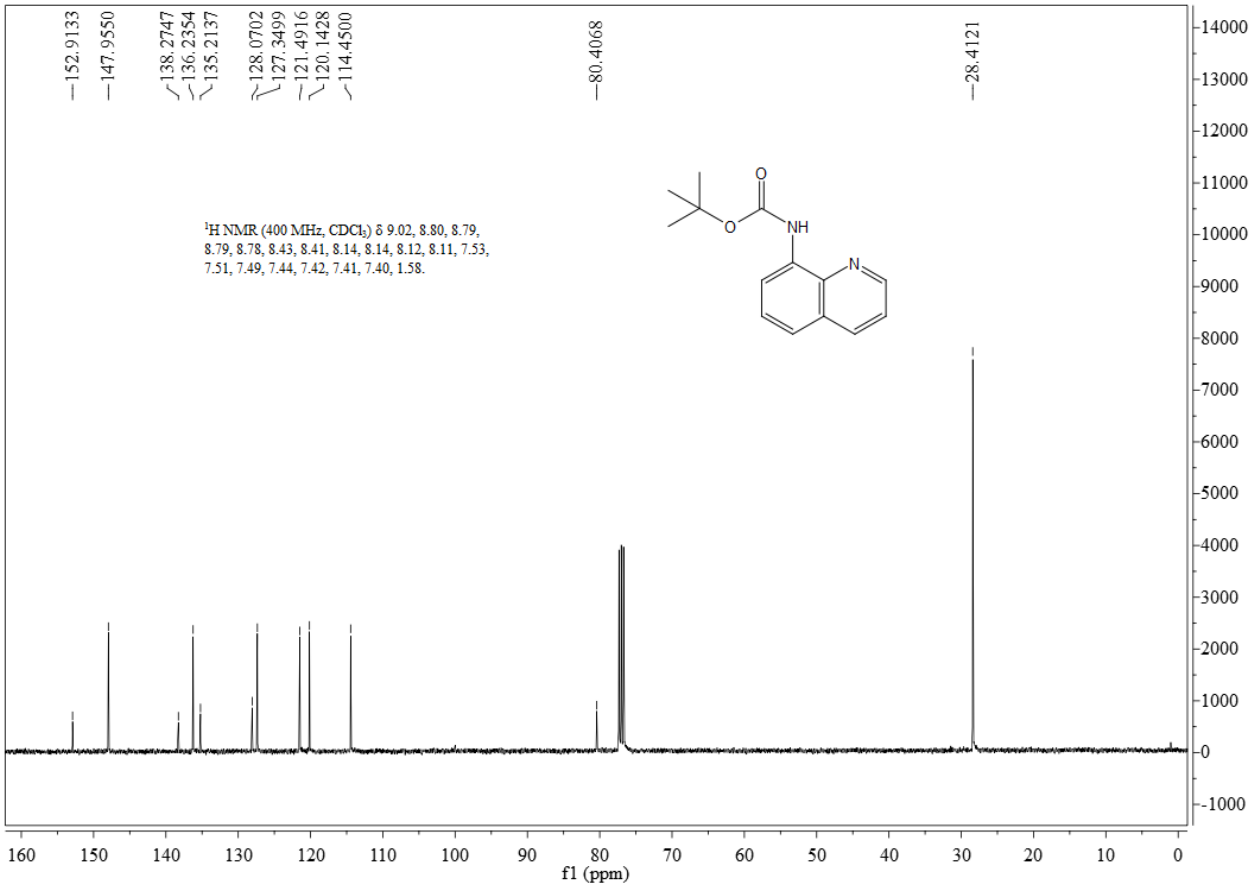

8.8671
8.8635
8.8571
8.8533
8.1793
8.1621
8.1586
7.9199
7.9157
7.8417
7.8242
7.8214
7.6026
7.5978
7.5633
7.5433
7.5074
7.2605
7.0336
7.0121
5.2245
5.2181
5.2032
5.1967
3.9407
3.4744
3.4410
3.3809
3.0349
3.0134
2.9995
2.9779
1.2176
1H NMR (400 MHz, CDCl3) δ 8.86 (dd, J = 4.0, 1.5 Hz, 1H), 8.17 (dd, J = 8.3, 1.4 Hz, 1H), 7.92 (d, J = 1.7 Hz, 1H), 7.83 (dd, J = 8.1, 1.1 Hz, 1H), 7.61 (dd, J = 8.6, 1.9 Hz, 1H), 7.56 (t, J = 7.7 Hz, 1H), 7.50 (dd, J = 7.2, 1.0 Hz, 1H), 7.42 (dd, J = 8.3, 4.2 Hz, 1H), 7.02 (d, J = 8.6 Hz, 1H), 5.21 (dd, J = 8.5, 2.6 Hz, 1H), 3.94 (s, 3H), 3.46 (dd, J = 13.4, 2.2 Hz, 1H), 3.38 (s, 3H), 3.01 (dd, J = 14.2, 8.6 Hz, 1H), 1.22 (s, 9H).
N (t) 7.56
C (d) 7.92
F (dd) 7.42
B (dd) 8.86
A (dd) 8.17
E (dd) 7.61
G (d) 7.02
H (dd) 5.21
K (s) 3.38
I (s) 3.94
J (dd) 3.46
M (s) 1.22
D (dd) 7.83
L (dd) 3.01
O (dd) 7.50
0.999
1.000
1.002
1.007
1.004
1.001
1.009
1.007
1.014
0.999
3.010
1.004
3.013
1.007
9.023
f1 (ppm)

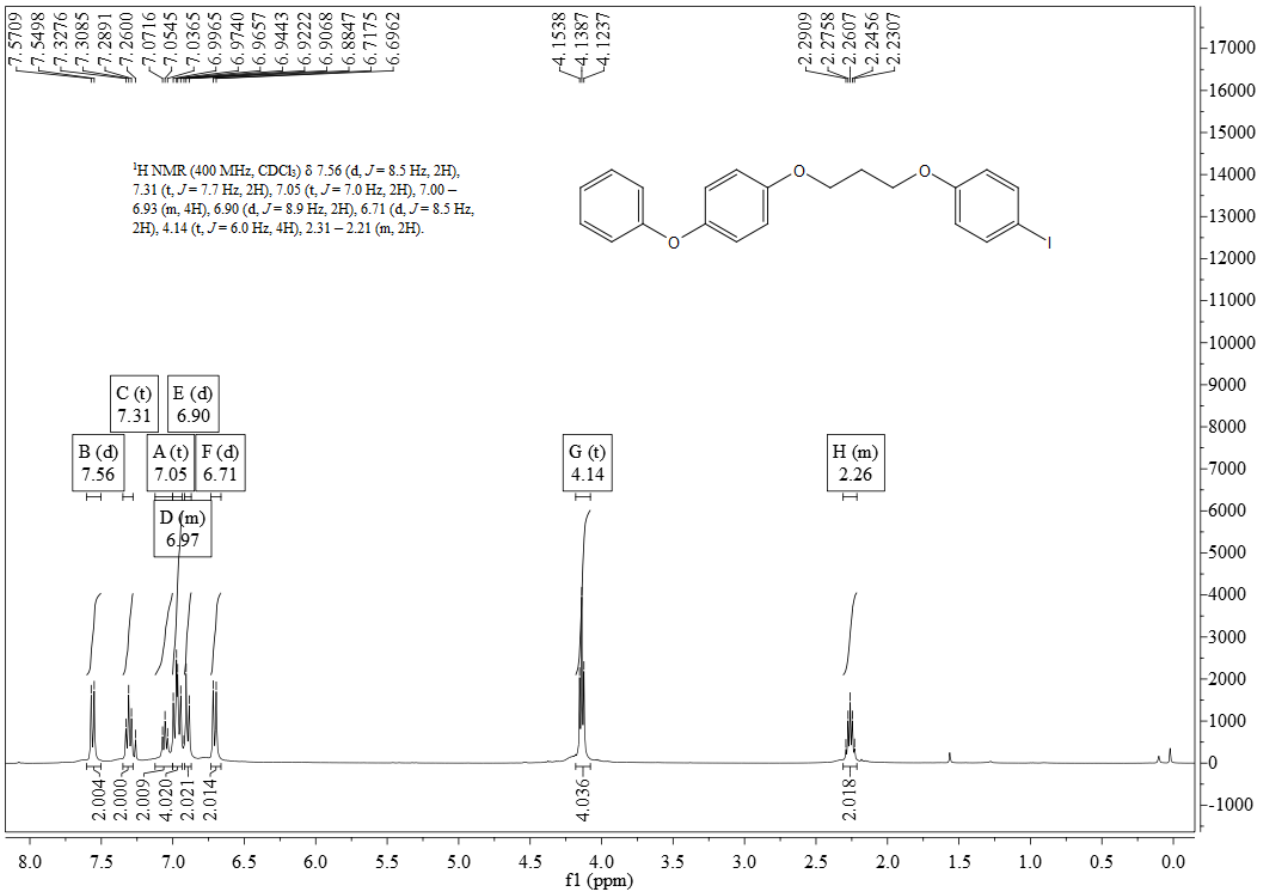

175.1089
152.9790
151.7321
150.5384
144.1483
139.5254
136.4069
136.0713
135.8370
131.3247
129.0480
128.3946
126.7380
126.1665
121.7233
113.3930
83.2603
82.5138
58.2705
56.6582
38.2144
27.7159
13C NMR (101 MHz, CDCl3) δ 175.11, 152.98, 151.73, 150.54, 144.15, 139.53, 136.41, 136.07, 135.84, 131.32, 129.05, 128.39, 126.74, 126.17, 121.72, 113.39, 83.26, 82.51, 58.27, 56.66, 38.21, 27.72.
f1 (ppm)

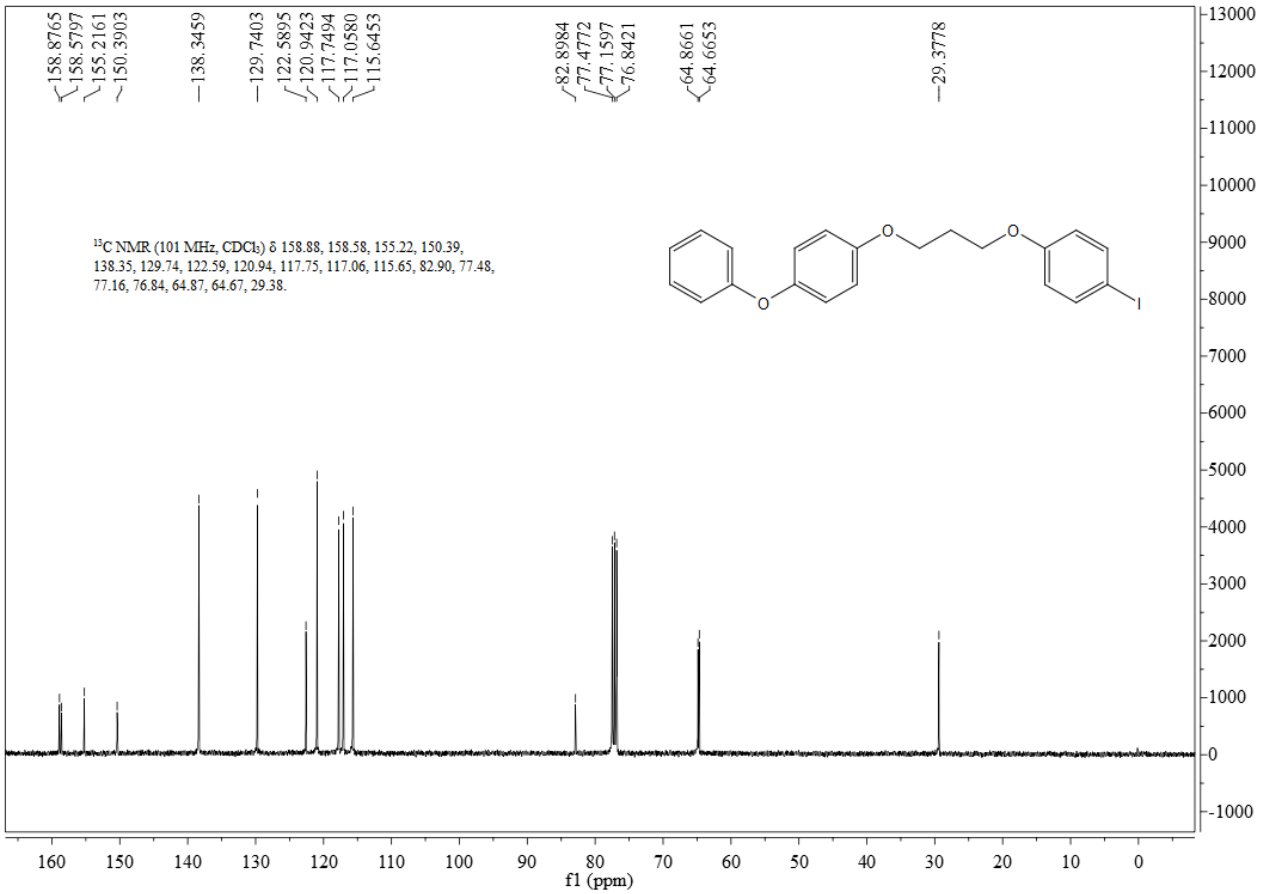

7.7448
7.7406
7.4491
7.4447
7.4278
7.4234
7.2596
7.0325
7.0110
4.0051
3.9948
3.9868
3.9762
3.4170
3.1384
3.1283
3.1024
3.0925
3.0418
3.0230
3.0059
2.9871
1H NMR (400 MHz, CDCl3) δ 7.74 (d, J = 1.7 Hz, 1H), 7.44 (dd, J = 8.5, 1.8 Hz, 1H), 7.02 (d, J = 8.6 Hz, 1H), 3.99 (dd, J = 7.4, 4.2 Hz, 1H), 3.94 (s, 3H), 3.42 (s, 3H), 3.12 (dd, J = 14.3, 4.0 Hz, 1H), 3.01 (dd, J = 14.4, 7.5 Hz, 1H).
B (dd) 7.44
A (d) 7.74
C (d) 7.02
H (s) 3.94
F (s) 3.42
E (dd) 3.01
G (dd) 3.99
D (dd) 3.12
1.009
1.012
1.003
1.012
3.004
3.017
1.009
1.011
f1 (ppm)

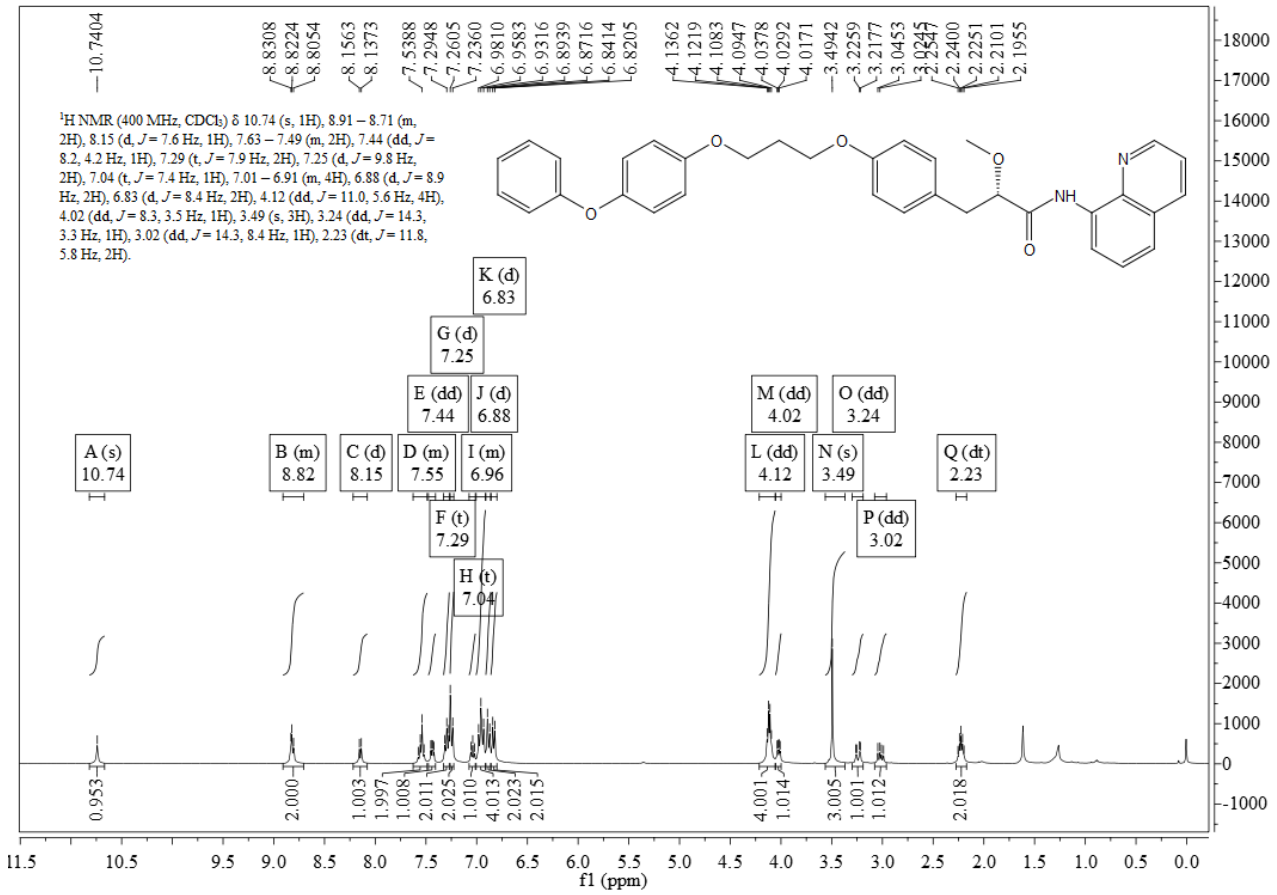

175.9891
152.1265
139.4772
135.5392
129.0275
126.5656
113.7182
80.6257
58.8530
56.6786
37.2777
13C NMR (101 MHz, CDCl3) δ 175.99, 152.13, 139.48, 135.54, 129.03, 126.57, 113.72, 80.63, 58.85, 56.68, 37.28.
f1 (ppm)


9.0202
8.7979
8.7942
8.7877
8.7838
8.1389
8.1353
8.1183
8.1147
7.5288
7.5085
7.4890
7.4351
7.4248
7.4148
7.4042
1.5829
^{1}H NMR (400 MHz, CDCl$_3$) δ 9.02 (s, 1H), 8.79 (dd, J = 4.1, 1.5 Hz, 1H), 8.42 (d, J = 7.4 Hz, 1H), 8.13 (dd, J = 8.2, 1.4 Hz, 1H), 7.51 (t, J = 8.0 Hz, 1H), 7.46 – 7.35 (m, 2H), 1.58 (s, 9H).
D (s) 9.02
B (d) 8.42
F (m) 7.42
C (dd) 8.79
A (dd) 8.13
E (t) 7.51
G (s) 1.58
0.934
1.001
1.001
1.008
1.002
2.005
9.094
f1 (ppm)

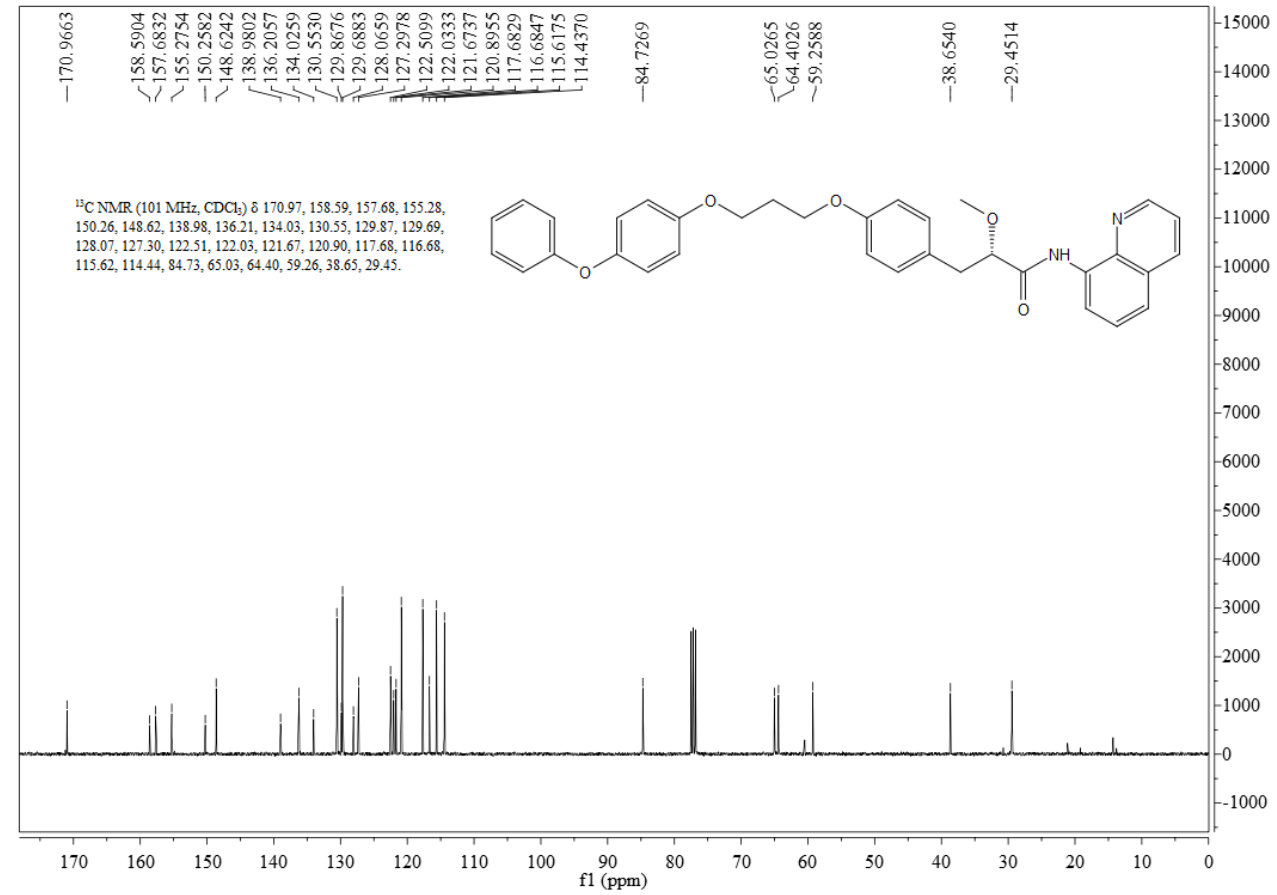

152.9133
147.9550
138.2747
136.2354
135.2137
128.0702
127.3499
121.4916
120.1428
114.4500
80.4068
28.4121
^{1}H NMR (400 MHz, CDCl$_3$) δ 9.02, 8.80, 8.79, 8.79, 8.78, 8.43, 8.41, 8.14, 8.14, 8.12, 8.11, 7.53, 7.51, 7.49, 7.44, 7.42, 7.41, 7.40, 1.58.
f1 (ppm)


7.5709
7.5498
7.3276
7.3085
7.2891
7.2600
7.0716
7.0545
7.0365
6.9965
6.9740
6.9657
6.9443
6.9222
6.9068
6.8847
6.7175
6.6962
4.1538
4.1387
4.1237
2.2909
2.2758
2.2607
2.2456
2.2307
^{1}H NMR (400 MHz, CDCl$_3$) δ 7.56 (d, J = 8.5 Hz, 2H), 7.31 (t, J = 7.7 Hz, 2H), 7.05 (t, J = 7.0 Hz, 2H), 7.00 – 6.93 (m, 4H), 6.90 (d, J = 8.9 Hz, 2H), 6.71 (d, J = 8.5 Hz, 2H), 4.14 (t, J = 6.0 Hz, 4H), 2.31 – 2.21 (m, 2H).
C (t) 7.31
E (d) 6.90
B (d) 7.56
A (t) 7.05
F (d) 6.71
G (t) 4.14
H (m) 2.26
D (m) 6.97
2.004
2.000
2.009
4.020
2.021
2.014
4.036
2.018
f1 (ppm)

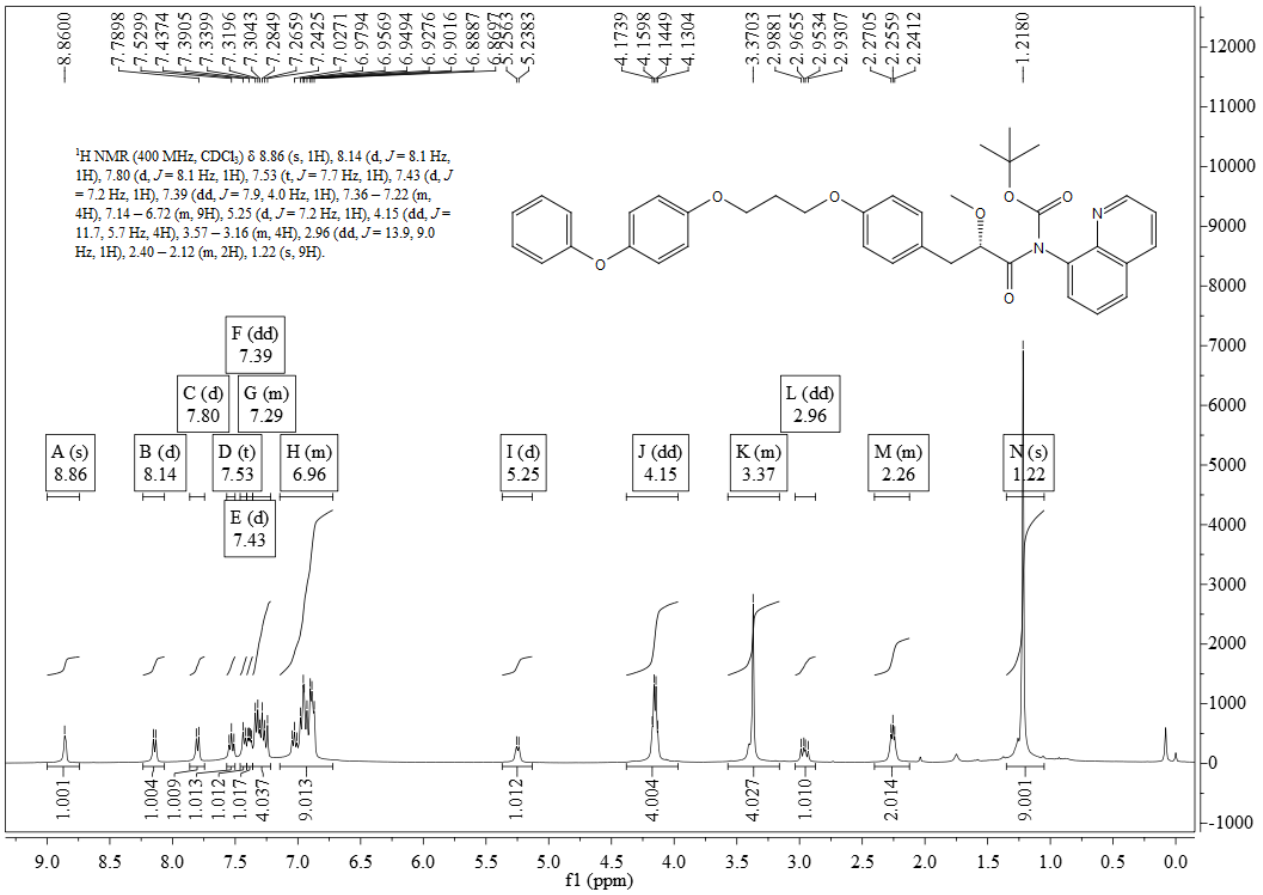

158.8765
158.5797
155.2161
150.3903
138.3459
129.7403
122.5895
120.9423
117.7494
117.0580
115.6453
82.8984
77.4772
77.1597
76.8421
64.8661
64.6653
29.3778
^{13}C NMR (101 MHz, CDCl$_3$) δ 158.88, 158.58, 155.22, 150.39, 138.35, 129.74, 122.59, 120.94, 117.75, 117.06, 115.65, 82.90, 77.48, 77.16, 76.84, 64.87, 64.67, 29.38.
f1 (ppm)



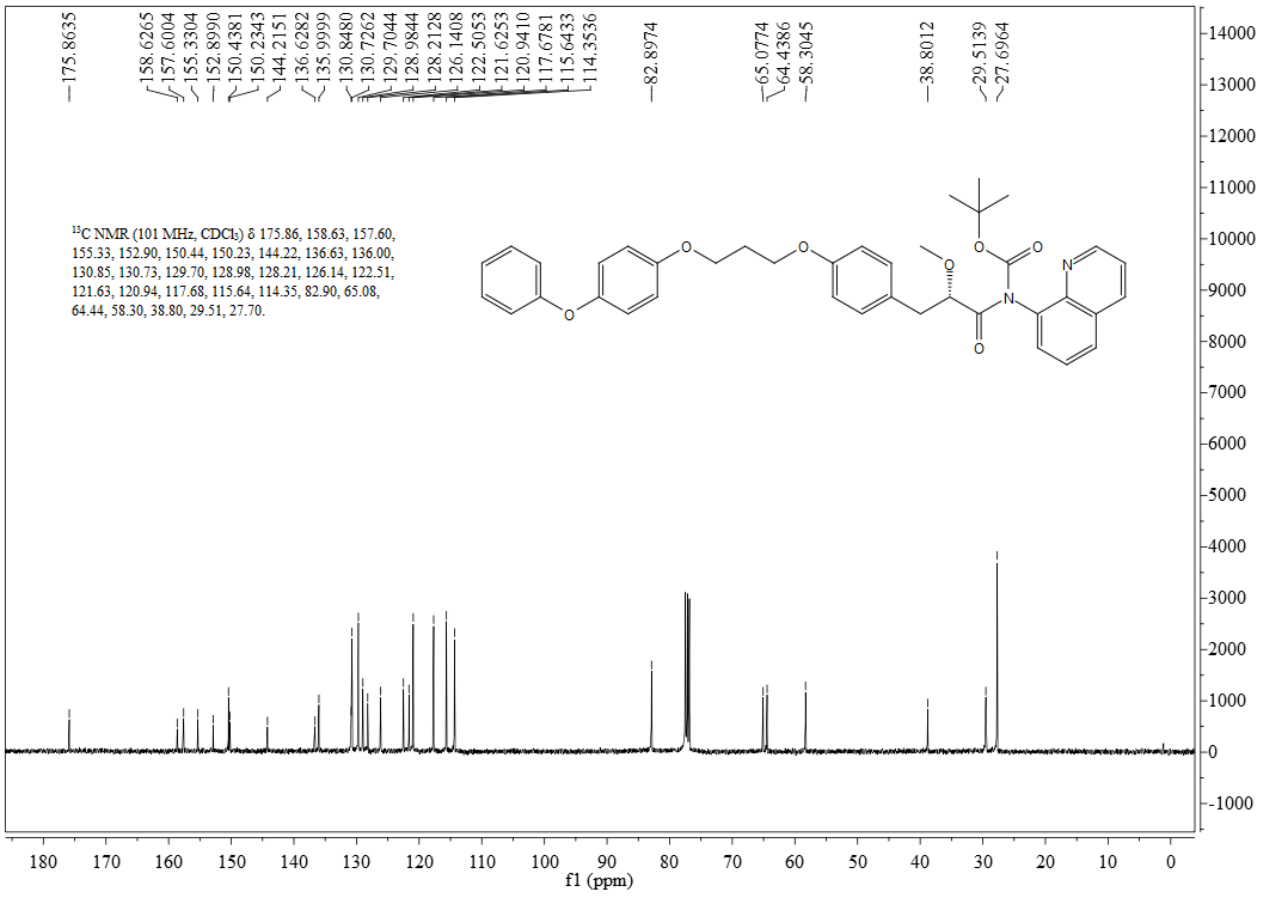
^{1}H NMR (400 MHz, $CDCl_3$) δ 10.74 (s, 1H), 8.91 – 8.71 (m, 2H), 8.15 (d, *J* = 7.6 Hz, 1H), 7.63 – 7.49 (m, 2H), 7.44 (dd, *J* = 8.2, 4.2 Hz, 1H), 7.29 (t, *J* = 7.9 Hz, 2H), 7.25 (d, *J* = 9.8 Hz, 2H), 7.04 (t, *J* = 7.4 Hz, 1H), 7.01 – 6.91 (m, 4H), 6.88 (d, *J* = 8.9 Hz, 2H), 6.83 (d, *J* = 8.4 Hz, 2H), 4.12 (dd, *J* = 11.0, 5.6 Hz, 4H), 4.02 (dd, *J* = 8.3, 3.5 Hz, 1H), 3.49 (s, 3H), 3.24 (dd, *J* = 14.3, 3.3 Hz, 1H), 3.02 (dd, *J* = 14.3, 8.4 Hz, 1H), 2.23 (dt, *J* = 11.8, 5.8 Hz, 2H).



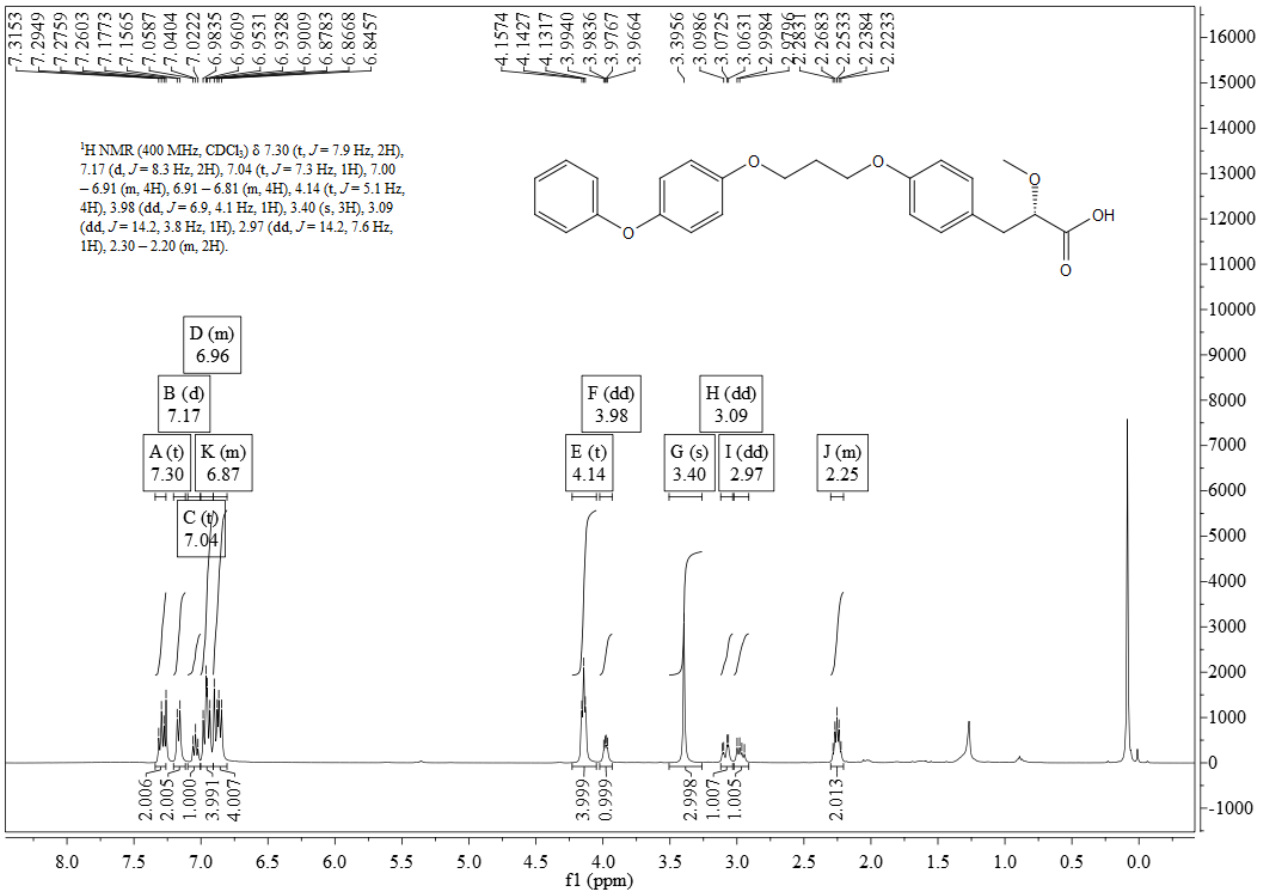
^{13}C NMR (101 MHz, $CDCl_3$) δ 170.97, 158.59, 157.68, 155.28, 150.26, 148.62, 138.98, 136.21, 134.03, 130.55, 129.87, 129.69, 128.07, 127.30, 122.51, 122.03, 121.67, 120.90, 117.68, 116.68, 115.62, 114.44, 84.73, 65.03, 64.40, 59.26, 38.65, 29.45.

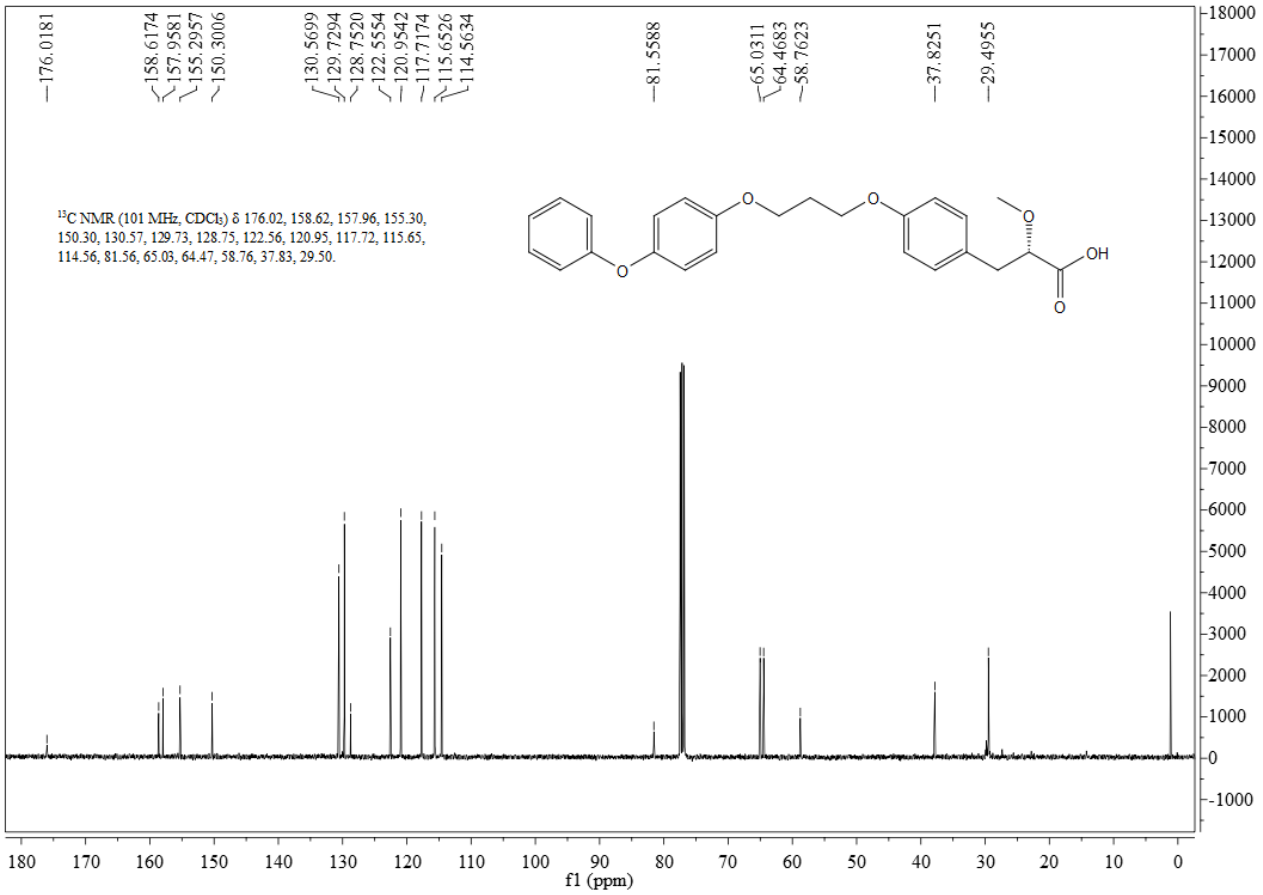


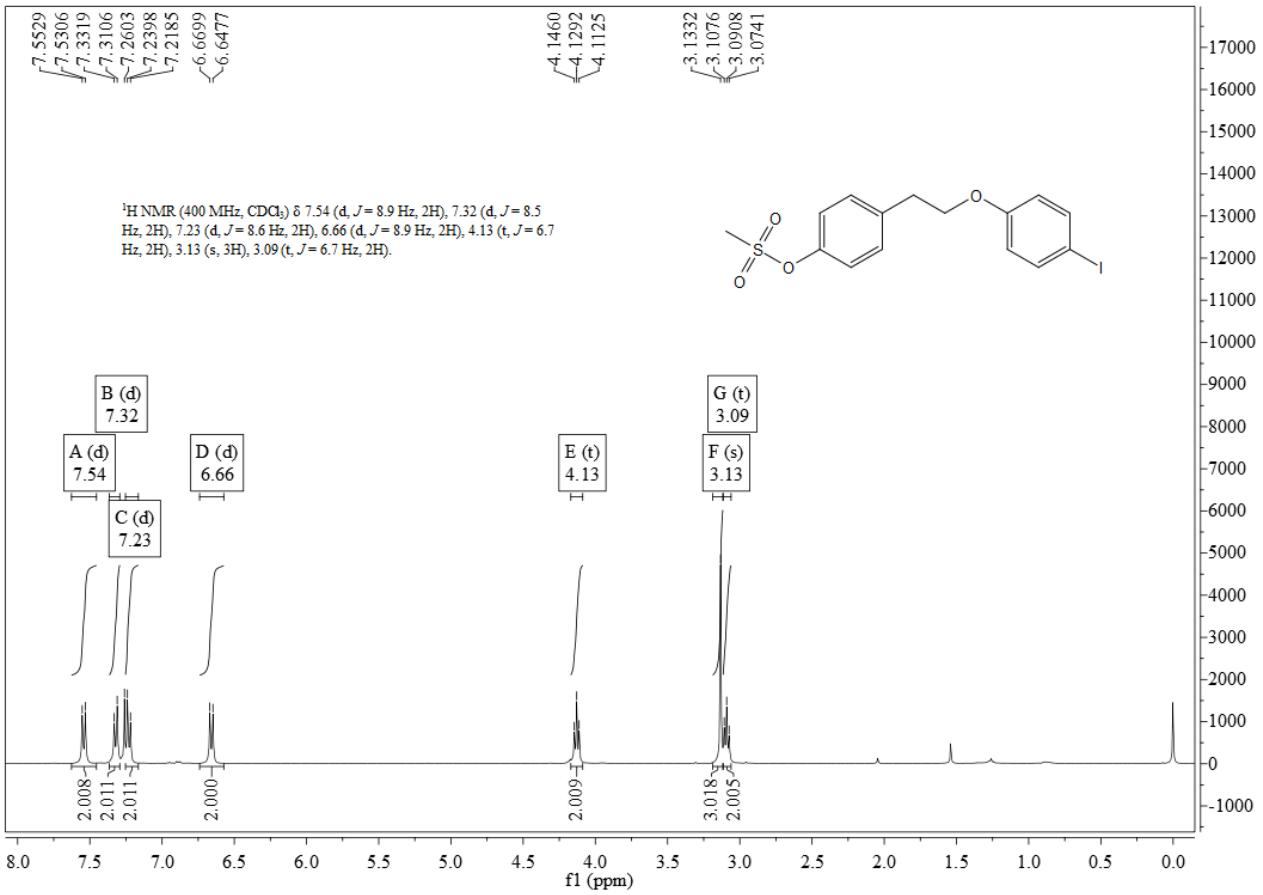
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.86 (s, 1H), 8.14 (d, *J* = 8.1 Hz, 1H), 7.80 (d, *J* = 8.1 Hz, 1H), 7.53 (t, *J* = 7.7 Hz, 1H), 7.43 (d, *J* = 7.2 Hz, 1H), 7.39 (dd, *J* = 7.9, 4.0 Hz, 1H), 7.36 – 7.22 (m, 4H), 7.14 – 6.72 (m, 9H), 5.25 (d, *J* = 7.2 Hz, 1H), 4.15 (dd, *J* = 11.7, 5.7 Hz, 4H), 3.57 – 3.16 (m, 4H), 2.96 (dd, *J* = 13.9, 9.0 Hz, 1H), 2.40 – 2.12 (m, 2H), 1.22 (s, 9H).

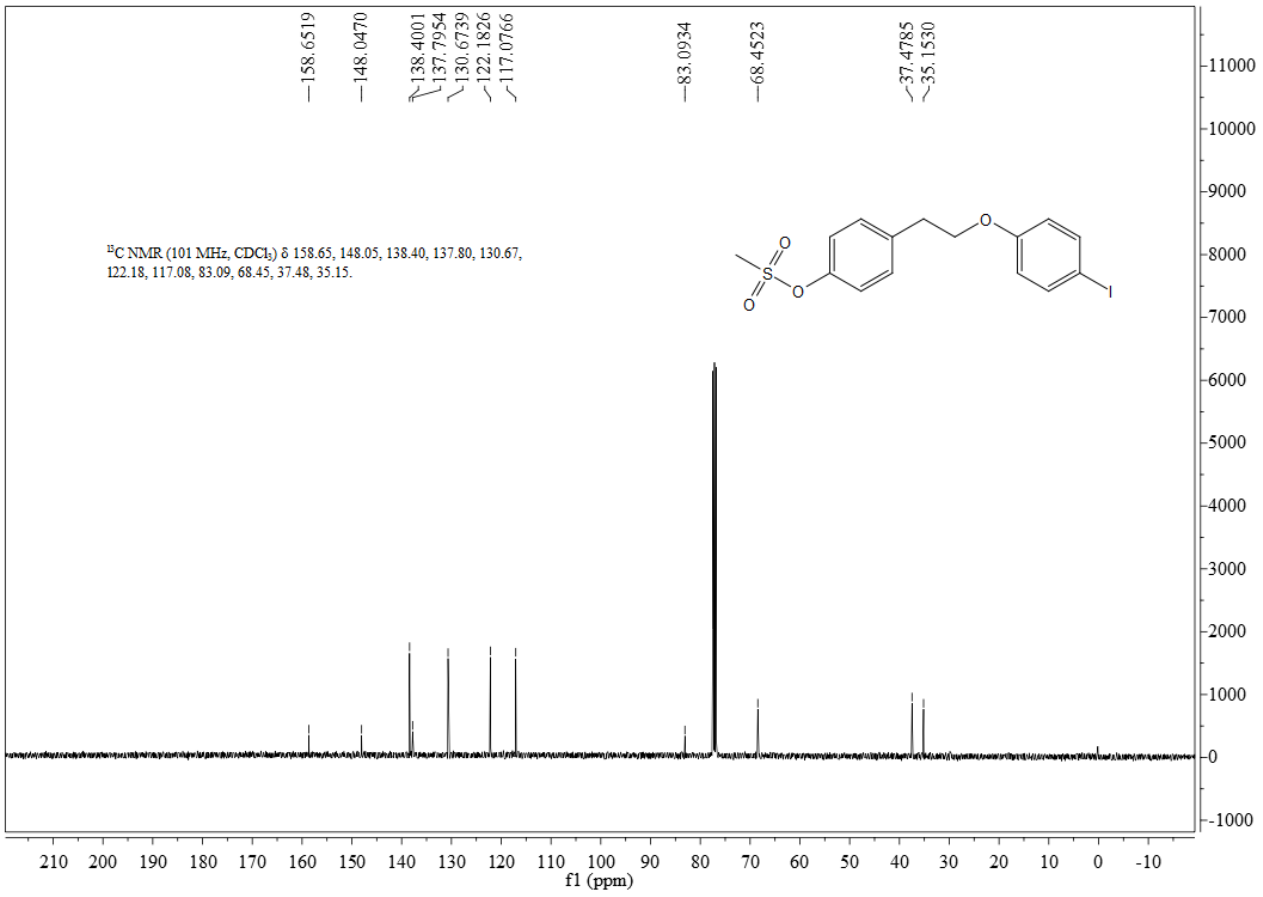


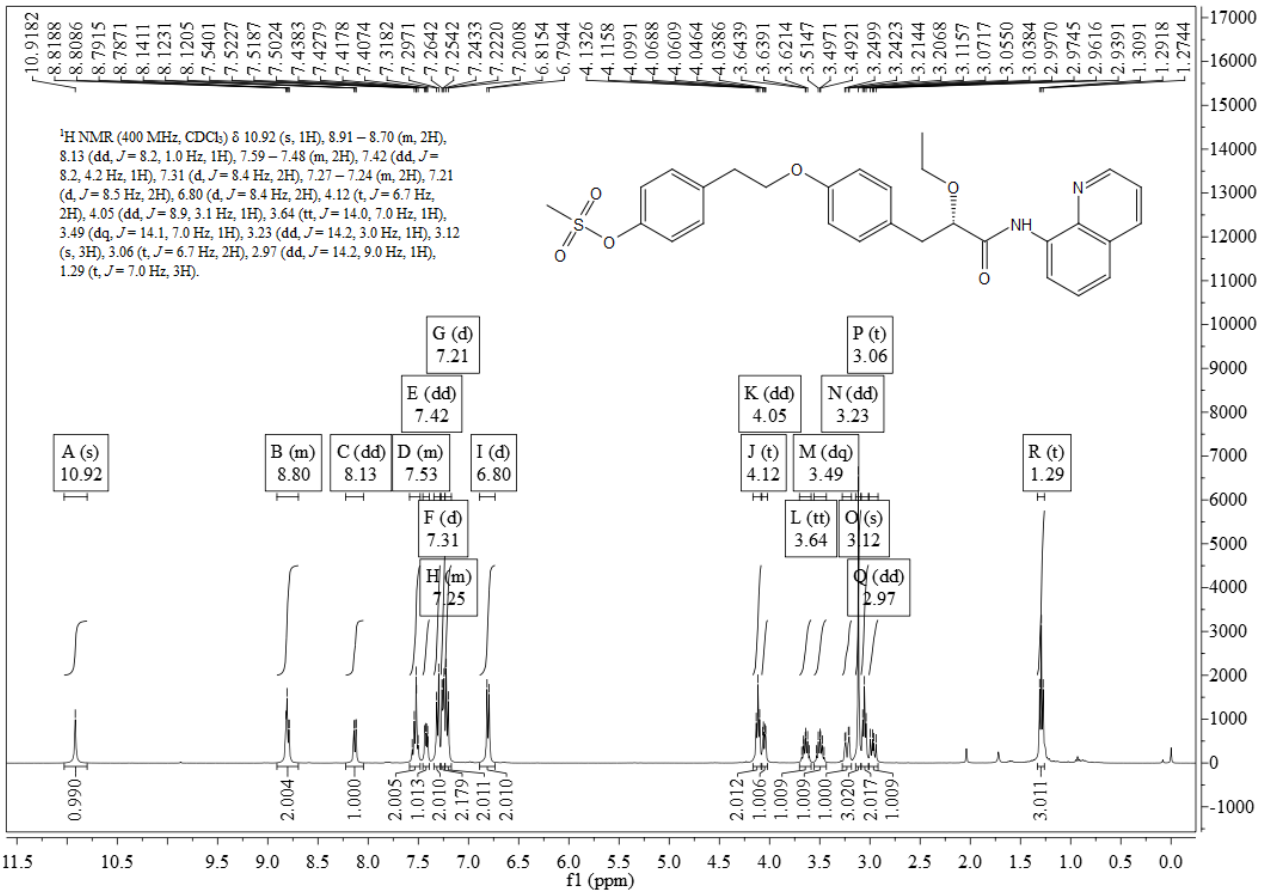
^{13}C NMR (101 MHz, $CDCl_3$) δ 175.86, 158.63, 157.60, 155.33, 152.90, 150.44, 150.23, 144.22, 136.63, 136.00, 130.85, 130.73, 129.70, 128.98, 128.21, 126.14, 122.51, 121.63, 120.94, 117.68, 115.64, 114.35, 82.90, 65.08, 64.44, 58.30, 38.80, 29.51, 27.70.


7.3153
7.2949
7.2759
7.2603
7.1773
7.1565
7.0587
7.0404
7.0222
6.9835
6.9609
6.9531
6.9328
6.9009
6.8783
6.8668
6.8457
4.1574
4.1427
4.1317
3.9940
3.9836
3.9767
3.9664
3.3956
3.0986
3.0725
3.0631
2.9984
2.2683
2.2533
2.2384
2.2233
1H NMR (400 MHz, CDCl3) δ 7.30 (t, J = 7.9 Hz, 2H), 7.17 (d, J = 8.3 Hz, 2H), 7.04 (t, J = 7.3 Hz, 1H), 7.00 – 6.91 (m, 4H), 6.91 – 6.81 (m, 4H), 4.14 (t, J = 5.1 Hz, 4H), 3.98 (dd, J = 6.9, 4.1 Hz, 1H), 3.40 (s, 3H), 3.09 (dd, J = 14.2, 3.8 Hz, 1H), 2.97 (dd, J = 14.2, 7.6 Hz, 1H), 2.30 – 2.20 (m, 2H).
D (m) 6.96
B (d) 7.17
A (t) 7.30
K (m) 6.87
C (t) 7.04
F (dd) 3.98
E (t) 4.14
H (dd) 3.09
G (s) 3.40
I (dd) 2.97
J (m) 2.25
2.006
2.005
1.000
3.991
4.007
3.999
0.999
2.998
1.007
1.005
2.013
OH
f1 (ppm)

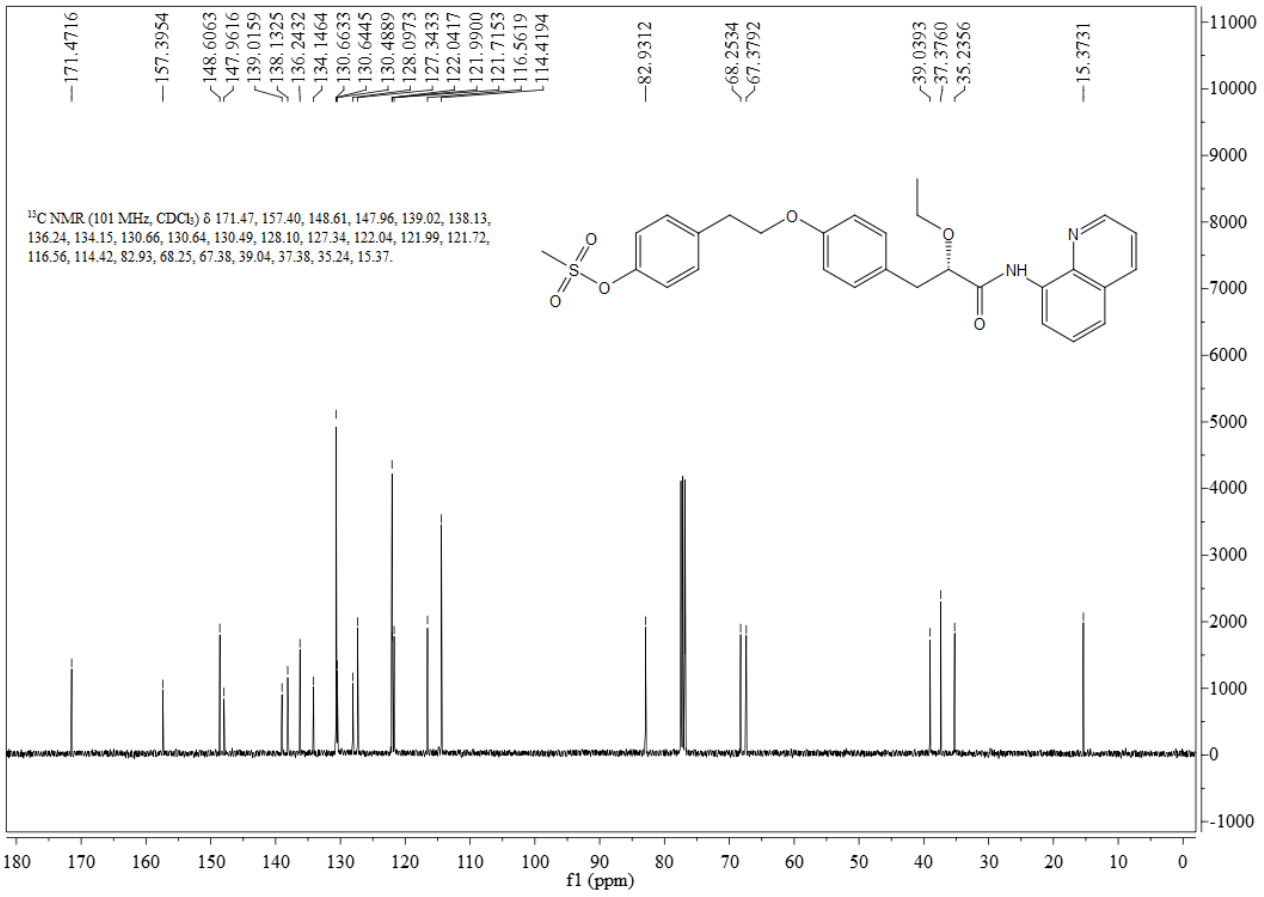

176.0181
158.6174
157.9581
155.2957
150.3006
130.5699
129.7294
128.7520
122.5554
120.9542
117.7174
115.6526
114.5634
81.5588
65.0311
64.4683
58.7623
37.8251
29.4955
13C NMR (101 MHz, CDCl3) δ 176.02, 158.62, 157.96, 155.30, 150.30, 130.57, 129.73, 128.75, 122.56, 120.95, 117.72, 115.65, 114.56, 81.56, 65.03, 64.47, 58.76, 37.83, 29.50.
OH
f1 (ppm)


7.5529
7.5306
7.3319
7.3106
7.2603
7.2398
7.2185
6.6699
6.6477
4.1460
4.1292
4.1125
3.1332
3.1076
3.0908
3.0741
¹H NMR (400 MHz, CDCl₃) δ 7.54 (d, J = 8.9 Hz, 2H), 7.32 (d, J = 8.5 Hz, 2H), 7.23 (d, J = 8.6 Hz, 2H), 6.66 (d, J = 8.9 Hz, 2H), 4.13 (t, J = 6.7 Hz, 2H), 3.13 (s, 3H), 3.09 (t, J = 6.7 Hz, 2H).
B (d) 7.32
A (d) 7.54
C (d) 7.23
D (d) 6.66
E (t) 4.13
G (t) 3.09
F (s) 3.13
2.008
2.011
2.011
2.000
2.009
3.018
2.005
f1 (ppm)

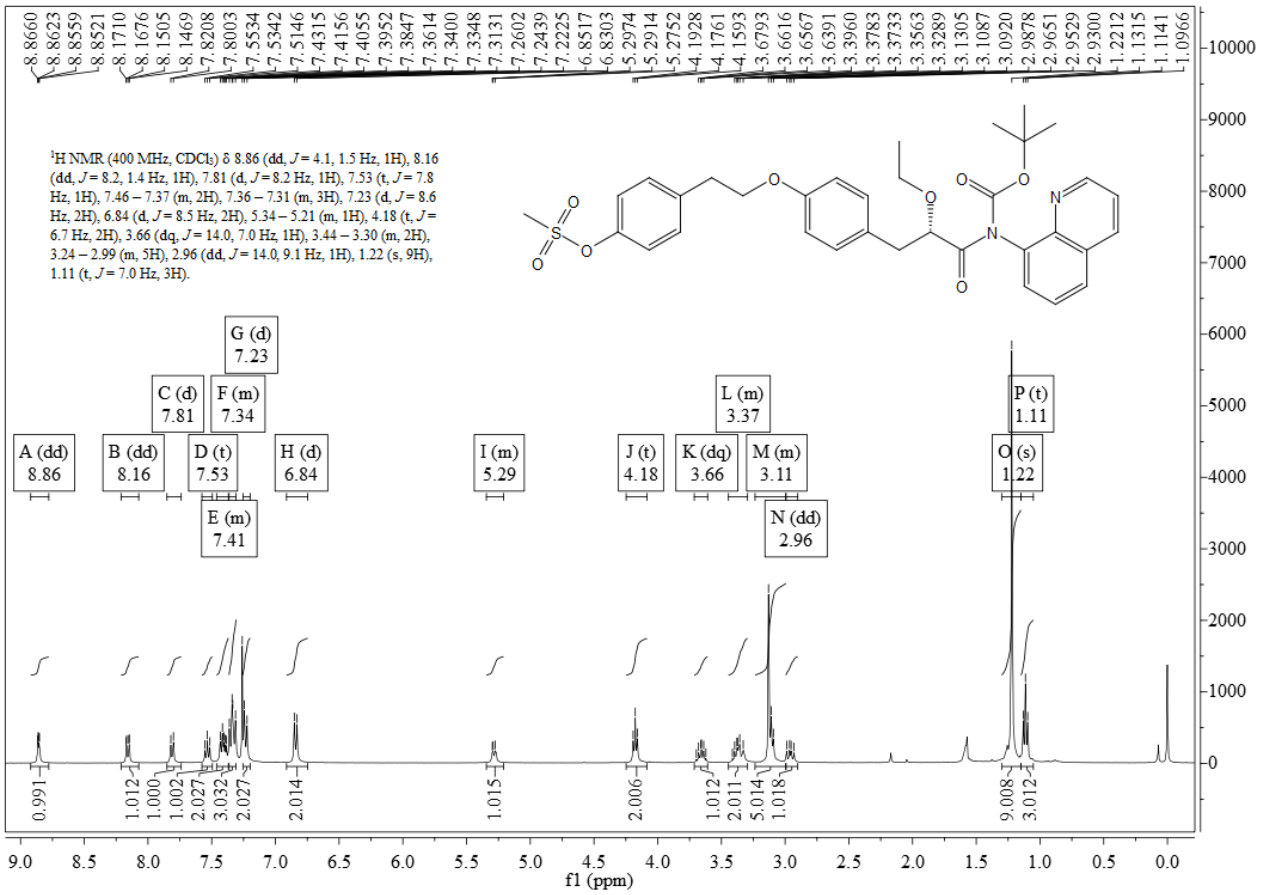

158.6519
148.0470
138.4001
137.7954
130.6739
122.1826
117.0766
83.0934
68.4523
37.4785
35.1530
¹³C NMR (101 MHz, CDCl₃) δ 158.65, 148.05, 138.40, 137.80, 130.67, 122.18, 117.08, 83.09, 68.45, 37.48, 35.15.
f1 (ppm)

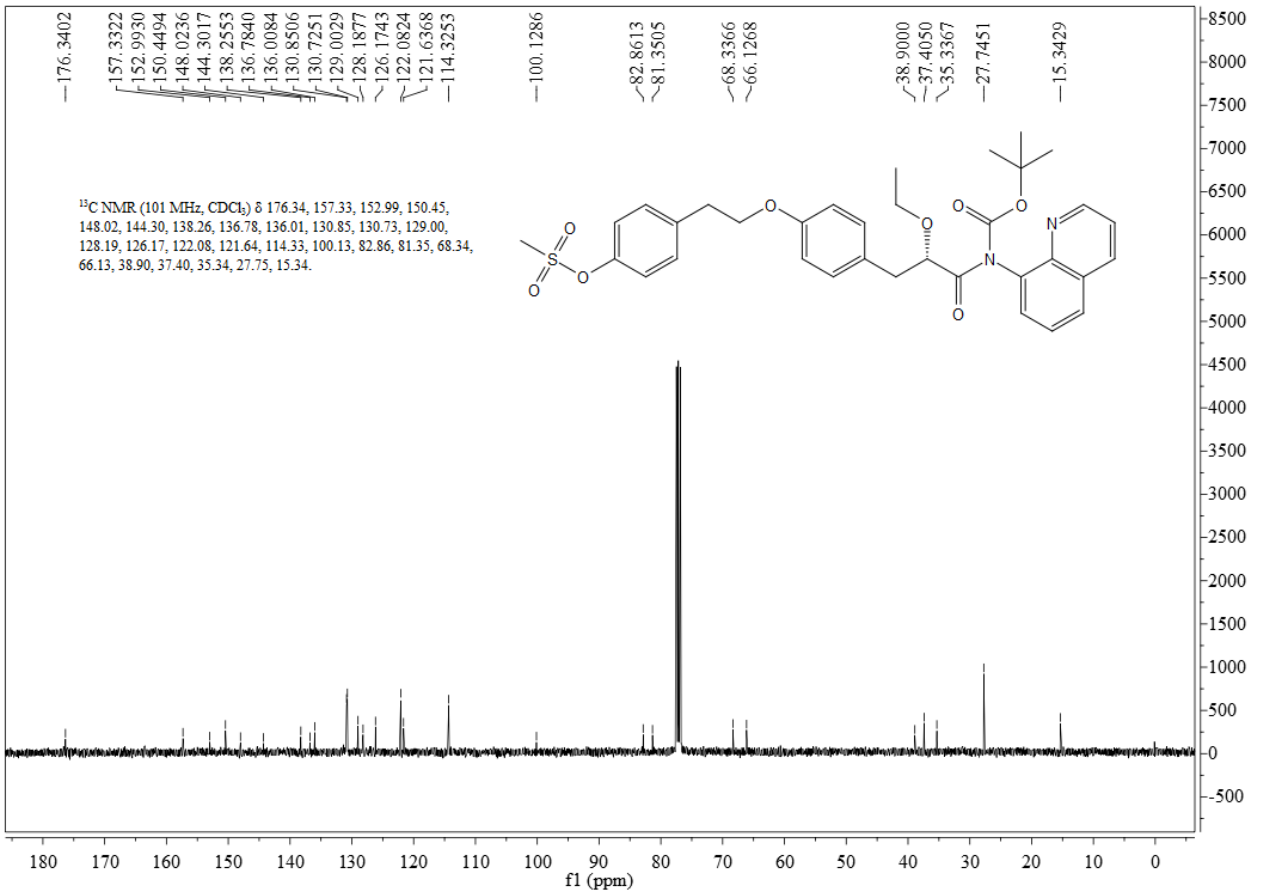


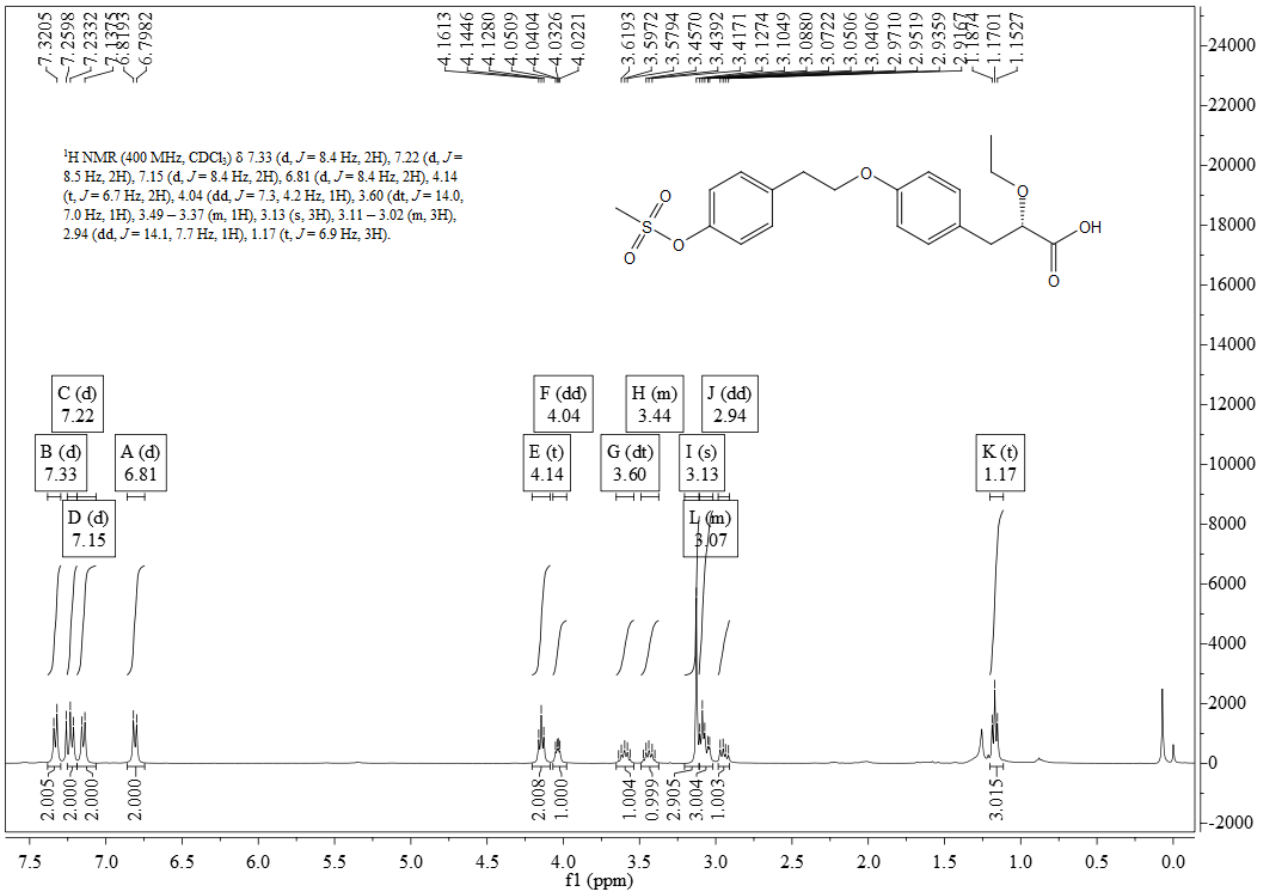
^{1}H NMR (400 MHz, $CDCl_3$) δ 10.92 (s, 1H), 8.91 – 8.70 (m, 2H), 8.13 (dd, *J* = 8.2, 1.0 Hz, 1H), 7.59 – 7.48 (m, 2H), 7.42 (dd, *J* = 8.2, 4.2 Hz, 1H), 7.31 (d, *J* = 8.4 Hz, 2H), 7.27 – 7.24 (m, 2H), 7.21 (d, *J* = 8.5 Hz, 2H), 6.80 (d, *J* = 8.4 Hz, 2H), 4.12 (t, *J* = 6.7 Hz, 2H), 4.05 (dd, *J* = 8.9, 3.1 Hz, 1H), 3.64 (tt, *J* = 14.0, 7.0 Hz, 1H), 3.49 (dq, *J* = 14.1, 7.0 Hz, 1H), 3.23 (dd, *J* = 14.2, 3.0 Hz, 1H), 3.12 (s, 3H), 3.06 (t, *J* = 6.7 Hz, 2H), 2.97 (dd, *J* = 14.2, 9.0 Hz, 1H), 1.29 (t, *J* = 7.0 Hz, 3H).

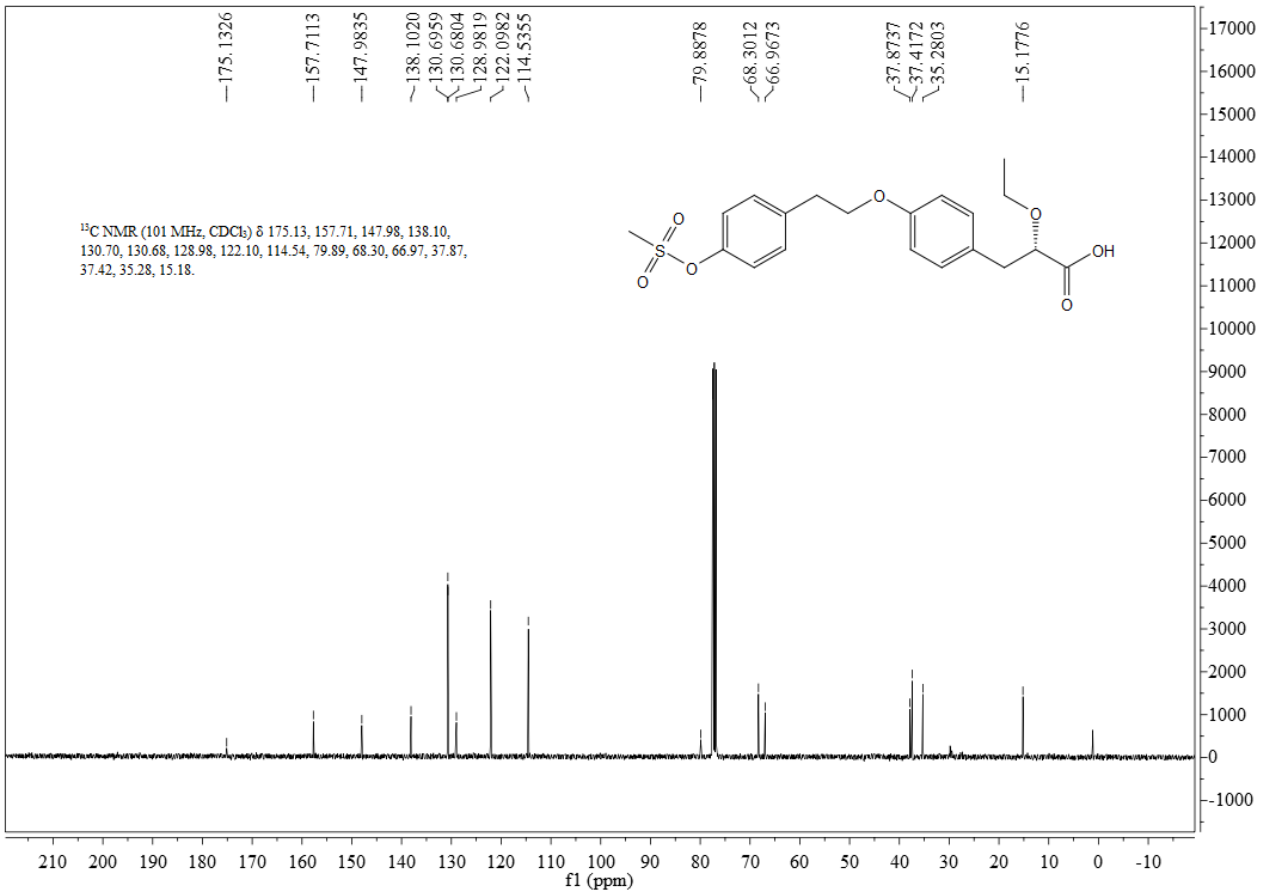


^{13}C NMR (101 MHz, $CDCl_3$) δ 171.47, 157.40, 148.61, 147.96, 139.02, 138.13, 136.24, 134.15, 130.66, 130.64, 130.49, 128.10, 127.34, 122.04, 121.99, 121.72, 116.56, 114.42, 82.93, 68.25, 67.38, 39.04, 37.38, 35.24, 15.37.


8.8660
8.8623
8.8559
8.8521
8.1710
8.1676
8.1505
8.1469
7.8208
7.8003
7.5534
7.5342
7.5146
7.4315
7.4156
7.4055
7.3952
7.3847
7.3614
7.3400
7.3348
7.3131
7.2602
7.2439
7.2225
6.8517
6.8303
5.2974
5.2914
5.2752
4.1928
4.1761
4.1593
3.6793
3.6616
3.6567
3.6391
3.3960
3.3783
3.3733
3.3563
3.3289
3.1305
3.1087
3.0920
2.9878
2.9651
2.9529
2.9300
1.2212
1.1315
1.1141
1.0966
^{1}H NMR (400 MHz, CDCl$_3$) δ 8.86 (dd, J = 4.1, 1.5 Hz, 1H), 8.16 (dd, J = 8.2, 1.4 Hz, 1H), 7.81 (d, J = 8.2 Hz, 1H), 7.53 (t, J = 7.8 Hz, 1H), 7.46 – 7.37 (m, 2H), 7.36 – 7.31 (m, 3H), 7.23 (d, J = 8.6 Hz, 2H), 6.84 (d, J = 8.5 Hz, 2H), 5.34 – 5.21 (m, 1H), 4.18 (t, J = 6.7 Hz, 2H), 3.66 (dq, J = 14.0, 7.0 Hz, 1H), 3.44 – 3.30 (m, 2H), 3.24 – 2.99 (m, 5H), 2.96 (dd, J = 14.0, 9.1 Hz, 1H), 1.22 (s, 9H), 1.11 (t, J = 7.0 Hz, 3H).
A (dd) 8.86
B (dd) 8.16
C (d) 7.81
D (t) 7.53
E (m) 7.41
F (m) 7.34
G (d) 7.23
H (d) 6.84
I (m) 5.29
J (t) 4.18
K (dq) 3.66
L (m) 3.37
M (m) 3.11
N (dd) 2.96
O (s) 1.22
P (t) 1.11
0.991
1.012
1.000
1.002
2.027
3.032
2.027
2.014
1.015
2.006
1.012
2.011
5.014
1.018
9.008
3.012
f1 (ppm)


176.3402
157.3322
152.9930
150.4494
148.0236
144.3017
138.2553
136.7840
136.0084
130.8506
130.7251
129.0029
128.1877
126.1743
122.0824
121.6368
114.3253
100.1286
82.8613
81.3505
68.3366
66.1268
38.9000
37.4050
35.3367
27.7451
15.3429
^{13}C NMR (101 MHz, CDCl$_3$) δ 176.34, 157.33, 152.99, 150.45, 148.02, 144.30, 138.26, 136.78, 136.01, 130.85, 130.73, 129.00, 128.19, 126.17, 122.08, 121.64, 114.33, 100.13, 82.86, 81.35, 68.34, 66.13, 38.90, 37.40, 35.34, 27.75, 15.34.
f1 (ppm)


7.3205
7.2598
7.2332
7.1375
6.8193
6.7982
4.1613
4.1446
4.1280
4.0509
4.0404
4.0326
4.0221
3.6193
3.5972
3.5794
3.4570
3.4392
3.4171
3.1274
3.1049
3.0880
3.0722
3.0506
3.0406
2.9710
2.9519
2.9359
2.1674
1.1874
1.1701
1.1527
^{1}H NMR (400 MHz, CDCl$_3$) δ 7.33 (d, J = 8.4 Hz, 2H), 7.22 (d, J = 8.5 Hz, 2H), 7.15 (d, J = 8.4 Hz, 2H), 6.81 (d, J = 8.4 Hz, 2H), 4.14 (t, J = 6.7 Hz, 2H), 4.04 (dd, J = 7.3, 4.2 Hz, 1H), 3.60 (dt, J = 14.0, 7.0 Hz, 1H), 3.49 – 3.37 (m, 1H), 3.13 (s, 3H), 3.11 – 3.02 (m, 3H), 2.94 (dd, J = 14.1, 7.7 Hz, 1H), 1.17 (t, J = 6.9 Hz, 3H).
C (d) 7.22
B (d) 7.33
A (d) 6.81
D (d) 7.15
F (dd) 4.04
E (t) 4.14
H (m) 3.44
G (dt) 3.60
J (dd) 2.94
I (s) 3.13
L (m) 3.07
K (t) 1.17
2.005
2.000
2.000
2.000
2.008
1.000
1.004
0.999
2.905
3.004
1.003
3.015
f1 (ppm)


175.1326
157.7113
147.9835
138.1020
130.6959
130.6804
128.9819
122.0982
114.5355
79.8878
68.3012
66.9673
37.8737
37.4172
35.2803
15.1776
^{13}C NMR (101 MHz, CDCl$_3$) δ 175.13, 157.71, 147.98, 138.10, 130.70, 130.68, 128.98, 122.10, 114.54, 79.89, 68.30, 66.97, 37.87, 37.42, 35.28, 15.18.
f1 (ppm)